

BUSINESS INFORMATICS IN MANAGERS' EDUCATION

LIBUŠA RÉVÉSZOVÁ

Abstract: *The development of knowledge society environment, especially information and communication technology (ICT) and information systems (IS) in the past decades, has greatly enhanced the productivity of intangible capital and intellectual potential of people in the firms and organizations. That is why it is very important to prepare students for challenges of knowledge economy. It is necessary for all graduates to understand functions, possibilities, advantages and disadvantages of using informatics knowledge in the business environment. However informatics is nowadays a very extensive field for studying. How can we integrate many aspects of using ICT and IS into education? The main question we are dealing with is how to develop new manner of education in informatics for our graduates - the future managers. We developed an innovative way of education based on usage of ICT, modelling, simulation and on a well known opinion that "no kind of teaching can replace the personal experience".*

Keywords: *business informatics, information management, education, modelling*

JEL Classification: *M15, I21, I23*

1. INTRODUCTION

Nowadays modern technologies, knowledge, products, processes, tools, methods and systems employed in the creation of goods or providing services, are considered to be engines of economic growth. It is common to think of technologies in terms of hardware, computers and machines. However, technologies embrace a lot more [2].

Performance and effectiveness of IS and ICT in a company is one of the most important management domains. We often recognize an attitude in which the primary things in development, implementation and effective application of ICT are modern technical devices, hardware and software. These are surely unthinkable part of it, however the key part are people – users [7]. Firstly, it depends on competent users what they will expect from IS and ICT, business informatics, what will be their requirements on information, its quality and quantity.

Today it is clear that any technology consists of four interdependent, co-determining and equally important components:

- Hardware – the physical structure, logical layout of equipment or machinery that is used to carry out the required task;
- Software – the knowledge of how to use hardware;
- Brainware – the reasons for using the technology in particular way – sometimes referred as "know why";
- "Know how" – the learned or acquired knowledge or technical skill how to do things well. People acquire "know how" by receiving formal or informal education or training and working closely with an expert in a certain field [2].

Nowadays education and training are considered to be investments for states, nations, entrepreneurs and individuals. The educating system cannot just reflect current knowledge but it also has to anticipate the development from the view of contents and quality [5].

2. FORMULATION OF SCIENTIFIC PROBLEM

As we work as university teachers, as researchers and as participants of project teams we have found out, that the knowledge and abilities everybody must possess in order to work effectively and succeed in knowledge economy, have been dramatically redefined. Educational institutions have to change their curricula and methods of education so that they may provide grounds for these skills. These changes must be based on considering changes in economic environment, development in computer science, ICT and IS, development in the area of enterprise management, using modelling in business process reengineering, simulation and application of informatics knowledge in all areas of life. There are two main questions in our research:

1. What is the current needed base of informatics knowledge and skills of our students - future managers - advanced IS and ICT users?
2. How is it possible to change until now satisfactory manner of informatics education at our faculty so that students would be prepared and competitive on the labour market?

3. USED METHODS AND PROCEDURES

We draw a special attention to the preparatory phase of education. To prepare adequate content of informatics education in the first and second semester we solve first a sub problem: What is the knowledge base of secondary school graduates gained during their secondary school education in the field of informatics?

Annually we have been monitoring the extent and the content of the education in the field of computer science of all secondary school graduates, who entered first year at our faculty. On the first seminar of subject Informatics I in 90 minutes students answer questions focused on the informatics education content. The questionnaire contains also items concerning information systems, type of IS, life cycle of IS, modelling and the work with them.

Numbers of respondents in presented years were: 165 students in 2010, 158 students in 2011 and 144 in 2012. We present answers evaluation of all 467 respondents. In this sample there were 87 % grammar schools graduates, 12 % business schools graduates and 1 % other schools graduates. To evaluate students' answers we use methods of quantitative and qualitative analysis of the closed and open items of questionnaire. Charts in the Figure 1 and Figure 2 present the evaluation of students' responses in percentage of students who have dealt with mentioned topics/concepts at secondary school in the last three years.

After evaluation of the real student knowledge base our effort is focused on creating modern education system for future managers in the area of "using informatics in business". This means to provide education in accordance to practice demands. We try to find solution of the next sub problem: "What are currently the managers competence requirements concerning the informatics and using ICT?"

To find proper solution we use studying the accessible sources of literature, the newest knowledge and trends in

the field of business informatics, process modelling, implementation and integration of IS in the firms and organizations, published experience of experts from the area of IS development and contents of foreign universities curriculums. These general findings are applied in the modernization of education in the field of computer science teaching, which is provided at the Department of Applied Mathematics and Business Informatics in conjunction with other courses.

4. SOLUTIONS

As we can see in Fig. 1 and Fig. 2 students' answers evaluation has shown that in average nearly 100% students worked with the basic applications of MS Office, used internet services but less than 20% of the students have had experience with IS, less than 10 % of students recognize the types of IS and less than 1% specified dealing/working with modelling as a method of simplifying and recognition of real objects.

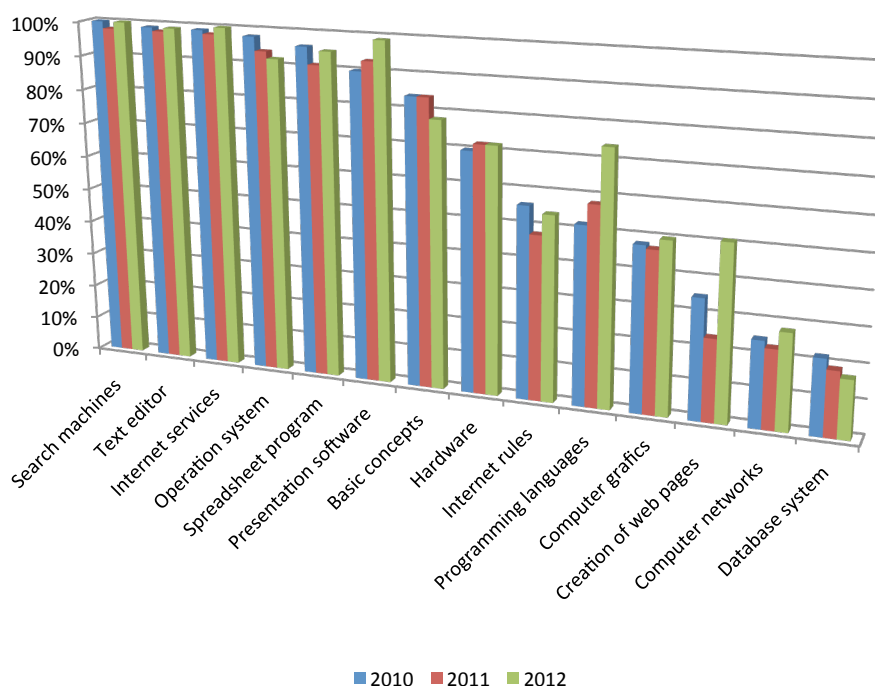


Figure 1 Percentage comparison of obligatory informatics education content at secondary schools
Source: own processing

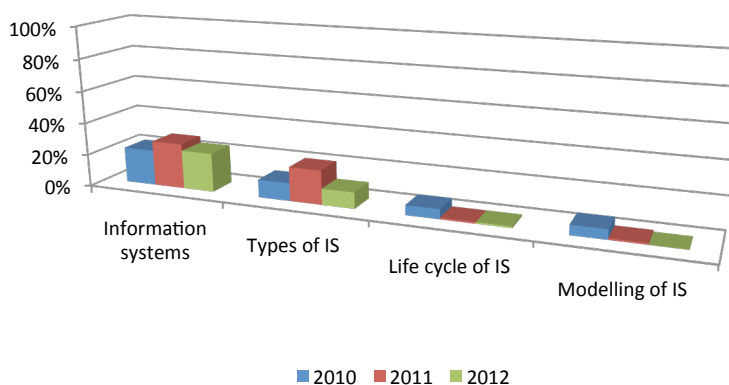


Figure 2 Evaluation students' answers in the field of IS
Source: own processing

Structure of subject Informatics II				
Classical way of teaching - lectures and exercises				
MS Excel	MS Access		MS PowerPoint	Test
Teaching/learning with application new attitude - Business informatics				
Development of Project - User Requirements of Information System				
Face to face teaching, basic lectures	Project proposal	Project first draft	e-learning, learning-by doing, using Moodle, providing feedback	Project final version, evaluation, presentation

Figure 3 Business informatics in the new structure of the subject Informatics II

Source: own processing

Based on the annual analysis of students' knowledge, considering the mentioned aspects we have decided for a concept of informatics education in two parallel planes as it is shown in Fig. 3.

First classical way - considering differences in ICT knowledge and skills of secondary school graduates was to keep the classical procedure in teaching in structure similar to ECDL Standard [6]. Working in text editor environment, table calculator, presentation software, database systems, usage of applications in internet environment etc. we consider it vital for further correct understanding of possible work in the frame of business informatics.

In the second, parallel plane the key theme is information management and business informatics in the relation with modelling of the business processes. One of the main reasons is the state of students' knowledge in this area, as we can see in Fig. 1 and Fig. 2. In spite of the facts that we daily use various IS in libraries, enterprises, offices, entertainment, in spite of the penetration of ICT into every aspect of life, the effort to integrate ICT and computer science into the education, in spite of that more than 90% of the students answered that they have an access to the Internet and that they use its services, students are not able to give examples of IS they meet, deal or work within more than 80% of the cases.

Another reasons why business informatics and information management are important can be found in [1]. Business organization is a system designed by people for the purpose of creating products and services for customers. Computers have become critical to the efficient functioning of all kinds of businesses; it is hard to find a workplace that is not computerized in some way. When we view a company as a system within an environment, each of the basic system concepts takes on a specific meaning. An information system is a set of interrelated parts that work together to produce, distribute, and use information products. One purpose of an information system is to provide information on the feedback and control function of a larger system. For example, an information system for a business organization produces feedback about the performance of the firm and distributes that information to managers in such a way that is useful for decision making.

For teaching in the area of business informatics we created two studying materials: Information systems for economists [10] and Basics of business process modelling [11]. As a dominant form of teaching in the area of business informatics we use problem oriented project teaching, while we are using the functionality of LMS Moodle environment [8].

Students find themselves in the position of a manager of a little virtual company, in project of specifying users' requirements they have to think about proper information system of this company, how to differ from the others,

which innovations they should bring into the model of the main process of chosen company. They have to have or by the method of learning-by-doing get knowledge of IS and their management so that the proposed IS would cope with more than just processing a lot of data.

The recommended structure of the students' projects consists of four parts which correspond with ARIS methodology according to [9] and [4]. In the first part students specify the core business process by text and a graphic model. It represents analysis of the business and its processes, creating a basis for process management, strategic factors and goals, challenges, possibilities to support management of IS/ICT. In this part students have to think about a basic business model which includes model of processes, model the functional and organizational structure of the business, product model of business processes and their parameters, concept of applications to support the business.

In the second part students create requirements on the IS in a text form. They describe the IS functionality in the third part using UML - use case diagram and the basis for the IS data model is a proposal of classes and their attributes using UML class diagram. The last part is a proposal of tables and their relations in MS Access environment. Students deal with logical structure of the data base system. These parts mean creating a logical concept of enterprise IS, which includes the structure of the enterprise information processes, the organizational structure, the basic structure of the application, IS procedures, role of users, requirements of hardware and network infrastructure, security requirements, possibilities of IS/ICT further development, documentation and staff training requirements, operation and continuous improvement of processes.

5. DISCUSSION

The reason why we consider education in the field of IS management and business process modelling for necessary are facts given in [8]. Based on studies in more than 150 companies, more than a half of the projects of reengineering business processes either failed or was not able to reach even the minimum of the planned results. The typical obstructions and shortcomings are reluctance towards changes in organization, inertia of employees and management, incorrect choice and insufficient preparation of project team, lack of communication, lack of time for a precise planning, not a detailed knowledge of essentials of particular problems, estimating of unclear aims, disability to estimate an extent of projects, incorrect choice and preparation of methodology.

On the other hand, for critical factors of success we can consider direct connection of the management, active support of the leading management, support of employees, ensuring a high rate of connected people, match of

improving projects with company's strategy, strict business case study, good methodology, clear understanding of strategic not only technical aspect of changes.

It is important to pay attention to individual differences among students - managers regarding their decision-making styles and the models they use to interpret reality; these should be considered in the context of a general decision-making process that is flavoured by the organizational decision style. An information system that supports decision making in an organization should be flexible and adaptable enough to support these different decision-making conditions [1].

6. CONCLUSION

Development of "brainware" and "know-how" and the implementation of innovations are considered to be the most important areas for success that can ensure economic

growth for individuals, companies even for whole countries. It is not different in the school environment either.

We developed a new manner of education based on application informatics knowledge in business, modelling, simulation and on a well known opinion that "no kind of teaching can replace the personal experience". In the proposed innovative way of teaching we are trying to transform problem solving process into an active process of cognition. Subject Informatics II should be a quality preparation for specialised subjects like e-business, e-banking [3], Economics information systems and serve as an important tool for student information competences development. The development of human's capital is a key factor for building and inclusive, sustainable economic environment.

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RNDr. Libuša RÉVÉSZOVÁ, PhD.

Technical University of Košice, Faculty of Economics, Department of Applied Mathematics and Business Informatics
 Nemcovej 32, 040 01 Košice, Slovakia
 e-mail: libusa.reveszova@tuke.sk