Development and Application of Ideological and Political Integration Teaching Assistant Network Application in Colleges and Universities Based on MVC Model

Xiaowen Song

1337558981@qq.com

Chongqing College of Architecture and Technology Chongqing, China

Abstract—At present, with the rapid development of digital electronic technology, a single teaching mode can no longer meet the overall needs of students. Colleges and universities need to keep up with the times and change the teaching mode of ideological and political education with the help of digital electronic technology. This paper combines Web technology with computer application technology, and constructs a teaching assistant system of ideological and political integration in colleges and universities based on MVC mode to solve a series of problems encountered in ideological and political teaching in colleges and universities at present. With the layered advantage of MVC, the system deploys all parts in layers. The overall development of the system takes computer as the development hardware, Windows 10.0 as the standard operating system, and C# as the development language. Then, with the help of ASP.NET as the overall development platform of the system for follow-up operation, IIS version 10.0 is selected in the aspect of web server to improve the running efficiency of the server. In the comprehensive evaluation part, the analytic hierarchy process (AHP), which combines qualitative and quantitative analysis, is used to calculate, and the functional linear regression model is used as the statistical basis of data, so that the ideological and political teaching mode in colleges and universities can be further optimized.

Keywords-auxiliary teaching system; computer application technology; AHP algorithm; innovation of educational model; MVC mode; Web technology

1 INTRODUCTION

With the steady development of China's economy, people's material needs are filled, but their spiritual needs are gradually empty. Therefore, in the "14th Five-Year Plan", President Xi put forward that "China should build a high-quality education system" to meet people's spiritual needs. [1] Ideological and political education, as the foundation of national education, has the important task of guiding college students to establish correct three views. It should update the teaching content in real time, take "cultivating people with virtue" as the fundamental task, carry forward Chinese excellent traditional culture as the educational goal, and cultivate the national self-confidence and national sense of honor of contemporary young students. China's modernization reform in the field of education has entered a formal stage. As the main way of education dissemination, colleges and universities should keep pace with the development of

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the times, and build a feasible teaching assistant system of ideological and political integration in colleges and universities with the help of modern digital electronic technology, so as to improve the spiritual level of teachers and students. [2] But at present, there are still a series of problems in ideological and political teaching in colleges and universities. First of all, the teaching mode of ideological and political education in colleges and universities is outdated. Most colleges and universities still follow the traditional classroom teaching mode, simple lecture teaching is difficult to meet students' learning needs, and there is little interaction between teachers and students, all of which restrict college students' learning initiative. The key to solving teaching problems is to keep the balance between teaching and learning. Secondly, the teaching resources of ideological and political education in colleges and universities are single, and the teaching theory is divorced from reality. The main reason why college students are not interested in studying ideological and political education is that the teaching resources are single, the content is outdated, and the change range of book knowledge is small. Many knowledge points have been studied by students in high school, which has lost their freshness and reduced their curiosity. Teaching theory is not updated in real time, and it is out of touch with social reality, which makes students' learning useless and reduces their learning effect. Finally, the evaluation system of ideological and political teaching is not perfect. The traditional teaching evaluation system is based on outcome evaluation, which often ignores students' learning process, and the teaching results and teaching process are in a state of differentiation, which is not conducive to students' comprehensive development.

Based on the above problems, this paper constructs a teaching assistant system of ideological and political integration in colleges and universities based on MVC model. This system makes full use of Internet technology to build a diversified learning environment for all-round training before, during and after class. This system takes advantage of digital electronic technology to integrate video, audio, courseware and exercises into the teaching system, forming an integrated teaching environment. Through the informatization of ideological and political teaching resources, it is more convenient to find resources, and the content of ideological and political teaching keeps up with the current hot spots, which broadens the learning ways of ideological and political teaching, meets the diversified needs of students and promotes their self-development. In this teaching assistant system, students can make plans for follow-up study with the help of the preview function of the system, and cultivate students' self-study ability. Students can also actively participate in public welfare activities in the announcement module and exercise their practical ability. Finally, with the help of the exercise function of the system, we can test what we have learned and realize self-evaluation. In the system, teachers can make full use of the advantages of information resource sharing, innovate courseware and teaching content, and improve students' interest in learning. Then, with the help of the integrated teaching function of the system, the evaluation system of ideological and political education will be reformed, and the evaluation methods will be enriched, so as to form a multi-evaluation evaluation system and promote the comprehensive development of students.

2 KEY TECHNOLOGIES

2.1 Web technology

Web is an information service established on the Internet, that is, the World Wide Web. All technologies that support Web development and operation are Web technologies. We usually divide web technology into client technology and server technology. Client is the visual interface style that we see in Web pages, software, apps, applets, etc. Technologies mainly include HTML, CSS, JavaScript, HTML is mainly used to structure information, CSS is mainly responsible for data format, JavaScript can modify the page by directing the browser, and it doesn't need to go through the server, which reduces the pressure of server operation. [3]

The early Web service operation of is relatively simple, mainly running in browsers and servers. When the user's request is sent to the server, the server will give the corresponding reply, and then the reply information of the server will be interpreted by the browser, thus forming a complete operation process. The whole process needs to know the relationship among browser, server, resources (files), and their deployment locations. There are the following basic presentation ways of Web technologies. The basic technologies include HTML and HTTP protocols. HTML is the presentation way of compiled data, while HTTP is a set of communication standards. Httpd is a tool for processing HTTP requests. When HTTP sends a request, httpd will start the corresponding service to process the user's request. Generally, it encapsulates the HTML corresponding to the server into a reply object, and then feeds it back to the user. The user can analyze the reply with the browser to get the final content. The technologies that can be selected for the overall implementation of the server include ASP.NET, Java, PHP, etc. Diversified development technology systems and gradually innovative framework structures promote the richness and power of the functions of the Web server, and further reduce the workload of Web design and development, improve work efficiency and reduce development difficulty.

2.2 MVC

MVC is one of the programming modes in ASP.NET, and it is a special mode for creating Web applications. MVC layering helps to manage complicated program applications, and programmers can pay attention to one aspect for a long time. Besides, MVC layering can also focus on view design without relying on logical business, making it easier to test program applications. MVC can divide system components into three layers in detail, namely view, model and controller. The detailed system structure is shown in Figure 1. The view layer is mainly responsible for page display and user data interaction. There are many technologies to realize page view, including HTML, CSS, JS and other front-end technologies. The model layer is mainly responsible for the realization of system function modules, the modules that carry data and calculate the requests submitted by users, such as login and registration of the system. Most of the models are implemented with JavaBean, which is a reusable component. A component can be written to achieve a general function, and it can be put into any structure only after being written once. [4] The controller layer is responsible for summarizing the work of the first two layers, that is, corresponding the views to the models. The construction of this platform takes MVC pattern as the whole framework structure, and the development and creation are based on component-based layered development technology. Distributed multi-

layer technology is an important development technology to create this platform. Using this technology can effectively realize the functions of the traditional pattern, and it has certain advantages in scalability and maintainability of the platform.

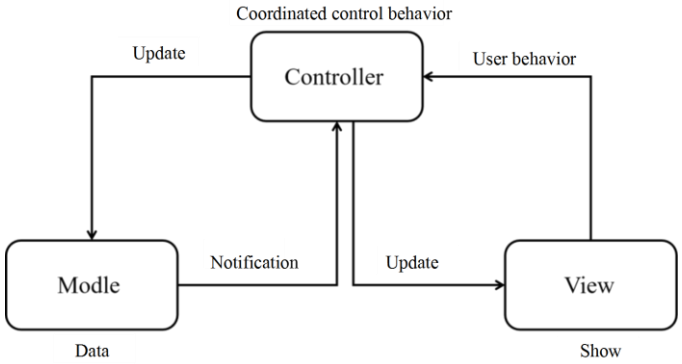

Figure 1. Structure of the MVC system (original)

2.3 B/S architecture

B/S architecture, that is, the browser/server structure with the rise of Internet technology, is evolved from C/S structure. Under this structure, the browser is generally used to build the user interface. Among them, the front-end implements some transaction logic, but the main transaction logic is still implemented on the server side, thus forming a 3-tier structure. B/S structure combines a variety of Script languages and ActiveX technologies, thus forming a brand-new software system construction technology. [5] The main features of B/S structure are strong distribution, convenient maintenance, simple development and strong sharing, and low total cost of ownership. However, this structure still has some shortcomings, such as data security problems and slow data transmission speed, and it is difficult to realize the special functional requirements in the general mode. In addition, it is difficult to realize complex application structure. Although ActiveX, Java and other technologies can be used to develop more complex applications, compared with a series of application tools that have developed very mature C/S, the development of these technologies is complicated, and there are no fully mature technical tools for use. B/S structure model is shown in Figure 2.

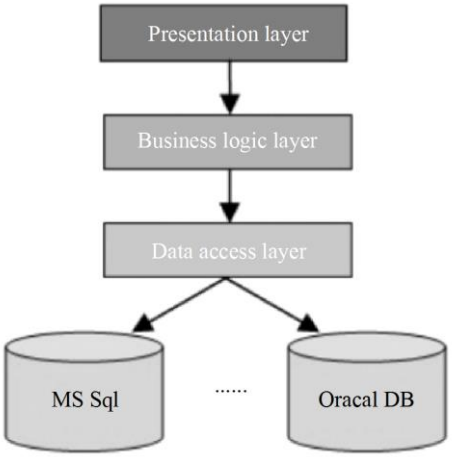

Figure 2. B/S structure model (original)

2.4 ASP.NET

ASP.NET is a kind of Web development platform, which provides an overall programming framework for the subsequent development of the platform, is the infrastructure used for development, and also provides various required services for web programs. ASP.NET can generate various types of web applications, such as Web pages, microservices, APIs, etc. ASP.NET relies on HTTP protocol, and uses HTTP commands to set up two-way communication between browser and server. ASP.Net can also realize caching, update the performance of some applications, and then cache frequently used pages of users and store them in temporary locations, which can retrieve these pages more quickly and give better feedback to users. ASP.NET Core is an open-source cross-platform version of ASP.NET, which has excellent running performance and flexible deployment characteristics. The ASP.NET Core runtime, on which the application runs, can be deployed as a part of the application, or installed on a Web server during integration, and it can perfectly match Docker container, which is faster, more efficient and safer than other web frameworks in the independent Techempower benchmark. [6]

2.5 Development process

According to the technical application requirements of the above-mentioned related applications, the configuration and deployment of the development environment of the college ideological and political integration teaching assistant system based on MVC mode can be completed. In order to improve the scalability and portability of the system, the platform is built by C# and other related technologies. Windows version 10.0 is used as the operating system, IIS version 10.0 is used as the web server, Visual Studio 2019 is used as the bottom development tool, and SQL server 2019 is used as the database server.

The detailed construction of the auxiliary teaching system is carried out according to the following steps. First, you need to open Visual Studio 2019 in the menu, create a new project, select ASP.NET web application, then click Next, and then configure the web form after presetting the project properties. Then, right-click the project in the solution explorer on the

right to add a web form and name it. On the pop-up form, select MVC and add BLL, DAL and Model three-tier projects. Model layer is mainly responsible for database operation and business logic implementation, and is the main body of MVC. DAL layer is mainly responsible for data access management, and provides method calls for business logic layer. BLL layer is just like a bridge linking the UI presentation layer and the DAL data access layer, and it is responsible for dealing with related problems involving business logic. For example, before calling to access the database, the BLL layer will judge and process the data first, and finally select the appropriate data to call. After the specific functional modules are configured, the simulation test is carried out. Publish the generated website to IIS without error, then create a new website project in IIS, select the advanced settings in the management website page, and select the physical path. After the basic configuration is completed, the college ideological and political integration teaching assistant system based on MVC mode can be constructed. Through the description of the above key technologies, the overall framework of the ideological and political teaching assistant system is roughly planned, and the feasibility of establishing the integrated ideological and political teaching assistant system in colleges and universities based on MVC mode is clarified.

3 FUNCTION REALIZATION

3.1 Student side

3.1.1 Online learning module: Users who use this system for the first time need to register, and they can log in after completing the user registration according to the relevant prompts of the system. Successful users can use the detailed functions of the system. The online learning module is mainly divided into the following parts: online courses, high-quality open classes and celebrity lecture halls. In online courses, students can learn independently according to the teacher's video explanation courseware, adjust the video progress according to their own learning efficiency, and watch it repeatedly until they master it. The system will save the user's learning progress and set labels for students to find. When students watch the course, they can use the notebook function to record the key points, so that they can review after class. [7] The high-quality open class module mainly includes two parts: lectures on current politics and excellent courses of famous schools. Students will be systematically recommended according to their learning situation, for example, Peking University's "Ideological and Moral Cultivation and Legal Basis" will be recommended to students who have just started their ideological and political study, so as to enrich students' political basic knowledge. Recommend Marxist Ethnic Theory and Policy of Guangxi University for Nationalities to students who have a certain basic knowledge, so as to improve students' political thinking. Recommend the Outline of Modern History of China of Central South University to students who are interested in history and politics, so as to enhance students' national self-confidence and arouse their fighting spirit. The system will regularly integrate the popularity of all courses to generate the top three favorite courses and throw them on the homepage. The detailed chart is shown in Figure 3.

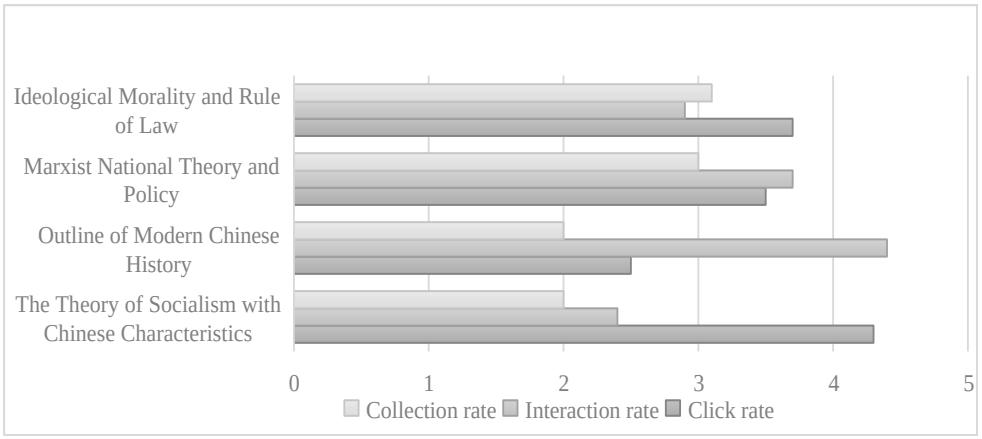

Figure 3. Survey of course popularity (original)

Political lectures are mainly conducted by teachers of our school to summarize recent current affairs hotspots, and then presented to students in the form of lectures. The opening hours of political lectures are fixed, and students and users need to attend on time. After the lectures are over, they need to hand in their experiences as a test of learning results. The uploading code of learning results is shown in Figure 4. In the module of celebrity lecture hall, students can learn red culture and inherit the red spirit by watching the glorious deeds of great historical figures. In this module, students can receive all-round ideological education, and they can be influenced by Chinese excellent ideas in the whole learning process, so as to cultivate students' feelings of home and country and national pride, and promote students to form correct ideas.

```
public A ctionResult Index( )
foreach (string upload in Request.Files)
if(!Request.Files[ upload].HasFile() continue;
string mimeType = Request.Files [upload].ContentType;
Stream fileStream = Request.Files [upload].InputStream ;
string fileName = Path.GetF ileName(Request.Files [upload].FileName);
int fileLength = Request.Files[upload].ContentLength;
byte[]fileData = new byte[J]eLength];
fileStream Read(fileData,0, fileLength) ;
const string connect=
@"Server=.\SQLExpress, Database= FileTest;Trusted_ Connection = True;";
using (var corm = new SqlConnection(connect))
```

Figure 4. Upload code of learning experience (original)

3.1.2 Practice communication module: After learning systematic knowledge, students can choose the public welfare activities published by the school to participate in the announcement module, so as to enhance their learning experience with personal experience, and integrate what they have learned with social practice, thus achieving the fundamental goal of promoting learning with knowledge and practicing knowledge with learning. After the practice, students need to upload the practice results to the personal center. The results can be uploaded in the following formats: pdf, txt, video or audio, etc. The scoring results will be included in the final

grade assessment. At the same time, if students encounter difficulties in practice, they can use the online communication function of the system to publish the problems, and teachers and other students can discuss the solutions together. In this pleasant learning environment, the sense of boundary between teachers and students can be blurred, teachers and students can exchange problem-solving thinking with each other, and arouse students' learning enthusiasm, thus improving the effectiveness of ideological and political teaching. The online communication code is shown in Figure 5.

```
<%
 Customer customer=(Customer)session.getAttribute("customer");
  %>
  welcome <%=customer.getName() %>chat<br>
  <form action="chatAction.jsp"    method ="post">
  Enter chat information：<input name ="msg" type="text"    size="40">
  <input type ="submit" value ="send">
  </form>
  <a href ="logoutAction.jsp"> log off</a>
  <hr>
  <iframe src ="msgs.jsp" witdth ="100%"    height ="80%"    frameborder ="0"></iframe>
```

Figure 5. Online communication code (original)

3.1.3 Online self-testing module: After practical study, students also need to test their basic knowledge. Students can use the special question bank function of the system to conduct self-test, and the system will summarize the key points of the course according to the students' online notes, and generate targeted test papers by itself. The specific content is determined by the students' personal notes. [8] Students can also check the units and knowledge points themselves and submit them to the question bank system. The system will generate test papers according to the selected content. Students can use this system to improve themselves and have a clearer understanding of their learning level.

3.2 Teacher side

3.2.1 Resource upload module: Compared with the function of student side, teacher side pay more attention to the guidance and organization of educational activities, which lays the foundation for building a long-term educational pattern. Teachers need to upload the knowledge of video courses to the resource database in advance, and arrange preview tasks for students to preview independently. The resource upload code is shown in Figure 6. In my course module, teachers can browse the completion of students' preview and difficult notes, and teachers can write instructional designs aiming at these problems, and focus on explaining them in class, so as to solve students' problems and improve teaching effectiveness. Teachers can also make micro-lesson videos aiming at the knowledge points that students ask the most questions. The whole video consists of one or two small questions, which can solve the problems pertinently, save teaching time and improve teaching efficiency. In this system, teachers can browse other teachers' excellent courseware in the courseware module, and after downloading, they can modify it for the second time, creating a new courseware that fits students' actual level.

```
</script>
<script type=" text/javascript" src ="inc/Admin.Lesson.js"> </script>
<script type="text/javascript">
Var vReiD=<%=ReiD%>,
Window. addEvent('domready' ,function(){
GetFolder(vReiD);
$('SelRoom'). addEvent('change',function(e) {
E.stop(); .
GetFolder(vReiD);
</script>
<form id="SocutForm" action=" ajax.aspx?do= Admin_LessonAdd"Method =" post">
<input type="hidden" id="Type" name="Type" value="1" />
<input type="hidden" id="iD" name="iD" value="<%=siD %>"/>
<input type="hidden" id='File" name="File"value="<% =File%>"/>
<input type="hidden" id=" OrderingOld" name="OrderingOld"Value=" <%=Ordering%>"/>
<input type ="hidden" id="GUiD" name="GUiD" value ="<%=File%>"/>
<input type="hidden" id="CheckTips" value="Tutorial title"
```

Figure 6. Resource upload code (original)

3.2.2 Comprehensive evaluation module: The integration of ideological and political teaching in colleges and universities is a new requirement for the theoretical reform of ideological and political courses in colleges and universities in the new era. It is a new method of ideological and political teaching in colleges and universities, and has profound times and value connotations. With the help of integrated teaching, a new teaching mode with student-centered and practical ability development as its goal can promote students' cognitive development, cultivate students' practical ability and make students develop comprehensively. Because the ideological and political course is theoretical and changeable in the implementation process, a single evaluation method can't comprehensively evaluate students' learning process and results. The form of online teaching not only meets the convenience of resource exchange, but also increases the difficulty of teaching evaluation. Students and users are prone to bad behaviors such as hanging in the system to collect lessons and not really entering the module to start learning. In this regard, the monitoring function is derived from this system, which can monitor the browsing time of student users in real time. When a student user stays on a page for a long time without any operation, it will be judged as dropped, and students need to log in again to study. When students watch the course, there will also be in-class exercises. Students need to answer correctly before they can continue their subsequent studies. If students complete their learning tasks within the specified time, they will be counted as their usual grades. If students drop the line more than three times in the same course, the system will automatically determine that they are re-enrolled. [9] This system innovates the evaluation method of learning results, combines the process evaluation with the summative evaluation to form a multi-dimensional evaluation method, pays more attention to the state of students in the process of ideological and political study, ensures the learning effectiveness of students, and then takes the summative test paper as the final assessment. Students' process evaluation C will be carried out from many aspects, and its scoring standard will be evaluated according to five grades: excellent, good, fair, poor and very poor, corresponding to five weights of 5, 4, 3, 2 and 1 respectively. After the evaluation, the system will automatically build an evaluation model matrix, as shown in Matrix 1.

$$C = \begin{pmatrix} 4^i & 2^i & 3^i \\ 5^i & 3^i & 1^i \\ 4^i & 4^i & 2^i \end{pmatrix} \tag{1}$$

The final score of students is composed of three aspects: the usual grade P, the final grade M and the teacher's grade G. The detailed calculation formula is shown in Formula 1.

$$\sum_{i} \left(P+G\right)\times 50\% + \left(M \times 50\%\right) = X \tag{2}$$

Three sets of examination papers will be randomly distributed in the library to ensure the authenticity of the examination, so as to meet the actual teaching needs. The reform of system evaluation mode pays more attention to the internalization of practice content and the extension of practice process. [10] The establishment of this module not only improves the authenticity and effectiveness of the evaluation of ideological and political teaching effect in colleges and universities, but also gradually improves the overall evaluation system of ideological and political education in colleges and universities.

4 CONCLUSIONS

With the development of digital teaching in colleges and universities, ideological and political courses in colleges and universities should keep pace with the times, try their best to improve the construction of ideological and political teaching system and innovate ideological and political teaching mode. The teaching assistant system of ideological and political integration in colleges and universities based on MVC model is the derivative product of classroom ideological and political teaching, which innovates the traditional ideological and political teaching mode. The emphasis of ideological and political teaching in colleges and universities has also changed from individual study by students to joint study by teachers and students, and the system pays more attention to the effectiveness of ideological and political education in colleges and universities. This system makes the online learning mode of ideological and political education more in line with the learning habits of teachers and students in contemporary colleges and universities, permeates ideological and political education into all aspects of college life, and completes ideological and political education in a subtle way. It provides a new method for promoting the implementation of the educational policy of "cultivating people with moral integrity and educating people in an all-round way". In the follow-up research, we will further expand the extensibility and applicability of the system.

REFERENCES

[1] Wang Jinping. Current Dilemma of Ideological and Political Teaching in Colleges and Universities and Countermeasures[J].Taste·Classic. 2022(19).

[2] Liu Huijuan. Design and Implementation of Web-based Network Teaching Platform [D]. Heilongjiang University.2016.

[3] Yang Hua. Analysis of the Relationship Between the Practical Significance of Ideological and Political Education and the Construction of College Students' Outlook on Life[J].China Staff Education.2013.10.
[4] Zhang Jingli. Research on the Construction of Ideological and Political Education System in Colleges and Universities under the New Media Background[J].University.2022(21).
[5] Zhang Ming. Constructing Ideological and Political Teaching System with Modern Information Technology —— Comment on "Research on Teaching Method Reform of Ideological and Political Theory Course in Higher Vocational Colleges Based on Internet Cloud Platform" [J]. Journal of Shanxi University of Finance and Economics.2021(03).
[6] Liu Tao, Tian Qian. Construction of New Media Platform for Ideological and Political Work in Colleges and Universities under the Background of "Internet Plus's Great Ideological and Political Work"[J].Changjiang Series.2020(32).
[7] Xiao Xiangmin, Wang Xiangzhi, Tang Yuanmeng. Research on Interactive Teaching of Ideological and Political Theory Course in Colleges and Universities[J].Theory Research. 2013(17).
[8] Qin Yi. Countermeasure Analysis of Ideological and Political Education in Colleges and Universities in the Internet Era[J].Ability and Wisdom. 2022(35).
[9] Chen Ying. Innovation of Ideological and Political Work in Colleges and Universities under the Background of Big Data[J].Popular Literature and Art. 2022(11).
[10] Wang Yuling. Research on Innovative Means of Ideological and Political Education in Colleges and Universities under the New Media Background[P].2022.