

Teaching reform and practice of object-oriented programming course

Yanhua Chen *

Shandong Xiehe University, 250100, JiNan, Shandong, China

Abstract. This article aims at the deficiencies in the teaching of object-oriented programming courses in our school, guided by the OBE teaching concept, and aimed at cultivating applied talents. On the one hand, carry out teaching reform and practice, and carry out the design of the ideological and political education system of the course, so as to fully mobilize the initiative and enthusiasm of students, stimulate students' innovative ability, effectively cultivate students' innovative thinking ability and unity and cooperation ability, and then improve students' ability to solve problems. To provide guarantee for improving the quality of personnel training.

1 Introduction

For the problems existing in the traditional Java teaching, based on the requirements of the current first-class discipline construction, information-based teaching, course ideological and political introduction, this paper carries out teaching reform and practice on the teaching content, teaching mode, practical teaching methods, course evaluation system and other aspects, and carries out the design of the course ideological and political education system, so as to fully mobilize students' initiative and enthusiasm, stimulate students' innovation ability, effectively cultivate students' innovative thinking ability and cooperation ability, thus improving students' ability to solve problems, and providing guarantee for improving the quality of talent training.

2 Shortcomings in traditional course teaching

The course of Object-oriented Programming takes Java language as the development language. There are many basic principles of programming in the course content. The traditional teaching mode leads to the boring daily learning of many students, who lack good engineering literacy. The main problems are as follows:

(1) The teaching content is outdated and limited to the teaching of simple theories. The original teaching content focuses on the teaching of basic concepts and principles, and focuses on the teaching of theoretical knowledge and grammar. The teaching is centered on the teacher and teaching content, and ignores the principal position of students, resulting in low interest of students in learning[1].

* Corresponding author: 290528163@qq.com

(2)The teaching mode is single. The teacher, as an actor, imparts knowledge to the students in the classroom through the introduction of new lessons, the explanation of knowledge, classroom exercises, homework and other teaching methods. The students just accept the knowledge passively. The students feel that the course is boring, and they are afraid of difficulties, which cannot mobilize the students' enthusiasm for learning.

(3)Practice teaching lacks systematicness. The experiments are mainly designed experiments and verification experiments, and there are a few comprehensive experiments. The practice content ignores the connection and practice with other software courses, which makes students unable to integrate the knowledge and is not conducive to the cultivation of students' ability to solve practical problems by integrating what they have learned.

(4)The assessment method is single and the assessment content is unreasonable. The assessment method of the course is mainly written examination, which focuses on the knowledge assessment of basic concepts and attempts, fails to reflect the ability of analysis and the ability of design and practice, and focuses on the evaluation of result rather than the combination of result and process[2].

(5)The ideological and political design of the course is weak. The course design emphasizes the study of professional knowledge, which is relatively weak in ideological and political education. Teachers hardly involve ideological and political education in the teaching process.

3 The implementation path of teaching reform of object-oriented programming course

Based on the OBE teaching concept, the implementation path takes cultivating students' software development ability as the main line, takes students as the center, and takes ability output as the guide, integrating into ideological and political elements such as love feelings for home and country, cultural literacy, scientific and technological innovation, and craftsman spirit. Based on Xuexitong and flipped classroom, it comprehensively uses inquiry-based teaching method, case teaching method and PBL teaching method to implement project-based teaching, strengthens teacher-student interaction and student-student interaction, so as to construct a learning community between teachers and students.

3.1 To reconstruct the teaching content and integrate the ideological and political education into the course

The post requirements of application software system development is investigated, and the teaching content is reconstructed based on the actual posts and tasks of enterprises. The content of the course is optimized to break through the chapter system of the current textbook, and it is divided into five modules: Java language foundation, object-oriented, collection, GUI, and file flow, driven by real project cases. The basic module of Java language is designed with the case of "simple calculator". The "student management system" is used throughout the course, and the knowledge points in each chapter are comprehensively applied.

It takes the "programmer craftsman spirit" as the core, strengthens the explicit ideology and politics of "persistence, preciseness, integrity, cooperation and excellence", refines the implicit ideology and politics of "value origin", integrates the love feelings for home and country, moral cultivation, cultural literacy, innovation and entrepreneurship into the course content, and optimizes the content supply. The course objectives are designed from four dimensions to realize the organic integration of knowledge, ability and quality values.

3.2 To innovate diversified teaching models

Guided by the work process, it realizes the integrated teaching mode of "introduction, teaching, learning, doing and evaluation" and combination of online and offline. It takes course learning as the main line, combines online and offline teaching, and focus on both theoretical teaching and practical teaching to build a learning community between teachers and students[3].

3.2.1 Teaching resources

The online course resources are constructed by using the Chaoxing Xuexitong network platform, which mainly includes three modules, namely, course chapter system and task list, course expansion learning resources and test question resource library.

Course chapter system and task list: each chapter releases the course learning task list, clarifying the learning objectives, learning contents, learning methods, homework and tests; recording micro lesson videos or selecting online high-quality resource course videos as the task points in the course, so as to facilitate students' pre-class learning.

Course expansion learning resources: it establishes complete course expansion learning resources, including enterprise recruitment written tests, interview questions, enterprise project cases, online learning resources recommendation, JDK instruction documents and other materials, so as to facilitate students to carry out expansion learning.

Course test question resource library: it sets stage tests according to chapter contents to conduct chapter tests, so as to timely understand the learning effect of students.

3.2.2 Teaching implementation

The teaching implementation is student-centered and teacher-led, realizing online and offline mixed mode teaching. Students complete the task points through online independent learning, teachers lecture the key and difficult points in class, teachers and students interact with each other, and the differences and individual needs of students can be solved.

(1) Online independent teaching

Teachers release videos, courseware, task lists, tests and other contents on the Xuexitong, and students complete each task point and test by learning independently. Teachers monitor the students' learning progress at any time through the statistical function of the completion of the task points on the Xuexitong teaching platform, discuss and answers questions online, and requires students to complete learning and classroom tests within the specified time, and test the students' learning effect through classroom tests and homework after class.

(2) Offline flipped classroom teaching

The flipped classroom teaching offline adopts a trilogy of "pre-class (knowledge teaching), in-class (knowledge internalization) and after-class (skill externalization)".

Pre-class: Knowledge is learnt through online resources. Teachers upload teaching PPT courseware, MOOC videos and various learning materials to the Chaoxing platform, assign topics for discussion, and enable students to learn independently. Teachers guide students to process information to achieve "learning" and effectively cultivate students' abilities to discover key information, summarize and apply knowledge.

In-class: Teachers carry out teaching by offline flipped classroom and students internalize knowledge by it. The teachers set up classroom tests to test the effect of pre-class preview and feedback students' pre-class preview. In the discussion of knowledge points, students are randomly selected to complete the explanation of relevant knowledge

points, and a class discussion is conducted to express students' different understandings of knowledge. Teachers also participate in the discussion to guide, sort out and judge. Teachers are mentors rather than lecturers, and gradually cultivate students' abilities of problem-solving, teamwork and communication.

After-class: class knowledge review and summary, project-type tasks, and phased mind mapping. Teachers test the learning effect of students by assigning after-class practical homework, introducing project case design, encouraging students to participate in discipline competitions and other channels, which is the externalization stage of knowledge and skills.

3.3 Hierarchical practice teaching

According to the students' own characteristics and their mastery of the course, the hierarchical practice teaching method is adopted. The in-class practice teaching includes basic experiments, small projects, comprehensive projects and course design, so that students can master the knowledge points related to Java and have the ability to apply basic knowledge points to solve practical problems. The after-class practice is based on the second classroom. Students are encouraged to actively apply for college students' innovation and entrepreneurship training projects, actively organize teams to participate in various software development and Internet + competitions at all levels, so as to apply what they have learned to practice, promote learning through competition, and improve students' project development ability. Through hierarchical practice teaching, students' innovative consciousness and subjective initiative are cultivated, and their ability to solve practical problems and professional quality are improved.

3.4 Development strategy of integration of production and education

Based on the teaching effectiveness, the assessment and evaluation methods are reformed to solve the problem of single traditional assessment form. Centering on the effectiveness of course teaching, scientific and diversified assessment is carried out. Adhering to the design principles of process evaluation and diversification, the online assessment module is added, which effectively monitors the whole process of online and offline. The assessment is divided into two parts: online assessment (30%) and offline assessment (70%). The online assessment is mainly a process evaluation, mainly including access, video viewing, task points, number of discussions, homework, etc. The offline assessment includes a process evaluation and a final evaluation. The process evaluation includes class participation, reading report, project assessment and innovation assessment. The final evaluation is a unified final examination. The online assessment and offline assessment are organically combined to effectively monitor the whole learning process and achieve the process, effectiveness, expansion and innovation. The evaluation subject is diversified, including teacher evaluation, student self-evaluation and student evaluation evaluation.

4 Effectiveness of teaching reform

According to the needs of professional posts, we have reconstructed the teaching content, focused on students, promoted the online and offline mixed teaching mode, guided and instructed students to actively participate in skill competitions, promoted the ability cultivation of innovation and entrepreneurship, and realized the learning community of teachers and students. The following reform achievements have been achieved.

(1) The course content is consistent with the social needs. The course knowledge system is reconstructed according to the actual work posts and tasks of the enterprise, which breaks the silence of the classroom by using the Xuexitong, and integrates the ideological and political education of the course into the teaching content, so as to improve the quality of talent training.

(2) The assessment forms are diversified. The adding of online assessment module effectively monitors the whole process of online learning and offline learning, so as to achieve process, effectiveness, expansion and innovation.

(3) The class atmosphere is active. The “online and offline mixed teaching” is realized by using information means such as Chaoxing Xuexitong platform, which breaks the silence in class. Through online preview, students can take questions to the class, which makes them answer questions more actively, stimulate their interest in learning, improve their independent learning ability, and enhance their innovation awareness, so as to improve the teaching quality.

(4) The acquisition rate of skill certificates has been improved. The participation and acquisition rate of students in subject competitions and obtaining professional skill certificates (soft test, computer level test, etc.) have been improved.

5 Conclusion

In this paper, the OBE teaching concept and the ideological and political elements of the course are applied to the teaching reform of the object-oriented programming course. And the teaching content, teaching mode, practical teaching methods, and course evaluation system are optimized and improved based on the output of results. The teaching is student-centered, result-oriented, and the teaching resources are continuously improved to achieve the unity of skills and knowledge, methods and processes. It enhances the ability of students to analyze and solve complex problems. Based on the Chaoxing Xuexitong platform, the online and offline mixed mode teaching is carried out to achieve the deep integration of information technology and teaching process, achieve student participatory teaching, promote students' active thinking, achieve “teach them to fish”, and cultivate students' ability of teamwork and communication. The teaching reform measures have been applied in the software engineering major of Shandong Xiehe University and achieved good teaching results.

Shandong Xiehe university 2020 university-level first-class course: Object Oriented Programming Design

References

1. LI Y B. Exploration of Ideological and Political Education in Advanced Language Programming Course Teaching [J]. *Western Quality Education*, 2020,6 (2):37-39.
2. LIU A H, CHEN J. Research and Practice on Discussion based Teaching of Database Courses Based on OBE Concept [J] *Computer Education*, 2018 (9): 112-115.
3. LIU J L. Mixed teaching mode of Java programming[J]. *Accessory computer*, 2020 (9): 182-183