



Design and Implementation of Work-Study Program Management Information System Based on Javaweb

Lei Ding^(✉)

Shandong Institute of Commerce and Technology, Jinan 250103, Shandong, China
527640205@qq.com

Abstract. At present, there are some problems in the process of carrying out the work-study program in colleges and universities, such as unbalanced post planning and design, insufficient training and education, and lack of assessment and evaluation, which seriously affect the work effect of work-study program. In this regard, this paper will give full play to the positive effect of network information technology in the field of university management, and put forward a set of work-study program management information system, aiming at improving the work efficiency of work-study programs in colleges and universities by means of information technology, and promoting the improvement of the management mechanism of work-study programs in colleges and universities. The system belongs to B/S architecture, and the whole system is designed and built by Javaweb technology. The function setting of the system will highly meet the actual needs of students and teachers, and effectively realize the network and digital transformation of work-study workflow. The simulation results show that the functions of each client of the system are running normally, which effectively improves the management efficiency of the work-study program and provides a new paradigm for the normal management of colleges and universities.

Keywords: Javaweb · Work-study program · Management information system · computer application

1 Introduction

At present, the enrollment expansion of colleges and universities in China is remarkable, the scale of students is increasing year by year, and the number and proportion of poor students are also simultaneously increased. The problem of poor college students not only has an impact on normal campus study and life, but also brings great psychological pressure to students, which is the focus of common concern of universities and society. As an extension of the work-study program, the work-study program in colleges and universities is essentially a practical activity in which students participate in various services or labor to obtain legal remuneration and use it to improve their study and living conditions without affecting classroom teaching [1]. Work-study program is an indispensable link in the system of subsidizing education in colleges and universities,

and it is also an educational practice with specific significance. Compared with other financial aid methods, it has obvious pertinence and wider applicability. At the same time, however, the work-study activities in colleges and universities are still in the primary stage of development, lacking the necessary management mechanism, so that problems such as unbalanced post planning and design, insufficient training and education, and lack of assessment and evaluation appear, which greatly reduces students' enthusiasm for participation and ignores the cultivation of students' labor concept and struggle spirit [2]. In view of this, this paper believes that colleges and universities should adapt measures to local conditions, change their working thinking, improve their attention, and build a work-study program management information system with the help of the application advantages of digital information technology in management practice, so as to promote the digital and network transformation of work-study programs and further improve the management mechanism of work-study programs in colleges and universities [3]. The system will take into account the actual needs of students and teachers, and effectively improve the management efficiency of the work-study program by means of remote login, online operation, data processing and multi-dimensional display, and enhance the effectiveness of the work-study program.

2 Development Process

Work-study program management information system belongs to B/S architecture, namely Browser/Server mode. In this mode, the whole system is divided into three parts: presentation layer, business logic layer and data access layer, aiming at improving the cohesion of each functional module of the system, reducing the coupling and realizing the agile development of the system [4]. Under Javaweb technology, the front-end interface is built with JSP technology as the core, jQuery class library and Ajax asynchronous refresh technology. Secondly, the development of back-end server needs to use the mature SSM framework to complete the deployment and regulation of various business logics, and also needs to clarify the connection and interaction mode of database and front-end pages [5]. The basic development environment of the system will be configured according to "J2EE" system, mainly including the underlying operating system Windows 10.0 x86-64bit, development kit JDK 1.8.0_251, integration tool Eclipse Neon 4.6.2 and database MySQL 5.7. In the development process, according to the attributes of SSM framework, Spring and MyBatis are set up by using Eclipse, and corresponding Java files are created to form the basic framework of platform functional modules [6]. When the functional modules are designed, all the files are packaged and published on the server side of Apache Tomcat 9.0, and all the public interfaces are set to facilitate users' remote login and access. Through the introduction of the above key technical theories, the overall environment of system development, the configuration of related software and tools are determined, and the technical feasibility of the overall project of work-study program management information system is also clarified.

3 Functional Implementation

3.1 Student Side

A. Job Application

After logging into the system, student users need to improve their personal information and apply for work-study positions according to their own time or preferences. After the student user submits the application, the system will automatically synchronize to the teacher and wait for the qualification review. The final audit results will also be displayed or notified in the system, which avoids the problem of poor information transmission under the traditional manual management mode, is conducive to improving the overall work efficiency and promoting the standardization of work-study workflow [7].

B. Online Training

The content of online training will include general knowledge and professional knowledge. Among them, general knowledge covers professional ethics teaching, safety education, ideological and political education, some rules and regulations, etc., while professional knowledge changes according to different positions. Through online training, student users can deepen their understanding of post work, which is conducive to realizing the two-way choice between posts and students and improving the matching degree between posts and students [8].

3.2 Teacher Side

Under the work-study program management information system, the functional requirements of teachers and users include job management, audit management, comprehensive evaluation and so on. Among them, job management supports users to complete job planning and design, job information editing, job publishing, job removal and other operations. The audit management module can provide cascade query function, which is convenient for teachers and users to quickly obtain corresponding data information from poor students database, student achievement database, student personal information database and job application information database to complete the audit [9]. The comprehensive evaluation is to give teachers and users the right to evaluate the effect of work-study programs, and rely on the system's advantages in analyzing and processing data and information to build a work-study program evaluation system standard. Teachers and users are responsible for completing the evaluation, as shown in Table 1.

The platform compares each index value in pairs to determine its importance, and completes the construction of judgment matrix according to the provisions of comparative quantized values, as shown in Formula 1. According to the judgment matrix, the

Table 1. Evaluation system of online learning effect

View point	Grading standards
Work hours A_{11}	8 h per week, out of 5 points, others are scored in proportion
Attendance rate A_{12}	Full attendance is 5 points, others are scored in proportion
Work completion rate A_{21}	$\geq 80\%$: 5 points, $\leq 80\%$: 3 points, $\leq 60\%$: 1 point
Work feedback A_{31}	Excellent: 5 points, general: 3 points, poor: 1 point
Work innovation A_{32}	Excellent: 5 points, general: 3 points, poor: 1 point
Work quality A_{33}	Excellent: 5 points, general: 3 points, poor: 1 point

elements of each row are normalized by the AHP hierarchical analysis method and then summed, and the obtained row vector is normalized twice to get the ranking weight vector W , and the corresponding weight λ_{max} is calculated by the sum-product method, as shown in Formula 2 [10]. After the weight of each index value is determined, the platform automatically calculates the work-study effect score, as shown in Table 2, which is the evaluation result of a student user.

$$A = \begin{bmatrix} A_{11} & A_{12} & A_{13} \\ A_{21} & A_{22} & A_{23} \\ A_{31} & A_{32} & A_{33} \end{bmatrix} \tag{1}$$

$$\lambda_{max} = \sum_{i=1}^n \frac{(AW)_i}{nW_i} \tag{2}$$

In order to verify the actual operation effect of the system, 100 students are used to simulate the test, and the data analysis is focused on the audit time and concurrent processing of the system. The test results are shown in Fig. 1. The results show that the system can greatly shorten the audit time, effectively improve the work efficiency of work-study program and enhance the effectiveness of work-study program.

Table 2. Evaluation results of work-study work

Job No.	Student No.	Duration	Attendance rate	Completion rate	Feedback	Innovation	Quality
001007	0013	7.5h	4 times	90%	Poor	Poor	General
Teacher score		4.69	4.00	4.50	1.00	1.00	3.00
Weighted value		0.053	0.102	0.074	0.167	0.097	0.047
Comprehensive score		4.62					

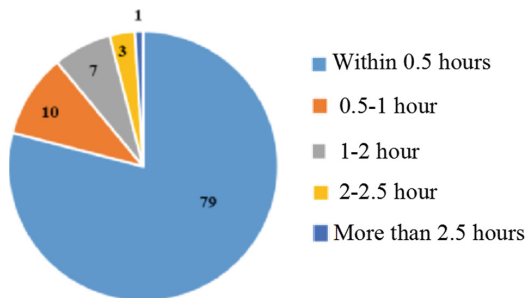


Fig. 1. Test effect diagram

4 Conclusions

Aiming at the reform of work-study mode in colleges and universities, this paper puts forward a design scheme of work-study project management information system based on many shortcomings currently faced. The system effectively promotes the digital and networked transformation of the work-study process and further improves the management mechanism of work-study in colleges and universities. In the follow-up research, the system should further introduce the workflow engine to realize the precise control of the whole process, so as to make an attempt for the modernization and intelligent construction of higher education.

References

1. Guo Li. Discussion on the Education Function of Work-study Program in Colleges and Universities in the New Period[J]. Chinese & Foreign Corporate Culture.2021.10.
2. Wan Lingxi. Analysis and Countermeasures of the Current Situation of Work-study Program in Colleges and Universities[J]. Course Education Research.2019.06.
3. Liu Lixia, Xiang Zhen, et al. Design of a Work-study System Based on “Four in One” Concept[J]. China Science and Technology Information.2022.04.
4. Wu Changzheng. Design of Web Development Framework Based on Front-end Separation Technology[D]. Nanjing University of Posts and Telecommunications.2020.12.
5. Cheng Yawei, Li Pan. Research on Web Application Development Based on J2EE[J]. Digital Communication World.2021.09.
6. Xu Yueying. SSM Web Application Development Measures Based on Agile Development[J]. Practical Electronics.2021.08.
7. Sun Changhong. Probe into the Path of Educational Function of Work-study Aid in Colleges and Universities[J]. Data of Culture and Education.2022.02.
8. Li Huan, Wang Yangjun, et al. Design and Implementation of Work-study System Based on B/S Architecture[J]. Modern Information Technology.2023.03.
9. Liao Yuanzhi. Research on the Work-study Program in Colleges and Universities from the Perspective of Funding Education[J]. Scientific Consult.2023.02.
10. Su Di. A Preliminary Study on the Two-way Satisfaction Evaluation Model of Work-study Jobs[J]. Data of Culture and Education.2022.04.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter’s Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter’s Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

