

# Design of Database Teaching Based on Mixed OBE and BOPPPS

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## ABSTRACT

According to the characteristics of computer courses in colleges and universities, aiming at the problems existing in the teaching of database principles and application courses, through the current situation of our school, this paper focuses on the analysis of teaching and student-centered, integrated TEACHING methods of OBE and BOPPPS, and explores the teaching design and practice scheme combining the two. The feasibility of OBE and BOPPPS teaching improvement is analysed through quantitative analysis of evaluation methods, evaluators and curriculum objectives. The teaching practice shows that the mixed teaching mode can solve the problems in the teaching process, promote students to master the teaching content, improve the teaching level of teachers, and lay a good foundation for the subsequent course teaching.

**Keywords:** OBE, BOPPPS, Database Teaching.

## 1. INTRODUCTION

With the development of new engineering construction, computer majors need to have both technical ability and industry background when they graduate [1]. Only in this way can we meet the needs of enterprises for talents across industries and fields and serve the construction of new engineering. Under the development of this information age, college students, as the main forerunners of the mobile network, have more ways to acquire knowledge [2]. Taking the course "Database Principles and Applications" as an example, as a professional basic course, it also involves mathematics, programming methods, front-end design and other disciplines. It has the characteristics of abstract knowledge points and strong applicability. It is urgent to find solutions that can solve problems. teaching mode. There are many commonly used teaching modes, such as MOOC, flipped classroom teaching method, PBL teaching method, BOPPPS teaching mode, etc. Combined with the characteristics of computer disciplines, taking the database principle and application course as an example, the mixed mode teaching of OBE and BOPPPS is carried out [3]. Taking students as the center, teachers guide, set learning objectives, pre-class testing, students and teachers participate in the teaching process together, after-class testing, students and teachers summarize together. To

carry out offline classroom teaching design and classroom organization teaching, combined with the learning advantages of online resources in the MOOC model, to discuss and practice the teaching of database quality courses.

## 2. OBE AND BOPPPS TEACHING MODE

In the 1980s, the world's mainstream educational concepts emphasized "Learning-Centered" and "Outcome-Based Education" ("OBE" for short) [4]. In terms of student experience, it focuses on the experiences and abilities that students can get after education. The OBE educational philosophy clarifies that the goal of instructional design and instructional implementation is the final learning outcomes that students achieve through the educational process. Among the autonomous learning theory, the most popular educational method in recent years is the BOPPPS teaching method [5]. Introduction (Bridge-in), Learning Objective (Objective), Pre-Assessment, Participatory Learning (Participatory Learning), Post-Assessment (Post-Assessment [6], Summary (Summary)). The model was originally developed by ISW based on perceptions of Canadian teacher qualifications [7].

The BOPPPS teaching mode has achieved certain results in the teaching of many professional courses,

which is in line with the training goals of applied talents. According to the characteristics of the "Database Principle and Application" course, six steps are integrated into the teaching to test the students' learning effect.

### 3. MIXED-MODE INSTRUCTIONAL DESIGN

#### 3.1. Reframe teaching goals

In accordance with the goals and requirements of professional teaching reform, curriculum reform is carried out closely around the goal of application-oriented curriculum construction. Guided by the employment of students, according to the professional ability requirements of the post groups covered by the major, combined with the characteristics of the major, with the ability goal as the core, and practical enough as

the limit, it does not pursue comprehensive professional theoretical knowledge, but basically maintains professional theory. On the basis of the integrity of knowledge, according to the needs of occupational work, select suitable professional theoretical knowledge and design it according to the needs of actual positions, and strive to achieve the combination of the teaching of theoretical knowledge and the needs of occupational positions. The teaching content is designed with the OBE method, and the traditional chapter teaching content is reconstructed into the teaching content that is easy for students to grasp, so as to achieve better teaching effect. The design and implementation of the three projects of the student course selection system, the news management system, and the online shopping mall system are the teaching content. The specific implementation process of the project is used as the carrier, and the subject system is changed into the work system to reconstruct knowledge, as shown in Table 1.

**Table 1.** Database Principle and Application Course Content Design

Student Course Selection System	News management system	Online shopping system
1-1 Student Course Selection Database Architecture	2-1 News management system database design	3-1 Function Design of Online Mall System
1-2 Entity-Relationship Model for Student Course Selection	2-2 News management system MYSQL database establishment	3-2 Online shopping mall query function
1-3 Student Course Selection System Database Paradigm Rules	2-3 Creation of news management system data sheet	3-3 Add, modify and delete functions of online store data
1-4 Student Course Selection Database - Relational Operation Example	2-4 Insertion of data in news management system	3-4 Design of Stored Procedure of Online Mall System
1-5 Demand analysis of students' course selection system	2-5 Update and delete of data in news management system	3-5 The use of triggers and cursors in the online mall system
1-6 Construction of the environment of the student course selection system	2-6 Query of data in news management system	3-6 Online store data DAO mode optimization
	2-7 Establishment of News Management System Index and View	3-7 Online Store Data Profile
	2-8 Design of Stored Procedure of News Management System	3-8 Online shopping mall system implementation

The situation is further decomposed into several items or sub-situations. Classroom teaching is organized through projects, each of which includes the process of software development: requirements analysis, outline design, detailed design, software coding, program testing, and software release. Scenario 1 is taught by the teacher and students follow; Scenario 2 is guided by the teacher and students learn to do; Scenario 3 is led by the teacher and students do it independently. After the decomposed project is completed and the foundation is established, the situation at this time can be regarded as a large project, which can not only exercise the students'

comprehensive application ability of knowledge, but also test the students' staged learning effect.

#### 3.2. Optimize the teaching process

BOPPPS teaching mode is adopted in the teaching process. Focus on class discussion, mobilize students' enthusiasm for participation, combine learning content with learning methods, pay attention to student learning effect feedback, and re-plan the teaching process in class. The course teaching process is shown in Table 2.

**Table 2.** Database teaching process design

Teaching link	Time (classes take 2 credit hours)	Study schedule
Preview	Before class	Student Preparation Materials
Online Platform Videos	Before class	Online Learning Videos
Pre-test	10 minutes in class	Training on video content

Analysis of key points	30 minutes in class	Introduce the key points and difficulties of database design
Design Generative Training	30 minutes in class	Multiple rounds of repeated training, independent design model
Discuss	10 minutes in class	Discuss and learn from each other in groups and learn from experience
Post test	After class	Complete database design model independently
Summarize	After class	According to the pre-test and post-test, make a summary, and feed back the teaching evaluation to the students

#### 4. EVALUATION OF THE BLENDED TEACHING MODEL

This paper is based on the database principle and application course in the first semester of the 2021-2022 academic year. To analyse the effect evaluation of OBE and BOPPPS mixed teaching on the students' learning in this class.

##### 4.1. Evaluation method

This student evaluation method is mainly based on procedural evaluation. The development of project-based teaching mode requires a more complete evaluation and evaluation mechanism. First, the number of evaluations cannot be limited to one final exam. A certain percentage is used to calculate the sum; secondly, more flexible factors can be added to encourage students to be bold and innovative, try more possibilities, and give bonus points; finally, the evaluation of teachers should also be considered from multiple perspectives, not limited to students' academic performance. Specific evaluation content: attendance (10 points), video learning (10 points), interaction (10 points), homework (20 points), mid-term and final test (20 points in total), item one (10 points), item two (10 points), item three (10 points).

##### 4.2. Evaluators

During the teaching process, the assessment personnel will be differentiated according to the project and assessment type. For example, in video learning,

As the main evaluator, the dormitory president can urge students to watch video learning. Attendance and tests are evaluated by teachers, assignments and projects are scored by the team leader, and defense members (including 3-4 teachers) are responsible for scoring the defense.

##### 4.3. Course Objectives

The main goal of this course is to enable students to have the basic theoretical knowledge of databases necessary for software development and the basic skills of software design; to have the ability to install, design,

and code databases. Preliminary design and analysis capabilities for data analysis, etc. It lays a solid foundation for students to learn professional knowledge and vocational skills, improve their overall quality, and enhance their ability to adapt to occupational changes and continue their learning. In this semester, the highest score is 98, the lowest score is 79, and all are failed. As shown in Figure 1. Judging from the scores of the students in this class, 15 students with a score of 90-100 are excellent, 24 students with a score of 80-90, have a good grasp of the teaching content, and 1 student with a score of 70-79, master the teaching content proficiently. Through the trial implementation of the OBE and BOPPPS mixed teaching mode in the classroom, the initiative of students in learning is stimulated, and the teaching objectives of the course are well achieved. In the future, a variety of project practice will be further carried out to enrich the teaching content.

#### AUTHORS' CONTRIBUTIONS

Based on the reform of the course teaching mode based on the OBE+BOPPPS hybrid concept, the education concept of student learning output (OBE) is constructed, and online and offline hybrid teaching is adopted. The BOPPPS learning method of intensive teaching mode allows students to cultivate high-quality applied talents through three links: active learning, learning, and learning how to train. Redesign the teaching process of computer courses, and increase the process of teaching content introduction, teacher-student interaction, service and evaluation and reflection. In the classroom introduction and pre-test links, the cloud class is used to carry out the random roll call mode in the classroom. In the main part of teaching, according to the teaching content, heuristic teaching, real cases, flipped classroom and other teaching methods are adopted. A "student-centered" teaching model is formed to stimulate students' enthusiasm, initiative and innovation in learning, thereby promoting the transformation of teaching training direction from "knowledge system" to "ability system". Through the exploration and practice of the blended teaching model, the students' grades in this semester have all reached the expectations, the distribution of grades is more reasonable, and the teaching objectives are easier to achieve. The blended teaching mode has certain

applicability and feasibility for the professional basic courses of computer.

## ACKNOWLEDGMENTS

Project Fund: 2021 Shaanxi Provincial Education Science "14th Five-Year Plan" Project. "Research on the construction and application of mixed teaching implementation strategy based on OBE and BOPPPS in database teaching under the background of new engineering" (NO.SGH21Y0342)

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