E- LEARNING MODEL OF EDUCATION PROCESS AS A PART OF KNOWLEDGE MANAGEMENT

Maja Lamza – Maronić, PhD, full professor
Faculty of Economics in Osijek, Croatia
maja@efos.hr

Jerko Glavaš, graduate economist, assistant
Faculty of Economics in Osijek, Croatia
jglavas@efos.hr

Milan Puvača, Dinko Roso, Luka Samardžija, students
Faculty of Economics in Osijek, Croatia
milan@ofir.hr

ABSTRACT

Modern business operations are oriented towards improved information flows and enhanced skills in decision making. Capacity for teamwork has become one of the major qualities required in the business world. Personal development of individuals working in a team through continuous learning is aimed at achieving the common vision and business growth. Starting with these facts, and taking into account the current situation and the changes arising from the Bologna process being introduced into Croatian higher education, the paper analyzes the possibilities of e-learning and teamwork in the education process. The drive for personal development and learning is the basic motivator in this complex and demanding process. By setting up education teams we can partially solve the problem of large student numbers, however, this results in increasing amounts of paperwork and record-keeping. Team interaction brings about an atmosphere of positive competition, while individuals learn how to develop their creativity and suggest their ideas within a group. General availability of information technology opens up a wide range of possibilities to every knowledge student. Distance e-learning systems provide mentors and students with a new space for easier, faster and higher-quality learning, fulfilling the additional imperative of saving time. By reviewing one learning-support system we shall examine its orientation towards teamwork and advancement. Synergistic effects in student teamwork allow for higher-quality feedback, whereas this new experience will enable young people to adjust more quickly to any work environment in the future.

Keywords: knowledge management, education process, teamwork, e-learning, synergy

1. THE BOLOGNA PROCESS AND HIGHER EDUCATION IN CROATIA

The amount of information is constantly growing and becoming more available owing to modern Information and Communication Technologies. The barriers of time and space have become virtually inexistent.

In 2001, Croatia signed the Bologna Declaration at the Prague ministerial conference thus taking on an international commitment to adapt Croatian higher education to its requirements and principles by 2010.

The process is rendered more difficult by the fact that the structure of Croatian higher education is dissimilar to the European structure – there is still no integrated university. An integrated university is a university in which decisions on how to act in an interconnected and coordinated manner are made jointly by designated bodies.

The Bologna process also expects higher education systems to adapt to the process of Life Long Learning (LLL) thus opening up possibilities in all three higher education cycles for continuation of studies for people with one or more academic degrees who, due to the dynamics of the labor market, return to their studies and go through selected education cycles.

In all aspects of the Bologna process, the European dimension is one of the imperative subjects. It means knowledge of language, history, culture, way of life and creation of the European Higher Education Area (EHEA) and the European Research Area (ERA). In doing this, equal and balanced opportunities for access to higher education have to be provided to all segments of the population.

The ways to promote and attain the European dimension are the European studies, the mobility of students and university teachers, as well as common university curricula.

2. SCIENTIFIC INFORMATION

As a phenomenon, information is in the centre of society's attention today. It is a central concept in the theory of information, a scientific discipline which emerged in the mid-20th century. It was introduced by Claude Shannon, who views the theory of information as a special part of the probability theory and mathematical statistics. At the same time, with his study of cybernetics Norbert Wiener gives a wide natural interpretation to the theory of information, claiming that what began as a purely abstract mathematical theory turned into a general applicative theory (Wahl, Radošević).

Wiener defines information as the content that we exchange with the external world while we adapt to it and influence it by our adaptation. In the process of adaptation Wiener emphasizes interactive features and a spectrum of different time dimensions, with information as the crucial aspect initiating and moving the process.

Information is that quantity of data required for following the system in its dynamics and its relationship with other systems, as well as in connection with the changes occurring in the system's structure and function in the course of its functioning.

Although information is related to a wide range of possible activities, it has a dominant and indispensable role in the process of decision-making.

Along with the well-established and still dominant material resources, non-material resources are gaining in importance: information, space and time.

Scientific information represents a segment of scientific communication, i.e. informal (oral and written) communication processes and formal communication processes in the transfer of scientific information.

Economic development should be accompanied with an appropriate level of research work based on horizontally and vertically connected systems for gathering, processing, storage and dissemination of scientific information. In parallel with the development of science, scientific information feature as an important development potential.

In this way information has become an interdisciplinary phenomenon. Scientific information can resolve only certain issues within a particular branch of science, but there is constant striving to include the biggest possible infrastructural unit by searching through specialized databases or data banks, as well as by data mining.

This concept of scientific information is a starting point in the construction of a knowledge quality model.

3. TOWARDS A MODEL OF KNOWLEDGE QUALITY

The process of knowledge management is a planned and guided process. It consists of a number of interrelated segments situated within an intelligent information system. It allows discovering, following and creating implicit knowledge, and is thus a driving force for the spiral of knowledge.

Universities in the Republic of Croatia are currently going through the process of adapting the higher education system to the Bologna Declaration principles, thus participating in the creation of a unique "European Area for Higher Education".

The University in Osijek is following the process of adapting the higher education system to the Bologna Declaration principles also through the regional development model, as the execution of the Bologna process has given it the role of mentoring initiatives.

Interactive approach in the dialogue of the University and its social and political environment is taken in an effort to develop a sustainable regional research programme, as a contribution to the knowledge quality model.

The knowledge quality model in the Bologna process implementation would be conceived and developed at the Josip Juraj Strossmayer University in Osijek.

Looking back at the development of the University in Osijek (established in l975) it should be noted that this is the only Croatian university which sustained heavy damages during the Homeland War in 1990s.

It currently has more than 15,000 students, and includes fourteen faculties and departments in the fields of natural sciences, technical sciences, biomedicine and health care, biotechnical sciences, social sciences and humanities. There is a long-standing and fruitful cooperation with a number of international partners in Augsburg, Giessen-Friedberg, Pforzheim, Vienna, Gdansk, Pecs and Mostar, which has resulted in regular annual exchange of teachers and students (mobility), cooperation on joint projects, annual conferences, symposiums and scientific colloquiums.

Some features of the current Bologna process, e.g. flexible study programmes, individual choices in education for all students, internationalization in teaching, joining the European

research and education area, and responsiveness to the demands of the economy, have already been anticipated and realized to a greater or lesser degree at the Faculty of Economics in Osijek.

Faculty of Economics in Osijek is one of the oldest constituents of the Josip Juraj Strossmayer University in Osijek. At this point it has some 5,000 students and it will serve as a proving ground for knowledge quality modelling within Bologna process in the economic science and practice.

4. FACULTY OF ECONOMICS IN OSIJEK – CASE STUDY

At a time when our education system is undergoing changes following Bologna guidelines, it is becoming increasingly difficult to manage large numbers of enrolled students. At times, the immense changes affecting the field of education are not visible. University teachers' mentoring comes to foreground as does the strategy to manage the problem of large student numbers and related unfavorable working atmosphere. During teaching, students are divided into more efficient smaller groups, i.e. teams. Teams can overcome changes and find solutions in unpredictable and turbulent situations much more easily. These are the kind of situations we wanted to simulate for students to see numerous unfavorable phases that teams go through. Outstanding individuals become leaders while on the other side there are those who pose a threat to the team complexity and productivity.

Naturally, due to the limited time and space which are important factors, teamwork is becoming increasingly problematic too. We have turned to new methods of learning. After the survey on the use of Internet applications by students, we have been trying to create a new learning model which will enhance the efficiency and effectiveness of students as receivers to whom knowledge should be transferred, but also university teachers as subjects in their role of mentors and knowledge transmitters. We have turned to market e-learning systems and we have been learning from them. Their complex nature has almost the same affect as the Bologna administration we have been trying to circumvent.

We are finding our own solutions and building them together with the help of students, our partners. Our guiding principles in creating something new have been simplicity and flexibility. Students must not feel alienated when they look at the monitor and read relevant data. Instead, they have to sense the mission of their mentor who put the material there taking account of individual needs. The most important part of this is the mutual success in the implementation of the system. From faculty bureaucracy we have turned to students once again, encouraging their creativity and knowledge.

4.1. Organization of teaching using "clusters"

4.1.1. Advantages of teamwork

TEAM = Specific social-psychological group of people who through joint effort work to solve a problem or a task so that each member does what he/she can to contribute to the solution.[1]

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[1] www.cool-school.net/index.php?**u**citelj=nbisk**u**p&view=44 (20.01.2008)

An organizational form of activity that has increasingly proved to be a functional solution to the problem of fast flow of information and quality feedback.

A great interest in higher education at a time when it is becoming increasingly difficult to organize time creates a problem of large student numbers intensified by unlimited and easy access to information of all kinds and reliability and makes transmission and upgrade of knowledge much more difficult.

"Since the permanence of knowledge is rapidly decreasing and the actual problems of economy and the world are becoming more and more complex, in order to be able to solve concrete problems, i.e., tasks directly and on the spot, there is a need for cooperation among workers of different education and specialization. Each individual is becoming less capable of meeting the set requirements. According to everything we know and can assess today, the future belongs to the teams."2

The division of a group into smaller teams works well in many ways. The interaction of university teachers with students is much easier and the quality of feedback is increased many times over. The university teacher takes on the role of a mentor and instead of communicating with each individual; he/she directs his/her attention towards each team as a separate unit. This makes supervision, guidance and allocation of problems to be solved much easer and quicker. The team works as a whole, receives answers and guidelines, and gains experience as such. The exchange of information is greatly accelerated; team members exchange ideas as part of the teamwork; mentor manages the project via the team representative or together with the team as an organizational unit; positive competitiveness is developed both among teams and among individual team members which creates a dynamic environment for progress.

"Our experts who advocated group work as a teaching method neglected the fact that a group should be viewed primarily as an active social-psychological structure, and as a unit whose functionality is conditioned and changeable in many ways."3

The allocation of work to teams has a significant potential for an efficient implementation of the strategy. Teamwork enables maximum degree of utilization of individual knowledge; use of creativity, inventiveness, and better speed and flexibility in responding to the set requirements.

4.1.2. Teamwork

Teamwork requires cooperation. It is important to point out that an individual can not solve the whole task on his/her own; there has to be a cooperative interaction that enhances the overall effect.

1. Individual and group creative problem solving
   - Each individual is obliged to cooperate with the rest of the team in order to achieve the common goal
   - It is necessary to adapt to each member's way of thinking
   - Joint defining of mission and vision, allocation of work, assigning of duties and deadlines

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2 (Klippert,H. 2001)
3 (Havelka, N, 1980., str.33 prema Andrilović, Z. 1989.)

- Developing a sense of belonging in an individual

2. Communication in the group
   - Good flow of information determines quality decision making
   - Respect for good manners, parliamentarism, seniority, urgency, freedom of speech or presentation of ideas are the bases of quality, fast, accurate decision-making and considerably decrease the risk of failure
   - Interaction with mentor

3. Conflicts and ways of overcoming them
   - Difference of opinion among team members
   - Conflict management: a) by team leader: by voting, arbitration b) by mentor c) by team members: sets productivity

4. Communication in motivation processes
   - The task of each individual within the team, team leader, and mentor
   - Problems related to lack of action or creativity
   - Importance of respect for individual member qualities
   - Successful leaders do not think in terms of "I", they think in terms of "we", they think in terms of "the team"

5. Decision making
   - Within the team itself
   - Democratic or by team leader
   - It is important to establish the decision making hierarchy in advance

6. Positive competitiveness in the team
   - Joint success makes all team members more successful
   - Synergy

7. Positive competition among teams
   - Improves the productivity of the entire organization
   - The principle of activity within the team is applied at the level of the organization (team interaction)
   - Positive atmosphere develops creativity and improves productivity

5. CONTENT MANAGEMENT SYSTEM

With the introduction of the Internet into everyday life and education process, came the development of different applications and models of learning via the World Wide Web. It is assumed that by 2006 there were around 3.5 million students in America who used applications for learning via the Internet in some way. The main goal of these applications is to enable unimpeded and quick communication between university teachers and students, but also among students themselves. The availability of electronic (texts, video, audio, interactive) material enables students to collate references from a single source or to take an exam from their house.

5.1. Use of the Content Management System

"Content Management System represents the program solution for next generation web page content management. The system includes computer databases, web design, audio databases and electronic documents." The first Content Management System (CMS) applications were developed for so-called web portals in order to facilitate news entry to a team of journalists.

5.2. Possibilities for application of the Learning Management System

With the development of CMS came various versions adapted to a particular problem. One of them is the Learning Management System (LMS) which combined the possibilities of the Internet in terms of education and the teaching content. LMS served as the basis for various versions of the new term e-learning. Today, the two terms have become synonymous with modern teaching. Coordinated, they offer numerous possibilities for distance learning.
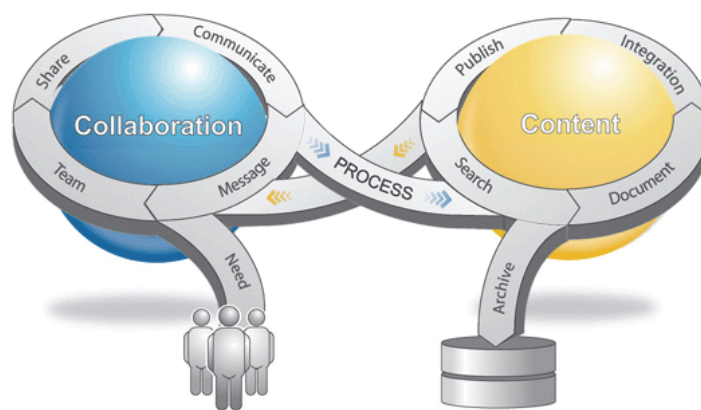

Figure 1: Possibilities for application of the LMS

The market has recognized the need for these kinds of information applications and a few were launched with a complete commercial support. One drawback of these commercial solutions lies in the fact that they can either be adapted to just one type of education, i.e., one scientific discipline, or offer a huge number of possibilities, which makes the software solution too complex and difficult to navigate. Naturally, educational institutions have the need for professional IT staff whose task is not only to provide computer equipment but also introduce the rest of the teaching staff into a new dimension in education. On the other hand, the research studies have shown that students accept this kind of work without any major difficulties. Moreover, they improve the entire system with their work and suggestions.

6. KNEX – TEACHING PROCESS SUPPORT SYSTEM

The introduction of the Bologna process to the Faculty of Economics in Osijek has brought fundamental changes to the curriculum. The application of KNEX system is analyzed in the course "Business information systems" where LMS application, KNEX system was implemented as a support in the education process. The application itself was developed by

students who attended the same course last year. The system has been operating successfully as of October 2007.

Special emphasis of the system is on teamwork as its principal task. Each student as well as the team of teachers with their assistants has access to the KNEX system at any given time. Students divided into teams have to prepare a seminar on a particular subject as a part of the curriculum. After completing the seminar, the material is entered into the system. The KNEX system has considerably improved the communication in this segment. By publishing the seminar on the system all users i.e., students attending the course, have the possibility to give their comments. Especially important is the synergy of teams. Teachers have the possibility to communicate with their students at all times. It is important to point out that the team which prepared the seminar has the possibility to improve it by listening to the comments of their peers and teachers and thus continually learn. In this way, the process of learning about a particular subject does not cease by completing the seminar but begins because authors and fellow members of the team (as well as teachers) can work on their education through constant improvement. Mutual evaluation of papers gives students an opportunity to practice and develop critical thinking, learn how to commend but also criticize. A positive competitive atmosphere contributes to the quality of teaching even outside the teaching process.

Figure 2: KnEx Teaching Process Support System

By polling all the students registered to the system on several occasions we have been observing indicators of successful implementation of our system. The analysis of the results showed that more than two thirds of students have successfully accepted the KNEX system and that as many visited the pages daily. We have reached a conclusion that the analyzed system is simple to use which was confirmed by 95% of students who were satisfied with the

way the system worked and who did not encounter any major problems. Notwithstanding the above results, the system will be continually upgraded.
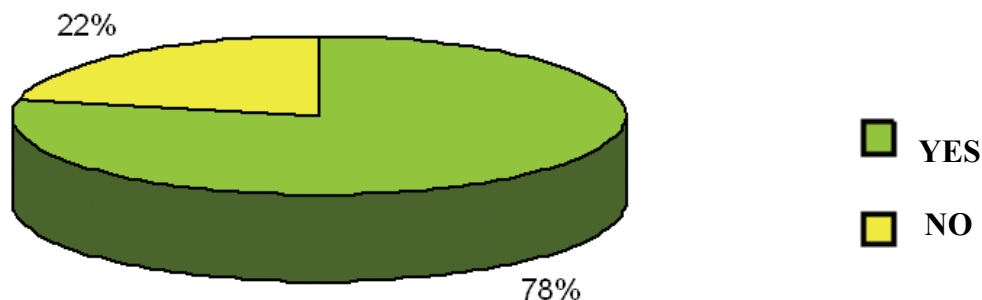

Figure 3: In your opinion, is this approach to students a good start in implementing the Bologna process?

7. CONCLUSION

The implementation of the Bologna process as a whole as well as activities related to the promotion of the European dimension should take into account that "the strength of Europe is in the union without *uniformity*". This is why the process of harmonization with the European Union member states, considering the existing differences, is a big challenge for the Republic of Croatia.

8. REFERENCES

http://www.vizija.com.hr/seminari/timski.html - 20.01.2008

http://www.cool-school.net/index.php?**u**citelj=nbisk**u**p&view=44 – 20.01.2008

http://209.85.135.104/search?q=cache:oLGTXF0IVcUJ:www.ndcosijek.hr/nova%2520skola/arhiva/timsko%2520ucenje.doc+u%C4%8Denje+u+timu&hl=hr&ct=clnk&cd=1
ili http://www.ndcosijek.hr/nova%20skola/arhiva/timsko%20ucenje.doc - 15.01.2008

http://209.85.135.104/search?q=cache:xAurO5vYF14J:www.os-pperice-ma.skole.hr/grupni%2520rad%2520i%2520suradnicko%2520ucenje.pps+u%C4%87enje+u+t imu&hl=hr&ct=clnk&cd=7 - 10.01.2008

http://www.os-pperice-ma.skole.hr/grupni%20rad%20i%20suradnicko%20ucenje.pps   – 10.01.2008

Klippert, H. (2001): Kako uspješno učiti u timu: zbirka praktičnih primjera, Zagreb: Educa