Reform of Experiment Teaching for Fundamental Computer course

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***Abstract*—The teaching objective of computer fundamental course is to cultivate the students' competence of using computer science, and experimental teaching is an important part. With the development of modern information technology, our university makes some reforms for computer fundamental experiment course to perfect and renovate its curriculum system by reforming the experimental teaching model and using a variety of teaching methods; improving the experimental teaching environment. All these reforms play significant roles for schools to cultivate more advanced application talents.**

Keywords—fundamental computer course; experiment teaching; teaching reform; teaching methods

I. INTRODUCTION

With the development of information technology such as computer, network communication and multimedia, our work, study and life style have been completely changed. It is the basic quality for modern college students to master modern information technology. Basic computer course is to cultivate students' ability of fundamental computer application and its teaching purpose is to enable students use computer to do daily office and information processing. Basic computer course teaching in higher school decides the future society people computer application level and the degree of master of information technology in the very great degree. [1]Experimental teaching is an important way to cultivate students' computer application ability and practice ability and it plays a very critical role for computer basic course teaching. Traditional experiment teaching has many shortcomings: one is to validate experiment too much, and the comprehensive and design experiment is less; the two is that the student innovative practice platform lacks integrated; three is that the content of experimental teaching of various software applications can't be dispersed and comprehensive use. [2] These seriously restrict students' flexibility in the use of computer knowledge. Shanghai Second Polytechnic University is a Local Application-oriented university. In recent years, we reform experimental teaching from three aspects: to establish a hierarchical experimental teaching content system, to continuously improve experimental teaching method and to strengthen the experimental teaching environment construction. We have formed a distinctive system of experimental teaching and have obtained the ideal teaching effect. This paper introduces some specific methods and experience.

II. THE ABUNDANT CONTENT OF EXPERIMENTAL TEACHING

The experimental teaching of computer basic course emphasizes the cultivation of students' practical ability. But in the experiment teaching in the past, the contents of experiment teaching is to make students understand the main verification, and to consolidate the theoretical teaching contents. This arrangement doesn't allow students' comprehensive application of computer knowledge, especially for the learning of software, can't grasp the overall and comprehensive use of software. [3] To this end, in computer basic course teaching, we increase the number of experiment teaching in class, the teaching contents related to office software, image processing, animation and Webpage production application software separate from the theory of course, will be the arrangement in the experiment teaching. At the same time, we will focus on the experiment teaching on cultivating ability of computer application, composition of the experimental project on ability training as the main line. Therefore we reconstruct the experiment project, design a project type, include the most comprehensive course knowledge point design experiment; improve the structure of the experimental project, increase the verification experiment, but also increase the comprehensive and design experiment. For the good students, we enhance the comprehensive and design experiment in the ratio of in the experimental process.

Through constant exploration and Practice for many years, we gradually formed the hierarchical experimental teaching content system. At present, the experimental projects include verification type, integrated type, design type and innovative type. Due to the requirements of each type of experiment is different, so we can maximize the enthusiasm and initiative of the students so as to better train students' practice ability and innovation ability. [4]In order to let the students learn more knowledge in limited time, we carried out the optimized design of experiment content, the integrated use of focus on training students' practical ability.

Verification experiment mainly refers to the basic operations of all kinds of application software, such as the establishment of the website, Webpage new and preservation, set the page properties, insert Webpage elements (text, image, multimedia and form) and other operations in Dreamweaver learning. Validating experiments is mainly used to strengthen

the students' basic skills training and train students' practical ability. Comprehensive experiment can make up for the lack of validation type experimental and it can cultivate comprehensive ability about software use. For example, in the study of Flash software, we let the students learn to make frame by frame animation, shape tweening animation and traditional tweening, on this basis, explain to the students how to make a mask animation, tell the students mask animation is through the barrier cover layer to achieve based on traditional tweening animation on. For these experiments, in order to achieve better teaching effect, we will first give the students look at some cases, such as the magnifying effect and the globe to rotate, so as to improve the interest of students to solve practical problems, mobilize the enthusiasm of students so that students can master the methods of solid system mask animation.

Design type experiment is refers to according to the layout of the teacher the experimental task, the teacher's guidance and help, the student own collect and process experimental material file and completed the experimental task independent. The experimental subjects are derived from the actual computer application problems, with emphasis on combining with practice, and highlight the cultivation of innovative ability. For example, "design and making posters" is mainly to train students' comprehensive use of Photoshop software. Propaganda posters can be seen in the campus and it is close to the student life. It can stimulate students' creative passion and cultivate students' ability of innovation.

Innovation experiment refers that the students use their spare time, according to students' individual learning interest, independently complete the experiment project with the teacher's guidance and help. Innovation experiment can effectively cultivate students in computer application ability and innovation spirit. Through independent study and exploration, students can convert computer knowledge into practical application, which is very efficient for the development of the students' ability of computer application. Every year we will regularly carry out a series of creative practice activities related to teaching content of basic computer courses, such as Webpage design competition, the PPT story design competition and the computer application ability competition, but also actively encourage and organize students to participate computer application competition in Shanghai. Each session our university has students get more than prize 3. This year, our university achieved first prize 1, 2 prize three and 4 prize

III. A VARIETY OF EXPERIMENTAL TEACHING MODEL

At present, the experimental teaching of computer basic course mostly attach to the theory teaching and most of teaching use multimedia classroom. Teachers explain side by side operation demonstration and the demonstration results show students through the projector while the experimental class is in computer room. In the process of experimental teaching reform, according to the different characteristics of the content of experiment teaching, we combined with the characteristics of students in different professional interest to reform the teaching model. Through the reform of experimental teaching mode, we have obtained the good teaching effect.

We carry on the conformity to the original experiment, reduce the verification experiment, strengthen the comprehensive experiment and design experiment, according to the teacher’ arrangement, we arrange different experimental tasks for different students. With the increasing of the experimental task, it is difficult for students to complete all experiment in the classroom. To this end, we make full use of the students' spare time, require all students who can’t complete experimental tasks in class must use the spare time to complete the remainder of the experiment, and submitted to the network teaching platform. At the same time, we extend existing experimental classroom to extra-curricular innovation competition, encourage and organize students to participate science and technology competitions in related with the teaching content of basic computer courses. In addition, in order to solve the problem such as lack of content for good students and too much for poor students. Since 2008, we arrange computer diagnostic test for freshmen from, according to test result, we arrange those who are weak in computer foundation into strengthening classes and adjust the proportion of the verification type, comprehensive and design experiment, increase the experiment lesson to ensure that they meet the course requirements. The measures have obtained the good teaching effect.

The reform of experiment teaching is bound to lead to the reform of curriculum evaluation mode. In the past, the examination of basic computer course generally use the written form and assessment content focus on the knowledge of the theory. The examinations of software application are through multiple choices and fill in the form, which ignore the actual operation of software for students. [5] The assessment can’t reflect the computer application ability and proficiency for students and therefore, we changed the form of examination, all adopt the computer-based test, at the same time we pay attention to the students' comprehensive ability of using computer in test. In consultation with academic schools and in their consent, we will modify the overall results for peacetime result to account for 40%, final exam scores account for 60%; for the usual results, according to attendance, usually accounts for 30% and the experimental task accounted for 70% of the final exam score. The changes of assessment methods greatly stimulate students’ interest in learning for all kinds of application software and the computer application ability of the students have improved significantly to achieve the final aim of experimental teaching.

The traditional teaching modes which think that teachers should say and students should listen are not conducive to the cultivation of students' practical ability. Therefore, according to the different characteristics of the experimental teaching content, we adopt a variety of teaching methods and these methods have obtained the good teaching effect. In the concrete teaching, we use a variety of teaching methods, such as lecture method, case teaching method and based-on-task learning method increase students' practice time. [6] We carry out the teaching idea "teaching by doing" in the whole teaching process.

Case teaching method refers that under the teacher's careful planning and guidance, according to the characteristics of the teaching content, the teacher select some typical application cases to analysis and explain, students grasp the basic knowledge points by the imitation of making case effect so as to learn the software. For example, in learning Photoshop image processing software, the teacher make the campus posters as a case, on which a background fill, word processing, image synthesis, the layer style knowledge point first analyzed one by one to explain, to enable students to have a general understanding of the basic functions of Photoshop software and the basic operation. Based on the students to master the basic software operation, let the students imitate the making similar poster, which can make the students to master the comprehensive application of the software.

Task-based learning method is called task driving teaching method. The teaching process is following: the first is to inform student specific experimental task, let the students study with the task, and then complete the experimental task. Task driving teaching method can stimulate students interest in learning, fully mobilize the enthusiasm and initiative of students, the students master the basic operation of software and comprehensive application in the process of completing the task. For example, in learning Flash software, we first give the students set a task: making use of Flash software and fabricating an animation to introduce the Shanghai Second Polytechnic University campus scenery. In this way, the students took the task to learn, to make the animation, they must understand all the knowledge points. Task driven teaching method accords with the characteristics of computer teaching and more can promote students' computer application ability. [7]

Network-based autonomous learning refers that the students make full use of online teaching resources to carry on independent learning. The teaching content of basic computer courses is very much and students must learn six software in 42 class hours. A large number of the teaching task can't be completed in the classroom. To this end, we make full use of the school's Curriculum Center and release the teaching video and each class experimental task on the Internet, and demand the students use their spare time to complete the experimental task and submit the homework through the network teaching platform, which extends the students' learning time and space.

IV. THE GOOD EXPERIMENT ENVIRONMENT

The computer lab is an important place to carry out the experimental teaching and cultivate students' practical ability. At the same time, the teaching laboratory environment determines whether the experimental teaching can carry out normally and orderly. We have taken a series of effective measures to improve the experiment teaching environment, which can ensure the effective development of experiment teaching and improve the efficiency of experiment teaching.

The configuration and performance of software and hardware directly affects the development and experiment teaching effect. In the past five years, our university each year spends about 4000000 Yuan on renewal, maintenance and upgrade of hardware and software equipment, which has greatly improved the teaching environment. In addition, we also make full use of campus cyber source, and construct multimedia teaching courseware, including various types of experiment item, teaching video and test question database. We implement open laboratory management so that students can use the spare time flexibly arrange their study and upload homework and at the same time, the teacher can check the homework and correct and evaluate them. 15 basic computer labs have polar electronic classroom teaching system, and its powerful features such as screen broadcast, online test, job submission, answering, black silence, provides a very convenient conditions for carrying out the experiment teaching.

The computer lab is overload for a long time and the dust accumulate in the internal chassis constantly, which easily cause the hardware problems such as display distortion, the loose of keyboard, mouse, memory, and blue screen. Therefore, the maintenance of hardware is very important. To this end, we establish a sound management system and take practical measures, such as regular check, updating the hardware equipment, establishment of service repair system, storage of some commonly used supplies. In addition, we also actively mobilize students involved in the management and maintenance of computer laboratory. Under the guidance of teachers, students can take participate in some of the equipment's maintenance and management to cultivate their practice ability.

The teacher is the core for practical teaching. To improve the experimental teaching, it must have a sufficient quantity, good quality, reasonable structure, relatively stable teacher team. We ask the speaker teacher must take experiment teaching. In recent years, by encouraging education and external means, we have formed a team of excellent quality, reasonable structure of teachers. At present, public computer teaching and research section are consists of 17 people which include part-time teachers and experimental personnel. They have advanced title 7 people, intermediate title 11 people by title; according to the degree, they have 1 doctor, 11 master and 5 undergraduate. At the same time, we have promoted teacher's professional level by going out to investigate, on-the-job training and enterprise practice.

V. CONCLUSION

Experimental teaching is an important way to cultivate practical ability and experimental teaching plays a very important role in the teaching of computer basic. Under the background of occupation-oriented higher education, we should attach importance to experimental teaching. University computer basic course focus on the experiment teaching, the cultivation of computer application ability and the master of the computer knowledge is largely dependent on the experimental teaching. In recent years, we carry on the reform of experimental teaching from the experimental teaching contents, teaching methods, assessment methods, experiment teaching environment and experimental teaching mode, and combine the basic operation skills with the ability to solve practical problems, especially pay attention to the cultivation of practical ability. The students' ability of computer application has been improved greatly.

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