

# *Mixed teaching reform of computer courses under OBE engineering education concept--Take introduction to database system as an example*

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**Abstract:** This paper mainly takes "Introduction to Database System" as an example to study and practice the mixed teaching reform based on OBE education concept, and analyzes the importance and current situation of the curriculum. Integrating the OBE engineering education concept, this paper expounds the exploration and practice of teaching design, teaching implementation and students' ability cultivation of hybrid teaching from the aspects of teaching mode, teaching resources and teaching methods. It is of great practical significance to comprehensively improve the quality of higher education, implement the "undergraduate teaching quality and teaching reform project of higher education", and positively promote the teaching reform of computer courses.

## **1. Overview**

In recent years, with the development of information technology, more and more multimedia technology and computer technology have been integrated into traditional courses. The mixed teaching model has gradually entered the vision of educators and become the focus of everyone's research. Introduction to Database System is a basic compulsory course for software engineering undergraduate majors, which plays an important role in guiding the follow-up courses related to database application. At the same time, it also lays a foundation for the follow-up study of Java Web technology/application development technology, and plays a key role in the future work of students in software development. This course is mainly for sophomores, and students at this stage mainly have the following common points: Have a strong desire to learn new knowledge, be familiar with computers and networks, and have a certain desire to express. However, self-study ability is insufficient, most students do not have any database related foundation, and they are not clear about their learning objectives. OBE (Outcome based education, OBE) education concept is an advanced education concept, which is a result oriented, student-centered and reverse thinking curriculum system construction concept<sup>[1]</sup>. The emergence of OBE education concept provides a solution to these situations. This paper mainly takes "Introduction to Database System" as an example to carry out research and practice on mixed teaching reform based on OBE education concept, so as to provide a teaching reference for similar computer courses and even engineering courses.

## 2. Research Status

### 2.1 Research status of teaching concepts at home and abroad

Since June 2016, China has been formally accepted as a full member by the Washington Agreement, becoming the 18th full member, which marks that China's engineering education professional certification system has achieved international substantive equivalence, and also lays a foundation for deepening the reform of engineering education. These ideas are crucial to guide and promote professional construction and teaching reform, and ensure and improve the quality of engineering education personnel training [2]. In recent years, some majors in domestic universities have successively carried out research on teaching and talent cultivation of OBE education concept under the certification of engineering education, such as engineering management [3]. In this upsurge of educational reform, the design of teaching methods and means for computer courses is still based on internal needs, and the research on teaching reform based on OBE education concept is less.

As early as 2013, Gong Yuanming et al. [4-5] introduced CDIO's innovative engineering education concept into the exploration of teaching reform, making the course teaching meet the requirements of the "excellent engineer education training plan" for the cultivation of students' quality and ability. By 2022, the reference [6-7] has outlined the problems such as tight class hours, many branches of teaching content, and the lack of close integration of classroom content and practice. The curriculum teaching team has carried out online and offline hybrid and OBE education theory teaching reform. Although there is a certain research foundation, the teaching objectives and teaching methods are simple, the understanding and understanding of basic knowledge points are good, and the cultivation of students' innovation ability and teamwork ability is lacking.

### 2.2 Current situation of domestic online resources in Introduction to Database System

In recent years, the state has strongly supported the construction of online courses. Up to now, through the research on the major domestic online teaching platforms (MOOC, Love Course, Wisdom Tree), it has been found that some universities have launched the online course Introduction to Database System, which has been operated for several cycles, and the resources are relatively mature. These high-quality online courses provide online teaching resource foundation for online and offline hybrid teaching. However, different types of colleges and universities have different levels of students. Therefore, in the process of mixed teaching practice, it is necessary to formulate a mixed teaching mode of teaching students in accordance with their aptitude in combination with the situation of students in their own schools.

## 3. Problems in the teaching of computer courses

The author has been teaching courses including Introduction to Database System, Oracle Fundamentals and Applications, Hadoop Big Data, etc. since he started teaching. Based on his teaching experience, the author believes that there are the following problems in the undergraduate teaching of computer science: (1) The examination teaching method and means are single, and the final examination results are emphasized. There is less process interaction, which leads to the lack of interest in the learning process of students. (2) Students lack the ability to obtain effective learning information by means of modern information technology and the awareness of active learning, which leads to the phenomenon of "not wanting to learn, not learning, and not learning". To sum up, how to integrate OBE engineering education concept into hybrid teaching based on previous research has become an urgent problem to be solved. As a course with a wide audience in computer specialty, the introduction to database system is necessary to carry out a mixed teaching reform by taking this as an

example, which can solve the problems in computer teaching at this stage and has practical significance in guiding the reform of engineering education in China.

## 4. Blended teaching design

### 4.1 Research ideas of blended teaching reform

According to the OBE engineering education concept, the curriculum system is reformed. In the teaching curriculum, the curriculum adopts the teaching mode of "task driven and project oriented". With the goal of cultivating students' professional ability in software development, the teaching content is arranged in a modular way. By selecting cases and decomposing the real project tasks of the enterprise, the curriculum is gradually improved from the simple to the deep. In accordance with the guiding ideology of "understanding the project during learning, and learning while doing the project", In teaching, students' dominant position should be highlighted, project training should be strengthened, and students' practical programming ability should be improved. The specific teaching model is shown in Figure 1:

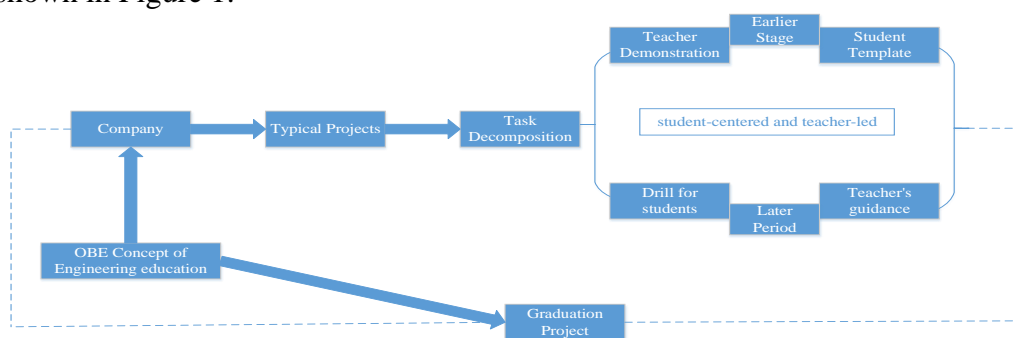


Figure 1: Mixed teaching reform program design ideas

### 4.2 Teaching method reform and innovation

Based on the syllabus, we introduced the classic BOPPPS model from abroad to design the online and offline hybrid teaching mode, and divided the whole teaching process into: (1) Before class: Self preview through Superstar learning platform and other platforms; (2) In class: adopt the teaching mode of BOPPPS Bridge-in, Objectives, Pre-assessment, Participatory Learning, Post-assessment and Summary Six stages. (3) After class: release relevant knowledge points for discussion at Superstar learning platform to increase teacher-student interaction. In teaching, diversified teaching methods are adopted for different teaching contents, and a combination of task driven+group discussion+summary and induction+process assessment+interactive discussion between teachers and students is adopted to improve students' participation and mobilize their enthusiasm. Teach students in accordance with their aptitude, flexibly use a variety of appropriate teaching methods, promote students to actively think and practice, achieve interaction between teachers and students, and truly change the situation of one-way information transmission and one-way control of teachers in the classroom.

### 4.3 Application of teaching means

Through case teaching, students can deepen their understanding of curriculum theories and methods, expand teaching resources through online and offline combination, and expand their horizons through rich curriculum resources. In class, students are the center, and more heuristic problem discussions are carried out to increase classroom interaction. In the course of teaching, we should flexibly use various modern teaching methods to fully stimulate students' interest in learning

and improve the teaching effect. With the help of Superstar learning platform, you can perform demonstration, snap answer, select people to answer, answer in succession, and distribute group discussion tasks to achieve the interaction between teachers and students. After completing the teaching task, students can conduct student student mutual evaluation to evaluate the group in real time. The platform also provides online learning system, online testing, online question answering, etc. Students can not only read, download, test online, but also realize teacher-student interaction, so that teachers and students can exchange opinions and suggestions anytime and anywhere. Turn the learning situation into a place beyond one-way information transmission, and form a platform for sharing knowledge, experience, wisdom and happiness.

#### 4.4 Construction of teaching resources

In our school, the SPOC course "Introduction to Database System" based on the Superstar learning platform is rich in course materials. It includes mixed course learning methods, courseware, teaching plan design, relevant videos, pre class preview materials, arrangement of key and difficult points for classroom explanation and consolidation exercises after class. Classroom attendance, class discussion, grouping tasks and assignment are conducted through Superstar learning platform. The contents of the chapters are complete and comprehensive, which is convenient for students to learn independently online. In the whole teaching process, the teaching policy and strategy of "learning centered" and "online and offline hybrid teaching method" are implemented. Can be on the construction of teaching resources from this link to view: <https://mooc1.chaoxing.com/course/219214169.html>.

#### 5. Summary

This paper tries to explore blended teaching reform from the following aspects, integrates new teaching concepts, builds a mixed teaching model and mixes a variety of teaching methods. (1) Frontier of teaching concepts. According to the OBE concept of engineering education, the reverse design of the curriculum objectives focuses on the development of students' independent learning, teamwork, innovation and design capabilities. (2) Reform and innovation of teaching methods. Using the foreign classic BOPPPS teaching model to design the online and offline mixed teaching mode. (3) Rich teaching methods. A variety of teaching methods are mixed to fully arouse students' interest in learning, and the traditional knowledge imparting is transformed into independent and team-oriented learning, which cultivates the ability of problem finding, problem solving and critical thinking. The combination of online and offline expansion of teaching resources, student-centered, heuristic discussion in class, flexible use of modern teaching means, fully stimulate students' interest in learning, improve the teaching effect, can solve the existing problems in computer teaching at the present stage, has a positive promoting significance for the teaching reform of computer courses.

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