



Design and Development of Online Teaching System for Career Planning Based on Web Technology

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Abstract. With the deepening of teaching information reform in the new era, the traditional teaching method of college students' career planning course can no longer meet the current educational needs, which seriously restricts the effectiveness of the career planning course. In this regard, based on the shortcomings existing in the current teaching practice, this paper will put forward a set of construction scheme of online teaching system for career planning, give full play to the application advantages of information-based teaching methods, and realize the transformation and upgrading of traditional teaching mode. The whole system belongs to B/S architecture, the client interactive page is built by VUE framework, and the Web Server is developed and deployed by Spring framework. The core function of the platform is composed of streaming media technology framework, which combines online teaching with live video courses to form a Web application platform combining data information with functional applications. Practice has proved that the functional service architecture of the system has good flexibility and expansibility, and has outstanding advantages in concurrency control, performance adjustment and data analysis application, which is of positive significance to improving the quality of talent training in colleges and universities.

Keywords: Web technology; Career planning; Streaming media technology; Computer application

1 Introduction

At present, the misplacement of college students' employment ideas has aggravated the employment pressure of graduates, and the overall situation is not optimistic. The reasons for the dislocation of college students' employment ideas are the lag of personal development consciousness and the lack of professional consciousness during college education. [1] Faced with this situation, colleges and universities usually offer career courses to help students establish a scientific and correct concept of job selection and employment. However, the current career planning education in colleges and universities has little effect. The fundamental reason is that the overall attention is insufficient and the teaching system of the course is not perfect; The second is to follow the traditional teaching mode, the teaching content is empty and the teaching form is single;

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The third is the lack of professional teachers, which can not fully meet the teaching needs. [2] In view of this, this paper holds that colleges and universities should recognize the importance of career planning education for college students and actively use information-based teaching methods to promote the transformation and upgrading of the teaching mode of career planning course. The online teaching system of career planning is put forward, which combines online teaching with live courses to vividly show the theoretical knowledge and practical methods of career planning courses. At the same time, it can also enhance the communication and interaction between students and teachers, help to form a teaching system of "concept introduction, simulation evaluation, personality consultation and special counseling", and provide a new idea for the digital reform of career planning education in colleges and universities. [3]

2 System construction

First of all, the running mode of streaming media technology framework is shown in Figure 1, which mainly involves three modules: encoder, streaming media server and player. [4] Among them, the encoder adopts FFmpeg, which converts audio and video contents into digital signals according to AAC algorithm and H.264 algorithm respectively, and completes the encapsulation according to the established format to form a data stream. Then the encapsulated audio and video files are sent to the streaming media server according to RTMP protocol to complete the streaming operation. [5] When the streaming media server receives the streaming request from the player, it will automatically perform caching, scheduling and transmission operations to provide streaming media data to the player. The selection of streaming media server matches the transmission protocol. In this system, Nginx-Rtmp-Module module is selected to build the streaming media server, and Flash player is used to decode and play the data stream.

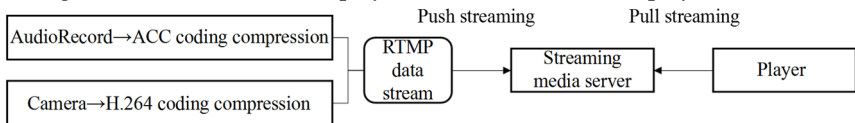


Fig. 1. Operation framework of streaming media technology

Secondly, for the development of Web applications, the overall environment is Java, and the JDK version is 1.8.0_181. The Web server is Apache 2.4.33 and the database is 5.7. Eclipse 2019 is selected as the development tool. After importing VUE framework and Spring framework, MVC creation and single entry file configuration are completed in turn, and the corresponding functional modules are finally selected to realize specific functions. [6] After the system is fully developed, it will be packaged and distributed to the server. After the corresponding ports are configured, users can log in from the client browser.

3 Functional implementation

3.1 Student side

A. Live course learning

Student users log in to the system through the client browser, and select the corresponding live course to study in the homepage interface. The setting of live broadcast course is divorced from traditional teaching materials, which is obviously innovative and targeted, and supports students to learn independently according to their own needs or preferences. [7]

In the overall operating framework of the system, teachers use streaming media technology to realize the long-distance transmission of course teaching, showing an obvious one-to-many relationship with student users. When many student users send requests at the same time, the server of the system will face challenges in stability, availability and delay. Faced with such problems, the system will set up a balanced load scheme of CDN network +Nginx reverse proxy server to achieve high concurrency control of the system. Among them, the construction of CDN network needs to rely on a certain load balancing algorithm. Taking the polling algorithm as an example, its working principle is to assign the user's requests to the server nodes in the CDN in turn, starting from 1 until N, and then starting the cycle again. [8]

In order to verify the actual use effect of the polling algorithm adopted by the system, a group of comparative experiments are set up. In the experiment, there is one proxy server and three back-end servers. The user requests to enter the proxy server at a speed of $1\mu\text{s}/\text{server}$, and the back-end server processes the requests at a speed of $100\text{ms}/\text{server}$. The experimental results are shown in Table 1. The experimental results show that the polling algorithm has the best effect, can ensure the processing capacity of the back-end server, and will not form a waiting queue in a stable state, which can meet the requirements of system concurrency control.

Table 1. Request processing time delay statistics results

Algorithm	Average delay	Tail delay
Polling algorithm	101 μs	119 μs
Randomized algorithms	133 μs	411 μs
Least request algorithm	108 μs	179 μs

B. Professional personality test

After the teaching of the live broadcast course, the system supports students to complete the professional personality test online, which helps students to further clarify their professional interests, personal abilities and specialties, and provides help for subsequent study and career planning. The commonly used test methods are MBTI personality test and Holland professional test. [9]

C. Communication and interaction

In the live course, student users can interact with teachers through the "barrage" function, that is, the expressed content is published in words and displayed synchronously at the student side and the teacher side. When the teacher sees the barrage, he can answer the questions raised by the student users and complete the special counseling. In addition, student users can also leave messages for teachers, enter the personalized consultation mode, and get help from teachers.

3.2 Teacher side

Teacher users have the right to use modules such as course management, online live broadcast and data statistics. Under the data analysis module, on the one hand, teachers can view the data of live courses, and on the other hand, they can evaluate the learning effect by using the data of students' systems. As shown in Table 2, it is the simulated usage data of student users, and the formula for calculating the weight value of a single object or element is shown in Formula 1, where λ_{\max} represents the weight value, A represents the hierarchical level, and W ranks the weight vectors. [10] The test shows that the system can dynamically complete the course teaching evaluation, effectively make up for the shortcomings of the traditional teaching mode in this respect, and enhance the importance of career planning education in colleges and universities.

Table 2. Simulation evaluation results of learning effect

Evaluation target	Data observation	Weighted value	Eigenvector	CI value	Item score	Score
Instructional	Per capita viewing time	C1=0.257	0.926	0.016	75	19.275
	Number of viewers (peak)	C2=0.477	0.987		77	36.729
Interactivity	Total number of barrage	C3=0.201	1.134		68	13.688
	Total number of personality counseling	C4=0.083	1.032		71	5.893
Effectiveness	Test result	C5=0.094	1.067		78	7.332

$$\lambda_{\max} = \sum_{i=1}^n \frac{(CW)_i}{nW_i} \quad CI = \frac{\lambda_{\max} - n}{n-1} \quad (1)$$

4 Conclusions

In order to improve the effectiveness of career planning education in colleges and universities, this paper aims at many shortcomings in the current teaching process, and

constructs an online teaching system for career planning, which provides a feasible solution to promote the digital and intelligent transformation and upgrading of teaching mode. In the follow-up research, the system will further optimize the application stability of streaming media technology, increase the interactive means between students and teachers, and make contributions to the digital reform of career planning education in colleges and universities.

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