On Teaching Reform in Database Technology and Its Application

Ling-Xing YANG

College of Physics and Electric Engineering of Qujing Normal University, Qujing, Yunnan, China
84759653@qq.com

Keywords: Teaching Reform; Practice teaching; Curricular system.

Abstract. Based on analyzing the problems met when teaching Database Technology and Its Application, the author puts forward specific reforming measures, including adjusting teaching contents, reforming course teaching, revising syllabus, paying attention to practical teaching and enhancing faculty building on a regular basis. The author eventually proposes the educational method based on combining theories and practice. This method pays attention to cultivating students that master basic theoretical knowledge and are capable of analyzing and solving practical problems independently.

Introduction

Most undergraduate courses related to database are based on database principles and characterized with orientating on theoretical teaching and assisted by practical teaching. Applied-talent cultivation universities pay much attention to cultivating students’ learning, practice, innovation and working capacities. Taught by traditional teaching means and textbooks, students fail to learn knowledge thoroughly and deeply [1]. The current application based on data technology becomes increasingly widespread and gradually formed different data technologies, including OLAP, data warehouse and object orientation [2]. Nowadays, the construction scale and using status of database have been two important signs for measuring the informational level. A large number of universities have offered the course of Database. This course is compulsory for students of most majors. As students’ majors vary, course requirements are also different. The author is currently teaching students not majoring in computers. It is urgent to know the right depth and width of taught contents for different students. The author conducted a series of teaching reforms targeting at the problems met when teaching Database to students not majoring in computers in Qujing Normal University to ensure students apply what they’ve learned in class.

Analysis of Teaching Status

Singular Teaching Contents

As database technology enjoys rapid development, the teaching contents of all textbooks are not updated in time. Moreover, most teachers only pay attention to the knowledge on current books and teach according to textbooks routinely, failing to keep pace with the developing database technology and update teaching contents in class. As a result, students don’t know what database management systems are currently popular after learning the course, which is apparently inconsistent with the needs of the era. Furthermore, partial teachers lack practical engineering experience, pay attention only to theoretical knowledge teaching and neglect experimental teaching links. For this reason, students are unable to apply what they’ve learned or reach cultivation objectives and requirements.

Outmoded Teaching Methods

Currently speaking, teachers mostly teach with the traditional cramming teaching method, namely teachers teach and students accept passively. There is no interaction between teachers and students [4]. In addition, teachers are only concerned about completing teaching tasks in class and students...
only listen and learn according to regulations. The specific learning effect remains unknown. In the long run, students will lack the initiative for learning and have no interest in knowledge. Both teachers and students can hardly reach anticipated teaching objectives. As teachers do not adopt flexible teaching means according to the characteristics of the course, the final teaching effect is unsatisfactory.

**Teaching Has More Theories and Fewer Practical Contents**

All textbooks are focused on introducing theoretical knowledge. Some textbooks introduce the systematic knowledge of databases in details and involve the latest database technology. Conversely, these teaching textbooks introduce few practical contents. What’s worse, the taught contents are slightly different from currently popular database management system. Although students have sensual understandings of these contents, they always feel the knowledge learned in class is inadequate or useless. As textbooks involve numerous theoretical contents and few practical contents, students can hardly understand or absorb what’s being taught in class [1]. In addition, partial teachers have no project experience and cannot combine case teaching with database informational application in reality. As a result, students can only learn theoretical knowledge and have no practical exercise.

**Rigid Teaching Means**

Generally speaking, teachers tend to teach the knowledge on textbooks by multi-media means, make no adjustment of teaching contents to adapt to teaching and neglect whether students understand it or not. Lacking appeal, these teaching means make it impossible for students to be focused in class. As a result, students have a poor learning effect and cannot learn anything. In experimental classes, some teachers simply assign random experiments for students and do not care about students’ experimental results. In this case, students cannot learn substantial contents in experimental class. If teaching and learning are both excessively reliant on PPT and neglect textbooks, students may be unable to understand some concepts deeply [3]. The course of Database Technology and Its Application requires understanding numerous concepts. Instead of simply making rote memorization, students need to enhance their learning based on actual application.

**Incomplete Faculty Building**

Database Technology and Its Application is originally a strongly practical course and needs teaching staff with different academic education levels, knowledge structures and practical experience. Currently, the teachers in Qujing Normal University that teach this course are basically all fresh graduates, who have no project development experience and meet some problems in actual teaching. In addition, teachers mostly only have a bachelor’s degree. There is no teacher with high academic education levels, nor part-time teachers from companies and enterprises. It can be said that the teaching echelon hasn’t been formed.

**Teaching Reform**

**Complement and Update Teaching Contents**

Apart from teaching contents required by the syllabus, teachers should know the development trends of database technology and complement some contents not mentioned by textbooks. For instance, teachers may compare popular DBMS and standard SQL to find out differences. Teachers may also give specific cases in experimental class. This makes it easier for students to understand contents.

**Optimize Class Teaching**

Teachers should break traditional teacher-oriented teaching methods and adopt diversified teaching means [3]. Some basic concepts, priorities and difficulties should be taught in class. Conversely, descriptive knowledge should be learned by students themselves and listed as assessment contents to
prevent students from studying perfunctorily. The teaching of knowledge should not be rigid cramming, but based on social and professional demands. Teachers should conduct targeting guidance based on knowing students’ professional foundation [6]. Some special problems may also be solved through discussions. Teachers should not make any preliminary judgment, but need to make conclusions after summarizing discussion results, point out discussion achievements and defects and turn complicated problems into simple. Whichever method it is, it aims to improve students’ learning interest and initiative. Students may check the syllabus, course notice, teaching resources and homework on the Internet, hand in course experiments, conduct online testing and ask teachers questions in the discussion zone [5].

Pay Attention to Practical Teaching

The past teaching tends to pay attention to theoretical knowledge and neglect practical links, which causes theories to be disconnected with practice. Although students have learned much about database, they hardly know how to apply such knowledge in experimental class, let alone apply such knowledge to actual projects. The practical teaching of this course is divided into three categories: (1) Testing experiments, which are combined with theoretical knowledge to enhance students’ understandings of theoretical knowledge. Teachers should assign pre-experiment learning tasks in advance, make explanations and demonstrations in experiment class and require students to complete experiments according to requirements. (2) Course designing. Such experiments aim to solve medium-level database application problems by groups. Teachers may either designate problems or allow students to choose problems. However, all problems should have real significance and be closely combined with learned knowledge, covering all learning contents in a phase and reaching the required level of complication and difficulty. (3) Comprehensive experiment. This part is the priority of curricular reform. Through a term’s learning, students have mastered substantial theoretical knowledge, made numerous experiments and formulated substantial curricular designs. How to apply such knowledge comprehensively to projects is worthy of further explorations. Hence a substantial number of comprehensive experiments aim to practice students’ capacity of developing applied systems based on database technology.

Complete Course Teaching System

To reform the teaching of Database Technology and Its Application, teachers should have comprehensive thinking from the teaching values and objectives of database principles and form organic combination between technology and theoretical teaching, thereby setting up a more complete teaching system of Database Technology and Its Application [7]. To achieve this objective, teachers should first clarify the priorities and difficulties of taught contents, the proportion and relations of theoretical knowledge and experiments, basic concepts and application expansion, as well as the division of taught contents and self-study contents. In addition, teachers should formulate an assessment syllabus, reform the evaluation solution and closely combine the evaluation of theoretical knowledge and experiments. The evaluation should be aimed at guiding students to apply knowledge to actual engineering projects and practicing students’ automatic learning and application capacity.

Enhance Teaching Staff Construction

Overall construction objectives: The aging structure, academic structure and discipline origin structure of teaching staff should be optimized through construction. It is necessary to set up an academic innovation team and teaching team with cohesion, high level and vigor to fully meet the demands for teaching development. There are the following measures:

(1) Old teachers should lead new teachers, cultivate new teachers and construct new teachers into a new yet powerful generation of successors.

(2) The university should select backbone teachers to have study tours and exchanges in other universities, cultivate top-level talents and develop academic leaders with huge influences inside and outside the province.
(3) The university should hire locally-reputed companies, senior corporate experts and other college teachers with rich academic achievements as part-time teachers according actual demands to complement teachers’ knowledge structure.

(4) The university should formulate talent introduction plans to introduce talents with high academic levels and qualifications to connected current teachers with newly-introduced teachers, set up a rewarding system to inspire teachers’ working initiative and improve the working efficiency.

Summary
The above-mentioned are problems discovered by the author in the teaching process and countermeasures. Through two terms’ practice, three students not majored in computer accumulated more theoretical knowledge and had higher practical capacities of databases than previous students. Partial students were even capable of designing and developing small informational management systems independently. On the one hand, the pass rate of students not majoring in computer in database subjects of computer software proficiency examinations and computer level examinations was approximate to that of students majoring in computer. On the other hand, teachers also grew in project practice. It can be said that the teaching reform in this course has been successful. However, further efforts should be made to improve the teaching quality and promote applying students’ experimental products.

References
[3] Chuan Lin, Shenghui Pan, Qingnan Huang, Research on and Explorations of Teaching Reform in Database Course, J. China Electric Power Education. 27 (2010)74-75.