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Teaching Platform for Private Undergraduate Colleges and Universities Teaching Qualification Evaluation Model Based on DEL-AHP

Wenjie Lu and Yanbei Duan

Nanchang Institute of Science and Technology, Nanchang 330108, China

540794571@qq.com

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Abstract: With the expansion of undergraduate enrollment in domestic colleges and universities and the rapid development of teaching evaluation projects, the evaluation system of teaching quality in China's colleges and universities has begun to form a guarantee system suitable to China's national conditions. It has become an urgent problem to ensure the smooth development of teachers' evaluation and the steady development of teaching quality. This paper applies the DEL-AHP method to the teaching platform of the teaching qualification evaluation model in private undergraduate colleges and universities, and designs and establishes the teaching platform by using hierarchical single sorting and consistency testing. And select a private undergraduate university teaching platform in this city for comparative study, define the platform originally used by the University as platform A, on the basis of the original platform of the university, use DEL-AHP method to improve platform A, form a new platform, define it as platform B, compare the average transaction response time and CPU utilization of the two platforms. The results show that the CPU utilization of platform B is significantly higher than that of platform A. On average, the average utilization of platform B is 58.332 higher than that of platform A. The minimum and maximum peaks of Platform A are 0 and 15.445, respectively, and the corresponding minimum and maximum peaks of Platform B are 3.125 and 89.119, respectively. Therefore, the teaching platform of the teaching qualification evaluation model of private undergraduate colleges and Universities Based on DEL-AHP can withstand a large load of data processing, and its average transaction response time is also less.

1. Introduction

The undergraduate teacher qualification evaluation is the national "quality certification" for postgraduate teaching projects. Although it is a subject, it covers all aspects of the whole school [1-2].This is a comprehensive review and acceptance of the overall situation of teaching reform in

Colleges and universities, a comprehensive evaluation of the training of University faculty, and a comprehensive test of a university's operational level. It is also a "big test of the comprehensive strength of the school". The qualification evaluation of undergraduate teaching projects is an important measure to improve the educational and teaching level and the quality of personnel training [3-4].This requires universities to strictly implement the spirit of the policy documents of the Ministry of Education, educate the masses, give consideration to moral wisdom, cultivate contributions to society and conform to society. It is our responsibility to have high-quality talents. We focus on improving the quality of teaching, promoting the overall reform of the system and building teaching so that all indicators of the school reach appropriate standards [5-6].

Before the evaluation, universities basically use computers to collect data without automation. The main task of each university is to collect data and data from different departments, to show the evaluation experts how the University works, and to summarize the data and data [7-8].Because these new data and data are scattered across different departments of the university, the collection and review of data and data is extremely difficult and workload. Universities are basically unable to collect data. Therefore, the evaluated universities are willing to use network information technology to integrate and manage university data, and use the indicators generated by the evaluation of postgraduate teaching level of the Ministry of Education to establish an information interface can fully reflect the overall development of the University [9-10].

This paper chooses a teaching platform of a university in our city for comparative study. Platform A is the original platform of untreated private colleges and Platform B is an improved platform using DEL-AHP. The average transaction response time and CPU utilization of the two platforms are compared. It is found that Platform B can not only improve efficiency but also undertake more tasks.

2. DEL-AHP Method and Evaluation of Teaching Qualification in Universities

2.1. DEL-AHP Method

(1) Meaning

Delphi method is also called Delphi method. In addition to its application in science and technology, Delphi method can also be used in other fields such as military prediction, population prediction, health care prediction, enterprise and demand prediction, education prediction, etc. It can also be used for evaluation, decision-making, and planning, with high confidence in the eyes of long-term planners and decision makers. Since the 1980s, many units in China have also used Delphi method for prediction, decision analysis and planning.

The analytic hierarchy process (AHP) is an effective decision-making method. Through the hierarchical and quantitative decision-making process of specific rules, quantitative decision-making indicators are finally obtained. This method improves the efficiency of decision making. First, the decision-making problem is divided into three levels: the goal level (A), the problem to be solved, the standard level (B) the measures and plans taken to achieve the goal, and the project level (P) the problem solution. Secondly, it establishes a judgment matrix and makes a comparative analysis. Thirdly, according to the analysis value of the judgment matrix, the weight of each index and the weight of each index level are determined. Finally, the consistency of the judgment matrix is tested.

(2) Principle

1)Scaling principle

DEL-AHP puts forward a measure of socioeconomic factors from the perspective of decision-making. The measurement process is divided into two phases. The first is to define a scale

to measure the relative importance or advantages and disadvantages of two elements under a particular criterion. This is a scale scale with an integer value between 1-9 and its reciprocal. The measurement method is a pairwise comparison judgment, and the results are expressed as a reciprocal table. Another scale is the derived scale, which measures the relative values of the comparative data. Scale values are actual numbers in space [0,1], and measurements should be calculated by their own systems using a crisis table.

2)Sorting principle under single criterion

Sorting under the DEL-AHP single criterion is an export measure of the relative importance of a group of elements calculated by a measure of the relative importance of the two elements. The measure of importance derived from the comparison of the two elements is expressed as the judgment matrix $B=(b_{ij})_{n*n}$, which is positive and reciprocal. The export scale is a scale of the relative importance weights of all the comparison elements, which is defined in [0,1].

(3) Hierarchical single sorting and consistency check

Calculates the maximum eigenvalue of the judgment matrix, and the score of the eigenvector corresponding to each element is the single ordered full value of the element's importance to the upper related elements. For consistency testing of hierarchical single-order sorting, the consistency index (CI) needs to be calculated with the following formula:

$$C.I.=\frac{\lambda_{\max}-n}{n-1} \tag{1}$$

The maximum eigenvalue of the judgement matrix is:

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

When the random consistency ratio CR=CI/RI<O.I, it is considered that the consistency of the judgment matrix is acceptable. When CR>O.1, it is considered that the judgment matrix does not meet the consistency requirements and needs to be revised.

2.2. Assessment of Teaching Qualification in Universities

(1) Principle of differentiating treatment

The implementation principles of University qualification assessment should be treated differently. The principle of differentiated treatment advocates that private and public colleges and universities should conform to the objectives of personnel training and the law of teaching. Private colleges and universities can be classified as "new colleges and universities", but the actual situation of private colleges and universities must be taken into account. At the same time, the more significant differences between private and public universities are the nature of school education, teaching funds and student sources. The existing settings of private colleges and universities include existing students, existing teaching conditions and existing social environment. These universities are not as good as public ones, and it is obviously inappropriate to use evaluation criteria suitable for public universities to evaluate private universities. Private colleges and universities can increase existing students to some extent through their efforts on the basis of existing colleges and universities. We need to look at the scale of growth and use it to assess its quality, which is the principle of treatment that should be followed in the assessment.

(2) Dynamic development principle

The evaluation based on the principle of dynamic development should support the prospective and developmental evaluation subject, which is also the deepening and development of the

evaluation of teaching forms. It is developed from formal teaching evaluation, but it is not a formal evaluation in its original sense. In the initial sense, formal evaluation emphasizes improvement, developmental teaching evaluation emphasizes respecting the individuality of the evaluated objects and human thinking. As an objective evaluation, developmental evaluation has the key characteristics of multiple values and respecting differences. According to the principle of dynamic development, considering the past, present and future evaluation is a continuous development process of the University itself. Focus on discovering features beyond the object level, especially the cultivation of innovation embedding, research, cooperation and practical ability of College students. Focus on the guidance of evaluation subjects, which will develop in the direction of specialization. The organic combination of modular evaluation and cumulative evaluation is especially critical for the new postgraduate school.

3. Experimental Objects and Processes

3.1. Experimental Objects

This paper selects a teaching qualification evaluation platform of a private undergraduate university in our city for experiment, which is set to 600 virtual users for about 6 minutes, with a maximum number of users of 1100, and the test page submits a query page of school evaluation materials for users.

3.2. Experimental Processes

(1) Method selection

Only authenticated customers can access the database and define permissions for system users. Users cannot project data, so data encryption mechanism can effectively prevent data from being stolen from transmission. The operating system of the application server is WindowsServer2003. Its operating environment is WindowsServer2003 AHP. NET is IIS+.NETFRAMEWORK2.0 and its development environment Aphtha client computer operating system is WindowsXP or Win7, and browsers are included with the operating system.

(2) Experimental steps

On the basis of the obtained data of the platform for teaching qualification assessment in private undergraduate colleges and universities, a new platform is formed by using DEL-AHP method, and then a virtual experiment is conducted with 600 users. Among them, we define the original platform as platform A, and the new platform formed by DEL-AHP on the original data as platform B. The average transaction response time and CPU utilization of the two platforms are compared. Mean and maximum and minimum peaks are obtained by processing data from the two platforms.

4. Comparison of Experimental Results between Three Algorithms

The design of the system should put the real needs in place. The management system of teachers' qualification evaluation in Institutions of higher learning takes into account the main tasks of teachers' qualification evaluation. Therefore, the function of the system should meet the basic work requirements of teaching evaluation and users of the system, and the functions and interfaces of the system must be checked thoroughly. The structure should not be too complex, it is necessary to take into account user convenience and provide direct documentation. No system designed to meet the long-term needs of customers will be redeveloped if customers have new requirements, which will waste a lot of manpower and financial resources. Therefore, the system design should take into

account the efficiency of its business expansion. Extensible systems have not been developed yet, which is a one-time use.

The structure of university teaching qualification management system should adopt three-tier B / S structure, and the middle tier structure and operation logic are realized by JSP programming. Its main working principle is: the user can access the system through the browser program, all functions are integrated into the browser program, and all requests are also sent by the user through the browser program. After the request is sent to the server, the server calls the service level for processing. The operation layer must store JSP program code. These program codes are used to process the operation logic and complete the processing of applications submitted by users, including application data acquisition, new data elements and data modification, legitimacy verification, etc. It does not include all the transaction processing browsing programs. The intermediate level can call the relevant data level according to the request, then process it, finally recover the execution result, and search the user in the presentation layer of the browsing program.

4.1. Transaction Average Response Time Comparison between Two Platforms

The primary purpose of system performance testing is to check system performance, and you can use test software. Test content should include indicators such as response time, test system performance, etc. Response time is the sum of time and system response time, and the system's processing power is measured by the efficiency of the system and the number of simultaneous users. It represents performance. In this experiment, the average transaction response times of the two platforms are compared as shown in Table 1 and Figure 1.

Table 1. Comparison of transaction average response time between two platforms

	Average Value	Minimum Peak	Maximum Peak
Platform A	6.078	0.588	9.454
Platform B	5.884	0.394	9.26

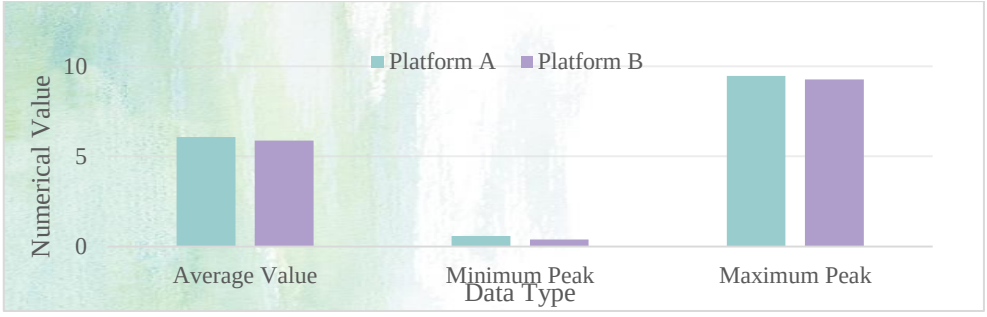

Figure 1. Average transaction response time of two platforms

Comparing the data in Table 1 and Figure 1, we can see that the average transaction response time of Platform B is less than that of Platform A. The highest peak value of Platform A is 9.454, the lowest peak value is 0.588, and the average value of experiment peak is 6.078.The maximum and minimum peaks of platform B are 9.26 and 5.884, respectively, with an average of 0.394, which is significantly better than the response time of platform A.

4.2. CPU Utilization Comparison between Two Platforms

The CPU usage is actually the percentage of time the current program spends on CPU resources,

which shows the state of the machine running the program for a specific time. The higher the usage, the more programs the machine has implemented, or the programs consume more CPU resources, and vice versa. Therefore, we compare CPU utilization between the two platforms, as shown in Table 2 and Figure 2.

Table 2. Comparison of CPU utilization between two platforms

	Average Value	Minimum Peak	Maximum Peak
Platform A	8.135	0	15.445
Platform B	66.467	3.125	89.119

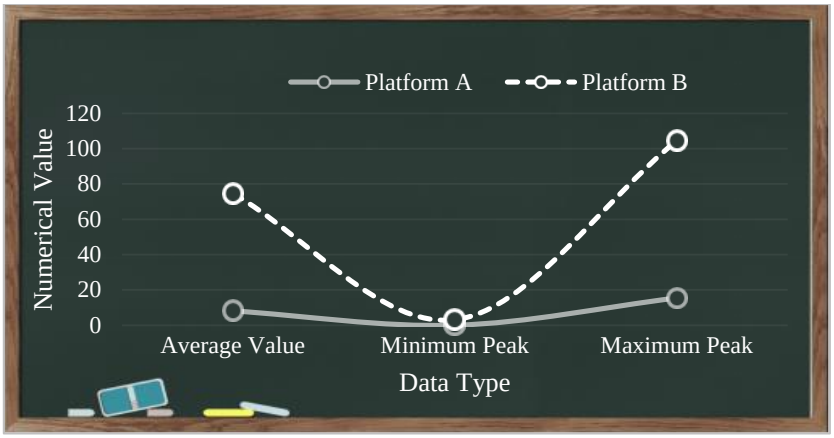

Figure 2. Comparison of CPU utilization data between two platforms

From the data analysis of Table 2 and Figure 2 above, it can be seen that the CPU utilization of Platform B is significantly higher than that of Platform A. On average, the average utilization of Platform B is 58.332 higher than that of Platform A.The minimum and maximum peaks of Platform A are 0 and 15.445, respectively, and the corresponding minimum and maximum peaks of Platform B are 3.125 and 89.119, respectively.

5. Conclusion

This system fully demonstrates the feasibility of developing a teaching quality evaluation system by using computer technology and network technology. From a technical point of view, the DEL-AHP method is used to further develop a framework based on a mature platform, which is very suitable for the undergraduate teaching qualification evaluation system. With the development of computer technology and network technology, as well as the continuous progress of computer application, the use of network to complete the evaluation of teaching qualifications is not limited by time and space. Due to the current status of the software and its limitations, the speed and efficiency of data collection have been greatly improved. The functions of the system need to be improved and expanded. For example, you can increase the flexibility of the system and introduce more integrated quantitative assessment management into the system. In operation, the system meets the basic requirements of higher education qualification evaluation management. In view of the complex environment, the system should be further extended to provide more reasonable services to ensure the normal operation of each new step of undergraduate work, and be true and effective, so as to improve the efficiency of work management.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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