

Database Teaching in Different Countries

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ABSTRACT

In this paper, we discuss different teaching methodologies practiced in the basic database course taught in different countries. This paper was written based on research conducted through a questionnaire about university students in these three different countries. The study was performed with a phenomenographic research approach among university students from Shanghai, Milan and Duhok. It investigates how and how well they learn during the basic database course.

First, this paper will give an overview about the systems that are practiced in each of the three universities. Second, a theoretical background for the study will be set and an analysis will be performed. Following that, the study and the results will be presented. Finally, implications for teaching and learning will be shown following from the results of the study.

Keywords

Computing Education, Database, Pedagogy, Phenomenography.

1. INTRODUCTION

As a result of coming from different countries, people have different cultures and traditions. The three researchers experienced much differences during their studies in Uppsala University. Thus, they decided to do a research on this theme. After several weeks of hard work, the results are presented as follows.

This paper wants to emphasise how different cultures influence different ways of teaching, learning and thinking. It will be shown, as well, the relations between teaching and learning. The way to improve both of them is discussed.

2. DIFFERENT EDUCATION SYSTEMS AND EVALUATION STANDARDS

2.1 SSE¹ of Tongji University in China

The first database course is usually given in the second semester of the freshman year. The course lasts 17 weeks. Lectures and lab works are combined with each other. Each week, a two hour lesson is given. All the students take the lectures in a lab room, sitting in front of a computer which has all the software needed for the course already installed. The teacher mainly uses slides to demonstrate the contents of the course. Meanwhile, small

practical exercises will be given and corrected during the class. No assignments are given after class.

The final result of this course is given according to a final group project. The students are asked to form small groups in order to produce a practical product using the knowledge they have gained from the course. The requirements of the project and scale of marks will be given out at the beginning of the semester. At the end of semester, each group presents its product to the teacher and TA² and explains how they divided the tasks. After that, the students will answer a few questions concerning their project. Final results will be given according to how well the students have done the project.

2.2 Università' statale di Milano in Italy

The first database course is given in the first semester of the second year of studies. It spans 17 weeks. The students take both the labs and the ordinary lectures concurrently. Each week, four hours of lectures and two hours of labs are scheduled. The lectures are delivered by the teacher in a classroom. The teacher utilises slides to show concepts and examples. The labs are delivered by a TA in a classroom as well. TA uses his own notebook in conjunction with a projector to illustrate the software tools to be used.

During the time the course is running, there are no assignments. But at the end there is a final theoretical written exam and a project. For this project, students are supposed to form groups of three members.

The final grade is an average of the two marks.

2.3 University of Duhok in Iraq

The basic database course is usually given during the fourth year. There are 18 lectures and 18 lab sessions. The course is divided into parts, lasting two semesters. Each week there are two hours of theoretical lectures and two hours of labs. The students take the lessons in a lecture room, with the teacher using a blackboard. The lab lessons are presented by two TAs in a lab room.

Students have to take assignments, three closed writing exams (proportion 80%) and one practical exam (proportion 20%).

3. THE STUDY

3.1 Phenomenography

Phenomenography is an empirical and qualitative study which investigates the various different ways in which aspects of the world are experienced. Because of this, it involves the relations between persons and aspects of their world [1].

Phenomenography has been used here to understand how the students' own cultures influence their learning. Through an analysis of the students' feedbacks, we also discover how the learning of a subject is influenced by its teaching.

Historically, phenomenography has been used to research the experience of learning, the experience of teaching, the different ways of experiencing the content learned, and describing aspects of the world around us [2]. Phenomenography is a qualitative, non-positivistic approach, which during the past few years has come to play an important role in CER [3].

The three researchers had a discussion about the methodology to be used in the study. A phenomenographic study was decided upon and the focus would be on database teaching in computer science departments in different countries.

Firstly, the researchers designed a questionnaire together concerning the first database course. They each asked five students from their own university to fill it out. After collecting the data, the researchers analysed it in order to reach conclusions about teaching and learning in database course

3.2 The Questionnaire

Each of the researchers sent out questionnaires via email to a group of sample students' in their home universities. Each sample consisted of five students from the same university. The questionnaire consists of the questions listed below.

Table 1. Questions Contained in The Questionnaire

	Question
1.	In which year did you take the course?
2.	Which programming language did you use?
3.	Did you like the course ? Why / Why not ?
4.	What are you able to do after taking the course?
5.	Which developing tools did u use for the assignments/ projects?
6.	Did you pass the exam with a low/middle/high grade? How did you get your final result?
7.	How many hours do you spend on this course after class ever week?
8.	Suggestions for teaching/ lab working/ anything else

All the questions are related to the first database course the students had taken (e.g. How they did, how they felt concerning the database course).

3.3 The Phenomenography Analysis

The researchers read the collected data and analysed it together. They looked for similarities and qualitative differences amongst the opinions of the students on the basic database course in the different countries. Phenomenography was used during the analysis.

3.3.1 SSE of Tongji University in China

The students who took the survey studied the basic database course in their first year of studies (2007). They used Visual Studio.net as developing tool, VB as a programming language and MySQL as the DBMS. Through analysing the questionnaire, the following highlights had been noticed.

Question: Did you like the DB course? Why?

Student 1: No,

Because the teaching was boring.

Student 2: No,

Cause the teacher is boring and I didn't gain anything in class.

...

It is interesting that all the Chinese interviewees stated that they didn't like the course. Most of them mentioned that the teaching of the instructor was "boring".

What we have to note here is that after taking the course, the Chinese students are not expected to be able to design a complete database system but are simply expected to get an idea of it. They are supposed to be capable of writing SQL statements and queries independently. However, for their final projects, they have to learn how to design a complete database system by themselves. Apparently, the Chinese students didn't have a pleasant experience taking this course. The teacher played a big roll in their studies.

All the students participating in the questionnaire passed the course and most of them obtained an average grade. However, although they were required to do database design for the project, some students were still not able to do so after the course.

Interestingly, in the suggestions' field of the questionnaire, most of the students complained about having lectures in a lab room instead of a normal lecture room. They said that it would have been better if the classes had been conducted in a classroom. Sitting in front of a computer connected to networks, the students can easily start to surf the Internet or do other activities. This causes them to lose contact with the "boring" teacher. In addition to that, it was suggested that the teacher keep in touch with the students and interact with them, in order to keep them from becoming "bored".

Of all the participants in this questionnaire, two of them like computer science in and two do not while the last one is impartial. As a result we can say that the analysis is fair because the students feel the same about the teacher regardless of whether the student likes computer science or not.

3.3.2 Universita' statale di Milano in Italy

The students took this course during their second year (2006). They used various developing tools. Some students used Oracle as the WebServer and PostgreSQL as the DBMS, while others used Oracle and MySql as the DBMS. All used Php as the

programming language. The following answers have been observed.

Question: Did you like the course? Why?

Student 1: Yes,

because they are a simple way of representing information, but they are also useful and powerful means to navigate and aggregate data...

Student 2: Yes,

because it allows you to classify and manipulate information (that is the main element in computer science); and second, it's a subject related with all the other computer science aspects, so, it's always useful knowing a little of it...

Most of the students liked the subject. Taking this course in the second year made it easier for the students. They talked positively about the basic database course because they used some of the knowledge from the course for future next courses.

After the course was finished, most of the students were able to design and implement database systems with different complexity and manage the relational DBMS with SQL languages. They showed that their study was not focused on the tools or on specific languages, but on the concept at the base of the subject.

Most of students got a good grade as a final result. The final grade is the average of the written exam and the project.

Students' suggestions indicated that if the teacher would have given more examples and solved more exercises during the lectures, the students would have gotten the opportunity to learn more. They stated that they couldn't apply the knowledge acquired during the lectures because the labs represented only one third of the total lectures. The students had to apply and practice what they learnt on their own.

3.3.3 University of Duhok in Iraq

Basic database course is given to the students in their senior year (2006-2007). The students used MS access as the DBMS and VB as a programming tool.

Most of the students liked the course. The main reason is because they understood the goals and contents of the course. The following quotes are taken from the questionnaire to show the students' feedbacks.

Question: Did you like the course? Why?

Student 1: Yes I liked it,

because it connects the real world's information to the software...

Student 2: I liked the course,

because DB makes programming manipulating records of information same as drinking a glass of water...

As it is easily noticed from their answers, the students talked about why and where they use database. They used a practical approach to the course. As strengthening of this assumption, one student explicitly mentions that he appreciated the practical part of the course more than the theoretical part.

Describing their abilities of designing databases after taking the course, the students again showed how their study approach to the subject was more practical than theoretical. They measured their knowledge gained from the course by talking about queries and SQL statements, without mentioning any other aspects of the relational model. It's interesting that the students who talked about the theory at the core of databases are the ones who had spent more hours studying after lectures on their own.

Most of the students got a average/high grade in the final exam. Through reading the surveys, the researchers found out that the students enjoyed computer science very much. All of the students liked to talk about their study and opinions.

Suggestions from most participants were to increase the number of hours spent on practical lectures and labs. Students passed the course with high grades but they were not able to create a complex database design.

4. FINDINGS

The situation in the three universities are very different from each other, which also indicates that different universities in different countries have different teaching structures. The first database course is offered in different study periods. The teaching methods are also different. Furthermore, the expectations and evaluation methods are different. It's interesting that the students are learning about the same technology through different paths. The following findings might give some inspiration for teaching and learning of this subject or in general.

Speaking of the sample group of Chinese students, it can be seen that the teacher plays a very important role in their study. The analysis shows that when students classified the teacher as "boring", they lost the interest in that subject. As a side effect, their results of the course will not be good. Although the problem regarding to the teacher is only mentioned by the Chinese students, the researchers think it could happen to any subject in any university. Especially when it's the freshman year, the students need more help from the teaches as a bridge between high school and university.

For the second year students in Italy, exam grades were relatively higher. The students had a very good understanding of database concepts after taking the course. It can be seen that when it's the second year of study, the students know better how to approach a course. Moreover they did not complained about the teacher, which means they don't rely on the teaching as much as the freshman year students. The students are eager to apply what they have learned in theoretical lectures into practical exercises.

In Iraq, students take their first database course in their senior year. They have already had enough knowledge to get a high grade in the exam. However, the results were not excellent because, while the students had a practical approach to the course, the exam was focused on theoretical concepts.

The researchers found out the three key elements of database teaching/learning: the teacher, the students and the teaching environment. In different study periods, these three elements change in importance. The freshmen are easily distracted by their environment and need more guidance from the teacher. The sophomores show their ability to study independently and their desire of study. The seniors obviously already knew and

understood what they were studying and enjoyed themselves during the study.

5. SUGGESTIONS

Through the findings of the research, some suggestions can be made.

Firstly the teachers should give more attention to the students during the lessons. Especially for freshmen, the teacher should not only provide the contents of the subject but also an efficient way of study. Unproficient teachers often correlate to a negative study attitude amongst the students. This can be seen from the Chinese sample group.

Secondly, the students should have a clear idea of what they are learning from the subject. It's better when they have their own study plans and goals. Milestones can be good in their study plan, so they can check their achievements. In this case, seniors can usually better plan their studies compared to the freshmen.

Thirdly, the researchers agree that having lab lectures is efficient to some extent. The students can follow the instructor step by step whilst performing the exercises. However, it's not necessary to have access to networks for database teaching. Removing the Internet connection can be an effective way to prevent freshmen from being distracted when having lectures in lab rooms. Thus it will be easier for them to focus on the teachers teaching.

Databases are an important part of computer science. However, learning about databases requires some prior knowledge of

computer science. The researchers believe that it's more suitable to implement this course in the second year of university study. This is because the sophomores would have already gained enough basic knowledge to support their database learning. They can plan well their study and apply the knowledge obtained from the courses into future studies.

Further study concerning the research subject can be carried out with larger number of interviewees.

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