Building and Applying Evaluation System for Blended Teaching Mode in Higher Education under the CIPP Model

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Abstract. Blended teaching mode is an important direction of current higher education teaching reform, and constructing a scientific and comprehensive evaluation system is the key to ensuring the quality of blended teaching. Based on the CIPP evaluation model, this study constructs a blended teaching evaluation index system from four dimensions: context, input, process, and product, and applies it to the "Database Principles" course at a certain university as a practical example. The study employs methods such as questionnaire surveys, platform data analysis, and interviews to comprehensively assess the effectiveness of blended teaching. The results show that the evaluation system can effectively evaluate various aspects of blended teaching, identify teaching strengths and weaknesses, and provide a basis for teaching optimization. Blended teaching mode significantly improves students' learning participation and performance, but further improvements are needed in teaching design, process management, and other aspects. The evaluation system constructed in this study provides important references for enhancing the quality of blended teaching in higher education.

Keywords: blended teaching; evaluation system; CIPP model; teaching quality; higher education.

1 Introduction

Blended teaching mode is a product of the deep integration of information technology and education, and it significantly enhances teaching effectiveness and learning experiences through the organic combination of online and offline learning [1]. However, the effective implementation of blended teaching relies on a scientific and comprehensive evaluation system. Currently, there are issues such as insufficiently systemat-

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ic indicators and relatively single methods in the evaluation of blended teaching in universities, urgently requiring the construction of an evaluation index system based on theoretical models and characteristics of blended teaching. The CIPP evaluation model, with its comprehensiveness and systematic features, provides a good theoretical basis for the evaluation of blended teaching. This study aims to design evaluation indicators for blended teaching based on the CIPP model from four dimensions: context, input, process, and product, and to verify the effectiveness of this evaluation system through practical application, in order to provide references and guidance for enhancing the quality of blended teaching in higher education [2].

2 Theoretical Foundation

2.1 Overview of the CIPP Model

The CIPP model is a systematic evaluation model proposed by the renowned American educational evaluator, Daniel Stufflebeam. This model includes four dimensions: context evaluation (Context), input evaluation (Input), process evaluation (Process), and product evaluation (Product) [3]. Context evaluation aims to determine the needs and goals of the evaluation object; input evaluation focuses on evaluating the allocation and utilization of resources; process evaluation concerns the activities and strategies during implementation; and product evaluation emphasizes the degree of achievement and effectiveness of the evaluation goals. The CIPP model emphasizes the comprehensiveness and systematic nature of evaluation, providing a complete framework for educational evaluation, which helps in comprehensively understanding and grasping various aspects of the evaluation object [4].

2.2 The Role of the CIPP Model in the Construction of Evaluation Systems

The CIPP model is crucial for developing evaluation systems, providing a solid foundation for making them more scientific, comprehensive, and systematic[5]. It highlights the dynamic nature of evaluation, enabling timely adjustments based on results to enhance effectiveness. Additionally, by emphasizing stakeholder participation and feedback, it enhances acceptability and sustainability. Hence, when constructing an evaluation system for blended teaching in universities, leveraging the CIPP model ensures its scientific, comprehensive, and practical nature[6].

3 Construction of Blended Teaching Evaluation Index System Based on the CIPP Model

3.1 Context Evaluation

When constructing the blended teaching evaluation index system, it is necessary to conduct context evaluation first. Through methods such as questionnaire surveys and interviews, understand the needs and expectations of students, teachers, and adminis-

trators for blended teaching [7]. As shown in Figure 1, the survey results indicate that 85% of students believe that blended teaching can improve learning efficiency, 90% of teachers believe that blended teaching helps in optimizing teaching design, and 95% of administrators believe that blended teaching is an important direction for educational teaching reform. At the same time, context evaluation also needs to analyze the goal positioning and implementation conditions of blended teaching, clarifying the purpose and scope of the evaluation index system. Based on the results of context evaluation, determine the overall framework and main dimensions of the blended teaching evaluation index system.

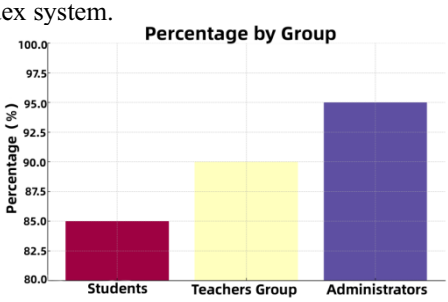

Fig. 1. Survey Results of Acceptance of Blended Teaching by Different Groups

3.2 Input Evaluation

As an important innovation in the modern education system, the quality and effectiveness of the blended teaching mode largely depend on the resources invested and the preparation behind it. Input evaluation for this mode reveals the specific efforts and arrangements made by educational institutions to implement this teaching method [8]. For this purpose, the school has allocated 5 million yuan specifically for the construction of an advanced smart teaching platform. This not only provides an efficient and interactive learning environment but also greatly enriches learning resources by building an online course resource library covering various disciplines and majors. Meanwhile, the school has also formed a blended teaching team consisting of 100 professional teachers, ensuring teaching quality and the diversity of teaching activities. In addition to hardware facilities and teacher strength, meticulous evaluation of teaching design for blended teaching is also a crucial step to ensure teaching quality. This includes clear teaching objectives, scientifically arranged teaching strategies, and effective organization of learning activities, ensuring the rationality of teaching design and the feasibility of implementation.

3.3 Process Evaluation

Process evaluation aims to assess the implementation process and effects of blended teaching. By employing learning analytics techniques, data on students' online learning behaviors such as learning duration, progress, and interaction are collected and analyzed to form quantitative indicators such as learning participation and perfor-

mance [9]. For example, for a certain blended course, the average student learning duration is 15.6 hours, the completion rate of learning progress is 92%, the number of interactions between teachers and students is 286 times, and the number of posts in the discussion forum is 468. Additionally, process evaluation also includes the assessment of qualitative indicators such as teaching organization, learning support, and process management. The evaluation results help in timely identification and resolution of issues existing in blended teaching, optimizing the implementation plans.The specific data are shown in Table 1.

Table 1. Learning Participation and Interaction in a Certain Blended Course

Evaluation Metric	Data
Average Study Time per Student	15.6 hours
Learning Progress Completion Rate	92%
Number of Interactions between Teachers and Students	286 times
Number of Posts in the Discussion Forum	468 posts

3.4 Outcome Evaluation

Outcome evaluation focuses on the effects and impacts of blended teaching. On one hand, it assesses students' academic performance through final exams, course assignments, project reports, etc., analyzing the improvement of students' knowledge, abilities, and qualities due to blended teaching [10]. As shown in Figure 2, the average score of the blended teaching class is 8.5 points higher than that of the traditional teaching class, with a 15% increase in the excellent rate. On the other hand, outcome evaluation also includes the examination of teachers' teaching abilities improvement, teaching mode innovation, and so on. Additionally, it is necessary to evaluate the social impact and promotion value of blended teaching. The results of outcome evaluation provide important basis for the continuous improvement and long-term development of blended teaching.

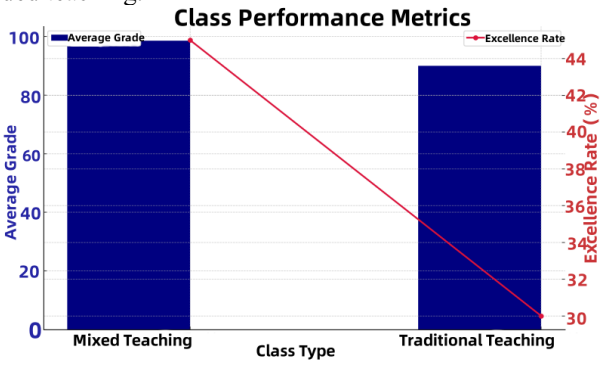

Fig. 2. Average Score and Excellent Rate

4 Application Practice of Blended Teaching Evaluation System

4.1 Case Background

This study selects the "Database Principles" course of the information management major in a certain university as a practical case for evaluating blended teaching. The course adopts a blended teaching mode of "online self-learning + offline face-to-face discussion" and uses a smart teaching platform to conduct teaching activities. The course consists of 60 class hours with 120 students enrolled. In order to comprehensively evaluate the effectiveness of blended teaching, the course team decides to use the evaluation index system constructed based on the CIPP model to evaluate the teaching process and results from multiple dimensions, identify problems, propose improvement measures, and optimize the quality of blended teaching.

4.2 Evaluation Implementation

The evaluation implementation, as shown in Figure 3, is divided into three stages: pre-class, in-class, and post-class. Before class, background evaluation and input evaluation are mainly conducted to understand the characteristics and needs of students through questionnaire surveys, and to analyze the rationality of teaching resources and design schemes. During class, the focus is on process evaluation, monitoring learning behaviors through platform data, and evaluating teaching organization and teacher-student interaction through classroom observation, interviews, etc. After class, the emphasis is on outcome evaluation, considering students' cognitive performance, skill development, and emotional experiences comprehensively, and evaluating teachers' gains and reflections. In the evaluation process, we adhere to the principles of combining quantitative with qualitative, formative with summative, striving to objectively and comprehensively present the actual effects of blended teaching.

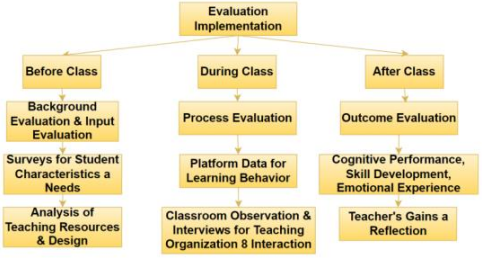

Fig. 3. Evaluation Implementation

4.3 Data Analysis

Through systematic analysis of platform data, questionnaire results, and interview records, we have obtained some important findings regarding the blended teaching mode. As shown in Table 2, students' acceptance of the blended teaching mode is quite high, with 85% of students believing that this mode helps improve their interest

in learning and self-learning abilities. The participation in online learning also demonstrates a positive trend, with an average learning duration of 20.5 hours, frequent interactions in the discussion forum, and enthusiastic communication between teachers and students as well as among students. More importantly, blended teaching significantly enhances students' learning performance, with an average score of 85.6 in the final exam, which is 12 points higher than previous years, and an excellent rate of 40%. Although there has been an improvement in teachers' organization and management skills in blended teaching, there is still room for improvement in teaching design and learning support. These findings indicate that the blended teaching mode has a significant effect on enhancing students' interest in learning, participation, and learning effectiveness. However, they also suggest the need for further optimization of teaching design and the provision of more effective learning support. The specific data analysis is shown in the table below:

Table 2. Evaluation Indicators and Data Results

Evaluation Metric	Data/Result
Student Acceptance	85%
Average Study Time	20.5 hours
Average Final Exam Score	85.6 points (compared to 73.6 points in previous years)
Excellence Rate	40% (compared to 28% in previous years)

4.4 Evaluation Results and Improvement Suggestions

Based on the evaluation of the effectiveness of blended teaching, the course team conducted in-depth analysis of its achievements and shortcomings, and proposed a series of improvement suggestions accordingly. The team plans to optimize teaching design to better integrate and blend online and offline learning, aiming to avoid the disjointed "two-faced" phenomenon between learning content and activities. Next, they will strengthen the management of the learning process by improving learning monitoring and feedback mechanisms to provide students with more timely and accurate learning support services. The course team intends to innovate teaching organization forms, especially by adding more discussion, debate, and other interactive activities in offline teaching to enhance student participation. The team plans to improve the teaching evaluation mechanism by integrating formative and summative evaluations to form a continuous improvement cycle. Through these measures, the course team hopes to optimize the blended teaching scheme based on evaluation feedback, further improve teaching quality, and enhance learning experiences. These improvement plans aim to address the challenges encountered in current blended teaching while leveraging its advantages to create a more efficient, interactive, and personalized learning environment for students.

5 Conclusion

This study constructed a blended teaching evaluation index system for higher education based on the CIPP model, and conducted practical application using a "Database Principles" course at a certain university as an example. The research indicates that this evaluation system can comprehensively and objectively assess the background, input, process, and outcomes of blended teaching, providing important basis for optimizing teaching design, improving teaching organization, and enhancing teaching effectiveness. The data analysis results of the practical case confirm the effectiveness of the blended teaching mode, with significant improvements in students' learning participation and performance. At the same time, the evaluation also identified shortcomings in teaching design, process management, etc., providing directions for subsequent teaching improvements. In summary, the blended teaching evaluation system based on the CIPP model demonstrates strong scientific and practical value, worthy of promotion and application in university teaching practices.

Fund Project

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