CBL TOOLS REQUIRE THE CHANGE OF LEARNING PROCESSES AND THEIR ENVIRONMENT

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ABSTRACT
Computer Based Learning (CBL) represents one of the terms for implementation of information & communication technologies (ICT) in education and learning. ICT enable changes of the education processes. They cannot be realized without active contribution of the university managers and professors. Changes in education processes may be managed with contribution of the same principles which are usually used in other branches of the social and economical life. Some of them are described in this contribution. At the end of this paper using of this principles at the University of Zilina is shortly discussed.

KEYWORDS
Process, implementation, education, information, communication, technology, change

INTRODUCTION

Education is globalised in the same way as economy. It is given mainly by the use of new information and communication technologies and due to faster and broader dissemination of knowledge. Quality of realisation of Computer Based Learning depends on the accessibility of technology, know - how in study materials design, systems of monitoring, evaluation and the legal and regulatory framework. With respect the facts mentioned above, CBL is not exploited effectively enough in education today. For solving of such complex problem the systematically oriented approach is needed. It is possible to adapt the ideas that are known in other branches.

DEVELOPMENTS OF EDUCATION AT UNIVERSITIES

University education has been known in Europe for more than 900 years. Its initial common role was to disseminate the knowledge and venerate God. The industrial revolution had a significant impact on that mission. Therefore, the role of universities started to change in the middle of the 19th century. Universities initiated more demand at national preferences following economic and military intentions of each country.

Besides the change of the initial role of universities, student mobility became more restricted.
This was due to the substitution of common teaching of the Latin language by national languages. New changes originated from the information & communication technologies (ICT) twenty years ago. They did not modify the primary mission of universities, which is the knowledge dissemination. ICT affect opportunities for the changing of forms and ways of teaching. However, the character of universities remains up to this point the same. The process of education is managed through the same methodology, as it was 50 or even 100 years ago. Meanwhile ICT has only replaced former manually or mechanically made activities and has improved the quality and effectiveness of the educational processes.

Information & communication technologies bring new tools to the education process at the universities. Additionally, they also bring new needs for the education of society. In the past when the technologies and knowledge in the world were changing slowly, the active life of people was divided into two parts:

- education - preparation for active life and profession,
- utilization of results of education in active life and profession.

This scheme does not work today. The main problem is the speed in the change of knowledge. A period in which knowledge doubled is shorter now. Ten years ago it was approximately within ten years. It is assumed that in next ten years it will be within some hundreds days, maximally within few years. The only way how to solve the education in such conditions is a broad implementation of continuing education and training during the whole life of people. Continuing education is not a new kind of education. It has only a different form from that one which is currently used. Apart from that it is necessary to change education processes at universities and not only there. Education in basic and secondary schools has to be changed too. Good preparation of young people for life long learning and continuing education is a big challenge for education systems. Success of societies will be strongly influenced by preparation of young generation for this new condition of their life. They must be adaptable enough for fast changes in a knowledge society and knowledge economy.

Education that is predominated nowadays must be changed. Computer Base Learning is the tool for that. Knowledge will be disseminated through ICT tools designed for those who are interested in new knowledge. Students travelling to a place of education will be dramatically replaced by the transmission of information to the students` locations "just in time". Instead of the situation where the student has to adapt his time to the timetable when the information is provided, the information will be accessible to the student when he has time to study. Students will be provided, at their workplace, by tools to access information, by searching tools to find new information, as well as by communication tools in order to contact teachers and other participants of education. Multimedia and other new forms of content presentation will enable students to absorb information better and faster than when using the traditional form of verbal and written interpretation or graphical notation. On the contrary to the present form of education used in all levels of schools where the student often becomes a passive object of education, dissemination of knowledge via CBL tools will push more responsibility to the student himself/herself.

CHANGES BY MEANS OF ICT

A main target in implementation of ICT is the innovation of the existing processes and activities. There have been generally different arguments for implementation of information & communication technologies in different time periods. They are depicted in fig. 1 according to Reichwald (2000). The most important period at the present is the third phase.
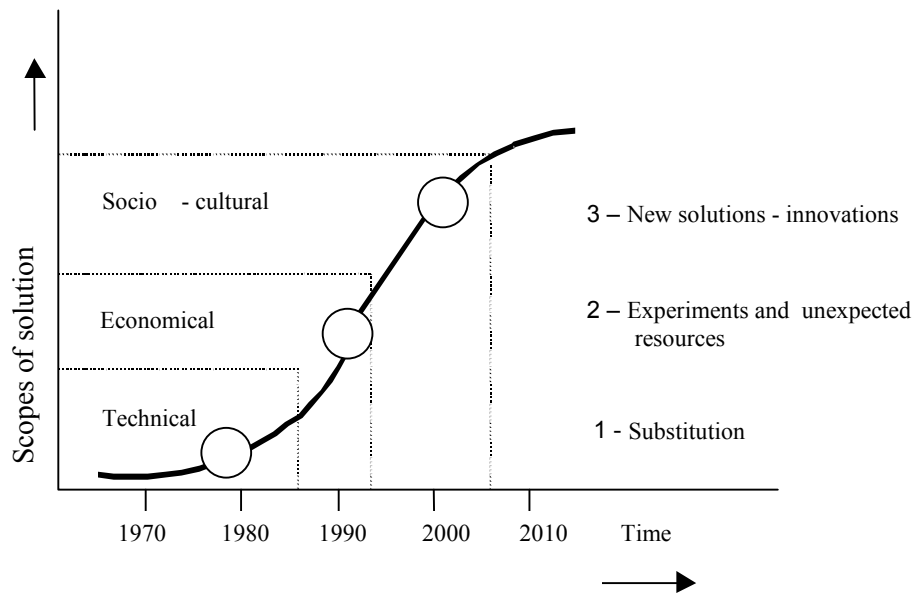
Figure1. Phases of implementation of information & communication technologies

In this last phase, new solutions are obtainable by the innovations. The old approach (which has been used up to now) is replaced in the innovation period by a new one. Firstly, new solutions interfere with the existing activities and processes, then gradually they dismantle them and establish new possibilities, which have not been feasible until now. New activities and processes are facilitated by new information & communication technologies. This phase is the most complicated one, because in addition to technological and economical aspects, the solutions have to meet a socio-cultural aspect. A technical solution or economical evaluation is not sufficient. There are, of course, other dimensions that have to be taken into account in every development phase. Apart from technological and implementation problems, the general economic and political situation needs to be taken into account and legal aspects enabling a free market and its development as well as an amicable attitude of society towards the given movement. New technology achieves its role only if the user applies it. "Changing the manner form in which interaction occurs calls for redesigning not only of the formal structures within the company, but also in the informal patterns of interaction between individuals and processes", says G. C. Gourales (2000).

Innovation in the education must bring benefits first of all for students. There have been many discussions about the implementation into the university environment. This implementation currently has its supporters as well as its opponents. In last four years university representatives and decision makers of government have prepared documents dealing with the strategy of education development.

BASE DOCUMENTS OF HIGH EDUCATION STRATEGY IN EUROPE

Base frameworks for development of higher education in the new educational environment are defined in many documents from meetings of university representatives and ministers responsible for education in Europe. Such documents as Magna Charta Universitatum (1988), Bologna declaration (1999), Salamanca convention (2001), Prague summit of ministers (2001), etc give main views about the future development of the university education.
Main conclusions from these meetings can be divided to four parts:
- education policy and legislative,
- philosophy and technology of education,
- development of human and material resources,
- content of education.

Realisation of these ideas needs an implementation methodology according to the general principles of innovation.

IMPLEMENTATION OF CBL TO THE EDUCATIONS PROCESS

It will be not possible to implement all advances of CBL simultaneously at all universities and other higher education institutions and effectively contribute to better education in the age of knowledge economy. Therefore, it will be necessary to identify barriers and propose their overcoming, according to possibilities, which are given by implementation of new information & communication technologies in education. Implementation will be faster and more efficient by using a business process reengineering methodology, Such approaches are described, for example, in Hammer, M., & Champes, J. (1993). According to the Final Report FGÚ (2001), the implementation of CBL to the education processes can be solved in three parts.

Process analysis

The success of the implementation of information & communication technology to the education process depends on the location of problems in the specified implementation area, which the ICT can solve. In order to use the most appropriate technology good knowledge of processes and actions in the education area are required. For a specified segment or an institution, this requires:

- process recognition,
- process description,
- process analysis.

Organization schemes and units are always clearly and strictly defined in an education institution. That is usually not the case for the process description. It starts to be elaborated mainly in the scope of acquiring the quality ISO 9000 certificate. Such certification is usually scarce at universities. However, the description itself does not specify the problem, which has to be solved. The reason for implementation of ICT has to be a radical change in the performance of the existing actions and processes. The task is to eliminate weak points of the processes, which make institution as an entity very inflexible and frequently low functional or expensive.

New processes design and existing processes redesign

The new process creation is possible due to the application of the reengineering method, problem analysis and the formation of a problem hierarchy together with the knowledge of opportunities that information & communication technology provide.

Procedure of new processes design includes:
- definition of crucial processes parameters,
- examination of changes possibilities caused by the implementation of new information & communication technology,
- alternative solutions design,
- solutions evaluation and selection of the most appropriate one.

The need for a new processes realization is a proof of the existing established inner conditions of the whole implementation system. If new information & communication technology cannot radically change the process, there is no reason to implement them. If there is no reason to implement them, there is a lack of justification for the whole implementation system.

Preparation of feasible conditions

The reengineering method describes the new process creation by mean of transformation principles. These principles are assumptions that ensure its successful realization. According to Andrews& Stalick (1997) the transformation principles are divided into three layers, each of which has three components:

- A physical technical layer ensures the creation of a physical technical infrastructure through:
  - ✓ a process model,
  - ✓ a ICT infrastructure model,
  - ✓ an organizational model.
- An organizational and managing layer defines the requirements to ensure physical-technical infrastructure through:
  - ✓ management methods,
  - ✓ reward system,
  - ✓ measurement system.
- A value layer describes the basic philosophy and characteristics helpful for better understanding of changes through:
  - ✓ creation of organization culture,
  - ✓ political power,
  - ✓ individual belief systems.

Without the creation of transformation principles, the use of new information & communication technology in altered processes may not be accepted. This often leads to the cessation of commenced changes and brings a return to traditional ways of work. These conditions guarantee that a new process realization by means of a new information & communication technology implementation create assumptions for activation of essential changes in processes and their activities.

The accuracy of the solution cycle of the application specification is confronted according to the model with the objective of the application specification as well as the overall implementation objective of new information & communication technology. If the result proves that the new technology does not bring innovation changes for the corresponding process, one can stop the implementation process at this point. If the result of previous steps generates the requirement for the realization, one continues with the projection and realization phase.

Application of the system of reengineering in to the education process at the University of Žilina

We have initiated process of changes with implementation of the general methodology of the system reengineering in the education process at the university. It was the response on the new strategic plan of the university that was approved by academic senate in 2002.
The first step of changes was the design of an overall plan of the University for the implementation of e-learnig based on two basic principles:
- the content and
- the form of education.

One of the stepping-stone to the new education process is a redesigning of pedagogical documents like university and faculties study plans and curricula. The second one is using information & communication technology in education to provide it as Computer Based Learning.

The university management has developed an action plan and offered it for general discussion. It lends the university staff to new roles and activities. To open people up to these new roles, it is important to explain all of them the reasons of this action plan. The management of the university has created a discussion group via the university Intranet. There are discussed all questions linked to the new strategy of the university.

The most frequent questions were:
- Why was the plan initiated?
- What is intended by the term Computer Based Learning? What is behind this term?
- What will bring for as the implementation of CBL?
- Why do the existing learning process have to be changed. They work well already… Is it really necessary?

Priority and perspectives of students, teachers and administrative staff are different and it seems to be a never-ending story to find consensus. Assisting and helping them to comprehend the complexity of the task removes short-term disillusionment.

Using of the reengineering methodology was the tactics to reach the aim. If we do not mean, that information & communication technologies will be used in existing processes it will be necessary to rebuilt existing education to the new system. On the first sight it may seem there is no problem in education processes. The main problem seems to be in finding enough time to fulfil all the tasks originated by the existing education process, not to find other problems. But this perspective leads to the extensive utilisation of information, communication and human resources without visible effect. Face-to-face lectures should be replaced by videoconferences; web forms replace Intranet files, filling of paper forms, they replace books. Any particular process is supported by new technologies, lot of money is spent, but no principle progress is visible. The only way to make progress is to set the same questions people have been asking for thousands of years: how to bring happiness in education to all students and try to give the answer using new technologies. In a more practical sense we have to decide what to learn and how to learn better and more efficiently.

We are not able to answer these questions, but we'd like to indicate what to do to become able to answer them. First of all it is necessary to know the existing process of learning.

We have analysed learning process at the university using structural analysis based on flow graphs for different levels of details. The main process at the university is the education process. Its components are described on Fig. 2, using arrows to show the direction of the main information flows.
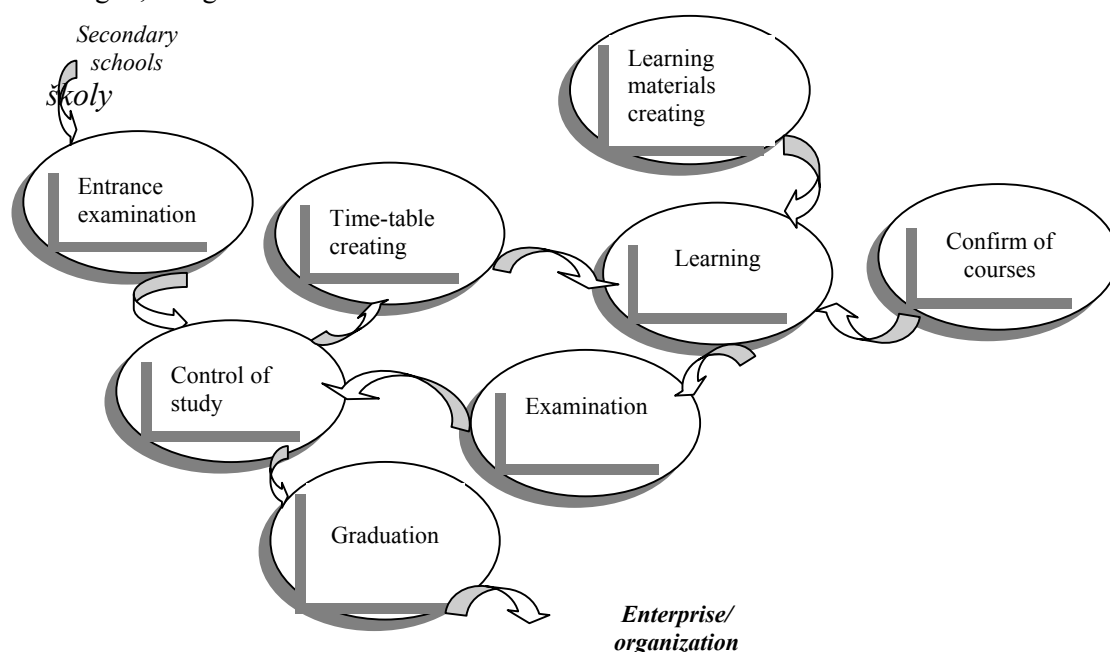

Figure 2. University education process description

The process of education can be divided in the followed sub processes:
- process of teaching/ learning,
- process of study materials preparing,
- process of examination.

We have described these processes in detail and for new processes design we made:
- critical analysis of existing processes,
- understanding of new information and communication possibilities.

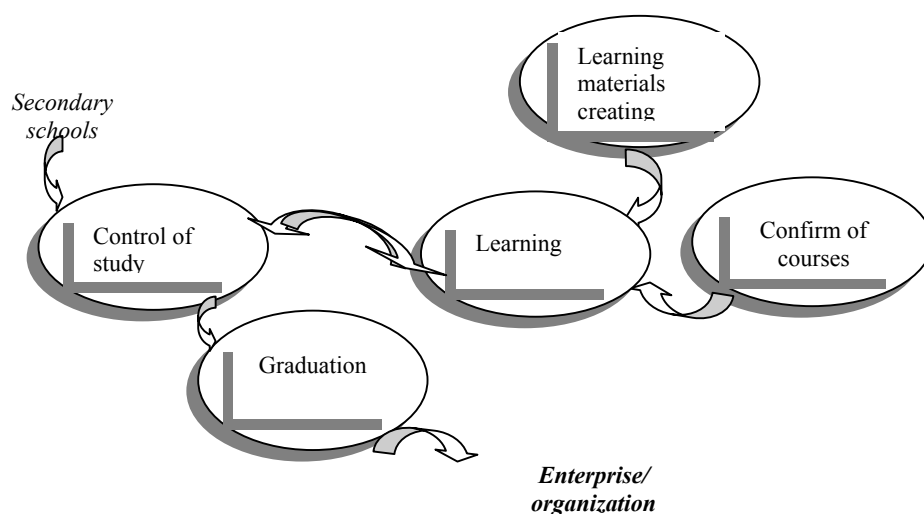The result leads to a new education process as shown on Fig.3.

Figure 3. Education process with CBL

We assume that is possible to realize this new education processes with support of information & communication technology. Realisation of those new sub processes is main task we are solving nowadays.

CONCLUSION

Information & communication technologies are implemented into the old processes in many cases. Such implementations do not bring effects, which are needed for change of education and learning in knowledge economy mentioned above. Necessary for that is an identification of the following possible difficulties and solve them:
- fast development of information & communication infrastructure regardless of CBL needs,
- missing links in the CBL value chain,
- missing criteria for evaluation and acknowledgement of new roles in CBL.

It will be necessary to reorganize university teaching and learning processes and initiate an overall discussion on evaluation criteria etc. Less visible but no less a threat is the possibility, that teachers will not accept CBL implementation. Start soft processes supporting
- creativity like brainstorming,
- common goals of the universities,
- new culture of the universities,
is very promising. Collective responsibility for general success of the universities can motivate it. Building up the new organization culture is a long-term and never ending task, but it must be introduced if education institution is to be competitive.

An effective CBL implementation should start in advance and it will be necessary for the universities with similar curricula and quality to negotiate and establish a common core of education. The individual approach will not be effective probably. It is assumed, that a larger step towards CBL may be achieved only by the co-operation.

It will be necessary
- to identify education processes which will bring the greatest progress by using CBL
- to develop a new pedagogical approach for CBL
- to understand complex methodology how to implement CBL to the existing university education system

- to collaborate with a new teacher's role, and new professions at university
- to analyse human resources and an existing infrastructure
- to develop a non university institutions, which can be in many case more effective in implementation of CBL tools than in cases of some more conservative universities. Outsourcing of chosen services for better implementation of CBL can give universities a new dimension.

It would be ideal if the implementation methodology existed and afterwards step-by-step was realized. It is not usually the case at the present time. The methodology with all the aspects mentioned above is delayed and results are not satisfactory. This is why universities usually have implemented some particular parts of CBL tools without real new results in teaching for the age of knowledge society.

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