

Research on Online and Offline Mixed Teaching Mode Based on "UMOOC" Platform——Taking the Course "Mechanics of Materials" As an Example

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Abstract: In higher vocational colleges, the traditional single and boring teaching methods can not improve students' enthusiasm and interest in learning. In response to this phenomenon, a mixed online and offline teaching model based on the "UMOOC" platform is proposed. It uses teaching platform to combine students' online learning with teachers' classroom teaching, and with the help of teaching resources and information-based teaching means, it fragments teaching resources, breaks through the time and space limitations of teaching, and realizes the high-level and innovative teaching. And practice shows that the teaching mode not only improves students' independent learning ability and enthusiasm, but also improves the quality of classroom teaching.

1. Introduction

In order to promote the development of higher vocational education informatization, the Ten Year Development Plan of Education Informatization (2011-2020) issued by the state emphasizes as follows: we should deeply integrate information technology with higher education, accelerate the informatization construction of vocational education, so as to give full play to the supporting and leading role of informatization education in education reform and development [1]. A "student-centered, teacher led" online and offline mixed teaching mode is proposed, which integrates information technology with higher education. Teachers use advanced information teaching methods, big data, cloud computing and other information technology to create a network course platform [2]. Students will make use of the guiding plan, teaching courseware, teaching video, micro class, test and other independent learning and discussion of the course platform before class. According to the students' learning situation, teachers will explain the students' doubts and incomprehensible knowledge in detail in class, and use information-based teaching methods to overcome the teaching keys and difficulties. After class, students will consolidate their knowledge and communicate with teachers and students in a timely manner through platform homework according to the key and difficult points explained by teachers. In the mixed online and offline teaching mode, the traditional one-way teaching method is solved, and the boring state of students is avoided. Combined with the network teaching platform, the autonomy and enthusiasm of students' learning are effectively improved. In the context of rapid development of information technology, online and offline mixed teaching mode is gradually used in higher vocational education.

2. The present situation of the traditional teaching and its solution

As for Mechanics of Materials, it is not only a professional basic course with strong theoretical in mechanical specialty, but also the foundation of the follow-up core course of mechanical specialty, which is widely used in many engineering fields. In this course, the combination of theory and practice is emphasized, and the application of theoretical knowledge to practical engineering problems is emphasized. This requires that students have the ability to skillfully calculate, analyze and solve problems, and be able to apply the theory and method of material mechanics to analyze and solve practical engineering problems. In the traditional teaching method, teachers' teaching is the

center, that is, the knowledge of teaching materials is transferred to students, which lacks the communication between teachers and students, can not mobilize students' independent learning, and ignores the differences and personalized needs of students [3]. In the continuous implementation of teaching reform, situational and project-based teaching is gradually carried out, but it can not mobilize the autonomy and enthusiasm of most students [4].

In order to change the traditional teaching mode, the online and offline mixed teaching mode based on "UMOOC" platform is proposed, which breaks through the limitation of time and space. Teachers can adopt flexible teaching methods according to the individual differences of students. Students can acquire teaching resources anytime and anywhere for independent learning, which facilitates the communication between teachers and students, students and students. In the classroom teaching, the teacher guides, inspires and supervises the students, which fully arouses the students' initiative and enthusiasm in learning, and improves the students' learning effect and quality.

3. The practice of online and offline mixed teaching mode

3.1. Network teaching platform

In the context of the development of information technology, there are more and more online teaching platforms. For example, "UMOOC" is a comprehensive online education platform to build an information-based teaching and management support system in colleges and universities. On this platform, teachers can not only create courses, but also upload courseware, videos, lesson plans, tests, assignments and other resources in the course module. In the network environment, students can use mobile devices or computers to complete independent learning, interaction and exchange of course content, which creates a student-centered and information-based teaching atmosphere. At the same time, the platform has the characteristics of simple operation, not limited by time and place, and provides convenience for teachers and students to use.

The "UMOOC" platform can log in on PC, tablet and mobile phone by downloading app. The main functions of the platform include but are not limited to: course creation, class addition, student management, teaching resource push, teaching activities (interactive communication, answer and question discussion, course assignment and task implementation, timing test), questionnaire voting, course evaluation. In this platform, students' learning results can be recorded in time (the number of times they enter the course, the length of watching the video, the results of homework, test results, etc.). Therefore, teachers can adjust the teaching methods and teaching progress according to the results, which is convenient for teachers to supervise and evaluate students' learning effect at any time, and provide personalized help to students in time.

3.2. Teaching design and implementation

In the design of online and offline mixed teaching mode, the key is the redesign of teaching mode and teaching strategy, that is to increase the richness of courses and mobilize the initiative and enthusiasm of students' learning through redesign. Taking Mechanics of Materials as a case, based on the online and offline mixed teaching mode of "UMOOC" platform, this paper divides the course into following three stages: cognition before class, learning in class and expansion after class. According to the characteristics of material mechanics course, each course is carefully designed into following five teaching links: "view, teach, do, evaluate and expand", which correspond to the three modules before, during and after the course. As shown in Figure 1.

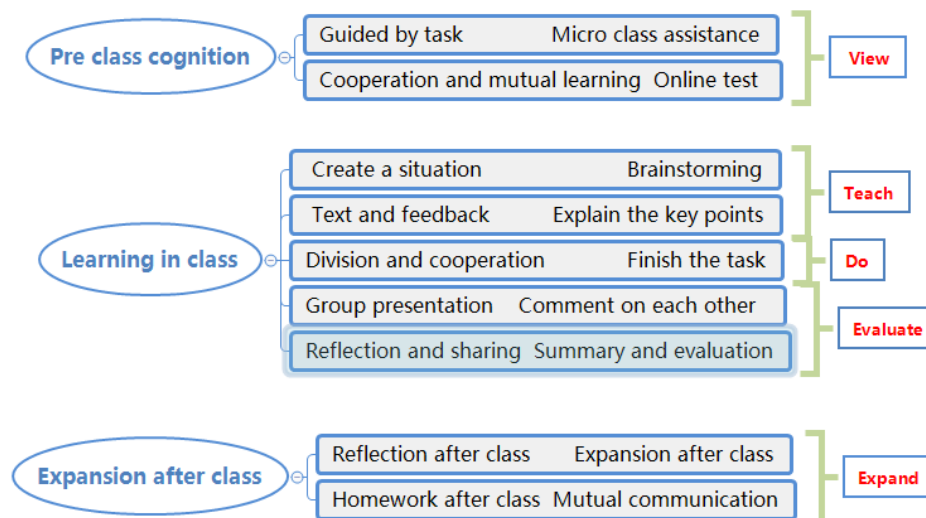


Figure 1. Flow chart of teaching design

(1) In the cognitive stage before class: for teachers, online platform system is used to upload fragmented teaching resources and related tasks such as learning guide plan, courseware, micro class, video, animation, test questions, etc., and pre class preview notice is issued through "UMOOC" platform, QQ group, Wechat group, etc. For students, they will watch micro videos, electronic teaching materials, animation, etc. according to the learning guidance plan, and communicate with teachers and students online in the discussion area, and upload the knowledge points they don't understand to the online question answering area in the form of questions to complete the pre class learning. Finally, the students complete the online test, save and submit it. Meanwhile, the teachers check the students' online preview and test statistics results, and adjust the teaching strategies in time according to the students' online learning effect.

(2) In the learning stage of the class: teachers create situations, brainstorm students and introduce courses. Teachers, according to the situation of students' independent learning, can flexibly adopt heuristic, discussion and other forms of teaching methods. In addition, teachers can use animation, video and other information-based means to explain the difficulties encountered by students in learning, to help students master the key and difficult points of the course and build a complete knowledge system of fragmented knowledge points. The task is completed through group cooperation, and teachers organize classroom teaching through group challenges, group cooperation, etc. to answer questions. Group presentations and peer reviews are used. Students show their achievements, and teachers comment and grade them in time. Reflection sharing and summary evaluation are adopted, and teachers organize students to conduct classroom reflection summary.

(3) Expansion stage after class: teachers collect students' feedback, reflect and rectify, adjust teaching strategies, assign homework, and students consolidate what they have learned. Teachers can also push some materials such as life practice, engineering examples and post requirements to expand classroom knowledge and broaden students' knowledge.

3.3. Teaching evaluation and assessment

In the online and offline mixed teaching mode assessment, it is divided into the usual assessment and the final examination, accounting for 50% each. Among them, in the usual assessment, the pre class independent learning assessment and classroom learning assessment are included. In the assessment of independent learning, videos watched by students, discussion and interaction, homework and test are mainly included. Independent learning assessment can improve students' enthusiasm and initiative in online learning, promote the interaction between students and teachers, and enable students to transfer more personal time to online course learning. In the assessment of classroom learning, attendance, group discussion, achievement display, etc. are included. Teachers can set the proportion according to the specific situation. According to the usual assessment results,

teachers can timely urge, encourage students, and conduct personalized counseling, which effectively improves the teaching effect.

4. Reflection on the implementation effect of online and offline mixed teaching

Through the "UMOOC" platform to carry out hybrid teaching and use the network course learning platform to complete online learning before and after class, the initiative of students' independent learning and training is improved. Through the use of video, teaching animation and other information-based means, it helps students understand problems, simplifies complex problems, visualizes abstract problems, and solves teaching difficulties. Through the teaching resource database and network course teaching platform, the information-based teaching mechanism from "material" to "course" to "material" is realized. According to the content and characteristics of the course, the teacher makes the grading rules, which not only realizes the classroom assessment and enables the students to better observe their own performance, but also effectively promotes the students' enthusiasm and self-restraint in learning. The comprehensive results are as follows: the vast majority of students have completed teaching task requirements, and students' vocational skills and professional qualities have been improved very well. Moreover, the implementation of the mixed teaching mode has greatly improved the final exam scores of the students, which shows that the average score is 81.6 points, 5 points higher than the average score of the previous students who accepted the traditional teaching mode.

5. Conclusion

By means of "UMOOC" platform, the mixed teaching is carried out. After class, students learn by themselves, teachers explain the key contents, discuss, interact, display, evaluate and summarize, etc. to complete the classroom teaching, which realizes the teaching with "students as the main body and teachers as the leading". Through the effective combination of "offline" and "online" learning methods and the use of animation, micro class video and other resources, students are guided from "passive" learning to "active" learning, and the achievement of teaching objectives is effectively promoted. In addition, through the establishment of interconnected learning tasks, the integrated mode of "from teaching to learning to doing to evaluation" is adopted to effectively improve students' ability of collaborative learning, problem analysis and problem solving, and cultivate students' craftsman spirit.

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