Research on Online and Offline Hybrid Teaching of Database Based on OBE Concept

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Abstract— *Based on the concept of OBE education, this paper studies the problem of the Online and Offline hybrid teaching scheme. Firstly, according to OBE, the expected learning results of database course are determined from three aspects: knowledge requirements, ability requirements and quality requirements; Secondly, teachers establish database Online resource database, students study Online and teachers teach in physical classroom; Finally, according to the expected results, teaching evaluation and continuous improvement are carried out from the aspects of examination, competition and graduate feedback.*

Keywords— *Database; Hybrid teaching; OBE; Teaching and research.*

I. INTRODUCTION

In recent years, with the progress of computer technology and mobile Internet technology has evolved quickly. At the same time, mobile learning mode started to be popularized, and the rise of endless teaching APPs and Online teaching platforms made up for the shortcomings of traditional teaching mode. [1]. Teachers use Online APP or Online teaching platforms to assist or replace existing teaching means based on Internet technology and pre-established teaching resources. In addition, the COVID-19 epidemic has not been effectively controlled, and sporadic infections have occurred across the country. Teachers use online APP or online teaching platforms to support or replace existing teaching methods based on Internet technology and pre-established teaching resources. In addition, the COVID-19 epidemic has not been effectively controlled, and sporadic infections have occurred across the country. Schools, especially universities, often do online teaching and do not suspend classes when an epidemic breaks out. In this way, the online and offline hybrid teaching mode is gradually adopted and promoted in colleges and universities and is welcomed by students. [2-4].

In addition, OBE (Output-based Education) refers to Education Based on learning output and focuses on students' learning outcomes [5]. At present, the OBE education concept has a complete theoretical system and operation mode, which is the first choice for the research of talent cultivation and teaching reform in colleges and universities. This paper discusses the online and offline Hybrid teaching mode of database under the guidance of OBE education theory.

II. PROBLEMS EXISTING IN TRADITIONAL TEACHING OF DATABASE COURSE

In the actual teaching process, due to the course content, teaching arrangement and students' own reasons, there are the following problems: (1) database course content is too much, knowledge dispersed, mainly divided into theoretical knowledge and practice content. (2) Few students do preview before class, review after class. There is also a lack of concentration in class, and the teaching effect is not good enough. (3) Students are also highly dependent on teachers.

Many students turn to teachers for help when they confront problems that cannot be resolved. (4) Lack of communication platform, teachers and students rarely interact after class. (5) Teaching assessment is primarily based on examinations, lacking a complete teaching learning feedback scheme.

III. IMPLEMENTATION PLAN OF HYBRID TEACHING MODE BASED ON OBE EDUCATION CONCEPT

A. Introduction of OBE education concept

The OBE education concept, focuses on outcomes, the expected results that students should achieve through the course of study. The teaching process revolves around why to achieve such results, how to achieve such results, to carry out teaching and evaluation if the expected results have been achieved, so as to analyze teaching effects and expected goals and make continuous improvement in teaching reflection [6].

B. Introduction of Online and Offline hybrid teaching mode

Hybrid teaching is a new teaching strategy that incorporates online and physical classes. Online classes are online learning where students complete videos, exercises, assignments and communication online. Online classes can typically be achieved by online teaching platforms. At present, there are more popular Chinese university MOOC, Rain Classroom, each university's own network teaching resource platform, Super Star learning software and Tencent classroom. The physical classroom is managed jointly by teachers and students and usually includes key knowledge explanation, class discussion, tutoring and Q&A, in-class exercises and example explanation, etc. The mixed teaching model is shown in Figure 1:
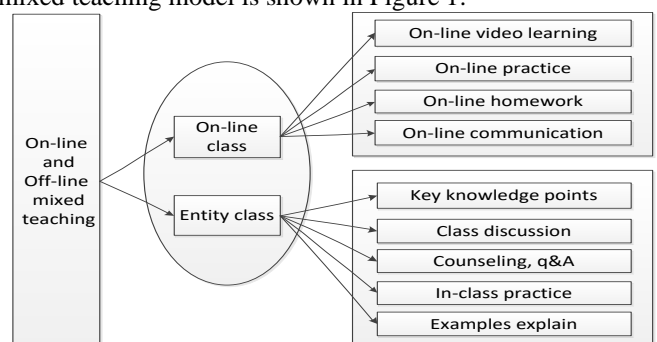

Fig. 1. Hybrid teaching mode

C. Implementation Plan

a. Identify expected learning outcomes

Based on the OBE concept, it is essential to make clear what type of predicted learning results students should achieve after learning database courses. The anticipated learning outcomes are determined from the aspects of knowledge requirements (KN), ability requirements (AB) and quality requirements (QU) according to the professional training program and curriculum outline, with the graduation requirements as the main line. The specific contents are shown in Table 1:

TABLE 1. Index point support degree of course teaching to expected learning outcome

Graduation requirements	Expected achievement index points
KN-Knowledge required	**KN1.** Familiar with and understand the basic concept of database, data model, database architecture and database system composition, master database security and integrity; **KN2.** Familiar with the standard query language OF relational database SQL language, can use the core commands Select, Insert, Update, Delete database query and add, Delete and change operations, master the basic programming technology of database, understand the concept and application of view; **KN3.** Master the basic methods and steps of database analysis and design; **KN4.** Familiar with and understanding of database query optimization theory, recovery technology and concurrency control theory.
AB-Capacity requirements	**AB1.** Ability to analyze and design databases for simple systems; **AB2.** Can create and maintain databases in SQL Server Management Studio, and can manually operate database backup and restore, separate and attach operations; **AB3.** Have certain database programming ability, including SQL command to create tables, maintain tables, insert data, modify data and delete data and data query; **AB4.** Ability to use Enterprise Manager and T-SQL statements to create, query, update, modify, and delete views to further understand the differences between views and basic tables.
QU-Quality requirements	**QU1.** To have an in-depth grasp of Marxism-Leninism, MAO Zedong Thought, Deng Xiaoping Theory, "Three Represents" and Xi Jinping's theory of governance in the New Era; Love the motherland, support the leadership of the Communist Party of China, support the party's basic line and principles and policies; **QU2.** Have solid database basic knowledge and grasp the scientific method of analyzing and solving problems, have rigorous scientific attitude and modern society consciousness of competition, environmental consciousness, value and benefit consciousness, realistic and innovative consciousness.

b. Teaching content arrangement and teaching form

According to the OBE education philosophy, in order to achieve the desired results, the corresponding teaching content and teaching form should be determined. The teaching form adopts Online and Offline hybrid teaching, and combines the characteristics of database courses, requiring students to learn conceptual content Online, while Offline teachers mainly explain the basic principles, design methods and practice of database and other key content. According to the above ideas,

it is assumed that the database theory class is 51 class hours, the Online class is 6 class hours, and the Offline physical class is 45 class hours. The specific content and class arrangement are shown in Table 2:

TABLE 2. Online and Offline teaching content and class hour arrangement

Chapter	Content	Online Knowledge	Number of lessons Online	Offline
1	Introduction	Four basic concepts	1	3
2	Relational database	Definition	1	9
3	SQL language	Basic concepts of SQL	1	9
4	Database security	Database insecurity Safety Standards	1	3
5	Database integrity	Entity integrity definition Referential integrity definition User-defined integrity	1	3
6	Relational database theory		0	6
7	Database design		0	6
8	Database recovery technology		0	3
9	Concurrency control		1	3
Total			6	45

c. Teaching Resource preparation

The database research group has applied for the MOOC project of Chinese universities and recorded course videos. Teachers create database courses on the online platform and upload courseware, lesson plans, assignments, and learning materials.

d. Online classroom learning

Students watch the courseware and video according to the task and study independently according to the teacher's pre-class preview requirements. Feedback difficult problems to the platform during learning and online communication with other students.

e. Physical classroom teaching

In the physical classroom, teachers should arrange teaching contents and methods according to students' feedback in the online classroom learning process, such as key knowledge point explanation, class discussion, example explanation, etc.

f. Improve teaching evaluation and feedback

According to the anticipated learning results, a teaching evaluation system is set up, including examinations, curriculum design, competition and graduate return visit, etc. The teaching impact of database course is typically assessed through these specific evaluation indicators, and the results are fed back to the new round of teaching, so as to continuously enhance the teaching content and teaching methods.

IV. CONCLUSION

Taking database course as an example, this paper analyzes the shortcomings of traditional classroom teaching, and studies the Online and Offline hybrid teaching mode based on OBE through Online learning platform, in order to resolve the problems existing in traditional classroom teaching. Through this mode, students can strengthen their learning excitement and improve their independent learning ability. For educators, online learning and the implementation of online teaching activities can understand the entire learning process of students, drive online classroom activities, enhance teacher-student interaction and improve teaching quality. In the past three years, database courses have been opened three times through the E-Learning Anhui Province Network Learning Center platform, and students have achieved good Online learning effect.

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