The Study of Blended Teaching Mode Based on Rain Classroom

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Abstract: Blended teaching mode is an online and offline teaching mode which combines the advantages of online teaching and traditional teaching. This research takes "rain classroom" intelligent teaching platform as the carrier, and uses MOOC and other online resources to carry out blended teaching reform and attempt on "Analog Electronic Technology" course. By considering the characteristics of the course and the problems existing in the traditional teaching methods, this paper expounds the ideas and methods of the course reform. It focuses on the construction of online and offline resources, the implementation of hybrid teaching mode, and the construction of Diversified Assessment and evaluation system. The implementation of this study has achieved good results and greatly improved the students' class participation and knowledge mastery.

1. Introduction

Analog Electronic Technology is an introductory course of electronic technology, which aims at enabling students to master the basic theory, knowledge and skills of analog electronic circuit. It has its own system, with strong engineering and practical. Engineers cannot be armchair strategists, they must emphasize the combination of theory and practice and turn the theoretical analysis of "feasibility" into "hardware implementation"[1]. Through the study of this course, students' ability to analyze and solve problems will be cultivated, which will lay a solid foundation for their development in some related electronic technology field in the future[2].

Online and offline blended teaching is a hot topic in higher education at present. The main participants of Higher Education - "post-95" and "Post-00" college students- have undergone profound changes in the way of information and knowledge acquisition, which is reflected in: mobile phones have become an integral part of students' life; students' cognitive laws are mainly characterized by constructivism, and they have accustomed to obtaining information from multiple different sources, they are not averse to fragmented information, but are interested in it. This can be seen from the popularity of Online Food Ordering App and Bilibili Website in the student community; students' expectations of learning and curriculum show a diversified trend[3].

Rain classroom is a smart teaching tool, which is developed by Xuetang Online and Tsinghua University Online Education Office. The purpose is not only to improve the classroom teaching experience comprehensively, but also to make teachers and students interact more and teaching more convenient. Relying on PPT courseware and mobile terminal (Wechat), rain classroom realizes all-weather interaction between teachers' teaching and students' learning in the whole teaching process (before, during and after class). The Ministry of Education issued the notice on strengthening the implementation of the spirit of the National Undergraduate Education Conference in the new era, which requires to eliminate "water courses" and create "gold Courses". It is a profound curriculum reform in the field of higher education in China[4]. Based on the intelligent teaching tool of rain classroom, the teaching reform of "Analog Electronic Technology" is carried out by adopting the mixed teaching mode, which can essentially mobilize the students' enthusiasm for learning, take students as the main body and teachers as the leading role, and strengthen the cultivation of students' comprehensive application ability and innovation ability.

2. Analysis of Current Situation of Classroom Teaching

2.1. Students

As an important basic course, Analog Electronic Technology is usually offered in the second semester of freshman year or the first semester of sophomore year. In general, students at this stage are more eager to learn and curious, full of longing and yearning for college life. They have proper learning attitude and full of enthusiasm for discovery. However, due to the short period of entering the university, many students follow their learning habits and methods of high school, like to "do exercises-stuffed" but not willing to "challenge", like to "listen to lectures" but not to "self-study". The amount of knowledge in college courses is large, and the range is wide, but the class hours are shrinking and shrinking. If students do not spend a lot of time to review and study by themselves after class, it is very difficult to really master the knowledge. As the result teachers must adjust the teaching methods according to students' conditions, and master the course contents efficiently and flexibly on the basis of helping students complete the transformation of learning methods.

2.2. Teachers

In the traditional teaching methods, teachers often use a single teaching method, mainly multimedia courseware. Teachers are mainly responsible for "speaking" and students are mainly responsible for "listening", which is called "cramming teaching". The advantage of this method is that the teacher had taught all that should be said, the teaching task has been completed. In fact, it is difficult to get timely feedback on how much students understand and how much they have mastered. Especially in the context of great changes in the connotation, concept, mode, content and method of the new engineering, there is no doubt that the traditional teaching methods are no longer suitable for the new requirements of the reform, nor conducive to the cultivation of students' innovation and entrepreneurship ability.

2.3. Assessment and Evaluation System

At present, the course assessment mainly adopts summative evaluation, for example, the final grade consists of two parts, the final written examination results are the main part, accounting for 70% - 80%, the usual attendance and homework accounts for 30% - 20%, lacking process evaluation and management. In some schools and courses, due to the students' low enthusiasm for learning and poor mastery of the course content, some teachers will make key points before the examination and reduce the difficulty of the examination in order to avoid the high failure rate. This practice further intensifies the phenomenon of "not studying at ordinary times and cramming before the examination", which is easy to form a vicious circle.

3. Result Analyses

3.1. Selection and Construction of Online Resources Before Class

Because there are many knowledge points in this course and the teaching hours are less, the traditional classroom teaching mode is very tight to complete the content required by the syllabus, and students have no time to improve their innovation ability and comprehensive quality. In order to improve the utilization rate of the class better, we changed the teaching concept, made full use of the existing online MOOC resources, and selected content carefully that was consistent with the requirements of knowledge points in the syllabus as materials for students to preview before class. At the same time, according to the actual level and ability of students in our school, the course group will record some video of the content that are too difficult or too simple to explain, such as the micro-variation equivalent circuit method, active filter, etc. At the same time, in order to make students' preview more targeted and purposeful, we have made a preview courseware for each class, in which we put forward specific requirements of the class to help students to understand better.

Relying on PPT courseware and mobile phone terminal (WeChat), rain classroom can realize all-weather interaction between teachers' teaching and students' learning in the whole teaching process (before class, in class and after class). In order to consolidate the students' grasp of classroom knowledge, we separately formulate network exercise questions. We can get the

corresponding feedback information without delay through the rain classroom, such as the number of preview people, each student's preview situation, preview practice scores, etc. According to the feedback information, teachers can give students personalized guidance timely through voice, pictures and so on.

3.2. Design and Resource Construction of Teaching Procedures in Class

Preview before class can make students' central theme even more apposite. Then, the level and quality of teaching design for classroom teaching become an important part of the effect of teaching. The code check-in function of rain classroom will make students join one class, and then the various assessment and supervision becomes very convenient.

Because of functions of the rain class intelligent platform in pushing courseware and problem sets timely, we will separate a "chapter" into many "sections" of the courseware at first, according to the requirement of the preview courseware, readjust the interpretation of courseware knowledge strategy. We will push 1-2 related exercises to students' mobile phone terminals after each knowledge point explained. Practice exercises are mostly multiple-choice questions, of course, can also be subjective questions which can be answered in restricted hours. When students begin to submit answers, teachers can see the answers on their own mobile phones and know which student choose different option. The great benefit of this feature is that teachers can be accurate to know which students are wrong timely! Later, we can ask questions to understand the reasons for the wrong choice, correct students' wrong understanding of the option with high wrong rate, and prevent the paradoxical understanding from affecting the follow-up study. In the traditional classroom, many students do not understand and are unwilling to take the initiative to ask questions, and teachers cannot get timely feedback when arranging classroom tests. Therefore, it is an important content and harvest of this study to make use of the functions of answering questions, voting and barrage in the rain classroom to enhance interactivity and build representative and targeted classroom resources.

For some important and difficult content, the arrangement of a small class discussion is also effective. For example, when talking about the feedback of amplifying circuit, it is difficult for students to judge which is voltage feedback or current feedback. They are always wrong and confused at the beginning, so we designed the discussion section of the class in advance. First, before class, all students scan the code into the classroom, the random grouping function of rain classroom will divide them into many groups, and then teacher can ask students to arrange seats according to the groups, so as to facilitate class discussion and report. In class, when it comes to the discussion of the knowledge points, students will explain and discuss in groups, summarize their judgment experience, and even draw it in the form of legend. After the discussion, group leaders can send their answers to the rain classroom platform through the "contribute" function, which can be projected onto the big screen of the classroom and pushed to each student by teachers. This kind of blended teaching improves students' participation in class and makes teaching efficient than before. Of course, in order to make full use of the classroom time, we also designed and collected a lot of new technologies and developments related to applications. According to the corresponding teaching contents, a lot of simulation contents were made by using the Multisim software of Canadian IIT company. The demonstration of these simulations deepened students' understanding of relevant knowledge well.

3.3. Review and Consolidation After Class and Construction of Assessment System

In order to acquire the information of students' learning without delay, we also developed exercises and tests for the rain classroom in addition to the exercises arranged in the traditional textbooks. This test can give the answer and score directly when the students completed their exercises, which facilitate students to correct and understand their learning situation. At the same time, students can send the questions they do not understand to the tutor or the group of students through online message or discussion forum, and the timely answers should be gained. This method further strengthens the interaction between teachers and students and among students, and plays a positive role in fostering students' communication and innovation ability. The blended teaching has achieved

the goal of keeping students "busy", and the single assessment method of "final examination for life" has been unable to adapt to this teaching mode. Through practice, the current assessment methods include three major parts: offline learning accounts for 20%, classroom discussion accounts for 10%, classroom exercises and tests accounts for 10%, homework accounts for 10%, attendance accounts for 10%, and final examination is 40%. We will feedback each score of the assessment results to students in time so as to facilitate students to understand and master their grade and try their best to check for gaps in the follow-up study. In order to get high grade point averages, students must pay attention to the usual tasks, to avoid cramming at the end of the semester to deal with the exam situation.

4. Conclusion

Innovative talents are the key subjects of national technological innovation, knowledge innovation and service innovation, while universities are the main channels of innovative talents training. The essence of new engineering construction is to improve the innovation ability and creativity of college students[5]. Through the reform, students' interest in learning the Analog Electronic Technology course has been greatly enhanced, and they have personally experienced the fun of online autonomous learning, offline multi-faceted discussion and improvement, and their class participation and activity have been significantly improved.

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