

PBL Teaching Practice of Computer System Maintenance Course in Higher Vocational Colleges Based on Chaoxing Network Teaching Platform

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Abstract

The paper introduces the concept and characteristics of PBL teaching, and the practice of PBL teaching based on the Chaoxing network teaching platform of higher vocational college computer system maintenance courses. The paper points out that the Chaoxing network teaching platform shows the advantages of powerful functions, efficiency and convenience when used to carry out PBL teaching, and therefore it can be widely used in PBL teaching of various professional courses.

Keywords

Problem-based learning, Network teaching platform, Chaoxing, Computer system maintenance, Higher vocational education.

1. Introduction

In today's world, emerging technologies such as cloud computing, big data, Internet of Things, artificial intelligence, etc. are changing rapidly, and have been deeply integrated with education and teaching. Education informatization is constantly advancing. MOOC, SPOC, innovative education, micro-class, flip classroom, mixed teaching and PBL Teaching have become the new development direction of education reform and innovation. The use of network teaching platforms to carry out education and teaching has become the only way for education reform and innovation, and it has also caused great impact and changes to traditional teaching models.

The traditional teaching model emphasizes that teachers are the center and main body of teaching activities, as well as the imparters of knowledge, and students are passive recipients of knowledge. The disadvantages are as follows: "Cramming education, students accept passively; they cannot effectively use fragmented learning methods and enhance learning interest"[1], meanwhile, "traditional teaching lacks the application training of innovative ability, lacks the training of "thinking" and application; the traditional professional course teaching lacks the cultivation of team consciousness and cooperation awareness, and can hardly reach the knowledge reserve requirements needed for innovative ability"[2].

At present, China is vigorously developing higher vocational education with the goal of accelerating the cultivation of high-quality creative and skilled personnel, which is a task that traditional teaching cannot undertake. "Teaching practice shows that the PBL teaching method can effectively overcome the shortcomings of traditional classroom teaching methods in cultivating students' innovative ability, and greatly improve the quality of teaching" [2].

2. Overview of PBL

2.1 Concept of PBL

The medical education of McMaster Medical University in the 1950s was the earliest origin of PBL (problem-based learning). PBL achieved great results in the school and aroused the attention of the society; subsequently, this method was promoted in more than 60 medical universities and was further improved. Now, this method is beginning to be adopted for teaching in more and more fields, including business, education, architecture and social sciences [3]. The PBL teaching mode is a student-centered and teacher-led process that focuses on the questions raised and learns the knowledge behind the problem through group discussion teaching. PBL teaching aims to enable learners to build a broad and flexible knowledge base and cultivate a strong internal learning motivation, develop effective problem-solving skills, and train self-learning and lifelong learning skills [4].

2.2 Extension of the concept of PBL

Some scholars pointed out: "PBL teaching methods at an innovative level can be extended to: project-based learning (Project-Based Learning), but also can be extended to process-based learning (Process-Based Learning)" [5]. For research on these two kinds of teaching there have been a lot of literature achievements. For example, Liu Jingfu believes: "Project-based learning is a new type of inquiry learning model which is centered on the concept and principle of the discipline with the purpose of making works and selling the works to customers. It uses a variety of resources in the real world to carry out exploration and solves a series of interrelated problems within a certain period of time." [6]. In recent years, a team led by scholar Jiang Dayuan has conducted research on the development of a course of systematic work processes [7]. The author believes that project-based learning and process-based learning essentially originate from problem-based learning, which can be considered as a subset and special case of the latter, so the first two are still regarded as problem-based learning categories.

2.3 Features of PBL

Features of PBL include:

2.3.1 Focus on the problem

Learning in PBL is based on scattered and complex problems, which are very close to reality. For learners, the problems in the PBL must be somewhat challenging in order for learners to develop effective problem-solving skills and advanced thinking skills, so as to ensure that learners have the ability to effectively solve practical problems in future work and learning.

2.3.2 Student-centered

PBL emphasizes on students' active learning, while traditional teaching emphasizes on teacher teaching.

2.3.3 Focus on small groups

Students should not only exert their individuality, but also give full play to the social nature of the group. The cooperation within the group has a substantial effect. Students no longer attach importance to their own communication with teachers rather than with their classmates. Therefore, learning is no longer just a matter for yourself, but for everyone.

2.4 PBL teaching requirements

To carry out PBL teaching, you need to pay attention to the following points:

2.4.1 Pay attention to changing education concept and role awareness

In the teaching process, teachers should regard students as the main body of teaching activities, and students should take the initiative in learning. Teachers and students should get rid of the traditional "course-centered" and "disciplinary-centered" concepts, and change into a new education concept of "problem-centered" and "student-centered". In particular, in this transformation, the role consciousness of teachers and students should be changed first [8].

2.4.2 Provide sufficient learning resources

Sufficient learning resources are the basis of PBL teaching, so teachers need to discover more learning resources, including designing, developing and producing courseware PPT materials, video tutorials, etc. Because "the development of learning resources is an important link to ensure the implementation of PBL. Advanced computer technology and network technology provide a broad development space for education, and teachers and students can obtain learning resources despite time and space limitations" [9].

2.4.3 Pay attention to the curriculum and evaluation

To carry out PBL teaching, it is necessary to adjust the curriculum system, and reform the evaluation system to achieve the transformation from exam-oriented education to quality education. "The curriculum should be student-oriented, and it should be conducive to cultivating students' learning attitude and lifelong learning ability; it must have an evaluation method suitable for the PBL model to help students with self-evaluation and self-education; the evaluation process does not interfere with student learning and does not let students be busy with exams and deviate from their learning goals" [9].

3. Application of PBL teaching mode in the course of computer system maintenance

3.1 Introduction to Chaoxing "One Platform Three Terminals" Smart Teaching System

The "One Platform, Three Terminals" smart teaching system is a comprehensive information-based teaching solution launched by Chaoxing Education Group, centering on online teaching platforms, integrating teachers, mobiles, and managements. It covers the network curriculum construction, making full use of the immediacy of mobile phones and mobile smart terminals, greatly expanding the teaching space and guiding students to study across time and space. It effectively opens up inside and outside the classroom, completing formative learning evaluation and assessment evaluation and completing new changes in management, teaching supervision and evaluation models. Its core is the Fanya online teaching platform, a localized online teaching platform as well as a small-scale private online course (SPOC) platform. It can integrate the platform, resources and services into one, build up microcurriculum resources and design a mixed teaching model based on the platform [1].

3.2 Examples of PBL-based computer system maintenance courses

Computer system maintenance is a professional basic course for computer-related majors in vocational colleges. The content of the course is of strong practical operability. Some operation projects have factors that are apt to cause damages to computer hardware and software systems, resulting in an unsatisfactory teaching effect of the course.

Because the Chaoxing network teaching platform has the advantages of complete functions, high efficiency, and ease of use, it is very suitable for carrying out mixed teaching. Teachers can use PCs or mobile phones to build and manage courses, and students only need to install the Chaoxing Xuexitong mobile app on their phones to achieve ubiquitous mobile learning.

3.2.1 Course objectives

The objectives of the course are to master the computer system composition and working principle, to master the hardware disassembly and assembly of commonly used microcomputers, BIOS settings, operating system installation, driver installation and software installation and debugging, system backup and recovery, as well as computer performance test optimization and daily maintenance.

3.2.2 Project construction of course content

According to the requirements of the PBL teaching mode, the course content is divided into three modules according to the actual job: procurement of computer complete machine and parts, software system installation, computer system maintenance, and then divided into a series of specific situational problems. For example, a group task is designed in the computer procurement module:

Xiao Ming, a college student, wants to buy a notebook computer for learning. The budget does not exceed 3,000 yuan. Please give a list of purchase configurations and explain the reasons. Since buying a computer is something many students have experienced, this problem is easy to arouse the interest of students. Through various investigations and research, each group's purchase plan has its own characteristics. During the discussion, each group reports on the plan. The groups evaluate each other, and finally the teachers summarize the comments. This example uses PBL teaching.

3.2.3 Online course construction

Building courses: Chaoxing provides the function of "building a course with demonstration package". Teachers can use thousands of free demonstration courses provided by the company as a model, and use Chaoxing Xuexitong to quickly build a course website with one click. Teachers can also import various teaching resources in the course resource library or teaching resource library, which provides great convenience for teachers to build their own school-based courses. The rich curriculum and network resources on the network teaching platform provide the necessary basic conditions for PBL teaching.

Students joining the class: the teacher adds the class and sends the class number or class QR code to the students, and the students can join the class.

Student grouping: The use of Chaoxing's "grouping task" function can realize student grouping, which facilitates PBL teaching.

Teaching activity management: teachers can send notices, assign homework, quizzes, discussions, check-in (a variety of forms such as gestures, location, QR code, etc.), as well as voting, rush answering and many other instant teaching activities, which enables good teaching interaction.

3.2.4 Construction of mobile teaching mode

The model of flipping the classroom is used, which involves three segments: before, during and after the class.

Before the class, students complete self-study. In the pre-lesson session, the main task is for teachers to prepare teaching resources and students to prepare lessons before class. The teacher issues the learning task list, self-test questions and discussion topics before the class. Students complete the pre-lesson preparation based on the learning task list issued by the teacher. The self-test questions are used to test the effect of the preview. They can also participate in the discussion and raise questions to prepare for the classroom teaching.

During the class, knowledge is internalized in the class, and cooperative learning is completed. Students first sign in through the learning app, and teachers can quickly understand the attendance of students, saving the time of roll calling in traditional teaching classrooms. Teachers focus on analyzing and explaining the key points of knowledge according to the effect of students' previews. At the same time, they can publish replies, discussions, quizzes and other teaching activities through Xuexitong to activate the classroom atmosphere.

After class, reflection and improvement, assessment and evaluation are completed. After class, teachers reflect on the teaching process and design some interesting thinking and discussion activities to deepen students' consolidation of classroom knowledge. Teachers can also send questionnaires for class satisfaction and conduct statistical analysis to reflect on the teaching process and achieve the goal of improving teaching. By publishing test papers through the learning platform, teachers can check the students' mastery of teaching knowledge. Using the statistical function of the Chaoxing network teaching platform, teachers can keep abreast of student learning dynamics and complete objective and fair process evaluation on this basis [10].

4. Conclusion

As a teaching model that allows students to learn actively, PBL has changed the traditional one-way teaching method based on teaching. PBL emphasizes the cultivation of students' learning ability, practical ability and teamwork spirit. It breaks the boundaries of disciplines and is guided by problems

and lets students learn how to solve problems from the situation, so that students can cope with the new problems arising from modern society progress and scientific development in the future [11]. Existing research shows that PBL can cultivate and stimulate cognitive learning motivation and promote the effective transfer of knowledge and ability [12]. PBL is conducive to mobilizing the enthusiasm and initiative of students, and it is conducive to cultivating students' self-learning ability and innovative spirit. It is very worthy of popularization and use in higher vocational colleges that cultivate skilled talents, especially in the teaching of professional courses with strong practicality.

The paper introduces the practice of PBL teaching based on Chaoxing network teaching platform to carry out higher vocational computer system maintenance course. By applying Chaoxing "One Platform and Three Terminals" smart teaching system, teachers can realize the smart teaching of vocational college courses, especially engineering courses, covering the whole process of teaching, and accumulating complete teaching big data, helping teachers improve teaching quality and efficiency, and simplify teaching management.

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