The Exploration of Progressive Experimental Training Teaching Mode Based on O2O

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Abstract. In view of the current situation that the experimental teaching hours are few and the task is heavy, the offline progressive experimental teaching, online micro class teaching and online progressive practical training breakthrough teaching mode are adopted, the experimental teaching contents with progressive logical relationship are designed, the difficult and in-depth practical training tasks are allocated, and the trainees' practical training results are mastered openly, fairly and fairly in real time on the training platform. It is proved that this method can improve the quality of practical teaching.

1. Introduction
College computer basic course is a required general course for freshmen in all majors. The purpose is to train the students' ability to analyze and solve problems by using computer technology in practical work by systematically learning the basic knowledge of computer field. This course covers nine chapters, including computing and society, python introduction, computing thinking, information coding and data representation, computer system, computer network and application, application foundation of database technology, scientific computing and new technology of computer development. It can be said that almost every chapter is a professional course of computer. It's really difficult for freshmen to finish these courses in a limited time. In addition, the experimental courses have fewer hours. In terms of the actual teaching effect, there are the following problems:

(1) There are more theoretical class hours and less experimental class hours. For this course, although we need to understand the technical basis of computer software and hardware, information representation, algorithm, database, computer network and other theoretical knowledge, the experiment is also very important. For example, most of the students in middle school have little or no access to computer programming, let alone Python language. From a professional point of view, learning any programming language can not be solved in a few classes. It requires a large number of programming exercises and experimental training to gradually understand the programming ideas and problem-solving computing thinking. Moreover, in addition to python programming language, computer network, database, algorithm, information coding and other chapters also contain a lot of experimental operations. However, in fact, the experimental class only accounts for 1 / 3 of the whole class, which is far from meeting the actual teaching needs.

(2) There are few experimental textbooks matching with the theoretical courses, and the experimental and theoretical contents are out of line. Most of the textbooks used in many courses are
only one, which is suitable for theoretical teaching. There is no corresponding experimental textbook and theoretical teaching. As a result, many experimental contents are either too simple, or disconnected from the theoretical courses, or cannot cover the theoretical teaching completely, which leads to the serious disconnection between the experimental and theoretical contents.

(3) The proportion of experimental examination results is not prominent. In the course examination results, there are few students' experimental examination results, or even no experimental examination results. In fact, in computer courses, many courses require students to do real work on the computer to reflect their mastery of theoretical knowledge and computer problem-solving ability. Therefore, the test results are particularly important.

In view of the above problems, this paper attempts to reform the teaching mode of experimental courses in the actual teaching. It adopts the teaching mode of gradual progress of offline experimental content and in-depth teaching of teaching difficulty layer by layer. It sets and distributes experimental content on the training platform online, grasps the experimental training situation of students in real time, conducts anonymous evaluation, cross evaluation, comparative analysis of results, etc. in an objective and fair way. Reflect the real situation of students' learning in order to obtain better teaching effect. The following is a summary of the author's experience in the experimental teaching part of the computer course.

2. Gradual Experimental Training Teaching Based on O2O

2.1 Content Design of Offline Experimental Training

According to the teaching content of the theory course, the experiment content is divided into six experimental modules: computer hardware foundation, computer software foundation, information representation and processing, computer network application, database development example and software engineering example. The experiment content of each module has 3 to 4 sub experiments, which are carefully planned and designed according to the theoretical teaching content.

For example, for the basic experiment module of computer hardware, students are required to first understand the basic structure of computer hardware and the structure and function of each component by assembling the computer, and be able to eliminate some common faults and the most basic maintenance by themselves. On this basis, in the second experiment of this module, i.e. simulation of von Neumann architecture, because the composition principle of von Neumann architecture and the collaborative work of all components are described in the theory class, in the experiment, python program is used to simulate the working mechanism of five components in von Neumann architecture, so that students can understand the basic composition of the computer, on the basis of understanding the current mainstream von Neumann architecture Man architecture has a deep understanding. Then we test the performance of CPU and memory in the computer. So we have a deep understanding of computer from the sense and cognition.

Another example is the information representation and processing module. In the theory class, we have explained in detail how different information such as numbers, texts, sounds, images, videos are represented in the computer. This is based on the theory class, so that students can process different information. For example, encrypting character, image, sound and video information is a good example, and the three sub experiments can be connected in series with the theme of information encryption, so that students can understand and master the knowledge of information representation and processing step by step.

If the computer hardware foundation, computer software foundation, information representation and processing, computer network application, database development examples these modules are called the important role of different application fields of computer, then software engineering is based on the above content for comprehensive application. First, let the students master the theoretical and experimental knowledge, design and develop a student course selection system, then design and develop a student performance management system, and finally develop a student information management system based on the first two systems, including the student course selection information, performance information, as well as the basic information of the students. Through the system development, students can have a preliminary and systematic understanding and mastery of the basic
knowledge and important application fields of computers, so as to lay a solid foundation for other courses in the future.

Looking at the content of the experiment vertically, it focuses on the students' understanding of the computer from the senses to the cognition, from the appearance to the internal mechanism, and from the superficial to the deep. Horizontally speaking, the experiment of each module, around the theme layer by layer to master the relevant knowledge points.

2.2 Online Experimental Training

As the saying goes, experiment is the only test of truth. If we want to understand the theoretical knowledge deeply, we can't do without the experimental practice. The experimental teaching process also needs to be methodically and systematically designed to make students learn something.

The online experimental training is divided into two parts, one is online micro class, private podcast and other online teaching. According to the needs of the experimental content, around the knowledge reserve before the experimental class, the key and difficult points of this experiment, and the expansion of knowledge after the experimental class, the teaching and students record in the way of micro class and private podcast, so as to provide teaching resources for other students' independent learning. The second part is online experimental training. After learning the knowledge of information representation and processing, students will gradually expand the difficulty level by level from easy to difficult through digital circuit simulation, encryption and decryption training, information processing examples, digital information compression training and other contents. Each training sub task is divided into three to five levels, which are carried out layer by layer in the game breakthrough mode, such as encryption and decryption rsa training, creation of public key and private key, encryption and decryption three levels. Through learning and implementing RSA algorithm, experience and practice digital information encryption and decryption methods, practice how to comprehensively use top-down, gradual refinement, divide and rule in computer science, and seek for questions Problem solving.

2.3 Online Training Assessment

All experiments are based on educoder [5] teaching and training platform, which is an integrated teaching and experiment service platform based on training projects, including intelligent teaching cloud resources such as knowledge explanation, case analysis, development and practice, operation deployment, real-time evaluation, etc.

3. Analysis of the Effect of Teaching Practice

According to the needs of the course, teachers set up practical training assignments, regular assignments, group assignments, online test papers, resource management, online questionnaires, online Q & A, teaching activity data analysis, and integrated practical teaching community. For the practical training, the instructor will release the task according to the experimental task, the trainees will conduct real-time evaluation on the platform, and the instructor will conduct work evaluation, performance evaluation, cross evaluation, anonymous evaluation, etc.

4. Conclusion

In order to find a suitable teaching mode for teachers and students, we need to constantly try to improve the teaching mode in the process of practical teaching. No matter what kind of teaching mode is to better teach students' knowledge and let them learn with interest, enthusiasm and initiative. In the future, we will continue to try various teaching modes, create our own teaching mode of College style, lay a solid foundation for students' future study, and be able to solve practical problems with the tool of computer in the future professional field.

5. Reference

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