

Application of Project Teaching Method in "Computer Assembly and Maintenance" Course Teaching

Shaoru Wang

Hainan College Software Technology, Qionghai Hainan, 571400,China

Keywords: Project teaching method, Assembly and maintenance, Application of project teaching method.

Abstract. The project teaching method is very effective for higher vocational colleges train students' practical skills. "Computer Assembly and Maintenance" is an important professional basic course of computer major in higher vocational colleges, and also a practical and application-oriented course. Through setting up projects, tasks decomposition, organizing completion and other forms, "computer assembly and maintenance" stimulates students' interest in learning, improves students' practical ability, and achieves a good teaching effect, so as to achieve teaching objectives of higher vocational colleges to enhance students' professional ability and meet the job needs of society.

Introduction

"Computer Assembly and Maintenance" is a basic course of computer major and related majors, which has a complex structure of knowledge, a wide range of contents, strong practicability and applicability. [1] In the traditional teaching methods, we first teach the theoretical knowledge, through multimedia show students the related operation method of main components and computer hardware and software and finally students master the skills through hands-on practice. In this teaching method, students generally reflect that the theory covers too much, there are few hands-on opportunities, teaching classroom is boring, their interest in learning is not strong, and teaching effect is poor. I believe that the key to solving this problem is to develop operational abilities of students, well organize the teaching process, and fully mobilize the enthusiasm of students in learning. For this purpose, we make certain research and exploration on the application of practice-oriented project teaching method in course teaching.

Teaching status of "Computer Assembly and Maintenance"

Current status

"Computer Assembly and Maintenance" mainly introduces the computer hardware foundation, assembly technology, operating system installation and commissioning, the daily maintenance of the computer and other related knowledge. Through this course, students can master the composition and working principle, the basic functions, the purchase selection method of computer components; skillfully install commonly used system software and application software, master common hardware and software troubleshooting methods and perform routine maintenance, and lay a good foundation for future work and learning and enhancement of the overall quality of students.

Characteristics of course

①It has much teaching content and a wide range of knowledge. Course content is related to computer basics, computer software, hardware and other knowledge, and some knowledge points have a strong correlation. Students' mastery of knowledge shows certain discreteness, and they cannot digest well and comprehensively.

②Hardware updates soon. New computer technology and new products change quickly. The teaching materials are lagging.

③ There is relatively strong practicability and applicability. "Computer Assembly and Maintenance" is strongly practical. Students must combine closely the theory and practice, and then they can truly digest theoretical knowledge and acquire appropriate skills.

Experiment status

① Hardware: the training room usually uses phased-out old machines, and machine models are single, so that components students have seen are different from on textbooks; some parts cannot work well, leading to the failure of certain experimental demonstration; laboratory equipment is imperfect, resulting in many experiment projects cannot be carried out.

② Software test: including software installation, maintenance, fault handling and so on. Most software can be downloaded on the Internet, basically able to meet the needs of the experiment, but training room do not have access to Internet, which leads to some experiments cannot be effectively carried out.

Contradiction of teaching and learning

① Contradiction of course practicality and driving force of students. Computer assembly and maintenance is the basis for daily work. Computer application has penetrated into all areas of society, mastery of the use of computer and network, and the ability to acquire, process and apply information have become essential quality of college students, and mastery of computer maintenance and repair is the higher requirement of the basic skills. However, a considerable part of students are not sufficiently aware of the importance and practicability, and their learning initiative and enthusiasm is not enough.

② Contradiction of lagging textbooks and new technology and new products. From computer industry's Moore's Law - the number and efficacy of transistors integrated by chip double every 18 months, [2] it is visible computer hardware develops at an alarming rate. There are already new technologies and new products, but equipment and technical specifications in the textbook are still obsolete, which makes the knowledge disconnect with production and life, so that students loose interest in this course.

③ Contradiction of theoretical knowledge and practical ability. "Computer Assembly and Maintenance" is a theoretical and also practical course. Students need many aspects of theoretical knowledge and practical skills to learn this course well. But for various reasons, students can not convert the theoretical knowledge into practical ability. Therefore, based on improving the ability to use knowledge, establish teaching concepts of "emphasis on learning and teaching", "learning as the main body", and "practice-oriented". Take the new practical teaching model as the breakthrough, which has a strong guiding significance for educational reform of computer assembly and maintenance.

Application of project teaching method

Project teaching method and characteristics

The official term of "project teaching" officially used in the field of education first appeared in the United States. American educator, Kilpatrick (William Heard Kilpatrick, 1871-1965), in September 1918, published "project method: applications of purposed activities in the process of education" on 19th "Teachers College Record" at Columbia University, in which he proposed the concept of project teaching for the first time, attracting attention and interest in the field of education[3]. Project teaching method [4- 5], is a "behavior guidance teaching form", widely and vigorously promoted by the German vocational education in the 1980s. This project-oriented and behavior-guiding teaching method organizes students to participate in project design (including simulated project), and fully complete the task of teaching in the project implementation process. Project teaching allows students to participate in work in a real or simulated work world through multiple ways to complete typical tasks, and during completion of the task, and interaction with the master and peers, gradually become experts from beginner, which is consistent with anthropological traditional context learning

theory. Project-based teaching method takes projects and cases as the core, and compared with the traditional teaching it has its own salient features, mainly including [6]:

Project task supports teaching content

Project teaching focuses on teaching task or unit, and designs a learning environment and activities, a project, technology and method. One of its important value lies in eliminating many disadvantages caused by traditional teaching. In project teaching of vocational education, teaching content is often organized and integrated in the form of teaching projects, and teaching projects are often developed from a typical vocational work tasks. Teaching content breaks the traditional disciplinary boundaries, taking project as the core, and constructed in accordance with the work process logic.

Teaching activities are students-oriented

In the practice, the project teaching mostly adopts work group learning method, which will not only helps students play their aptitude, and contributes to the formation of students' sense of responsibility and the spirit of collaboration, experiencing the joy of collective growth of individuals and the group. Meanwhile, the project teaching has changed the past passive learning of students. By creating the conditions, it enables students to actively explore and try. In the project teaching, students participate in every aspect of the process, including information gathering, planning development, scheme choosing, goal implementation, information feedback and outcome evaluation, and they become subjective in activities. So that students can understand not only the overall, also the specific and clear detail of each aspect.

Learning results are diversified

Project teaching creates a relaxed environment that enables students to play their full potential, and its main learning outcome is not accumulation of knowledge, but the improvement of the professional capabilities. Professional competence is a comprehensive capability. Its formation not just relies on teachers' teaching, but more importantly the professional practice, which requires creating a real professional scene for students. The project teaching relying on the work task makes students involved in a real or simulated work world. The pursuit in the project is not only the correctness of learning outcome, because the evaluation criteria to solve the problem is not "right" or "wrong", but "good" or "better." In the project teaching, according to their own experience, each student will give different programs and strategies to solve the task. Therefore, learning outcomes are not single, but diversified.

Application of project teaching in “Computer Assembly and Maintenance”

According to the principles of project teaching method, based on teaching research and the actual situation of our college, we have developed a project teaching method suitable for students to learn "Computer Assembly and Maintenance". The implementation of the method greatly improves the students' interest and enthusiasm for learning and contributes to improving the quality of teaching.

Teaching project design

According to teaching tasks and teaching objectives of "Computer Assembly and Maintenance", we will design teaching content as the following items.

Implementation of teaching project

- ① According to class size and teaching actuality, we divide students in the class into several groups, form complementarity within the group as much as possible when grouping, and fully consider students' learning ability, personality characteristics and other factors. The group recommends a team leader, responsible for the implementation of project tasks and assignment of sub-tasks.
- ② We will divide teaching project into three types: single skilled project, comprehensive training project and outreach project. In single skilled project training, we ask students to strictly follow standardized process in the plant to operate. Meanwhile, in teaching projects, we all design project migration tasks, requiring students to use the Internet, product brochures, site visits, or other ways to understand the manufacturer, brand, performance, knowledge of single component, to train students' ability to migrate knowledge and skills and self-learning ability. In comprehensive training project, such as developing installation program, and computer purchase and other projects, use ISAS

(information search and analysis skills) [7] teaching mode, arrange teaching task, and ask students search and integrate information, conduct group discussion and show project analysis process and conclusions through group presentations. In terms of critical capacity building, emphasize collaboration between team members in project implementation, control and communication of team leader with members, standardization of submitted materials, and language expression and communication skills with customers during explanation.

In the expansion project, usually tend to emphasize on the integration of multidisciplinary, such as printer maintenance project, create the actual situation or case study, to allow students to understand faults of printer, replacement of cartridges, addition of powder and other operation skills, and gradually establish the concept of work system.

Project No.	Project Name	Teaching Objective
1	Selective purchase and configuration of computer	Learn about types and applications of computer; master technical indicators and selective purchase methods of computer main accessories
2	Hardware assembly of computer	Learn about preparations before installation; understand interface types and performance characteristics of the various components; master assembly order and setting method of each computer accessory
3	BIOS setting	Learn about the basics of BIOS; master common setting methods of BIOS; grasp advanced setting of BIOS
4	Installation and operation system	Learn about the hard disk partition and formatting; master installation method of Windows XP, Windows 7 operating systems; master installation of device drive programme; master installation and uninstallation of common software
5	Common peripheral installation and test	Learn about types and performance indicators of common peripherals; master purchase and use of common peripherals ;
6	Test and optimization of system performance	Master the computer system optimization methods; proficiency in the use of Master Lu and windows optimization guru for system performance testing;
7	Daily maintenance of computer system	Master computer security methods; master one-key reset method;
8	Backup and recovery of computer data	Grasp recovery methods of destroyed files; master recovery methods of deleted data;
9	Diagnosis and removing of common software faults	Master common system software fault diagnosis and troubleshooting; master common application software diagnosis and troubleshooting;
10	Diagnosis and removing of common hardware faults	Master common fault diagnosis and removing methods of computer components;

Acceptance of project

Evaluation of the project focuses on training of application ability, so the expression ways of learning outcomes are advocated to be diversified. Combine three methods of self-examination, mutual

assessment, and teacher's review, combine evaluation on team and evaluation on member by team, combine qualitative evaluation and quantitative evaluation, and finally give appropriate incentives to the group or individual who outstandingly completes projects.

Conclusion

In summary, in "Computer Assembly and Maintenance" course teaching, use project teaching, and then learning process becomes the creative and practical activity everyone participates in. Its focus is not the final result, but the process of the project completion. In the project practice, students acquire appropriate knowledge and skills, experience hardships and fun of innovation, and train how to analyze and solve problems. At the same time, in project teaching, teachers are required to keep with the times, change the traditional teaching concepts, challenge themselves, and constantly improve their own abilities, to experiment the need of teaching development. Teaching practice has proved that the introduction of the project teaching makes "Computer Assembly and Maintenance" teaching both play the leading role of teachers, but also reflect the dominant position of students, demonstrating modern education values of "competency-based", greatly improving the quality of teaching to cultivate skilled personnel who can adapt to social needs .

References

- [1] Zhang Wei. "Computer Assembly and Maintenance" Course Teaching Model, *Journal of Xianyang Normal University* 2007 (8): 85.
- [2] Zhang Cuoling, et. Harvest and Experience of "Computer Assembly and Maintenance" Teaching Reform, *China Science and Technology Information* 2010 (1): 273.
- [3] Kilpatrick, W. H. The Project Method, *Teachers College Record*, 1918 (19):. 319-335.
- [4] Chen Zhikui, Liu Yang, Ding Ning. Discussion on Information Security Experiment Teaching Based on Project Management Methods, *Computer Education*, 2009 (8): 140-143.
- [5] Guan Shaoyun. Application of Project Teaching Method in Basic Computer Teaching, *Education*, 2010 (7): 53-54.
- [6] Xu Han. Theoretical Base, Basic Characteristics and Requirements on Teachers of Project Teaching, *Education Forum*, 2007,3: 11-12.
- [7] Zhang Ling, Jiang Shenglin. Course Reform Practice of Application-oriented "Computer Assembly and Maintenance", *Computer Education* 2009, 24: 76-77.