Design and Practice of Blended Teaching Mode Based on Rain Classroom in "Security System Engineering"

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Abstract. With the development of Internet + and the popularization of smart phones, there are more and more channels for students to acquire knowledge, and the traditional teaching mode can no longer meet the existing teaching needs. Based on this, this paper takes the demonstration course of Security System Engineering as a foothold, this paper designs the teaching methods and means from three stages before, during and after class, explores the mixed teaching mode based on rain classroom, and applies modern intelligent teaching tools to the whole process of course teaching, thus realizing the teaching idea of taking students as the center and teachers as the guide.

Keywords: Demonstration class · Rain classroom · Blended teaching

1 Introduction

Security System Engineering is the core course of security engineering specialty. The knowledge of the course are the necessary knowledge reserve for the students to go to work. The course has the characteristics of wide knowledge and abstract knowledge points that are difficult to understand. In order to better guarantee the teaching effect, this paper takes the demonstration course of Security System Engineering as a foothold, establishes a mixed teaching and process assessment mode based on rain classroom, so as to improve students' autonomous learning and teachers' teaching ability, thus realizing the teaching idea of "student-oriented, teacher-guided" and comprehensively improving students' comprehensive quality and ability.

2 Characteristics and Current Situation of Curriculum Teaching

With the development of the Internet, there are more and more ways to acquire knowledge and the forms are gradually diversified. Under such a background, the traditional teaching methods have gradually exposed their pain points:

(1) Pay more attention to teaching input than humanistic quality.
(2) Lack of initiative in learning.

Y. Chen et al. (Eds.): ICMETSS 2022, ASSEHR 693, pp. 670–677, 2023.
https://doi.org/10.2991/978-2-494069-45-9_81

(3) The way of curriculum evaluation is single.

In view of the pain points existing in the traditional teaching process of this course, we decided to comprehensively use modern teaching tools, carry out the whole process of diversified blended teaching based on "rain classroom", combined with new teaching tools such as mobile phone terminal and rain classroom, and carried out from three stages of the classroom in order to improve the learning initiative [1].

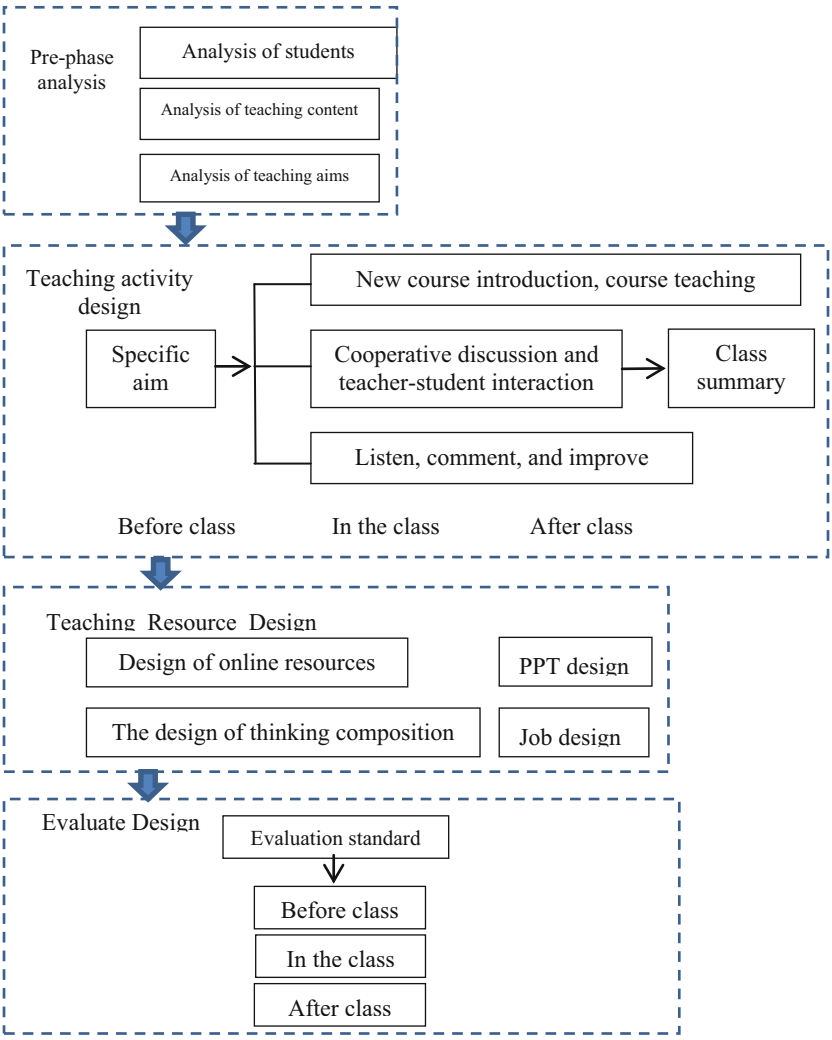

Fig. 1. Teaching design

3 The Mixed Teaching Model Based on "Rain Classroom"

Rain Classroom, a new intelligent teaching tool, can provide data support for the teaching process. Based on this, the teaching process is designed for this course, as shown in Fig. 1.

3.1 Before/After Class

(1) Student Analysis

Students are the main body of the classroom, the analysis of students is an important step in teaching design, only by fully understanding the characteristics of students, in order to better carry out teaching work and arrange teaching activities properly.

The target of this course is junior students, who have gradually developed classroom habits in the first two years of college. Therefore, recognizing students' learning attitude in advance before designing the course is conducive to the development of the course [2]. According to the compiled learning situation questionnaire, the results are shown in Fig. 2 and Fig. 3. Through analysis, it is found that 28% of the students have the habit of preview, and 42% of the students have a mediocre preview, indicating that most of the students have the consciousness of preview in advance (Fig. 2). Nearly 75% of students will take the initiative to ask questions when they encounter problems, which shows that most students have high enthusiasm (Fig. 3). These situations are conducive to the development of rain classroom teaching.

(2) Analysis of Learning Content

At this stage, teachers release preview tasks in the "rain classroom" and teach students to complete the corresponding homework according to the corresponding requirements. If they encounter doubts during the period, they should put forward them in time and the teacher will answer them [3].

After class, the teacher classifies and summarizes the statistical data in class, improves the teaching plan according to the students' situation, and actively prepares the next class.

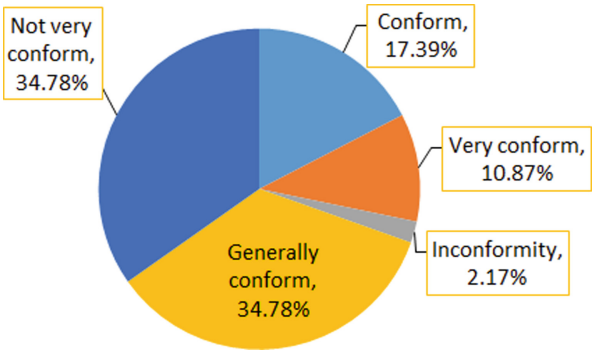

Fig. 2. Preview before class

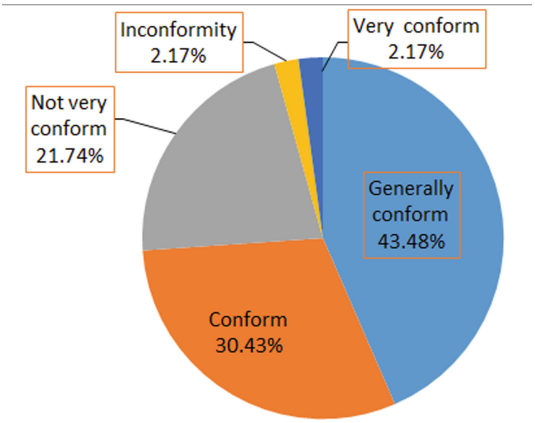

Fig. 3. Active questioning in the learning process

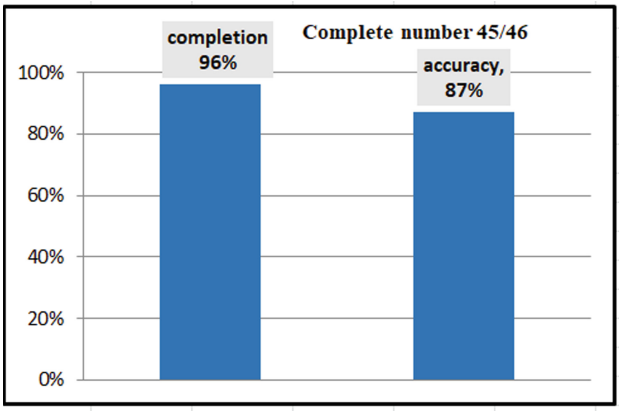

Fig. 4. Answer in class

3.2 Tutorial Phase

This process is mainly classroom teaching, and live teaching can also be added appropriately in case of emergencies such as epidemic. The doubts of students' pre-class preview are analyzed in combination with the key and difficult points. In the teaching process, students can receive the course teaching materials through mobile phones and send "bullet screen" and "don't understand", teachers can adjust teaching according to the content marked by students. In class, the group cooperation task is issued, and the discussion is carried out according to the results of each group. The group representative reports the discussion results of the group, and the teachers and students find a common solution after listening [4].

In class, teachers can also publish questions in class based on the teaching content, and students can complete relevant exercises in time on mobile phones. (Fig. 4).

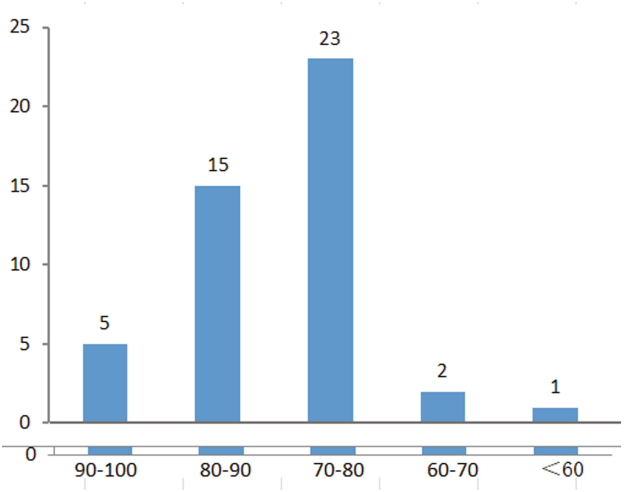

Fig. 5. Chapter 2 distribution of test scores

Through the analysis of students' answers, analyze the wrong questions, and consolidate the knowledge points of the course in time. Through class comments and suggestions from classmates, students can summarize themselves, reflect and modify, so as to consolidate the teaching content and deepen the understanding of the knowledge point.

3.3 Testing Phase

After the three stages of pre-class, in class and after-class, students have been able to learn well according to the teaching activities. However, the learning effect still needs to be further tested. At the end of each chapter, the test questions can be issued for a limited time for the test. The scores of the objective questions are given directly by the rain class, and the scores of the subjective questions are evaluated by the teachers. After the completion of the test, the score distribution of the test in Chapter 2 is shown in Fig. 5. According to the test results, 93.5% of the students have a good grasp of the knowledge of Chapter 2, but some students have some short comings. At this time, it is necessary to make up for the deficiency according to the deficiency. (Fig. 5), it is different from the traditional to the final as the only way to detect, which can realize real-time evaluation class, form a diversified supervision and examination form, so that in the presence of students teaching progress and content in time [5]

4 Teaching Evaluation

According to the three stages in the teaching process, formative evaluation indexes are designed to guide the teaching evaluation work of this study. On the basis of the three evaluation stages, a class of indicators is divided, and on the basis of a class of indicators, more detailed class-level indicators are divided, as shown in Table 1. The evaluation grade is composed of five grades, E ~ A, corresponding to 1 ~ 5 points respectively. After the

Table 1. Learning evaluation table

Evaluation stage	A kind of index	Class II indicators	Evaluation criterion				
			5A	4B	3C	2D	1E
Before class	Preview of learning resources	1. Check preview materials 2. Have you finished the material preview					
	Discussion on the platform	1. Ask questions and speak times 2. The number of replies and likes in the comment area					
In class	Participation in learning	1. Class attendance 2. Classroom participation in barrage 3. Class participation and discussion					
	Cooperation and exchange	1. Whether the team task can be submitted on time 2. Whether to listen to students' suggestions 3. Is it united and friendly					
	Online testing	1. Can the test be completed within the specified time 2. Accuracy of the test					
After class	Completion of individual work	1. Can the homework be submitted on time 2. Quality of work submitted					
	Group work	1. Division of labor among team members 2. Is the group discussion justified					

course, A complete and detailed three-dimensional report is generated according to Table 1. Through evaluation, it is shown that 15 students in this class are A, 20 students are B,10 students are C, and 1 student is D. The evaluation results provide A basis for diversified evaluation of students.

Table 2. Investigation Results of blended teaching Effect (n = 46)

Evaluation index	significant	general	not obvious
Stimulate students' interest in learning	24(52.2%)	20(43.5%)	2(4.3%)
Improve students' autonomous learning ability	30(65.2%)	13(28.3%)	3(6.5%)
Improve the ability to use knowledge	23(50%)	20(43.5%)	3(6.5%)
Improve the ability to analyze problems	25(54.3%)	17(40%)	4(5.7%)
Have a better understanding of the course knowledge points	26(56.5%)	16(34.8%)	4(5.7%)

5 Evaluation of Students' Learning Effect

In order to better understand the learning effect of students, at the end of the semester, a questionnaire survey was distributed in the class to investigate the learning effect of students and blended education. A total of 46 questionnaires were distributed and 46 valid questionnaires were recovered. The results of the questionnaire survey showed that the blended teaching model of "Rain classroom" had a positive effect on stimulating learning interest, autonomous learning, knowledge application and problem-solving ability. The course materials sent by students before the class feedback could help them well preview the teaching content and significantly improve students' autonomous learning ability. It greatly improves his understanding of the knowledge point of "Security System Engineering", especially the relatively complex alarm system. Most students can master most of the course contents in the pre-class preview and teaching process, and then consolidate through the after-class review questions, plus the coverage of unit tests, can master the course knowledge points in a relatively comprehensive way, and can be well used in real life. Only a small number of students said that they did not adapt to this way of teaching, mainly because of the problems of not adapting to the completion of homework. As shown in Table 2.

6 Conclusions

With the development of the Internet, "Internet + education" gradually shows its role in teaching. In this paper, the instructional design based on rain classroom visualizes and digitizes the whole teaching process, strictly controlling every link of the teaching process, systematically designing the three stages of the teaching process and the test links are conducive to mobilizing students' learning enthusiasm, enhancing the interaction between teachers and students, greatly improving students' learning initiative, and thus helping students to better master the teaching content.

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Funding. "Double-Base" Teaching Demonstration Course of Education Department of Anhui Province (No: 2020sjsfk02).

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