Creative Thinking of Database Course for Economics and Management Major in Conceive of the "Big Course" and "Big Task"

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Abstract

According to the teaching and reform practice experience of database course for economics and management major, the paper makes a comparative analysis of the database courses of the universities in china and foreign, in terms of textbook, teaching content, teaching method, homework form, examination method and so on. In this paper, some new ideas about system and content of database course based on the "big course" and "big task" are put forward, and some improvements on teaching method have been discussed.

Keywords: database technology; database course for economics and management major; course system; teaching resources library; curriculum group

1. Introduction

Database technology is a computer-aided data management method and an important branch of computer science, it researches mainly on how to organize and store data properly and how to read and process data efficiently. Database technology has become an important basis of the information management system and the computer application system. In the late 1970s, foreign universities started to set the database as an important courses of the computer major. Since the 1980s, many Chinese universities had also set the database as one of the main courses of computer major. At present, the course of database theory and application has become a compulsory one for economics and management major, which play an important role in personnel training.

We have long been engaged in teaching the database course for economics and management major (DBCEM for short), and understood fully the current teaching situation and major characteristics. Our paper discusses the DBCEM reform from several aspects: the course feature analysis, teaching system and teaching content design, teaching method and so on.

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2. Feature Analysis of DBCEM

2.1. Nature and Purpose of the Course

The teaching object of DBCEM is undergraduates of economics and management major. It is a comprehensive professional course closely related to the theory and engineering practice. Compared with the database course for science and engineering major, it has differences in the teaching plan, content arrangement, points and difficulties. In general, DBCEM teaching focuses primarily on database technology application, configuration and using of mainstream database systems (*e.g.*, Microsoft SQL Server), data management by the database technology. After possessing these skills, students also should have some know the theory and method of database design and the future development direction. In most Chinese universities, programming language courses (*e.g.*, VB, C) are offered in freshman year, the DBCEM is opened up in sophomore, and some system design and development courses are taught in grades three and four. Therefore, the database course can become naturally an important bridge, its teaching quality is directly related to whether student can form a reasonable and comprehensive knowledge structure of information management.

2.2. Comparison of Classical Courses Between China and US

"Introduction to Databases" [1] is served as the first database course for undergraduates in Stanford University, using the textbook "A first course in database systems" [2], which is co-written by well-known computer scientist Jeffrey D Ullman and Jennifer Widom of Stanford University. Although this course was originally developed for students in computer major, now it has become the database introductory course in the whole university, and the elite school open courses for the whole world. Renmin University of China is the first school which opened up database courses in China [3]. Its textbook (named by "Introduction to Database Systems" [4]) has been widely used in many colleges and universities in China, and it has been built as a national high-quality course. In 2007, Xi'an Shiyou University has set the "Principles and Applications of the database" course as a required course for undergraduates in economics and management major.

In Table 1, we compare the database courses in our school, Renmin university of China and Stanford University from several key aspects, such as textbook, teaching content, teaching object, total class hour, teaching method, homework form and exam method. To identify the gaps and differences, we try to learn successful experience, and seek new ideas and methods of DBCEM reform and innovation, so as to make it become a high-quality courses with professional characteristics.

Table 1. Comparison of Database Courses

		Renmin University of China	Stanford University	Xi'an Shiyou University
Textbook	**Title**	Introduction to Database Systems	A First Course in Database Systems	Database Technology and Applications
	Press	Higher Education Press	Pretice Hall	Machinery Industry Press
	Author	Shan Wang, Shi-xuan Sa	Jeffrey D Ullman, Jennifer Widom	Xue-lan Miao, Rui-xin Liu, Hui-qun Song
Teaching	**Basic**	Chapter 1	Chapter 1	Chapter 1 Database

Content	Theory	Introduction Chapter 2 Relational database Chapter 6 Relational data theory	Introduction Chapter 2 Relational database Chapter 5 Relational algebra Chapter 7 Relational design theory	Basic knowledge Chapter 2 Data model and conceptual model Chapter 4 Relational Database Chapter 7 Relational database theory
	Basic Operation	Chapter 3 SQL	Chapter 6 SQL	Chapter 5 SQL
	System Design	Chapter 7 Database Design	Not covered	Chapter 3 Design of database systems
	Technology Application	Chapter 4 Database Security Chapter 5 Database Integrity Chapter 10 Database Recovery Technology Chapter 12 Database Management System Chapter 13 New development of database technology	Chapter 3. XML data Chapter 9 UML Chapter 10 Index Chapter 11 Constraints and triggers Chapter 13 Views Chapter 14 authorization Chapter 16 OLAP Chapter 17 NoSQL systems	Chapter 6 SQL Server 2000 relational database management system Chapter 8 database protection technology and SQL Server database protection Chapter 13 New database systems and development of database technology
Teaching Object		Computer science and related majors	Basis for all professional courses	Economics and management major
Total Class Hours		64 hours and 56 hours for extracurricular experiments	9 weeks (total instructional videos Duration: 944 minutes)	54 class hours
Leading Class		Computer program design methods and design language, Data structure	Unknown	University computer Foundation, Programming languages (VB)
Database Systems for Teaching		Kingbase ES	SQLite, PostgreSQL, MySQL	Microsoft SQL Server
Teaching Approach		PPT, Instructional videos, Animation, One-	Complete network video of instruction and discussions,	PPT, Live demonstration, Exercise class, Seminar, Tutorial

	to-one online Q&A	Online PPT, Online homework submission and marking system, SQL programming training system, Forum-style Q&A system	Q&A
Homework Form	(1) written assignment (2) computer experiment (3) course large homework (database design)	Students need to register at the school designated site for their own account (1) Homework submission and marking system (exercise, quiz, extracurricular exercise) can complete homework submission, scoring, answer analysis and explanation (2) SQL programming training system can support online writing and running SQL statement, and viewing the results.	(1) Written assignment (exercises after the class); (2) Computer experiment (thematic training); (3) Course large homework (complete database design)
Exam method	Mid-term and final written examination, online self-test system	Mid-term and final online automatic test system, it can support real-time examination, scoring, answer analysis and record personal achievements and mistakes.	Final written examination, SQL programming computer exam

2.3. Characteristics of the DBCEM

Database Course plays an important basis role for the students of economics and management major in their latter courses of system design and development. It also has an inevitable impact to the eventual graduation design and social practices. While learning the DBCEM, the student behaves the following characteristics:

(1) Teaching of DBCEM focuses on cultivating students' ability in database

application. Meanwhile, other basic technology courses involves in a wide range of knowledge and content, students can only arrange limited time and effort to learn the database theory and concept which has strong abstractness. This actually increases the difficulties of understanding the related teaching content.

(2) Most students in economics and management major are liberal art background and their four-year university subjects mainly lies in the nature of liberal arts-type. This kinds of courses are mainly research the macroscopic phenomena. However, the computer technology courses are focus on researching and solving the microscopic and specific problems. All the above cases lead to the difficulties that students would take more time transforming their thinking. While learning the DBCEM, most of the students just learn by rote instead of understanding.

(3) As the occupational direction of students in in economics and management major has no close relationship with software development and computer technology, moreover, some employers does not value the achievements of computer technology courses, students have insufficient understanding of importance of DBCEM, and their learning motivation and enthusiasm is not high.

3. Design of Course System and Teaching Content

3.1. Designing Course System

For the unique, differences and connection effect of DBCEM, we propose the database system development course with the thinking of "task-based curriculum group" [6] and "teaching resource library" [7]. In order to make students be able to complete the design and integration work in management information system development, the course system of DBCEM is reconstructed.

We introduce the concept of "cross-curricular timeline" into teaching plan. By overall planning the leading course, core course and following course which are related to database technology, we can make teaching plan crossing multiple courses and semesters, and schedule all kinds of teaching resources such as teachers, students, multimedia, computer room and network. Finally a complete database system "big course" for economics and management major will be formed. Figure1 shows teaching arrangement of the "big course", it involves in the entire curriculum group, ranging from basic computer application course to management information system course.

Meanwhile, we apply the task-driven method to design course system of the "big course" and use "big task" to achieve final teaching effect. This "big task" is shown in Figure2. The basis of "big task" are in-class experiments of Programming Language course (VB) and DBCEM. The extending part of "big task" are in-class experiments of Management Information System course and Computer Network topics. Especially, the target of "big task" is to give students a clear idea that their task in the management information system development is design and integration, rather than programing.

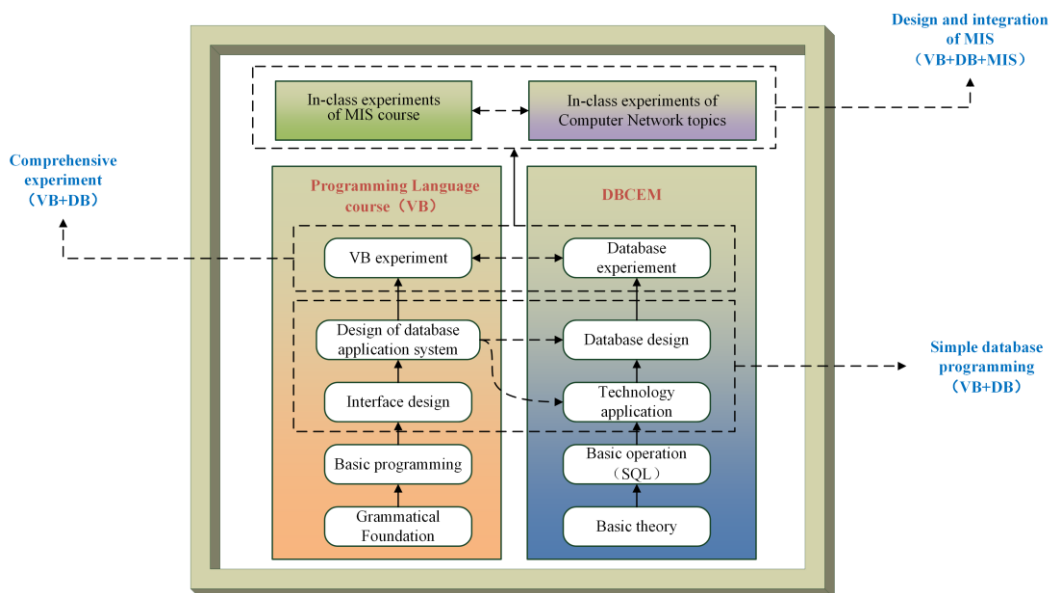**Figure 1. Teaching Plan of the "Big Course"**

Figure 2. Structure of the "Big Task"

3.2. Designing Teaching Content

In order to improve availability of the DBCEM, we should not only consider its connection and cooperation with other courses within the course group on the "big course" and "big task" but also adjust and improve the internal structure of the DBCEM. In the new teaching plan, we have the database basic operation (SQL) ahead, so students can study the database manipulation language earlier. In addition, we arrange database system design at last, for it can be combined with the teaching of the simple database program in Programming Languages course (VB). So students will understand really the relationship between application program and backward database.

DBCEM has been identified as the platform course in the School of Economics and Management from Xi'an Shiyou University, its total teaching hours are 54. There is

unified syllabus and teaching plan in this course. According to the new idea of course system design which is mentioned above, the teaching content and teaching plan adjusted is as follows:

(1) Basic concepts of database system (4 hours);
(2) Relational data model (2 hours);
(3) Relational algebra (4 hours);
(4) Introduction of Microsoft SQL Server (4 hours);
(5) Standard query language of relational database (SQL) (16 hours);
(6) Relational database protection technology (4 hours);
(7) Advanced database technology (2 hours);
(8) Relational design theory (2 hours);
(9) Procedure and method of database system design (12 hours);
(10) Experimental course (4 hours)

4. Discussion of Teaching Method

Overall, the teaching method of the DBCEM includes: lectures, computer practice, exercise class, seminar, tutorial Q&A, online class, online testing, course experiment, computer exam and final written exam, *etc.* In the specific teaching process of the DBCEM, the following aspects should be emphasized:

(1) Enrich the background knowledge: Relatively students in economics and management major have lower computer application ability, so the basic computer knowledge should be appropriate review and supplement during the class teaching. While choosing teaching case, we should introduce some database application examples which are related to current economic and social life. In the beginning of the class introducing the background knowledge with story-telling can effectively reduce the strangeness and resentment of students who are learning technical courses.

(2) Improve the multimedia teaching method: In the teaching slide the points and difficulties should be emphasized by bright color, graphics and animation. For example, in explaining the "self-connection" part in the connection query of SQL, the slide animation shows the whole process: fixing the table A, table B is moved one line down and splice into one table with table A. This way is more intuitive and vivid than the previous static screen and verbal description. We had received good effect in our actual teaching.

(3) Focus on the demonstration experiment: While explaining database theory, if it can be demonstrated in practice, teachers should demonstrate on the projection screen or blackboard step by step, so students can understand easily database theory. A specific application of this improved teaching methods is to explain the complex nest query that contains two "Not Exists", so we used the description method of "loop structure" in programming design course to demonstrate the query process step by step.

(4) Make common operation tutorial: Due to limited time of the class, teachers cannot repeat the same operation and explain the same problem repeatedly. Teachers can make textual descriptions of common questions, operating screenshots into tutorial documentations. Also we can video the operation and match it with voice or text to make video tutorials. These tutorials should be released on the teaching site for students to download. This will not only facilitate the students to arrange their study plan flexibly, but reduce substantially teachers' time waste to answer the same questions.

5. Conclusion

In this paper we begins with analyzing feature of the database course for economics and management major, and propose some new ideas about course system and teaching content of the DBCEM. Finally, we discuss on improving the teaching method.

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