



Design and Development of Remote Training Platform for Work-Study Skills Based on Streaming Media

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Abstract. In order to solve the problems of difficulty, high cost, fixed time and limited space in the remote training of work-study skills in China, this paper takes the work-study training as the research object, and designs a set of remote training platform for work-study skills by combining the technologies of network information, database management and computer application. The platform provides a necessary help for optimizing the work-study process, improving students' comprehensive quality and ensuring the smooth development of the work-study program in schools.

Keywords: work-study · remote training · streaming media · SSH · computer application

1 Introduction

Work-study is an important part of national student aid work, an important way for schools to carry out labor education, an effective strategy to improve students' practical ability and quality, and an effective channel for students to get paid through honest labor and solve economic difficulties. Work-study training is an important measure to deepen students' comprehensive system of work-study, improve work-study skills and ensure the quality of work-study. However, there are many problems in current work-study training. First of all, with the increase in the number and variety of jobs, more and more students are taking part in the training, and the cost of training venues, labor, etc. has also increased, making it more difficult to carry out the training. Secondly, the tight schedule of students' schoolwork, the different schedules of students from different majors and the difficulty in coordinating their time make it difficult for students to meet the training requirements. Thirdly, due to the increase of work-study programs arranged during the winter and summer vacations, the positions are scattered all over the country, which makes it difficult to carry out training activities. Finally, due to the difficulties in statistical management, such as students' sign-in and absence, the single form of training and assessment, and the poor interaction and cooperation, the actual effect of training is not obvious [1].

Table 1. Development environment of the remote training platform for work-study work skills

Streaming technology		Web technology	
Encoder	Windows media	Language environment	Java1.8.0_291
Player	Windows Media Player	Operating system	Windows10.0
Server	Windows Media Server	Web server	Tomcat5.8
Protocol	RTSP session control protocol RTP + RTCP real-time transmission protocol UDP user datagram protocol TCP transmission control protocol IP interconnection protocol RSVP resource reservation protocol	Development framework	SSH(Struts2.1.8, Spring2.0.2, Hibernate3.2.5)
Coded format	WMV	Database	MySQL8.0.19
Transcoding tool	FFmpeg	Tool	eclipse v4.23

Therefore, the author of this paper has designed a set of remote training platform for work-study skills, based on years of work experience and feedback from students, with the help of Internet information technology and computer application technology. The platform adopts the way of “online registration + online training + online assessment”. The work-study training is streamlined and digitized, and the whole process can be monitored and easy to monitor. More importantly, the platform enriches the training forms, adopts multiple evaluation methods, improves the training effect and visualizes the effect [2].

2 Development Environment

According to the application of related application technologies and system functional requirements, the configuration and construction of the development environment of the distance training platform for work-study skills have been completed, [3] as shown in Table 1.

3 Function Realization

The remote training platform for work-study skills has two login identities: students and teachers. The module settings are the same, but the functions and permissions are different. After successfully logging in as a user, you will see three buttons in the top navigation bar: project registration, online training, training evaluation and personal center. The specific functional modules are as follows:

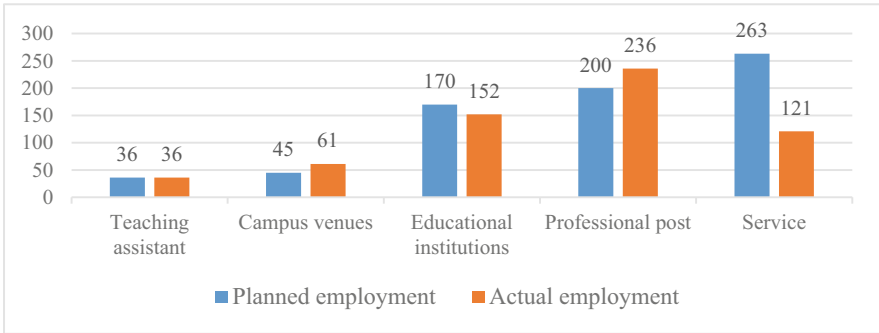


Fig. 1. Participation of various work-study programs

3.1 Project Registration

Project registration includes all the work-study programs. Teachers edit information and upload relevant materials. Students can preview it online, choose projects according to their personal situation and hobbies, click the “Sign Up” button, fill in personal information in the pop-up form and upload the required qualifications. Teachers will approve or reject the registered students after reviewing them, and the registered students will automatically enter the corresponding training class [4]. Figure 1 shows the participation of all kinds of work-study programs in our school (as of July 31, 2022).

3.2 Online Training

There are two main forms of online training: recording and broadcasting, and live broadcasting. Teachers can upload recorded videos in the form of large files or diversity, and students can watch them online or download them locally [5].

In the live broadcasting module, teachers can make an online appointment for training, and the system will automatically inform all students of the live broadcast time and joining method, etc. During the live broadcasting, students can choose to connect with teachers to solve practical problems, or send barrage for discussion. Through online real-time communication, the problem of insufficient interactivity in offline training is solved [6]. The implementation code of the live broadcast contact microphone is shown in Fig. 2.

3.3 Training Evaluation

Multi-evaluation method is adopted for training evaluation. The dimensions of student evaluation include training video viewing, live punch-in, training test scores, training teacher scores, students in the same group scores, and post unit scores [7]. Video viewing and live punch-in are automatically counted and calculated by the system. The training teacher’s score, the same group of students’ score and the post unit’s score are based on Wilson’s theorem, as shown in Formula 1 [8].

$$n = u + v$$

```
//Apply for microphone connection.
fun applyLine() {
    RtmManager.instance.sendPeerMessage(hostId,
        "{\"cmd\": \"apply\", \"avatar\": \"$userAvatar\", \"userName\": \"$userNickname\"}"
    )
}

//Receive a signaling callback notification
override fun onP2PMessageReceived(var1: RtmMessage?, var2: String?) {
    val params = JSONObject(var1.text)
    when (params.get("cmd")) {
        "acceptLine" -> {
            //Anchor agrees
        }
    }
}
}
```

Fig. 2. The implementation code of the live broadcast contact microphone

Table 2. The scoring results of the top 3 students in the comprehensive score of the job skills training for librarians in the 2nd issue of 2022

Name	Video class	Live class	Assessment results	Teacher score	Student score	Unit score
Li Hailin	98.1	82.4	83.9	86.6	71.9	78.2
Liang Huiwen	76.2	89.1	90.6	87.1	82.5	80.3
Cao Huimin	82.3	70.7	69.8	79.2	90.5	92.3

$$p = u/n$$

$$S = (p + \frac{z_a^2}{2n} - \frac{z_a}{2n} \sqrt{4n(1-p)p + z_a^2}) / (1 + \frac{z_a^2}{n}) \tag{1}$$

Among them, u represents the approval number of content, v represents the opposition number of content, p represents the approval rate of content = approval number/(approval + opposition), and Z is a number related to weight [9]. Table 2 shows the scoring results of the top 3 students in the comprehensive score of the job skills training for librarians in the 2nd issue of 2022 in our school.

3.4 Personal Center

Students can view their study records and grades in the personal center, and modify their personal information. Teachers can view and manage their own videos and scheduled live broadcasts in the personal center. They can also view the learning situation of all students

in their own training courses, and urge them to complete the training and improve their work skills [10].

4 Conclusion

In this paper, a remote training platform of work-study skills based on streaming media is constructed, which integrates work-study skills training with digital electronic information technology. It innovates the traditional training methods, breaks the limitations of practice and space, and makes the job skills training run through the whole process of students' work-study before, during and after work, so that students can really gain something in the work-study process [10]. In the follow-up research, we will further expand the extensibility and applicability of the platform, find a more efficient remote training mode, improve students' work-study skills and comprehensive quality, and provide guarantee for school work-study.

Acknowledgments. University level projects: Research on the educational function and adjustment mode of work study program in higher vocational colleges (Number: C207).

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