

# Development of Database Construction and Management Course Based on OBE

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**Abstract:** Now is the era of rapid development of information technology. Therefore, database processing in the information age requires efficient management and analysis of databases. Database course is a core professional basic course, which requires students to master the basic principles of databases and use these basic theoretical knowledge to solve practical problems. OBE (Outcome based education) is used to carry out the teaching reform of network database technology course. The ultimate learning achievement of the course is to have the most popular database application technology programming and management ability. The teaching system of four major parts of the course is constructed. The online and offline flip classroom teaching implementation strategy is adopted, and the evaluation method of learning achievement is carefully designed. Combined with the author's teaching experience and experience in related courses for many years, this paper discusses the idea of database course construction oriented to OBE concept, so that graduates can master the corresponding export ability, and make multi-level closed-loop continuous improvement on the course content according to multi-party feedback, and finally ensure the quality of professional personnel training.

## 1. Introduction

Database course has high requirements for students' comprehensive ability in theory and practice, and can help students to establish a preliminary concept of software engineering, which has an enlightening effect on the development of large-scale software systems [1]. In the past, case teaching was mostly used in teaching, students were passive in receiving knowledge, and the assessment of learning effect was mainly based on homework and final exams, which was not conducive to mobilizing students' learning enthusiasm and initiative.

OBE (Outcome based education) is also called ability-oriented education, goal-oriented education or demand-oriented education [2-3]. The teaching design based on OBE concept is "student-centered, results-oriented", focusing on what abilities students have and what they can do after learning, and then adopting reverse design to determine teaching objectives, teaching content, design classroom teaching and evaluation mode, etc. Based on practical experience, this paper will discuss the idea of database course construction under OBE concept, and elaborate in detail from several aspects, such as curriculum setting and teaching content reform, closed-loop continuous improvement of the course, etc.

## 2. OBE concept and discussion teaching

### 2.1. OBE concept

OBE is concerned about the final achievements made by students through the educational process, so OBE's four core issues focus on four points: first, what are the learning achievements made by students, second, what are the reasons for the learning achievements, third, how to effectively help students achieve these learning achievements, and fourth, how to judge that students have achieved these learning achievements [4].

OBE, as an educational structure model, is organized, implemented and evaluated with the predefined learning results as the center. As shown in Figure 1, the overall framework of the online open curriculum resource structure model is constructed according to the four links of OBE education model proposed by Chan drama Acharya.

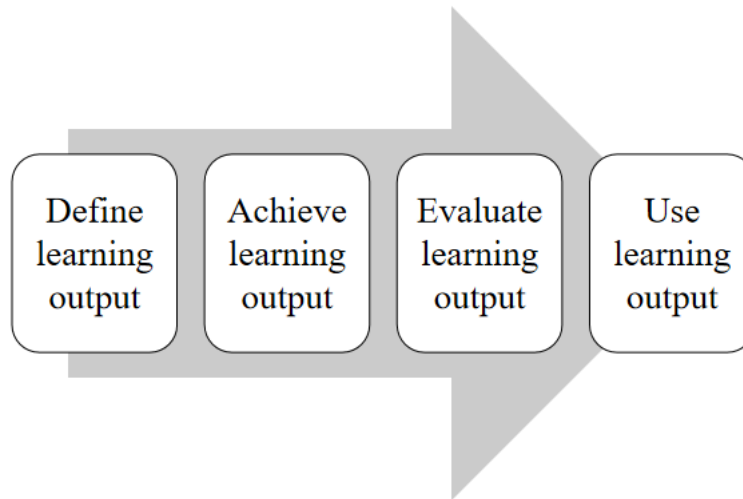


Figure 1 Four links of OBE education model

**Defining learning output:** This link is the characteristic of OBE education model and the first key step in the whole education system. According to the specific requirements of students and teachers and the dynamic development needs of the industry, we should adjust the learning output level in time and quickly, and refine the established definition of learning output to make it concrete and operable.

**Achieving learning output:** this link is designed retroactively according to the defined learning output, and all feasible curriculum resources that can help achieve the expected learning output should be included in the curriculum resource system, which greatly enriches the construction of curriculum resources.

**Evaluation of learning output:** Evaluation of learning output is accompanied by the whole process of realizing learning output, so as to dynamically grasp the learning situation of learners by making use of various evaluation resources provided.

**Using learning output:** using learning output emphasizes two aspects: on the one hand, learners apply learning output to work, study and life as a test of learning output; On the other hand, the application effect of learning output, as the feedback of curriculum resources construction, guides the optimal design of curriculum resources.

OBE emphasizes that education evaluation is based on learning output, focusing on whether the training objectives and graduation requirements of students are clear, whether the set goals and requirements are achieved, and how students are doing, so as to ensure that learners can obtain the knowledge, ability and quality they need after entering the society [5]. It focuses on the development ability of MySQL database system and the achievement of MySQL database management ability, which lays a foundation for students to engage in MySQL database application development and database management after graduation.

## 2.2. Discussion-based teaching

Discussion teaching is a teaching method that pays equal attention to both teachers and students, and both teachers and students participate in teaching activities to the maximum extent, forming a benign pattern of mutual learning and mutual improvement [6]. In teaching, teachers should constantly guide students to think and stimulate students to establish contact with previous knowledge. Therefore, the discussion-based teaching needs to adopt effective strategies to promote students' awareness of the significance of learning and feel the improvement of learning ability, so as to generate motivation for continuous learning.

## 3. Database construction based on OBE

### 3.1. Basic information design

In this study, Visual Basic Programming is selected as a compulsory course of general education

in the teaching plan, which is an introductory course for students to learn programming language and software development technology, and plays a fundamental role. Make students master the basic Visual Basic programming methods, and form the basic object-oriented programming ability, including basic grammar, logical thinking, program debugging and problem solving.

### 3.2. Self-taught resource design

According to the typical case content "menu design" of Database Development and Application programming course, the design and development of learning task objectives, task guide sheets, case course resources and instant tests will be carried out. It is designed based on learners' learning preparation. It explains learners' learning tasks, learning goals, difficulties, learning methods and the use of learning resources. It also contains a list of questions and learning experiences as teaching feedback, which not only urges students to reflect on themselves, but also serves as the basis for teachers' teaching adjustment. See fig. 2 for the task guide sheet of "menu design" case.

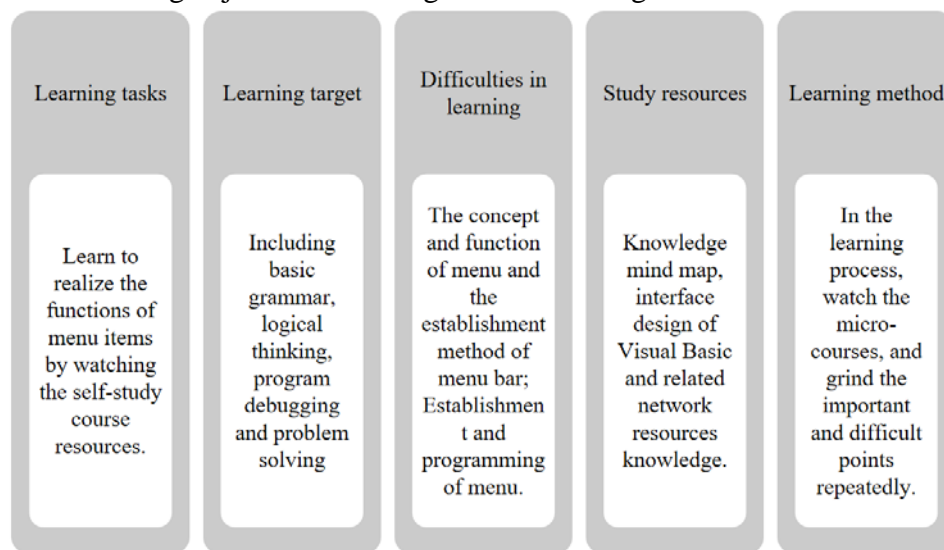


Figure 2 "Menu Design" task guide sheet

Script, also known as blueprint, often refers to the base book on which video shooting or editing is based [7]. Here, it is more reflected in the foundation of course designers' selection of teaching content and teaching design by using various resources. Good script design is the foundation of a good video course, which can best reflect the creativity and characteristics of teachers and researchers. The materials needed in the case task of "Menu Design" include audio, pictures, detailed scripts, subtitle design and so on. Among them, the picture requirements are cartoon pictures, which are consistent with the theme of animation design and come from the Internet; The script mentioned here is different from the script design of teaching ideas, but emphasizes the material arrangement in each frame animation, which is synonymous with the concept of script. Detailed script design is still divided into three parts: the beginning, the middle and the end.

The end of the film is the ending of a video, which summarizes and ends a lesson. This case uses the psychology of learners' need for interaction to finish in a questioning way, which can not only promote learners to recall the content of this lesson, but also play the role of problem screening [8]. In addition to designing curriculum resources based on micro-curriculum, other related curriculum resources are also designed, including mind maps, related courseware and network resource integration.

### 3.3. Activity resource design

Upload various course self-study resources (such as classroom task guide list, video, file resources and basic task questions, etc.) to WeChat group file sharing, and then use the real-time communication function of WeChat platform to send learning announcements. After receiving the learning announcement, learners learn independently and test the learning results through the basic

test questions.

Doubts or some innovative thinking generated in the process of autonomous learning can be exchanged through WeChat platform, and some problems in basic test questions can also be preliminarily solved through online discussion. Teachers will sort out and summarize the problems in learners' basic knowledge test questions and the doubts in the list of questions, discuss related topics on WeChat platform, and give teachers timely guidance. Through the process of problem solving, the learner's ability is further improved, and the teaching effect feedback is provided by completing the expansion task, which sometimes includes the design of the expansion task, and students can upload it to the WeChat platform for teachers to review.

#### 4. Management course development based on basic OBE concept

The essence of management curriculum development based on OBE concept is "reverse design", that is, taking the final training goal (final learning achievement) as the starting point, managing curriculum development, carrying out teaching activities and teaching effect evaluation, etc. The management curriculum development, carrying out teaching activities and teaching evaluation are not based on systematic and scientific factors of professional development, but on the demand of learning output.

##### 4.1. Teaching content design

From the perspective of curriculum, database teaching is divided into two courses: database principle and database course practice. The principle of database is the classroom teaching of related concepts; The practice of database course emphasizes practical teaching, which requires students to be proficient in using typical RDMBS, solve the data management needs in practical scenarios, and simulate the internal functions of RDBMS.

In order to enable students to obtain corresponding learning results through this course, the teaching content of Database Development and Application is integrated and optimized, and the teaching content is divided and organized according to the course objectives and expected learning Chen Guo. The detailed knowledge module division and core knowledge points included in the module are shown in Table 1.

Table 1 Knowledge module and core knowledge points

Knowledge module	Core knowledge points
Overview of database	Basic concepts, technical application and frontier development of database, database system and database management system, types and development process of database application system
relation model	The concept, pattern and model of relationship, and the operation principle of relationship model
Sql language	SQL basis, SQL statements for data manipulation, query, control and transaction
Database design	E-R design process, model design and generalization of conceptual data, logical data and physical data, common database modeling tools, and database design with SQL
Database programming	The structure, development method and programming technology of database application system, the programming of database cursor, stored procedure and trigger and their application in information system
database administration	Database transaction management, concurrent management, security management and database backup and recovery

##### 4.2. Curriculum practice

In the aspect of curriculum practice, we arrange the computer every Thursday, which includes three aspects: the use of RDBMS tools, database design and the realization of RDBMS functions, and the difficulty increases step by step. Database design is aimed at a given application scenario,

which requires students to design corresponding conceptual models and database patterns to meet the standardization criteria and avoid data redundancy and abnormality. The above experiment is based on DBMS system interface, which trains students' ability to solve practical application problems based on tools.

OBE concept emphasizes the cultivation of students' complex engineering ability. The purpose is to solve the problem of correctness of concurrent business and recovery of software and hardware failures. This part is selected and arranged according to the actual situation of students. Taking SQL query language experiment as an example, it is necessary to add more practical technologies needed in the future development of the system on the basis of connection and nested connection, so as to cultivate students' ability of being good at practice, thinking and questioning. It is difficult to promote students' mastery of the underlying system design, implementation methods and basic principles of basic software, and train students' practical ability to flexibly apply theoretical knowledge to complex engineering practice.

There will be experimental reflection in the investigation reports of classroom experiments and extracurricular experiments, and students are asked to express the problems they encounter and the process of solving them. 5~7 people with the same subject are selected as a group, and group discussion is started from requirement analysis, design use case diagram and ER diagram, and more than one database design drawing is given in each group. Each person completes his own system according to the target requirements, which can not only facilitate students' discussion, but also highlight their individuality and realize students' hope of "having team help and sharing with each other".

Under the guidance of OBE teaching philosophy, we should pay more attention to the application of theoretical knowledge in practice while paying attention to the teaching of theoretical knowledge, and constantly strengthen students' practical ability. The three-level project link is typical, which not only retains the original experimental link, but also strengthens the students' hands-on operation ability. By combining theory with time, we can deepen students' understanding of theoretical knowledge, solve problems in real life, guide students correctly, and cultivate students' team cooperation ability and comprehensive quality.

### **4.3. Evaluation results**

With good design content, teachers are also required to make a pertinent evaluation of the results in the experimental research report, and respond and guide students' questions and difficulties in time, so as to encourage students to continue their efforts or urge students who have slacked off to adjust their learning rhythm.

In fact, it is easy to give evaluation in experiments, and the biggest part of the workload lies in answering students' questions, especially pointing out the problems in the code. The experimental interactive platform can directly send scores and graphic replies given by teachers, and directly reply to personality problems. You can use screenshot tools to identify errors and give tips in words; When the project is accepted, each group of students will participate together, and the best works will be selected in the group for display. The team members can not only observe and learn, but also understand the design concept and practice level of other students through defense. Teachers ask questions with difficulty coefficients from high to low, and students can answer them first, or supplement and evaluate the answers. Emphasis is placed on the assessment of final learning achievements. According to the teaching content of each part of the curriculum system, students gradually improve and finally complete the database design, implementation and maintenance of a database application system. In addition, in the online and offline teaching process, students' self-evaluation, mutual evaluation, teacher comment and other evaluation methods are set up.

The appearance of OBE teaching mode has changed the simplification of examination methods into diversification. At the same time, according to the diversified target requirements, the evaluation grades of the examination are divided into three grades: excellent, good and medium. The evaluation of curriculum design is also based on the goal and demand of the curriculum,

participating in the form of groups, and selecting excellent works from each group for display. Members in the group can not only love learning, but also learn about the design concepts and practical level of other students through relevant practical activities.

## 5. Conclusions

OBE concept and research-based teaching method are both helpful to the cultivation of comprehensive quality and ability of engineering students in application-oriented undergraduate course in the current teaching reform of colleges and universities. The research shows that the implementation of OBE education concept in the course of Database Principles has achieved good results, and students have changed from being confused about the course of Database Principles at the beginning to being in a state of clear goals, active participation and active learning. Many students have made great progress after learning and become interested in the course of Database Principles. Based on OBE education concept, deep learning theory and multiple intelligences theory, this paper explores the curriculum teaching reform in the course of database development and application with project development as the main line, multiple teaching methods as the means and multiple assessment as the guarantee.

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