A probe into the implementation path of Open experiment in First-year Engineering Taking the School of Physics and Information Engineering of Jianghan University as an example

Fen Chang

Institute of Physics and Information Engineering, Jianghan University J05A103, 430056, China

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Abstract: Firstly, the connotation of open experiment is introduced, then the effect of open experiment in the first grade project is described in detail, that is, cultivating students' interest in professional study and improving students' professional cognition level. Training students' practical ability, improving students' innovative ability, creating students' subject competition, students' scientific research echelons, introducing the system of professional upperclassmen into the process of open experiment, creating the power of example; To make up for the deficiency of traditional experiment, to improve the effect of experiment teaching, and to improve the quality of talent training with the cooperation of theory teaching. Finally, the implementation path of open experiment in first grade project is discussed. That is, the flexible open form of laboratory, the teaching content of teaching in accordance with students' aptitude, the introduction of the system of professional seniority into the process of open experiment, the organic combination of the plan of senior students, the investigation of Party members, the post of part-time work study and the open experiment; The combination of teacher guidance, academic guidance and counsellor supervision ensures the effect of open experiment; the combination of open experiment and regular training of professional associations; the introduction of extracurricular practice innovation credit recognition mechanism.

1. Introduction

The School of Physics and Information Engineering of Jianghan University has been carrying out open experiments in its first year of engineering since 2012. By mobilizing all freshmen to participate in open experiments, it trains freshmen 'professional interest, encourages freshmen to join at least one professional association, and develops good professional study habits. It realizes the early cultivation of professional talents, early discovery and cultivation of professional competitions and echelons of students' scientific research, explores the implementation path of open experiments in the freshmen of science and engineering, and improves the quality of personnel training in colleges.

2. First, the connotation of Open experiment

The so-called open experiment for college students usually refers to the laboratory that can be open to undergraduates by using existing resources such as teachers, instruments and equipment, environmental conditions, and so on, on the premise of completing normal teaching and making use of the formal establishment of colleges and universities in colleges and universities. To cultivate students' practical ability and creative thinking through open experiment [I]. Compared with the traditional experiment, it has more flexibility in the aspects of experiment time, experimental content and experimental form, and has more advantages in cultivating students' professional interest, learning ability, and improving students' practical and creative ability.

The open experiment carried out by the School of Physics and Information Engineering of Jianghan University in the first year of engineering runs through the whole academic year of freshmen. The open experiment is divided into two semesters. In this paper, a basic and universal open experiment was set up for all the first grade students in the last semester, with emphasis on

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cultivating the professional interest of the first grade students and improving the students' professional cognition level. In the next semester, we should pay attention to the improvement of students' innovation ability, and change the open experiment project from basic, popularizing to exaltation and excellence. It has the flexibility of scheduling experimental activities, experiment The main body participates in the initiative and the whole staff characteristic.

3. Second, the effect of open experiment in the first grade project

From 2012, the School of Physics and Information Engineering of Jianghan University began to carry out open experiments in the first year of engineering. It has also achieved certain results.

3.1. It raises students' interest in professional study and improves their professional cognition level.

Freshmen enter university, in fact, hope and confusion coexist, for their professional do not understand, many students choose the major is often decided by the parents, not to mention professional understanding, or even feel strange. After the military training for freshmen, the college mobilized all freshmen to participate in open experiments. In the course of the experiment, students could make up for the confusion in theoretical study and promote them to have a preliminary understanding of their major. Gradually cultivate their professional learning interest, improve the students' professional cognitive level.

3.2. It raises the students' practical ability and improves the students' creative ability.

Through studying in the laboratory, the freshmen are familiar with the operation of laboratory instruments and equipment, and through participating in the teachers' open experiment projects, they cultivate their ability to find and solve problems. During the debugging of an experimental equipment and the completion of a scientific research project, the students' practical ability is trained and their innovative ability is improved. For example, in the “Grade one Engineering” welding contest of infrared counter based on 51 single chip microcomputer, many students' welding works are very creative and the welding skills are excellent, which has been highly appraised by the laboratory teachers.

3.3. Created the student subject competition, the student scientific research echelon

In the process of open experiment, the basic, universal training is combined with the training of exaltation and excellence. The basic and universal open experiment participation rate of 100% has been realized. Through the combination of open experiments and regular training of professional societies, we have realized the early cultivation of professional talents, the early discovery, the creation of a discipline competition, and the scientific research echelons of students. In the first and second grades, more than one student in the class of 2012and 20132014 was in the first and second grades. Has been in the national and provincial disciplines competition has made good achievements. 2015 class has five students with their works on behalf of the school to participate in the fourth Hubei university Innovative Design Competition for students' Physics experiments.

3.4. The introduction of the system of professional upperclassmen into the process of open experiments creates the power of example.

Introduction of excellent professional talents, senior teachers and sisters into the process of open experiments. While the senior students tutoring freshmen in major learning and improving their own professional skills, they actually inject the power of passing on and the power of example into the freshmen. Allowing freshmen to integrate into college life faster and better also injects strength into professional continuity. The college electronics enthusiasts association, the smart car association, and the physics community can grow because of the selfless dedication of generation after generation of science and engineering students.

3.5. Make up for the deficiency of traditional experiment and improve the effect of experiment Teaching

The open experiment makes up for the deficiency of the traditional experiment in both the experimental form and the experiment content. In the mutual cooperation with the traditional experiment, it improves the teaching effect and teaching quality of the laboratory teacher, and makes the students more willing to take root in the laboratory. It is also beneficial to play a role in the laboratory of engineering college.

3.6. With the cooperation of theoretical teaching, the quality of talent training in colleges has been improved.

Students in the laboratory, under the guidance of teachers, senior students, in the efforts of their own, in the laboratory to solve the theoretical classroom confusion, to make up for the blind area of theoretical learning; At the same time, students in the laboratory to verify the effectiveness of classroom teaching, to verify the correctness of theoretical teaching. With the cooperation of open experiment and theory teaching, the students' self-learning ability, problem finding and problem-solving ability have been cultivated, and the quality of talent training has been improved.

4. Third, the implementation path of Open experiment in Grade one Project

The open experiment has made some achievements in the first grade project, but there are still some shortcomings, so it is necessary to establish a more perfect and sound path of the open experiment in the first grade project.

4.1. Flexible laboratory open form

In order to give full play to the laboratory's advantages in improving students' practical and innovative abilities, the College of Physics and Information Engineering has implemented a more flexible laboratory opening form in its first year of engineering. For example, in the first semester of freshmen, the regular opening system was put into practice in accordance with the requirements of the basic and universal open experiment for all the freshmen. In order to meet the need of regular training of professional organizations, the open experiment is changed from basic, popularizing to exaltation and elite in the next semester. In order to meet the need of regular training of professional organizations, the form of all-weather reservation and opening is also implemented.

4.2. Teaching contents in accordance with students' aptitude

Last term it was a basic and universal open experiment for all the first grade students to cultivate their professional interest and improve their professional cognition level. In the next semester of the freshmen, the open experiment pays more attention to the improvement of the students' innovation ability, and the open experiment changes from the basic, the popularization to the exaltation and excellence. In terms of training content, teaching according to students' aptitude, according to the new students' professional basis, the implementation of basic, universal training and high quality, elite training combined.

For example, in the 8-13 weeks of the last semester, the College of Physics and Information Engineering used the freshmen's evening study time to guide the freshmen into the laboratory, to help students become familiar with and understand the common electronic components, to help students master basic welding skills, and to help them master the basic welding skills. Help students to use common electronic instruments; guide students to design simple electronic circuits. During the 14-17 weeks of last semester, the freshmen were guided to perform demonstration experiments on physical operations (force, heat, electricity, light) at the physics lab center.

In the next semester, we will combine the professional teachers' open experiment project with the professional association training to train the freshmen highly and excellently. On the one hand, a number of open experimental projects are opened according to the application of professional mentors for different majors. According to their own interests and strong points, the first-year students select newspapers to cultivate the students' professional quality and skills. On the other hand, by combining the open experiment project with the regular training of the professional society, the professional society will make use of the weekend training to solve the professional confusion

according to the difficulties encountered by the freshmen in their major study.

4.3. Introduction of the system of professional seniority into the process of open experiment

Students Mentoring Scheme is a model of student self-management, which first appeared at Eton University in the 15th century. Since then, this system has been popular in European and American colleges and universities. The main point of the system lies in the spirit of equality, fraternity and fraternity among senior students

Junior students achieve positive interaction, helping them solve all kinds of learning, life and emotional difficulties [II]. In order to train students more efficiently and take into account the pressure and burden of laboratory teachers, the School of Physics and Information Engineering of Jianghan University is carrying out open experiments. Introduce the professional system into it.

In order to make the senior students take part in the training and management of open experiments, the college experimental teachers should select the students with strong sense of responsibility, outstanding professional ability and strong oral expression ability among the senior students.

4.4. Program of Senior Education, investigation of Party members, combination of Work-Work posts and Open experiments

In the process of carrying out open experiments, the Institute of Physics and Information Engineering not only introduced the system of academic upbringing into the process of open experiments, but also included the cultivation and investigation of party members. In the course of opening up experiments, the more important college has set up four work-study posts, which not only provide an exercise platform for senior students and party members, but also set an example for younger students and younger students.

4.5. Teachers' guidance, academic guidance and counselors' supervision are combined to ensure the effect of open experiment.

The open experiment differs from the traditional one in that it uses more of the students' spare time, such as evening study, public recess, Saturday and Sunday. And students who have just left high school to enter university, under the pressure of the college entrance examination, into a more relaxed university environment, many students choose to rest, play for a while, and neglect the strength of their own professional study. In particular, open experiments conducted by freshmen in their spare time will inevitably meet with students' rejection at the beginning. In order to ensure the effectiveness of open experiments, freshmen will really gain something in their professional studies. The School of Physics and Information Engineering provides guidance from teachers, tutoring from senior students, With the help of external force, counselors can help students become familiar with college life as soon as possible.

4.6. Combination of open experiments with regular training for professional associations

The School of Physics and Information Engineering has three major professional associations, the Electronic enthusiasts Association, the Smart car Association, the Physics Society, and the College encourages each student to choose at least one professional community according to their professional interests to ensure a lifetime. On the basis of the basic, popularizing and open experiments of freshmen in freshmen, professional associations will, according to the needs of the students, the electronics enthusiasts' association, the smart car association, in the next semester of their freshmen. Each of the three physical societies has its own professional training plan and takes advantage of the weekend to train the freshmen.

As a mode of practical education, open experiment does not happen overnight. It needs time to verify and correct. The open experiment has achieved some results in the first grade project, but there are still some problems, such as the students' initiative is not strong, the equipment is damaged seriously, and so on, so it is necessary to sum up the experience and feedback in time. The aim is to perfect the implementation path of open experiment in grade 1 project, and make the educational effect of open experiment in grade 1 project more remarkable.

5. Note

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