The Design and Management of Open Research Experimental Teaching

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Keywords: Open research, Experimental teaching, Design and management

Abstract: In order to cultivate more excellent and innovative talents in education in China, the continuous deepening of education reforms, experimental teaching has become an important reform content and development direction, to a certain extent, it has undertaken to cultivate high-quality, high-level and The responsibility and burden of innovative talents. Open research experiment teaching has a positive effect on students' innovation ability, professional technology and practical ability. However, there are some problems in the process of carrying out open research experimental teaching. These problems have brought great problems to the improvement of teaching quality and teaching efficiency. Therefore, this paper conducts research on open research experimental teaching, and proposes specific design and management strategies, which can eventually train more talents with innovative and practical skills.

1. Introduction

Experimental teaching refers to the experimental activities carried out by students through the use of different equipment and instruments, scientific eating methods and observation skills. Through this activity, they can continue to have a deep understanding of the main theoretical knowledge content, and students can also in this process Cultivate innovative awareness and problem-solving skills. Teachers are on the side to guide and correct students' experimental behavior errors. Compared with traditional experimental teaching, open experimental teaching is more open and dynamic. When conducting experiments, students' freedom to participate in experiments is greatly improved. Open experimental teaching is not only the opening of the laboratory, but also includes the open characteristics of the teaching content, teaching methods, teaching system management, teaching evaluation system and teaching concepts, etc. [1].

2. Advantages of Open Research Experiment Teaching

To carry out open research experimental teaching firstly has a higher degree of freedom. Students can choose the content of the subject to be studied according to their own ideas and hobbies, and can plan according to their actual situation; in addition, open research experimental teaching can continuously improve the comprehensive quality of students. In the process of conducting the experiment, students independently choose the object of the experiment, and observe, process and analyze, and further gain practical ability, thinking ability and perseverance; in addition, students can also enhance their own innovation ability. The research experiment itself has strong innovative features, and the experimental teaching involving such experiments can also encourage students to accept new ideas and technologies in a shorter period of time, and also allow students to better master experimental skills and guide Students establish innovative thinking and abilities; in the end, they promote the continuous expansion of students' knowledge, and the degree of communication and communication between students has also been greatly improved [2]. Students participate in experimental learning in the form of group cooperation. In this process, they continue to communicate and communicate, prompting different modes of thinking and ideas to collide with each other, expanding the knowledge and communication skills of other students in the group.

  DOI: 10.25236/iceesr.2020.084

3. Open Research Experimental Teaching Design

Chinese colleges and universities do not attach importance to the design and management of experimental teaching, and they do not fully understand and understand the positive impact and value of experimental teaching design and management. Therefore, in the process of open research experimental teaching design and management, we must strengthen the emphasis on this teaching model, and use this teaching model to improve teaching quality and teaching efficiency, and guide students and teachers to actively participate in teaching.

3.1 Strengthen the Degree of Attention to the Design of Course Content System

The development of experimental teaching must be supported by scientific and systematic experimental courses, which is also an important key to ensure the quality of teaching. In the process of designing the course content, experimental teaching will be affected by the basic conditions of the major and the laboratory. Therefore, teachers need to carry out scientific experimental teaching design according to the actual situation of the major and the basis of the students [3]. The whole course content is divided into three parts: comprehensive, design and research. These three different contents occupy about one third. Such a course ratio can ensure that on the basis of training basic skills and operations, it will continue to deepen the full understanding of the learned theories and related principles, and also combine the research and design aspects, which will be relatively simple and verifiable. The experiment was changed into a mixed experiment with a certain degree of difficulty, which encouraged students to stimulate their own initiative and enthusiasm to participate in the experimental teaching.

3.2 Strengthen the Design of Teaching Method System

After designing the experimental content, we must set the goal of experimental teaching. In order to achieve such teaching goals, it is necessary to adopt appropriate teaching methods. Traditional experimental teaching believes that as long as students can complete the expected experimental results, the entire teaching is relatively simple. As a result, some teachers do not pay much attention to the application of experimental teaching methods. Open research experimental teaching needs to be supported by a teaching method system, and specific teaching methods should be formulated and designed in the face of different links and actual situations [4].

Therefore, when designing the teaching method system, we must abide by the principle of “problems” as the center, designing each experimental teaching as a research project, and project-oriented to encourage students to conduct research and exploration, so that students can target problems during the experiment. Continue to solve. This teaching method is mainly guided by a research idea: first of all, it is necessary to observe objective things, or in-depth discussion on the results of previous studies, and to find problems based on the results of research and discussion, and conduct research on the problems, Put forward your own insights and assumptions, and use experimental methods to draw correct conclusions. The strengthening design of the teaching method system should be guided by the scientific thinking mode. The teaching of comprehensive experiments can also adopt a relatively open teaching method. Teachers mainly guide on the side, and the acquisition of the conditions of the entire experiment and the completion of the experiment are completed by students. For example: students can first form a team of 3 to 6 people. The team arranges different tasks to collect data and select topics, and submits the project application that they want to carry out the project; the teacher approves and gives guidance, the student is Carry out and implement the project according to the guidance of the teacher, write a project report after the project is completed; the last thing is to conduct academic exchanges on the research results and the final report. In this way, teaching can be promoted to have open and research characteristics, and to strengthen students' innovative ability and active research consciousness in participating in experimental learning [5].

3.3 Refine the Experimental Condition System Design

Open research experimental teaching is basically student-oriented, requiring students to master time independently, so students can freely enter and exit the laboratory. In order for students to complete the experiment better and obtain more correct experimental results, it is necessary to create a relatively stable and harmonious experimental environment. Therefore, it is necessary to plan for the opening hours of the laboratory, the responsibilities of teachers, the use of equipment, the application of funds, and the safety and health of the laboratory.

3.4 Design of Evaluation System for Open Research Experimental Teaching

3.4.1 Design of Evaluation System for Student Experiments

The existence of teaching evaluation design can improve the actual effect of teaching, and can also encourage students to revise their learning results. Therefore, it is necessary to actively establish an evaluation system in which students can participate. First, the teacher guides each experimental project to form an evaluation group; in addition, students should report on their own research projects, and each student's group has a certain reporting time; the teacher evaluates the group based on the student's report and defense. And according to the students' substantive research results, process and the situation of the defense, score the objective evaluation.

3.4.2 Student Evaluation of Teachers

After the end of the experimental teaching, teachers should actively organize students' evaluation of themselves and the evaluation of teaching effects. Each student needs to submit a certain number of words for experimental experience or teaching suggestions, and teachers need to distribute teaching evaluation forms to students, requiring students to fill out these evaluation forms anonymously.

3.4.3 Teachers' Evaluation of Experimental Teaching

Teachers should evaluate and analyze the teaching results and actual conditions of the semester, and use the experimental results submitted by students as one of the evaluation criteria; actively reflect on the evaluation results and actively reform the problems in the teaching process. And the experimental situation in the experimental teaching can also provide corresponding experience for the next round of experiments.

4. Management System Design of Open Research Experimental Teaching

Open research experimental teaching is still inseparable from the laboratory to effective management. The teaching experiment carried out by the laboratory is quite different from the traditional teaching method. Unlike the teaching laboratory in the past, the laboratory is completely open. In such laboratories, students are mainly used as the main body of laboratory activities, and teachers and other staff members assist students to complete the experimental projects. Moreover, the practice activities in the open laboratory are quite long, and students need to participate in the laboratory to constantly experiment with the items in the laboratory. Therefore, open research experimental teaching must have a scientific and systematic management concept.

4.1 Diversified Instrument Configurations

As far as possible in the configuration of instruments in open laboratories, the variety and comprehensive functions are guaranteed. Moreover, the instrument and equipment should be updated regularly to ensure that the instrument can be replaced in time after the wear and tear, so that the instrument can be more in line with the daily use standards.

4.2 Standardize the Daily Management of Laboratory Equipment

After the laboratory is fully opened to students, the frequency of use of instruments and equipment has been greatly increased, accompanied by the damage rate and wear rate of

instruments and equipment, which are also prone to instrument failures. In order to reduce such phenomena, it is necessary to adopt relatively strict management and preventive measures. First of all, it is necessary to adopt digital and information management, record the experimental items to be carried out by each student in the computer in advance, and arrange them according to the student number or input order [6]. The record also includes the equipment and instruments, utensils and medicines that are required for each experimental project; in addition, it is necessary to strictly register the students' entry and exit of the laboratory, and establish a report for the appointment and use of equipment system. Staff and teachers on duty can check the use of students through these systems; and some instruments are expensive, so students must be trained in advance to use them, and timely maintenance and prevent damage to the instrument accident.

4.3 Establish and Improve the Management Responsibility System for Teachers and Staff

Teachers or staff on duty in the laboratory need to grasp the specific situation of students entering and leaving the laboratory. In addition, teachers should also guide students to face problems during the experiment, and help students correct some irregular operations and behaviors; in addition, they should make detailed records of the operation and development of the laboratory on the day, and actively deal with the occurrence of accidents. In order to ensure that the laboratory can be in a relatively stable, safe and orderly state.

4.4 Construction of Student Autonomous Management System

The fully open laboratory is operating almost all day, so it is impossible to fully manage every aspect only by relying on teachers and corresponding staff. Therefore, the management of the laboratory can be promoted to another level through the autonomous management system of students. First of all, during the period of laboratory operation, student cadres should be arranged to be responsible for the laboratory's health and record the laboratory's operating status on time; in addition, a group system should be set up, and each group must choose a The team leader is responsible for recording the attendance of the team members [7]. In this way, students can be encouraged to supervise each other and establish a consciousness of maintaining laboratory equipment and interests.

4.5 Formulate Corresponding Safety Management Codes and Specifications

These rules and regulations clearly clarify the discipline, equipment use, and equipment maintenance that students need to follow when entering the laboratory. At the same time, it also includes the specific methods for students to deal with emergencies correctly, and the way to use toxic substances. Safety management rules and regulations are essential management methods for open laboratories.

5. Conclusion

Experimental teaching is a long-term systematic teaching system. Through the use of experimental teaching methods, students are encouraged to continuously improve their innovation and scientific research capabilities, and students are encouraged to establish a sense of scientific experiments. Compared with traditional teaching, open research experimental teaching has more advanced characteristics, so the reasonable application of this teaching method can effectively improve the teaching efficiency and quality. My country has conducted in-depth research on experimental teaching, and formed a relatively complete research system on this basis. In order to cultivate more innovative talents, it is necessary to introduce the "research" teaching concept, and on this basis, create a new development model of open research experimental teaching. Therefore, this article mainly discusses the design and management methods of open research experimental teaching. Through the research of this article, we can further cultivate more innovative and research talents.

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