Not Economic Informatics but Informatic Economics - The development of the subject Economic Informatics in the commercial colleges in North-Rhine Westphalia, Germany

Gregor Kuhlmann

Business Schools Hoexter,

Im Flor 35, D 37671 Hoexter, Germany, phone 05271/97250, fax 05271/37926, email Gregor.Kuhlmann@t-online.de

Abstract

In the subject Economic Informatics it has been general practice up to now to teach program and data structure in Pascal for solving individual problems of Industrial Economics. The method of teaching has become obsolete. The Ministry of Education requires extensive use of standard software in economics lessons. As a consequence, some experts demand that the subject Economic Informatics be deleted. Other experts are of the opinion that the methods and procedures of Economic Informatics be treated as an independent subject. The contents of this subject are to be increasingly oriented towards the problems of business information economy when employing SQL-database systems and spreadsheet programs.

Keywords

economic informatics, database system, SQL, information management, informatic economics

1 THE POSITION OF ECONOMIC INFORMATICS WITHIN THE CURRICULUM OF A BUSINESS SCHOOL

The curriculum of a German business school consists of two parts:

a) general subjects like

Sports,

Politics

German Language

- Foreign Language (English or French or Spanish)
- Religious Instruction.
- b) economic subjects like
 - Political Economy,
 - Industrial Economics
 - Mathematics and Statistics
 - Accountancy
 - Theory of Management and Economic Informatics

Economic Informatics takes up a tenth of the lessons. It is an important subject but not the main one. The learners are 17 - 21 years old. They are either taking part in a day-release vocational training or are attending a commercial college where they are preparing for a commercial profession.

2 THE SUBJECT ECONOMIC INFORMATICS IN COMMERCIAL COLLEGES IS TAKING ON A NEW SHAPE

In the 1970's Economic Informatics was taught as a part of the theory of organisation and management. Data Processing was a problem of workflow management. The students had to learn,

- how a computer works,
- kinds of data input,
- kinds of mass storage etc.

The hardware was the object of learning. The teachers had to explain why the electronic data processing system was not user-friendly.

Since Micro Computers were available in the early 1980's the main topic was the logics of programming. There was great discussion about whether BASIC or Pascal was the better programming language for beginners. In the course of time Pascal has become more widely accepted.

Due to developments in modern offices since 1987, standard software like Multiplan has become important. Because of difficulties in programming with Pascal many teachers decided to teach DBASE II instead of Pascal. The discussion and presentation of hardware has become less important. Since 1991 Multiplan has been replaced by Excel and in addition special software for different branches has been taught.

Now the Minister of Education requires the integration of Economic Informatics into the other subjects of commercial schools. In the subject Industrial Economics, for example, the students are expected to use spreadsheet programs like EXCEL and database systems like ACCESS, etc. In the subject Economic Informatics the students are only supposed to learn the handling of the programs so that they can use them for solving the special problems of the commercial subjects.

3 DIFFICULTIES IN REALISATION

Teachers of Economic Informatics don't accept these limitations. Now there is great discussion about which of the different fields of Economic Informatics are to be integrated into the different subjects. In this discussion three different opinions have crystallised as a result.

- (1) No integration necessary, the situation should not be changed.
- (2) All fields of Economic Informatics must be integrated into the basic subjects of commercial schools.
- (3) The subject Economic Informatics must acquaint the students with the principles of information management.

(1) The working place of an office worker is determined by software and the kind of network. Therefore the subject Economic Informatics must address the elementary situation of computer-based working places. The students must learn about

- the principles of programming
- kinds of operating systems and networks
- how to use office programs for special branches
- how to use standard software like spreadsheet programs, database programs, etc
- the social, health and economic problems connected with the use of computers.

The intention of Economic Informatics is to enable the student to cooperate in forming his working place. Taking all this into consideration, Economic Informatics and the other subjects have less in common.

(2) There must be total integration of Economic Informatics into the subjects Political Economy, Industrial Economics and Accountancy. The students of a business school will use computers for making purchases, doing accountancy and handling sales. Therefore students must be taught economic theory, the principles of laws related with the job and the use of the computer in these situations. This conception of instruction makes sure that informatics is taught in the right framework.

For example, students learn how to calculate the prices of an offer. They become acquainted with the legal consequences of an offer and when calculating the price, the students use a spreadsheet program in a similar way as in the job.

In this conception of economic education the subject Economic Informatics should teach the students how to handle the computer and a spreadsheet program so that the main economic subjects can make use of this program for solving the special problems of their subject.

In this way students can see and compare the logics of the sequence of operations and the structure of the applied program. They will understand that the logics of a subject determine the structure of a program written for this purpose. An accountancy application program is based on the rules of accountancy. Without knowledge of accountancy the students cannot understand such programs and their correct use.

According to this point of view, the themes of Economic Informatics are primarily considered with regard to the use of computers and the application of programs. Hard- and

software are only considered in so far as they are important or necessary for understanding commercial applications.

(3) Teachers of Economic Informatics support this development in teaching less hardware and more software. But they point out that students must not only learn how to purchase or how to sell. They must also learn that information is the basis for the decision-making in an enterprise. The actions of an enterprise are governed by a network of information. The importance of information as an important factor in production is demonstrated by the data-warehouse concept, for example.

Information is expensive. Information management in an enterprise must ensure that the right information is available at the right place, at the right time and at the cheapest possible price. The backbone of the information system is a database management system in a network. A spreadsheet program is employed for solving arithmetic problems in many working places. That is why these two programs are the most important objects of learning in the Economic Informatics subject. The following points show the contents of the subject when Economic Informatics is considered with regard to informatic economics.

4 CONTENTS OF THE SUBJECT ECONOMIC INFORMATICS

The topics of Economic Informatics are

- (1) Operating system and hardware
- (2) Introduction: how to solve problems with a spreadsheet program
- (3) Logics of the development and use of a database system related to the topics of the basic subjects
- (4) Social and economic problems induced by an automatic data processing system

4.1 Operating system and hardware

In this course the students learn how to handle an operating system like WINDOWS. They must understand how the operating system links the application software with the hardware. Some remarks are made on how the computer works and on different devices for input, output and storage.

Necessary teaching: 6 lessons

4.2 Introduction: how to solve problems with a spreadsheet program

In German business schools EXCEL is the spreadsheet program most used. The topics are

- the idea of a spreadsheet program
- planning a table
- types of data
- construction of mathematical expressions
- kinds of addressing cells
- short remarks on graphics

This introduction will require approximately 16 lessons. With regard to Informatic Economics, the development and use of database systems should really be treated first. Many teachers believe that a spreadsheet program facilitates the development of one's own applications. Even with regard to linking different subjects, teaching EXCEL at a very early stage can be sensible because this program can be employed in connection with many different themes.

4.3 Logics of the development and use of a database system

By using this sequence in our lessons we demonstrate that Informatic Economics is an important prerequisite for the optimum employment of production factors. The acquisition, storage and employment of information must be carried out as economically as possible. A database system is employed in many companies as an important means of structuring, storing and acquiring information.

The development and use of a database is carried out in cooperation with the subject Industrial Economics. If in Industrial Economics students learn the theory of purchase, the subject Economic Informatics teaches them to develop and to use a purchase-oriented database. So they have to collect the information needed for purchase and to build up the different tables by considering the first three rules of Codd. The topics are

- Collecting information and structuring data related to a problem
- Structuring the tables and the joints

Using the database system full of data, the learners are taught how to acquire information that is necessary for solving particular problems of Industrial Economics. For example, one question that is very important for the purchasing manager of a company is: which supplier can provide us with the goods with a stock deficit at the best price. In a well-structured database system the result can be found in less than a minute. In comparison with a conventional information administration system, the learners recognise that Informatic Economics based on a database system can provide the information necessary for business decisions very quickly.

The above mentioned problem can already be very difficult to solve from the learners viewpoint. That is why the learners are gradually introduced to solving complex problems. The individual steps are

- Simple SELECT -statements
- SELECT-statements with simple and compound conditions
- Aggregate functions and GROUP BY clause
- Equal join
- Outer join
- UPDATE, INSERT
- Reports

Integrating the results of a query on into an EXCEL-worksheet is discussed in some problems. As SQL-capable database systems are increasingly employed in business, the database program used in lessons must also be SQL-capable. SQL-statements can be formulated in different ways. On the one hand, database programs provide graphic surfaces in which the SQL-statement is formulated. On the other hand, the SQL-command can also be entered as text. In

teaching experiments we have found out that teaching text-oriented SQL-statements leads to a higher degree of learning success than graphics-oriented SQL-statements. Altering the orientation of Economic Informatics from developing programs under Pascal to developing information systems using a database systems meets the requirements of practically-oriented pedagogics:

- The development and use of databases for solving problems of Industrial Economics promotes abstract thinking, sensibility towards industrial economical processes as well as the learner's creativity.
- The basic elements of SQL are quite easy to understand. If necessary, the degree of difficulty can be increased according to the needs of a spiral curriculum and the capabilities of the learners.
- The data models to be developed are characterised by a high degree of practical relevance. For example, when modelling a data framework for the collection of outstanding debts on the basis of a SQL-oriented database system, the learners are confronted to a much higher degree with problems related to organisational processing and with informational aspects than under programming in Pascal with only a short time limit.

The teaching of the logics of the development and use of a database system will require about 60 lessons

4.4 Social and economic problems induced by an automatic data processing system

The main points discussed in this part of the course are:

- Are computers job killers?
- Is health endangered by using a computer?
- How to prevent the abuse of personal data

Necessary teaching time: 12 lessons

5 CONCLUSIONS

In this teaching unit the learners have been informed about an informational system from different points of view under the aspects of applying, using and developing database systems. If the database is run on a multi-user-system, the problems of legal access can easily be picked out as a central theme.

It is extremely important that the database used is SQL-capable. This language system will also remain important in the fields of economy and administration in the future. There is no faster and more flexible way of getting information from a database than by using and applying SQL.

Companies operating in a market economy are extremely interested in obtaining information for their decisions and all this has to be done with a minimum of input, cost and time. As a general rule it can be said that the faster and the more specifically, information required is provided, the smaller is the grade of uncertainty under which these decisions are taken.

For commercial colleges this means that students have to be taught methods of obtaining and administering information.

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7 BIOGRAPHY

Gregor Kuhlmann born in 1943 studied pedagogics, informatics and economics at the university of Cologne. He is the director of the business schools of Hoexter. He published several books dealing with Pascal and SQL.