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ARTICLE

A CASE STUDY ON THE EFFECTIVENESS OF BLENDED TEACHING IN COLLEGE

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ABSTRACT

The application of blended teaching in higher education not only responds to the national call for promoting educational informatization but also constitutes an important part of higher education reform. Blended learning shares similarities with the reform of "Classroom of Passion" teaching design of our college. This reform encourages teachers to apply online teaching design to enhance students' learning achievements and also provides a specific model for teachers' teaching design reform. However, true blended learning is not simply adding online activities; it requires a certain proportion of online design and an appropriate and efficient combination of the two, which is also one of the research focuses of blended learning. The author uses the teaching design model of the "Classroom of Passion" to design online and classroom activities, making their proportion of class hours meet the requirements of blended learning, and applies it to the teaching of "Primary School Science Education". The aim is to explore the direction of the Classroom of Passion's informatization reform and the specific ways of combining online and offline in blended learning. After the teaching, 84 students provided anonymous feedback through a questionnaire, and the results were good, especially for the "activity design". The author analyzed in detail the main measures and effects of the "activity design" and made prospects for future research directions.

KEYWORDS

Blended Learning, Teaching Reform, Effectiveness

1. INTRODUCTION

The "Classroom of Passion" teaching reform of our college has entered its eighth year. Its essence is to stimulate students' active learning, transforming from the traditional "teacher-centered" approach to a "student-centered" one. The "Classroom of Passion" not only provides a specific teaching model but also offers a direction for "student-centered" educational reform, providing teachers with a broad space for teaching innovation and encouraging them to flexibly apply it in teaching practice, bravely explore, and continuously enrich and improve the reform experience. The popularization of computers and the Internet and their application in higher education have led to the emergence of blended learning, which can respond to more flexible demands and environments and has become an important trend in higher education reform [1]. At the same time, policy documents issued by our country have put forward the requirements for developing blended learning. The "Key Points of Education Informatization Work in 2016" issued by the Ministry of Education proposed "guiding universities to explore teaching mode reforms such as flipped classrooms and blended learning by using online open courses" [2]. In the "Classroom of Passion" teaching reform of our college, using online teaching design to enhance students' learning achievements is one of the key measures, and the "Classroom of Passion" also provides a specific model for teaching design. However, true blended learning is not simply adding online activities. Next, the author will analyze the differences and connections between the two.

2. THE RELATIONSHIP BETWEEN BLENDED LEARNING AND "CLASSROOM OF PASSION"

2.1 Similarities between Blended Learning and "Classroom of Passion"

Firstly, their goals are consistent. The "Classroom of Passion" transforms from the traditional "teacher-centered" approach to a "student-centered" one. Through teachers' carefully organized cooperative and exploratory learning, it achieves "high cognitive and high participation" teaching, especially rejecting rote learning and enhancing the participation of all students in the classroom, helping and urging students to develop the habit of active and deep learning [3]. At the implementation level, the "Classroom of Passion" should present a "dynamic" aspect, manifested in the teacher's vitality, students' initiative, and the interaction between teachers and students; it should embody a "lively" aspect, integrating lively cases, lively ideas, and a lively atmosphere throughout the teaching process; ultimately achieving a "successful" aspect, manifested in knowledge generation, thinking cultivation, and outcome formation, with both teachers and students growing and maturing together, and ultimately achieving success. The purpose of blended learning is to change the traditional classroom's "teaching-centered" teaching and emphasize the "guidance-subject" teaching model [4]. Teachers need to break away from the traditional role of imparting knowledge and instead consider what kind of help students need. Both are teaching forms that aim to transform the role of teachers and achieve the dominant position

of students in the classroom.

Secondly, there are similarities in the means of implementation. Taking the "Classroom of Passion" teaching model 2.0 of our school as an example, in order to achieve the engagement, involvement and depth of students before, during and after class, teachers need to build resource platforms, communication platforms and assessment platforms. In specific operations, teachers widely use Learning Management System to build online course activities. The broadest definition of blended teaching is the combination of face-to-face teaching and technology [5]. It can be said that online teaching design is a necessary condition for the realization of blended teaching. The completion of teaching activities in both requires a close combination of Internet information technology means.

2.2 Differences between Blended Teaching and "Classroom of Passion"

"Classroom of Passion" gives teachers full freedom in the form and quantity of online teaching and learning activities. Teachers can flexibly use various functions according to the nature and needs of the course. Blended teaching, on the other hand, is generally recognized as a teaching and learning model that combines face-to-face teaching and online learning, combining the advantages of both [6]. However, not all learning with online components is blended teaching. Many scholars have defined the proportion of online and face-to-face learning time in blended teaching. For example, according to the definition of Allen and Seaman, a teaching model with an online learning component of 1% to 29% is web-facilitated, 30% to 79% is blended or hybrid, and 80% or more is an online course [7]. According to Watson's definition, as long as the online learning time is more than 30% of the total class hours, it can be called blended teaching [8]. At the same time, scholars also point out that blended teaching is not a simple superposition of two teaching forms and platforms, but a carefully designed result [9]. There are already many implementation methods of blended teaching in practice, such as flipped classrooms. The efficiency of blended teaching depends on the combination of face-to-face classroom teaching and online learning, which is currently the research and development direction of blended teaching [10]. At the same time, blended teaching also strengthens the advantages of personalized learning. Because blended teaching includes a part of online self-study by students, personalized interaction and evaluation feedback between teachers and students, personalized learning experiences and experiences deepen the concept of student-centeredness, which is also a rich aspect that "Classroom of Passion" can draw on.

The author believes that the reform concept of "Classroom of Passion" provides a specific mixed model for blended teaching, while blended teaching provides a specific implementation method for the reform of "Classroom of Passion". Therefore, the purpose of this study is to explore the direction of information-based reform of "Classroom of Passion" and the specific ways of combining online and offline in blended teaching. In terms of research methods, the author uses the teaching design model of "Classroom of Passion" to design online and classroom activities, making their proportion of class hours meet the requirements of blended teaching, and implements these reform measures in the "Primary School Science Education" course taught by the author.

3. THE APPLICATION OF BLENDED TEACHING IN THE COURSE OF SCIENCE EDUCATION IN ELEMENTARY SCHOOL

The course of Science Education in Elementary School is for the Primary Education majors, which prepares normal students to become primary school science teachers. It is both theoretical and highly practical. The author believes that it is highly compatible with the "Classroom of Passion" 2.0 model's learning process of "posing questions - analyzing problems - solving problems". In the teaching design, the author follows the "Classroom of Passion" teaching model, dividing it into three stages: before class, during class, and after class. The pre-class section mainly aims to stimulate students' interest and trigger their thinking. It is completed online, mainly in the form of flipped classroom videos (each averaging 10 minutes), with each video accompanied by quizzes, online discussions, questionnaires, voting activities, etc., to guide students to reflect and raise questions. This section accounts for 20% of the total class hours. The in-class section lasts for 60 minutes and mainly focuses on discussing and practicing the raised questions. The main forms include: quick response, voting, experiments, etc., accounting for 60% of the class hours. The post-class section mainly involves reflecting on and evaluating the in-class activities. The main forms include discussions, reflections on design works, etc., accounting for 20% of the class hours. Functionally, the online part mainly leverages its high efficiency and personalization advantages to promote autonomous learning, while the face-to-face part provides students with opportunities for group cooperation, communication, and practical experience, thereby fostering higher-order thinking. In terms of class hour ratio, the online part accounts for 40%, which meets the quantitative requirements of blended teaching.

It is particularly worth noting that in this model (Figure 1), the role of the teacher has shifted from a dominant lecturer to a supporter and coordinator at different stages, providing a platform for students' activities at each stage. This model emphasizes the leading role of students in the learning process, and the role and function of the teacher become more concealed.

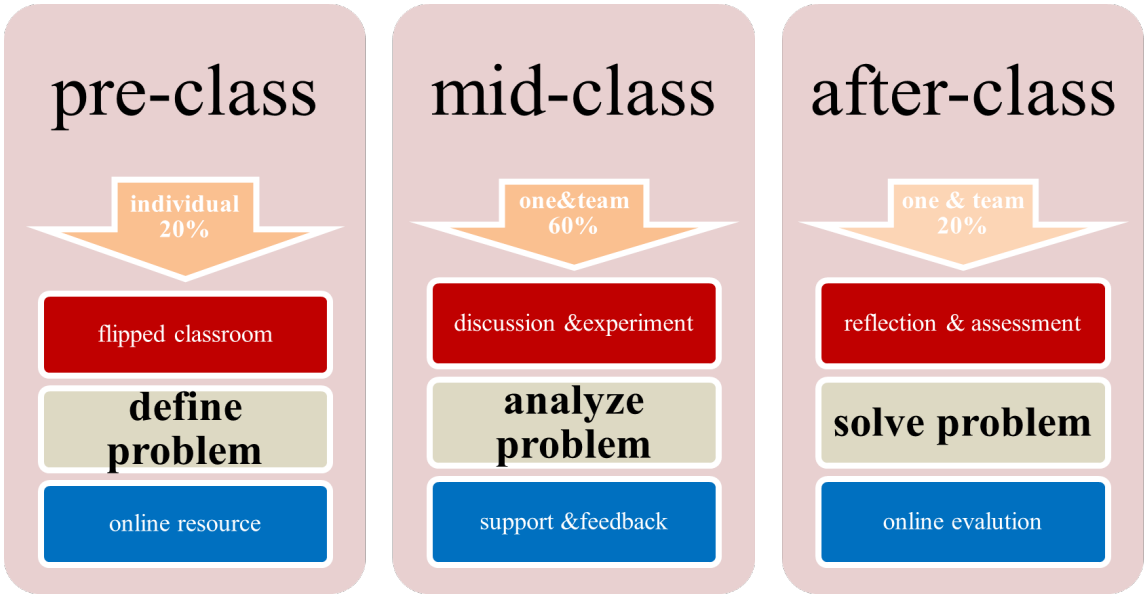

Figure 1: Model of Blended Teaching in Practice

4. TEACHING REFORM OUTCOMES

Essentially, the teaching design conducted by the author belongs to blended learning. To understand the effectiveness of the teaching reform, the author used the "Blended Learning Evaluation Scale" and asked students to evaluate the teaching. The reliability coefficient of this scale was tested and found to be $\alpha = 0.949$, with validity coefficients RMSEA = 0.034, TLI = 0.979, and CFI = 0.981. The scale contains 25 items covering six aspects: course overview, course objectives, teaching resources, learning activities, learning assessment, and course technical support and platform. Each item is scored on a five-point scale. According to the scoring rules, a score of 80 or above is considered good. After receiving feedback from 84 students, the average score of the course was 85.08, reaching a good level. Among them, the learning activities section received the highest score, with an average of 18.5 out of 20. The following is a further analysis of the design and effectiveness of the "learning activities".

4.1 Activity Task List

This course has a high degree of practicality, so there are many activities. According to the needs and teaching objectives, different activity organization forms are set up, such as individual and group activities, online and offline activities, etc. The diverse activities can easily cause psychological pressure for students and confusion in actual operation. Therefore, in the first class, the author released and specifically explained the activity task list through the online platform, as shown in Table 1. This task list spans the entire semester in terms of time, including the learning content of each chapter, pre-class, in-class, and post-class activities, the organization forms of activities, the submission and display platforms for various assignments and works, and the scoring ratios of each activity.

This detailed activity task list has achieved remarkable results. Throughout the teaching process, no student has ever reported confusion about the activity platform or missed assignments. Another piece of evidence is that in the indicator "Learning activities help me achieve my learning goals", students gave an average score of 3.5 out of 4. This means that the activity task list not only guides students in the direction of their activities but also enables them to see the logical relationship between these activities and the teaching objectives, as well as understand the value and significance of the activities.

Table 1: List of Activity Tasks

Week	Chapter	Objective	Pre-class	Mid-class	After-class
1	1	Compare and construct	read, quiz	poll, experiment	test
2	2	Master five strategies	read, video	Discuss, share	reflection

4.2 Inquiry-based Activities Create Active Learning

This course is designed to prepare students for becoming primary school science teachers. Students must not only understand science lesson design but also possess scientific literacy. According to the "Compulsory Education Science Curriculum Standards", the learning method for primary school science is inquiry-based learning. Therefore, future science teachers must be able to design student-centered inquiry-based learning. To achieve this, they themselves must first have such experiences and knowledge. Based on this understanding, the author reduced the proportion of theoretical learning, using short videos in the flipped classroom to complete the interpretation and thinking inspiration of the theory, and placed science practical activities in the face-to-face classroom. Students first conduct practice and inquiry as primary school students, and then reflect and exchange as teachers after class. Through these three steps, students experience different perspectives and experiences as both primary school students and science teachers.

The design of inquiry-based activities must meet three requirements simultaneously: they should not be too simple and should be in line with students' cognitive development characteristics; they should fall within the scope of primary school science education; and they should be closely related to the teaching objectives. Only such inquiry-based activities can attract students to actively explore. Teachers act only as organizers and coordinators, allowing students to complete the activities driven by curiosity and the desire for knowledge. However, the results of the activities are unpredictable and unrestricted. Open-ended discussions and assignments enable each student to have personalized learning experiences and achievements, realizing "student-centered" learning.

4.3 Synchronous and asynchronous interaction Builds a Learning Community

The theoretical basis of primary school science education is constructivism, which is also the theoretical basis of blended learning. Constructivism emphasizes cooperative learning, and communication and collaboration among different learners stimulate interest, broaden horizons, and promote cognition [11]. Therefore, many teaching reforms emphasize the establishment of learning communities to promote group communication. In this course, in addition to discussions in the classroom and online learning, the author particularly focuses on initiating functions that can facilitate communication and sharing, allowing students' ideas to interact with teachers and other students asynchronously and reducing the sense of isolation in online activities. For example, enabling the bullet comment function in flipped classroom videos and setting open-ended questions in questionnaires. Take the life science as example. The pre-class activity is for students to watch a flipped classroom video about life education and complete a short questionnaire based on the video. To enable students to see others' viewpoints, the questionnaire is set up in such a way that students can "immediately view results" and there is an open-ended question, allowing students to express their own opinions after seeing others' views, thus completing a discussion among students.

4.4 Quantitative and Qualitative Approaches for Process Evaluation

As activities constitute the main part of this course, the teaching evaluation mainly focuses on the process of students' activities and provides feedback. Process evaluation is primarily adopted. The purpose of process evaluation is to offer timely information to students during their activities, enabling them to identify problems and improve their activity plans and behaviors [12]. To achieve this goal, activity record sheets and activity evaluation sheets are designed for all activities. The activity record sheet includes the steps and results of the activities that students need to carry out, while the activity evaluation sheet contains detailed evaluation criteria.

5. CONCLUSION

This teaching reform, with a focus on blended learning, has implemented the spirit of a dynamic classroom centered on students and has shown initial success. Blended learning should be designed according to the nature of the course and the characteristics of students. For courses that attach equal importance to practice and theory, teachers can set up different activities to motivate students, enabling them to form their own experiences through hands-on activities. The feedback and reflection activities after class should be of high quality, and multiple forms of evaluation should be used to reinforce and sustain the learning process, ensuring the durability and consistency of learning. Generally speaking, blended teaching returns the classroom and the learning process to students, allowing them to truly become the masters of their own learning. However, there are still some areas for improvement. For instance, a deeper understanding is needed regarding which types of teaching activities have the most significant impact on students' learning experiences. To address this issue, the author has designed a teaching experiment and will implement it during the teaching process for specific verification.

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