Research on construction of classroom teaching quality evaluation system of university teachers under OBE concept

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Keywords: OBE concept; Classroom teaching quality; AHP decision analysis; Delphi method; satisfaction

Abstract: Based on the concept of OBE, the evaluation of teaching quality in colleges and universities emphasizes students' learning outcomes. By constructing first-level indicators including teacher quality, learning content and teaching effect and their corresponding second-level indicators, and combining with AHP decision analysis method to determine the weight of each indicator, a comprehensive evaluation system is formed. Delphi method is used to invite experts to assign the relative importance of the indicators, construct a judgment matrix, and calculate the comprehensive evaluation value through a series of formulas, so as to measure the quality of higher education. This evaluation system is helpful for universities to optimize teaching strategy continuously and improve teaching quality. The results show that the average score of the experimental class is 73.13 points, which is significantly higher than 65.03 points of the control class. The average score of satisfaction with the teaching method under the OBE concept of the experimental class is 4.24 points, which is much higher than 3.39 points of the control class.

1. Introduction

As the main teaching force of colleges and universities, teachers play a key role in shaping the overall quality of students and enhancing the country's innovation ability [1]. Therefore, the establishment and improvement of classroom teaching quality evaluation system has become one of the important issues in the current college education reform [2]. In recent years, many universities have implemented the teaching mode based on OBE concept. The introduction of this model not only triggers the potential of students' autonomous learning, but also puts forward new requirements for the teaching methods and evaluation system of college teachers [3]. However, there are many problems in the current classroom teaching quality evaluation system led by university teachers. The traditional evaluation system pays too much attention to the content and form of knowledge imparts by teachers, and neglects the development of students' autonomous learning and practical skills [4]. Incomplete evaluation indicators, and it is difficult to objectively evaluate teachers' ability to inspire students' thinking and help students think independently about key abilities [5]. Due to the diversity and individualization of teaching objectives under the OBE concept, traditional evaluation methods are unable to fully reflect the effects and results of teachers' implementation of OBE teaching mode, and do not support the sustainable development of teaching quality [6]. Therefore, it is necessary to deconstruct and reconstruct the teaching quality evaluation system of academic teachers in higher education.

There are shortcomings in the evaluation of teacher competence and education in classroom education in Chinese universities. The evaluation conclusion is subjective and biased, with weak diagnostic and guiding significance. There are problems that need to be solved in both theory and practice for new teaching methods and teaching reforms. In response to these issues, this article elaborates on the existing content and main content of classroom evaluation, explores the content

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teaching of classroom quality evaluation based on the OBE concept, and combines it with the Analytic Hierarchy Process to create a new evaluation system, ensuring that the OBE based evaluation system is of great significance for improving teaching quality.

2. Related Words

In order to make college students get better development, Zhang B proposed that it is very important to build a targeted academic evaluation system. Teachers combine practical teaching with students' learning ability and critical consciousness to promote students' all-round development [7]. In the 5G environment, Cheng Q et al. use SSM framework and MYSQL database to build an information platform for classroom teaching quality in colleges and universities. On this platform, teachers can obtain information about teaching quality more intuitively [8]. Aiming to promote the development of physical education in colleges and universities, Li J combined with induction statistical survey data, used case analysis to find the existing problems in college courses, using comparative analysis to analyze the educational problems in universities [9]. Liu G et al. developed a student-based college English language assessment, which typically includes the use of linguistic terms, triangular fuzzy numbers, and preference models to evaluate college English courses [10]. Li Y et al. proposed a student-oriented, teacher-guided PAD classroom teaching model. PAD classroom provides a way to solve the problem of declining teaching quality in current university classrooms [11].

3. Method

OBE was first proposed by Spady (1981), an American researcher, to show this effect [12]. This article is based on the concept of OBE to study the teaching quality of universities, mainly through four factors: (1) classroom teaching evaluation. This type of teaching evaluation is usually completed jointly by one or both teachers and students; (2) Develop effective training plans; (3) Research on new models of teaching supervision; (4) Exploration of Quality Evaluation Indicators for Online Course Teaching [13]. The evaluation of teaching quality in universities should be a universal process, and universities should be led by the OBE ideology, based on content evaluation, strategy evaluation, process evaluation, and outcome evaluation. The design of the evaluation system for teaching quality in universities is shown in Figure 1.

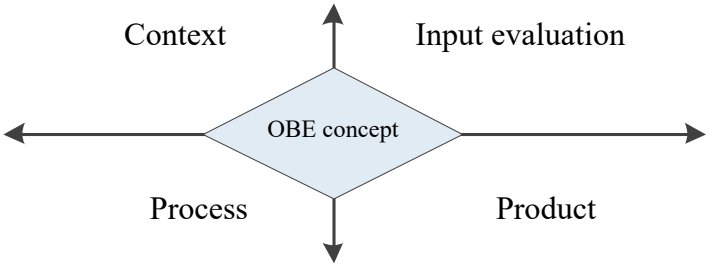

Figure 1 Teaching quality evaluation system

Before making teaching evaluation, it must be clear that there is a relationship between students' learning behavior and the learning behavior determines students' learning. Teachers' teaching behavior will directly affect students' learning behavior and thus affect students' learning [14-15]. The evaluation index system for teaching quality in universities is shown in Table 1.

According to the OBE concept, the assessment focus should be on students' learning outcomes, so the corresponding assessment focus is listed in the table [16]. Analytic Hierarchy Process (AHP) is a decision-making analysis method that can determine the weights of each indicator. These two evaluation indicators are combined to evaluate the teaching quality of universities [17].

Table 1 Evaluation indicators under the OBE concept

Primary index	Secondary index	Focus of evaluation under the OBE concept	AHP weight
Teacher quality	Teaching content	Emphasis on student-centered, focus on student learning outcomes	0.2
	Teaching method	Focus on students' active learning, cooperative learning, reflective learning	0.3
	Teaching attitude	Teachers actively guide, encourage students to explore, give timely feedback	0.2
	Teaching resources	Provide a wealth of learning resources, including textbooks, online courses and more	0.1
	Teaching characteristics	Highlight the characteristics of the subject, combined with the needs of the industry to teach	0.2
Learning content	Theory	Focus on the mastery and application of basic theories	0.3
	Art and sports	Develop students' interests and skills in arts and sports	0.2
	practice	Strengthen practical links and improve students' practical ability	0.3
	practice	Provide internship opportunities to help students gain practical work experience	0.2
Teaching effect	Learning objective	Achieve preset learning goals	0.4
	Learning effect	Assess student learning outcomes and satisfaction	0.4
	Learning characteristics	Analyze students' learning characteristics and optimize teaching strategies	0.2

According to the evaluation index system of university teaching quality based on OBE concept. Taking criterion layer as an example, using AHP structure model, the judgment matrix and consistency test results are obtained as follows:

Experts from the university and outside assessment experts are invited to use the Delphi method to assign values according to the relative importance of each index pair in the index layer and construct a judgment matrix [18].

$$\begin{bmatrix} c_{11} & c_{12} & \cdots & c_{1n} \\ c_{21} & c_{22} & \cdots & c_{1n} \\ \vdots & \vdots & \cdots & \vdots \\ c_n 1 & c_{n2} & \cdots & c_{nn} \end{bmatrix} \tag{1}$$

The geometric mean value of each factor of the judgment matrix is reasonably calculated, and the formula is as follows:

$$Gi = n\sqrt{\prod_{j=1}^{n} cij} \tag{2}$$

Then the normalization operation is carried out to obtain the weight value of each impact factor. The expression is as follows:

$$wi = \frac{Gi}{\sum_{i=1}^{n} Gi} \tag{3}$$

$$W = \left(w1, w2, w3 \cdots wn\right)^{T} \tag{4}$$

Through the comprehensive evaluation value, the comprehensive score of the evaluation index system of higher education quality based on OBE concept is obtained.

4. Results And Discussion

4.1 Experimental subjects

In this paper, two classes of students from a university in a certain region are selected as experimental classes and control classes. The experimental class adopts the OBE concept teaching method, while the control class adopts traditional teaching methods. Both classes are taught by the same teacher. The test results are shown in Table 2. Independent sample T-test was adopted. At 95% confidence level, the learning basis and level of students in the two groups were the same, and there was no significant difference. The experimental class scored 55.3 points, and the control class scored 55.7 points, indicating that before the application of OBE concept, students in the two classes were basically at the same level in terms of performance, with no obvious difference. The standard deviation of the experimental class is 10.9, while that of the control class is 11.5. The standard deviation of the control class is slightly larger, indicating that the score distribution before the application of OBE concept is relatively more discrete, that is, the score gap between students is larger.

Table 2 Grade mean and standard deviation

Class and grade	Number of people	Average pre-test scores	Standard deviation
Experimental class	49	55.3	10.9
Comparison class	49	55.7	11.5

4.2 Analysis of teaching quality

The learning process data generated by the experiment can support the means of assessing learning activities in order to test the effectiveness and quality of learning.

After a semester of teaching practice in the second half of 2023, the OBE concept of OBE teaching, the previous methods of traditional teaching, the two classes took the post-experiment final exam uniformly, the final exam results of the two classes were analyzed, and the evaluation indexes and the results are shown in Table 3.The average grades of the OBE concept and the previous methods were 73.13 and 65.03, and the OBE concept of the higher education classroom teaching quality is more excellent.The passing rate of OBE concept is 91.9%, while the previous method is only 75.6%, which further supports the effect of OBE concept in the construction of teaching quality evaluation in colleges and universities.5.2% of the students in OBE concept achieve excellence, which is more than 80 points, while the previous method is only 0.5% of the students achieve excellence. This indicates that the OBE concept has a higher percentage of students in the higher marking bands, but both classes have more room for improvement in the excellence rate.The highest score of 95 for the OBE concept is higher than that of 86 for the previous method, while the lowest score of 49 for the OBE concept is also higher than that of 38 for the previous method, which suggests that the OBE concept is now generally higher in terms of student achievement.

Table 3 Evaluation indicators and results

Evaluation index	Experimental class	Comparison class
Mean value	73.13	65.03
Standard deviation	9.34	11.59
Mean standard error	1.34	1.66
Pass rate (≥60%)	91.9%	75.6%
Excellence rate (≥80%)	5.2%	0.5%
The highest score	95	86
Lowest mark	49	38

The average score of classroom teaching satisfaction is shown in Figure 2. The average score of the class that attempted to use the OBE concept for classroom teaching was 4.24, which was higher than the average score of the control class that used traditional classroom strategies, which was 3.39. The experimental class students are interested in teaching based on the OBE concept. The OBE concept displays the educational outcomes of students, including their engagement and active learning. Continuous evaluation and feedback of student learning outcomes can increase their interest in learning, improve their learning level, and ultimately achieve higher satisfaction. The control class teaching focuses more on the teacher's teaching and skills, and there is no regular evaluation and feedback on student education, resulting in poor teaching effectiveness.

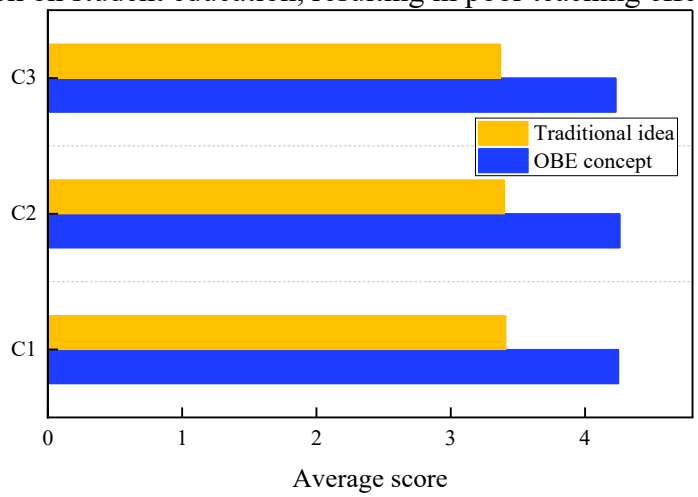

Figure 2 Average score of classroom teaching satisfaction survey

5. Conclusion

This article combines the AHP with the concept of OBE to develop an evaluation index system for teaching quality in universities. A comparative analysis was conducted on the teaching quality of two courses in a certain field of a certain university. The results showed that the average score of the experimental class in the test course was 73.13 points, higher than the 65.03 points of the control class. The passing rate of the final exam in the experimental class was as high as 91.9%, higher than the 75.6% in the control class, indicating a good teaching effect. According to a classroom satisfaction survey, the average satisfaction level of the experimental classroom with teaching under the OBE concept is 4.24 points. This indicates that the teaching strategy proposed in this article is effective and can be widely applied to classroom teaching in universities.

Acknowledgements

1) Education and Teaching reform project of Basil Education Department of Beihai Campus of Guilin University of Electronic Science and Technology in 2023 "CIPP-based College English Teaching Research"(JGJX23005)

2) Youth Fund for Humanities and Social Science Research of Ministry of Education,2022,

Project name: Construction and Empirical Research on the Evaluation index system of International Chinese Teacher Communication Ability(22YJC740051)

3) Middle and Youth Class Project of the State Language Commission,2023 . Project name: Research on the Theoretical connotation and Practical Path of the Development Concept of International Chinese Education Security(YB145-106)

4) General topic of education and teaching reform in 2024, Project name: Exploration of "Chinese +" training mode for International students in Beijing Polytechnic Universities (2024JGYB040)

5) The First Batch of Approved Projects for University-Industry Collaborative Education Program by the Ministry of Education in 2024“Research on the Reform of Curriculum System for Chinese Language and Literature Majors in Universities under the Guidance of Applied Talent Training” (231107590170138)

6) Guangdong University of Science and Technology 2022 "Innovation Strong School" project (Research) “Intelligent Logistics and Supply Chain Management Research Institute” (GKY-2022CQJG-4)

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