



Application and Practice of Online Teaching of Computer Image Processing Courses Under the Concept of OBE Education

Li Wang^(✉)

Shandong Institute of Commerce and Technology, Yantai, China
917586724@qq.com

Abstract. The computer image processing course is a professional orientation course for computer technology, information technology, artificial intelligence and other majors. During the COVID-19 outbreak this spring, the course teaching team investigated and analyzed the software and hardware environment for students to conduct online teaching, and combined with the characteristics of this course, relying on the online teaching resources established by the continuous promotion of teaching reform in recent years; teaching. Online teaching takes OBE results as the guiding ideology, takes students' development as the core, pays attention to the autonomy of students and the guidance of teachers, evaluates and feedbacks students' learning effects through different channels, and promotes teachers and students' teaching and learning methods. Continuous improvement, so that the quality of online and offline teaching is essentially equal.

Keywords: OBE education concept · Computer image processing · Online teaching

1 Introduction

In recent years, with the rapid development of computer technology, mathematical theory has been continuously improved, and computer image processing technology has become increasingly mature, and has been widely used in military, transportation, industry and other fields. With the emergence of artificial intelligence, intelligent manufacturing and other emerging disciplines, and the future development trend, "computer image processing" has become a compulsory course for university automation and electronic information engineering. However, there are some difficulties in the teaching process due to the large amount of teaching content of image processing technology, the high requirements for mathematical calculation, the rapid technological update, and the integration of theory with practice. In recent years, the course teaching team of this major has been carrying out the reform of course teaching, and has been trying to combine with modern educational technology in the past three years, and gradually formed online course resources suitable for classroom teaching.

2 Analysis of Online Teaching Situation

Online teaching refers to a kind of teaching activity carried out by teachers and students in time and space, and it can be carried out online through various channels. Online teaching means that teachers and students cannot communicate “face-to-face” in course teaching, while “computer image processing” is a professional course with a certain degree of difficulty, and its online teaching and offline teaching quality are equal [1].

Before the start of the course, the course group compared some common online teaching methods: MOOC, live broadcast and recorded broadcast. If it is in the form of MOOCs, during the epidemic, various online platforms will provide “computer image processing” courses, but the content, time and content of the courses will vary. Just letting students learn the content of the MOOC by themselves is far from meeting the teaching requirements of this course. If the traditional classroom is moved to the Internet through live broadcast, it can make up for the lack of MOOCs, but the limitation of time and space will inevitably lead to difficult communication. Teachers and students teach at home, and live broadcasts are easily disturbed, and live broadcasts are prone to interference. There is a strong dependence on teaching platforms, software, and networks. Many students cannot participate in the live broadcast, and the quality of the live broadcast cannot be guaranteed. If the PPT teaching video is used as the teaching content in the form of recording and broadcasting, the dependence on the platform and the network can be well solved, but the teachers can only “seem to themselves”. Since they cannot grasp the learning situation of the students in time, it is difficult to effectively communicate with the students. Communication and guidance, and requires a high degree of consciousness. Through comparison, it is found that only relying on MOOCs, live broadcast, recording and other methods cannot meet the requirements of this course.

3 Online Course Teaching Practice

3.1 Instructional Design Method

On the basis of the investigation and analysis of the network teaching, the research team has determined that the network teaching mode will be a combination of online self-study and online teaching. The teachers refer to the national excellent MOOC resources on the Chinese MOOC website, create their own school’s “asynchronous SPOC” course, and according to the content and difficulties of the syllabus, the MOOC resources have been transformed, supplemented and expanded knowledge points, and Added some key and difficult tutorials, quizzes, homework, etc. Build online classrooms through QQ voice, screen sharing + MOOCs, etc., teach in QQ groups, and use the teacher’s computer screen as a blackboard to share with students. In the form of online classroom, the auxiliary teaching function of MOOC is used in the classroom to carry out check-in, announcement, discussion, classroom test; such as carrying out questionnaire survey, etc., and project relevant webpages on the teacher’s computer screen, and communicate with students They share [2].

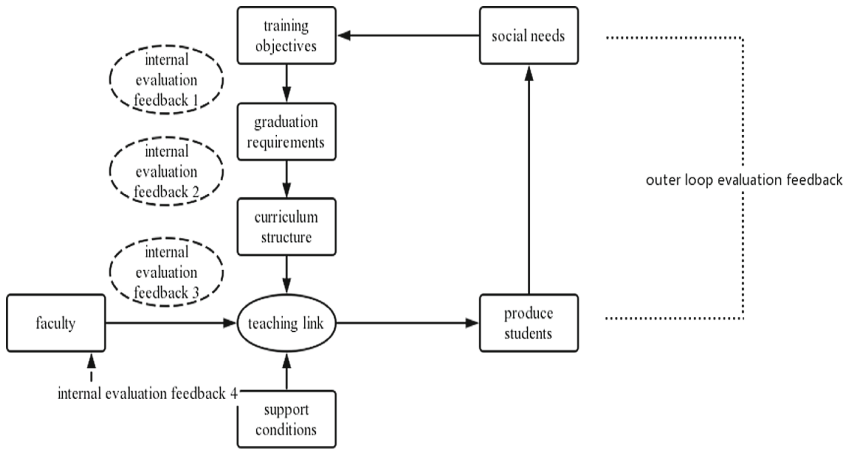


Fig. 1. Teaching design of “Computer Image Processing” course based on OBE concept (self drawn)

3.2 Preparation of Teaching Environment

Before the official class, the students will prepare for the online class under the guidance of the teacher. Join the QQ group. All the students related to the course have joined the QQ group with their real identities, which is convenient for communication between teachers and students, and also regards the QQ group as an online classroom. Form a QQ group with other members of the class to test online teaching and give timely feedback on the situation of the class. Make eBooks. There is a set of electronic versions of “Digital Image Processing” in the QQ group archives, which is also a reference textbook for the national excellent MOOC online teaching resources. Instruct students to register online for MOOCs in Chinese universities and pass the “Computer Image Processing” asynchronous SPOC project of this major. Created the “Mr. Zhou’s Computer Image Processing” MO class, and all students participated in the MO class. On the MOOC website of Chinese University, the students were introduced to the overall arrangement of the course through the asynchronous SPOC course of “Computer Image Processing” [3].

3.3 OBE-Based Outcome-Oriented Instructional Design

Based on the OBE result-oriented design idea, the online teaching design of “Computer Image Processing” is shown in Fig. 1. In teaching, students-oriented, teacher-oriented, and students’ learning effectiveness are the starting points; teaching activities are carried out for the purpose of comprehensively developing students’ knowledge, ability and quality. The online classroom enables students to actively participate and actively participate, and realizes the focus of course teaching and the cultivation of high-level ability and quality [5].

In the teaching process, there will be independent learning, tests, homework, etc.; classroom discussions, experiments, project training and other teaching activities are

Table 1. Students' online self-learning situation (self drawn)

project	Number of items/piece	Completion number/person	Completion rate/%	grade point average
video learning	58	88	86.2	
unit test	6	90	88.2	96.6
Coursework	10	94	92.3	85.3
other assignments	5	92	90.1	

included in the scope of course evaluation, teachers use the tools provided by the online teaching platform and online classroom teaching evaluation and other means, the mastery of the knowledge points, the ability of independent learning, the ability of language thinking and expression; the spirit of teamwork, the ability to practice innovation, the humanistic quality, and the rigor of scholarship; a comprehensive evaluation of the craftsmanship spirit, etc., to encourage teachers And students constantly reflect and improve in teaching, so as to achieve a closed cycle of teaching and learning [6]. Through the evaluation of each stage of the teaching process, teachers can make timely evaluation of students' knowledge learning effect, and can also test their ability and quality, so that they can invest more time and energy in the classroom to improve their own skills. Ability quality. The specific online self-learning situation of students is shown in Table 1.

The calculation formula for the OBE objective realization degree analysis is shown in Eq. 1:

$$\sum_{i=1}^n (\text{Grade Item } i \text{ Score}/100) \times (\text{The weight of grade item } i/\text{The weight of the course item}) \quad (1)$$

4 Conclusion

Due to the sudden outbreak of the epidemic, the large-scale online teaching carried out by colleges and universities across the country in the spring semester of 2020, although a form of emergency measure, has also opened up a new way for colleges and universities to reform traditional teaching and accelerate classroom reform. The teaching group of "Computer Image Processing" seized this rare opportunity, dared to meet the challenge, successfully completed the online teaching, and obtained some achievements and experience; this is an experience worthy of our serious study and absorption. Practice shows that the online teaching of "computer image processing" based on OBE results can be essentially equivalent to online classroom teaching. The subsequent course teaching team will improve the course construction according to the teaching needs and combined with the feedback of this online teaching practice.

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