

Research on Task Driven Teaching Model based on Flipped Classroom ——Take the "Database Principles" Course as an Example

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Abstract. On the analysis of the task driven teaching pattern of database principle problems, on the basis of focus from preparation before class, classroom practice, analysis summary part studied the flip class after class and task driven database principle of combining teaching activities, the corresponding teaching mode is designed.

Introduction

Task driven teaching method is a kind of teaching method based on constructivist learning theory, the main features is the "task drive, pay attention to practice", very suitable for the teaching of computer courses, because of the most practical course, students should not only learn the theoretical knowledge, and to master the practical operation skills. [1]

In the flipped class, the teaching of knowledge is completed through the assistance of information technology, and the knowledge internalization is completed in the classroom by the help of the teacher and the help of the students, thus forming a formal subversion in class. With the reversal of the teaching process, every link in the course of classroom learning has also changed. [2]

The ultimate goal of task driven teaching and flipping the classroom is to enable students to truly become masters of the classroom, this paper aims at the combination by turning the classroom and task driven teaching method, innovation teaching model of the course of database principle, training high quality talents.

Problems Faced by Task Driven Teaching

The course of database principle is a required course for computer majors, and its teaching objective is to enable students to master the basic knowledge and skills of database design and implementation. This course is abstract and practical, involving requirements analysis, two layer model abstraction, database implementation, and database programming. Only through classroom participation and a great deal of practice can students grasp and understand knowledge and effectively apply theoretical knowledge to practice. The practical task is divided into two stages: teacher demonstration, student verification stage, and student independent design and implementation stage. In the first stage, the teacher first presents the practical tasks, objectives, demonstrations, and then the students complete the tasks at a limited time. The second stage, students according to the needs of independent choice of database application system topics, sub group exploration completed.

However, there are also some problems in the implementation of task driven teaching.

The Order of Teaching Content Needs to be Rearranged. The practical teaching of the course will integrate the engineering thought into the concrete task, according to the requirement analysis, the conceptual structure design, the logical structure design, the physical structure design, the database implementation and so on. The practical tasks can not be carried out in accordance with the order of the teaching materials, but after the accurate analysis and induction of the course contents, the subjects and hours of each task should be determined.

There are many Teaching Contents and large amount of Knowledge. Design and develop a database application system, which involves knowledge of software engineering and high-level

language programming. For software engineering knowledge that has not been studied, students need to study ahead of time. For programming skills that have been learned, students need to review their applications in databases. Thus, the teaching task of the course is increased.

The teacher prepared a large amount of lessons. To answer questions raised by students in the course of teaching and participating in student questions. Teachers should carefully consider each task before class, students to clear the completion of tasks, to spend more time searching a large number of teaching materials in order to increase the depth and breadth of knowledge, and familiar with the content of practice.

Typical Cases are Needed to Lead the Teaching. [3]In order to stimulate students' interest in learning, teachers should demonstrate typical cases in combination with actual needs and cover important knowledge points of the course. The demonstrations of typical cases make the class tense, therefore, the task driven teaching process requires a scientific and rational arrangement of classroom practice time.

The Application of Flipped Classroom in Task Driven Teaching

Considering the insufficiency of the original task-based teaching method, it is a better choice to turn the classroom teaching idea into the practice teaching of the database principle course.

Application Value. Turn the classroom, each task of teaching courseware, micro video to students, students in the completion of the task, in accordance with their own state of knowledge in advance, save practice teaching time. Students can spend more time in practice class interacting with students or teachers, and teachers and students have more opportunities to contact, solve the problem of knowledge internalization, and make task driven teaching fruitful.

Teaching Mode Design. Teaching mode is the reflection of certain teaching theory or teaching thought, and is a norm of teaching behavior under certain theory. The theoretical basis of the flipped classroom teaching model is the design thought of constructivism, learning theory and system theory. [4]

After years of teaching and accumulation, Professor Robert Tallbert of the United States summed up the implementation structure model of "flipped classroom": watching video teaching before class and performing specific exercises. In class, a quick, small amount of testing, problem solving, knowledge transfer, summarization, feedback. [5]On the basis of this, the database principle curriculum and task driven teaching model based on flipped classroom is mainly composed of pre class preparation, classroom practice and after class analysis, as shown in figure 1.

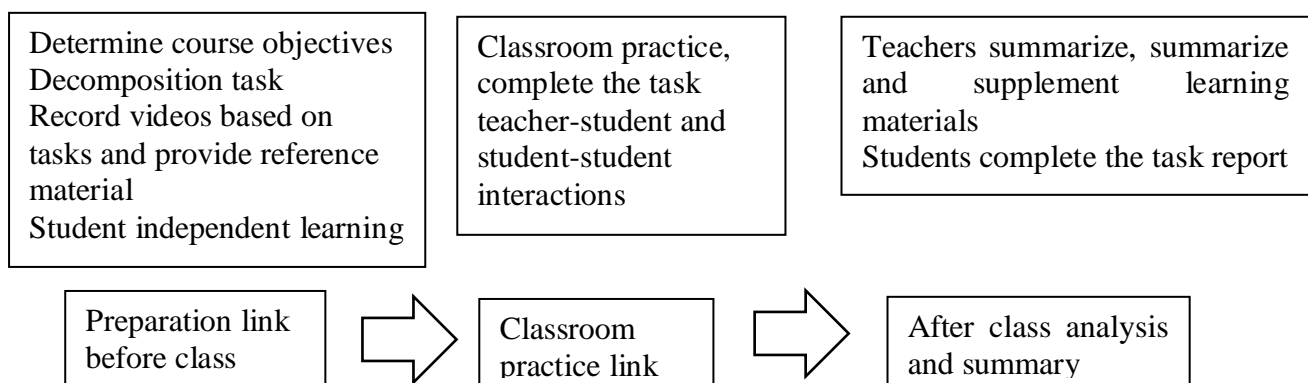


Fig. 1 teaching model diagram

The preparation step before class -- enables the student to study voluntarily, expands the classroom study time. The teacher first clear the teaching goal of the course is to let students master the database design and implementation, from the teaching objectives of the practice of task partitioning, task completion and refinement to prepare knowledge, as shown in table 1. Clear up the knowledge points involved and record video presentations for each specific task. Demonstration

video production, content has theory explanation part, and practice operation part. Upload video and learning resources to the learning platform. After that, prepare to collect student feedback.

Table 1 Division of practice tasks [6]

Task	Specific learning tasks	Knowledge preparation
requirement analysis	Knowledge of data dictionary composition and integrity constraints	The composition of data flow diagrams and the rules of integrity
Conceptual structure design	Master conceptual model design	Design method of ER diagram
Logical structure design	Grasp the theory of logical structure design and relation normalization	Transformation from conceptual model to logical model and decomposition method of normal form
Database implementation and maintenance	Master database creation, table creation, update, query, database security, database backup and restore	Relational algebra theory; the syntax of SQL in databases, tables, security, backup, and restore
Database programming	Master the database programming technology commonly used in database application system development	JDBC programming methods, embedded SQL, dynamic SQL, cursors, PL/SQL, stored procedures

Students start with the task, review the learning materials, learn the video by themselves, try the task of completing the task, and prepare questions that are discussed with the class or the teacher. Students change from passive listening in class to active discovery learning before class. [7] And ready to answer, "what theoretical knowledge have you learned?" "What skills have you learned?" "What's the problem?" Three aspects.

Practice in class -- analyzing, solving problems and internalizing knowledge. Students study data before class, they have some understanding of the content of the practice, and the classroom practice time is mainly allocated to students to do the training on the computer. Students in the course of completing the task, and constantly explore, continue to interact with students or teachers, to complete the knowledge of internalization. Teachers collect questions before class and give feedback and discussion to the class. In this way, efficient use of classroom time, interaction between learning experiences and perspectives can deepen students' cognition. [8] This link is divided into two stages. In the first stage, the practice process of each task requires two students to share the thinking, that is, a student demonstrates the task completion method in the DBMS environment, and belongs to the verification practice. Another student explains the design examples of the same knowledge and belongs to design practice. In the second stage, students will complete the task of selecting topics in groups and prepare to demonstrate their defense.

After class analysis and summary. The student teachers of each task error prone points are summarized, added to the teaching video, make teaching video more widely. Students complete the task report, will complete the task of steps and harvest reflect on, complete the knowledge consolidation. The teacher will carry out the database design, the big homework displayed by the group, each group will report the work, other students will query and propose improvement measures.

By turning the classroom into a task driven teaching model, students can learn from "think right" to "speak clearly" and "make it clear". [9]

Summary

Some scholars believe that the reversal of classroom teaching model can make the higher engineering education classroom return to the cultivation of students' ability. [10] The classroom teaching method will be introduced into the task driven teaching model, and the time in the practice class can be left to the students to interact with the teachers and to make a thorough study of the knowledge. This kind of teaching model can improve students' database practice skills.

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