Design and Implementation of Teaching Resource Platform of Political Science Theory Course in Colleges and Universities Based on Web Technology

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Abstract. Based on Web technology, this paper builds a teaching resource platform of political theory course based on B/S architecture. By using the tools of big data technology such as Flume, HDFS, Hive, Impala and OCR technology in network public opinion monitoring system technology, the problems of effectiveness of teaching resources of political theory course and inability to capture students' ideological trends are solved. It not only realizes the sharing of data information, but also effectively improves the quality of data information, and evaluates the teaching effect of teachers, thus finally achieving the goal of efficient teaching. Through big data operations such as platform data collection, storage, calculation and cleaning, analysis and query, and data uploading and updating, the visualization and effectiveness of data information are realized, and the evaluation of teaching resources achievements is realized through statistical analysis tools. In addition, the innovation of the platform is to add the investigation and analysis of students' thoughts, thus further verifying the teaching effect of teachers.

Keywords: Web Technology · Political Science Theory Course · Teaching Resource Platform · Big Data Technology

1 Introduction

Political science is a social discipline that studies political relations, political phenomena and their development law centered on state power. The theory of political science is one of the first political science disciplines in colleges and universities to be restored after the reform and opening up in China. The discipline history and cultural details it involves are of great significance to modern education. Because people's supported views and methods are different from the social environment in which they live, their understanding and explanation of the same social and political relations, political phenomena and so on will be different, and their understanding of political theory will be inconsistent. At present, we are in the high-speed development stage of information. How to cultivate

the understanding and explanation ability of the theoretical basis, hot and difficult issues of political science under the new situation has become an important topic to cultivate students' topic explanation ability at this stage. At present, there are some problems in the teaching resources of political theory courses in colleges and universities, such as lack of pertinence, effectiveness, information sharing and digitalization, which have seriously affected students' confidence in learning political theory courses. Web technology, big data technology and network technology provide opportunities for efficient learning of political theory courses in colleges and universities, making it possible to learn political theory courses efficiently.

Therefore, this paper holds that, based on Web technology, B/S framework, using big data technology and network public opinion monitoring system technology, a teaching resource platform of political theory course is constructed. The platform has the characteristics of real-time and sufficient resources of political theory course, strong pertinence of teaching resources and clear evaluation index of teaching resources achievements, and achieves the goal of information digitization and sharing.

2 Related Application Technology Introduction

2.1 B/S Architecture

B/S architecture is a network architecture model developed with the development of Web technology. B/S architecture refers to the two-level mapping of three-level architecture. Three-tier architecture refers to the browser, server and database, and secondary mapping refers to the requests and responses between browser and server, server and database. Figure 1 shows the B/S architecture diagram. Browser is the most important application software of client, server is the core function application software of this architecture, and database refers to the place where data is stored. The architecture is simple and easy to operate in the research, development, maintenance and operation of the system. B/S architecture can not only realize zero maintenance of the client, but also trace the original data of the data, and the data it stores has the characteristics of consistency. In software update, it can realize a quick response service of updating one program and all other applications [3].

2.2 ASP

ASP is a server script environment developed by Microsoft Company, which is a dynamic server page. It is used to create dynamic interactive Web pages and build web applications. When the server receives the request of the ASP file, it will call the ASP engine
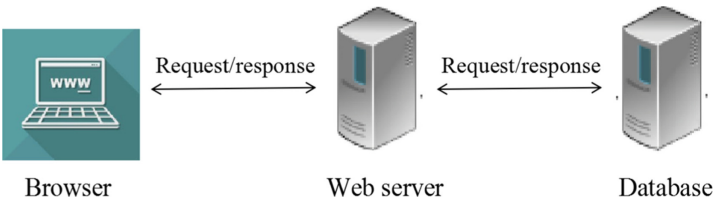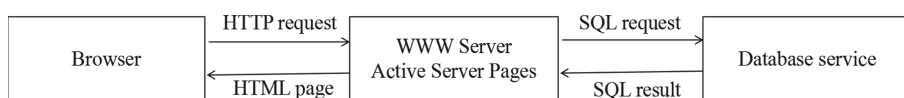

Fig. 1. B/S architecture diagram

Fig. 2. ASP technology principle

to execute the ASP file, explain the script language inside, link the database through ODBC, and then access the component ADO by the database. Finally, ASP generates an HTML homepage containing the data query results and returns it to the client, the whole procedure is shown in Fig. 2. This paper adopts ASP.NET version 4.6.

ASP is characterized by its interoperability with HTML or other scripting languages; it runs on the server side, so its program code is highly confidential; built-in ADO component can access various databases; add several ActiveX controls to expand the functions; it transmits data information to the client browser in HTML format, which can be applied to many browsers. In addition, it is the easiest and most flexible tool in the current Web page development technology, and it is the best choice for accessing the web database.

2.3 SQL Server 2019

SQL Server 2019 is a new generation database product officially released by Microsoft at the Ignite2019 conference. It comes with Apache Spark and HDFS, which makes the data intelligent. Its highlights are: first, the intelligence of any data provides the possibility of transformation for structured and unstructured data. Second, it supports multiple languages and platforms, such as Windows and Linux. Third, leading performance, such as high scalability, high performance and high availability. Fourth, it has high security, and can protect static or in-use data. In addition, the application as a container can be deployed on the SQL Server big data cluster, and the application deployed by users can monitor the whole process of accessing the stored data.

2.4 Java Script

Java Script is a client-side scripting language. In front-end development, it can't run independently, but must be mounted on the web page unless Java Script running environment has been installed. It is an imitation of Java. Because its original design goal is small and simple dynamic language, it is widely used in Web application development. Because it can give users a smooth and beautiful experience when browsing web pages, it is often used to add dynamic functions to web pages. In addition, it is often embedded into HTML to realize its own functions.

Java Script programming is based on data types and variables. Among them, the naming rules and specifications of variables should be paid attention to. For example, the rule is that variable names generally need a combination of uppercase and lowercase letters and numbers, and can't start with numbers or keywords. It is the standard variable name that needs to play the role as the name implies, and English names should be used, not pinyin and Chinese.

2.5   Network Public Opinion Monitoring System Technology

2.5.1   Language Processing, Graphic and Text Intelligent Analysis Technology

By using advanced technology to analyze words in language, pictures and texts, we can judge the emotional attributes to which their meanings belong, and then give priority to displaying sensitive information, so that the data can be intelligently analyzed more accurately in the monitoring system.

2.5.2   Video Processing Technology

The information in the video is transformed into text information, so that the text information is analyzed and classified. In addition, the information in subtitles and barrage can be extracted to further analyze the focus and mood of public opinion.

2.5.3   OCR Technology

OCR technology is used to identify picture information, classify and retrieve information, and relevant content can be obtained by setting keywords.

The functions of the network public opinion monitoring system are as follows: first, to monitor the negative information, so as to identify the unfavorable information and further control it. Second, it plays a role in guiding and managing public opinion, and positively guides public opinion. Third, monitor the marketing effect, and then know the feedback after the event. Fourth, help to formulate the development plan, and improve the plan by collecting the results of public opinion monitoring.

2.6   Development Environment

The platform is based on Web technology, adopting B/S architecture, SQL Server 2019 as database server and ASP as middleware technology to complete the construction and deployment of the overall environment. Specifically, HTML, JavaScript, CSS and so on are needed as front-end development tools. The back-end development technology needs VB, C# and other languages. This part needs broader technology, and needs to be familiar with the following contents, such as design pattern, requirement analysis, performance optimization, etc. In database development technology, relational database SQL Server is needed. In addition, the network public opinion monitoring system technology needs to be deployed in the ideological dynamic investigation and analysis platform. In the hardware environment of Web, the physical system needs to adopt Windows 10 system, because the mobile devices of this system are relatively complete, such as projection to the local computer, mobile hotspots, etc. It provides virtual desktop, touch control, driver, Flash and other functions. The application layer needs to install and configure technologies, such as the installation and configuration of language development environment. It needs to download and install VS (Visual Studio) development tool, which needs to pay attention to input code for debugging and running.

Through the theoretical explanation of related technologies, this paper determines the development environment and configuration of the platform, and then ensures the feasibility of technology and management of the design and implementation of the

teaching resource platform of political science theory course in colleges and universities based on Web technology [7].

3 Requirement Analysis

3.1 System Requirements Analysis

Requirements analysis is the initial stage of a project development, and it is the expectation of users for the system in terms of function, behavior and performance. The responsibility of requirement analysis is to find the requirement and define the requirement [2]. System requirement analysis is shown in Fig. 3.

According to the resource processing and resource development needs of political theory teaching, this platform mainly analyzes the requirement of teaching resources from the following three aspects. The first is the requirement analysis of resources themselves, which is mainly the content of resources. The purpose of this requirement analysis is to emphasize the importance of targeted resources and provide efficient learning materials for users. The second is the requirement analysis of resource use effect, which mainly aims at the verification of teachers' teaching and students' learning achievements, so as to improve teachers' teaching level, timely understand and adjust students' learning mentality and thinking mode of dealing with problems. The third is resource development requirement analysis, which is to ensure the real-time performance of policies related to political theory. Through the analysis of users' requirement for teaching resources of political theory, this paper designs a teaching resource platform of political theory course in colleges and universities based on Web technology.

3.2 Global Design

The teaching resource platform of political science theory course in colleges and universities based on Web technology adopts B/S architecture, which is divided into three parts, namely application layer, business control layer and data service layer. The relationship between the three-tier architecture is that the business control layer receives the command, and then sends it to the data service layer by using SQL language. After the data service layer processes the information, it sends the processed information to the business control layer, and finally the business control layer feeds back the result to the user [5]. Specifically, users can log in to the homepage of the platform through login
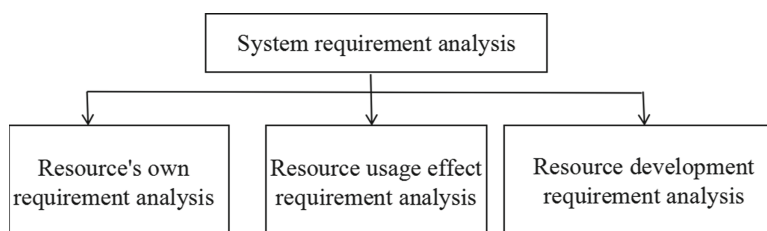

Fig. 3. System requirements analysis

or registration of new users. The main functions of the homepage include consulting platform, teaching resource database, teaching achievement evaluation, and ideological dynamic investigation and analysis platform. Users can click to enter any function, and then directly close the window after inquiring or learning relevant content. The design of the platform not only provides students with learning materials at all stages, but also ensures the effectiveness of political theory, and also tests the teachers' teaching and students' learning achievements.

4   Detailed Function Realization

The detailed functions of the teaching resource platform of political science theory course in colleges and universities based on Web technology are shown in Fig. 4.

4.1   Consulting Platform

Consulting platform refers to the consulting platform of political theory course, which includes academic frontier, teaching research, activity meeting, micro video and so on. The setting of the content in this platform is realized by various technologies in big data, specifically, collecting all kinds of data in the network and logs through web crawler and Flume, in which Flume can also simply process the collected data, then store the data of each node with HDFS, then clean the stored data with DataWrangler, and distribute and calculate the cleaned data with MapReduce. Moreover, the tool can customize the calculation formula, analyze the data by Hive and Impala, and it also provides the function of query. Finally, the analyzed data is displayed by Echarts. Through a series of operation settings, we can get real-time data information related to political science theory, which can not only help students understand real-time politics in time, but also ensure the effectiveness, value and mass of materials used by teachers [4].

4.2   Teaching Resource Database

The teaching resource database includes lesson plans, teaching courseware, teaching case database, political class, etc. The setting of these contents not only provides a rich political database for all teachers, students and scholars so as to realize the sharing of resources, but also facilitates students to review courses and teachers to update the teaching resource database centrally. Because college students will face the change of
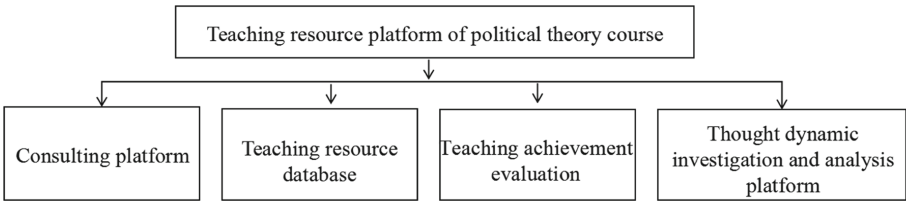

Fig. 4. Detailed functions of teaching resource platform of political theory course

roles every year, for example, when they are freshmen, students are social roles of natural persons, sophomores and juniors are social people, and seniors are professionals. The change of identity requires the adjustment and cooperation of teaching software resources and hardware resources. Therefore, the hardware resources and software resources in the teaching resource pool have been adjusted in a targeted manner, and teachers have also made targeted adjustments from theoretical teaching resources and research teaching resources to professional teaching resources [9].

Teaching resource library needs Web database management and maintenance [10]. For example, when the browser sends an. Asp file request to the Web server, the ASP script starts to operate. The Web server transmits the request to the database server by using ODBC, and then the database server receives and processes the request, and then sends the result back to the browser. ASP technology needs ActiveX control to complete the operation of Web database. This control is used to increase the function and interactivity of Web pages, and can be embedded into Web pages. It uses JavaScript description language through event mechanism to generate interactive influence, that is, request and response [1].

4.3   Teaching Achievement Evaluation

The evaluation of teaching achievement is divided into two ports, namely, the teacher port and the student port. The teacher port involves the innovation of teaching content,
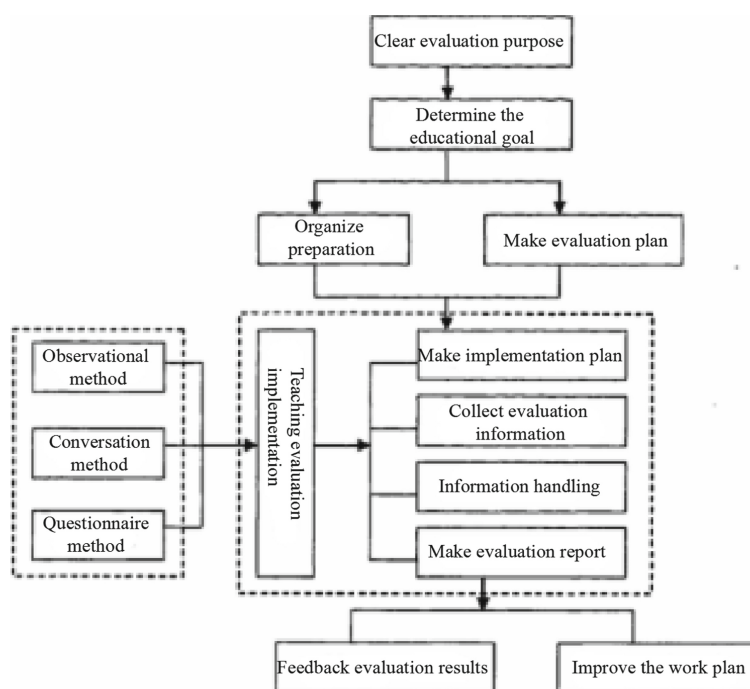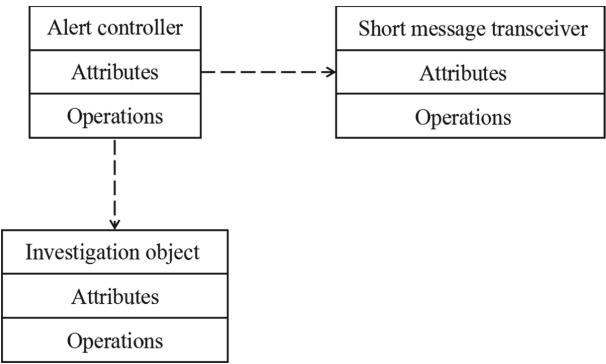

Fig. 5. The structure and procedure diagram of teaching evaluation

teaching methods, the correlation between teaching content and political theory, scientific research achievements, etc. Student ports are related to class attendance rate, class enthusiasm, content understanding and so on. The quantification of evaluation criteria can well solve the disadvantages of those evaluations that only focus on the quantity of scientific research results and neglect the teaching quality of political theory.

Teaching achievement evaluation is the basis for teaching evaluation and educational measurement. Specifically, after evaluation, teachers and students report and analyze the evaluation results, and finally formulate an improved teaching plan. The structure and procedure diagram of teaching evaluation are shown in Fig. 5.

4.4 Ideological Dynamic Investigation and Analysis Platform

The platform effectively collects the data of students' ideological trends, and displays the basic situation of students' ideological trends through intelligent analysis and multidimensional display, thus providing powerful data support for strengthening and improving the teaching of political theory in colleges and universities. This part is divided into two parts, one is public opinion analysis, after identifying and analyzing language, pictures and videos by using the technology of network public opinion monitoring system. Then, OCR technology is used to classify and retrieve data information, and according to multi-dimensional analysis charts, such as public opinion category analysis, public opinion area analysis, public opinion trend analysis, public opinion ring-on-ring analysis, etc., public opinion reports are formed, and then directional monitoring is carried out. Among them, the algorithms involved in information retrieval include feature location information algorithm, feature frequency algorithm, HITS algorithm and so on [8]. In addition, the detection system includes progress monitoring and result monitoring. Figure 6 shows the principle of progress monitoring. The core part of progress monitoring lies in the reminder manager. After the manager sets the automatic reminder conditions, the reminder monitoring program will automatically run in the background. Second, the questionnaire survey, through the new survey, questionnaire management, analysis of the results of the questionnaire, thus forming the teaching and research report. Through the two reports, we can gradually understand the students' ideological trends,

Fig. 6. Principle of progress monitoring

so as to adjust the students' mentality and thinking mode of dealing with problems in time.

5   Conclusions

The theoretical teaching resources of political science are the foundation of information-ization of political teaching in colleges and universities, and an important part of teaching construction in colleges and universities. The innovation of the teaching resource platform of political science theory course in colleges and universities based on Web technology is based on the combination of Web technology, big data technology and public opinion monitoring system technology. It not only realized the effectiveness of teaching resources, targeted and shared teaching resources and all-round quantification of evaluation standards, but also realized the real-time mastery of students' ideological trends, thus improving the digitalization and high quality of teaching resources of political theory courses, and further improving students' speaking ability and skills. In addition, the development of this platform also explores a way to realize the effective combination of political teaching resources construction and technology in colleges and universities, which has a significant demonstration role for improving the informatization level of education and teaching in colleges and universities [6].

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