

WEB BASED MEDICAL INFORMATICS EDUCATION IN BOSNIA AND HERZEGOVINA

Izet Masic¹, Ahmed Novo¹, Zlatan Masic²

¹Cathedra for Medical Informatics, Medical faculty, University of Sarajevo,
Bosnia and Herzegovina (BiH)

²Technical University Vienna, Austria

SUMMARY

Introduction: Increase and development of **distance learning (DL) technologies** over the past decade has exposed the potential and the efficiency of new technologies. Benefit and use of contemporary information technologies is the area where medical informatics got the most on understanding and importance. Definition of distance learning as “**use of technologies based on health care delivered on distance**” covers areas such as electronic health, tele-health (e-health), telematics, telemedicine, tele-education, etc. as **web based education**. For the need of e-health, telemedicine, tele-education, web based education and distance learning there are various technologies and communication systems from standard telephone lines to the system of transmission digitalized signals with modem, optical fiber, satellite links, wireless technologies, and web sites, etc. Web based education represents health education on distance, using IC technologies and Internet, as well as continuous education of a health system beneficiaries and use of electronic libraries, data bases or electronic data with data bases of knowledge. Number of events has in order to promote distance learning and web based education organized by teaching staff from Cathedra for Medical Informatics are very broad: Professional-scientific events, workshops and congresses, first tele-exam at Medical faculty, University of Sarajevo, Introducing of Distance learning in curriculum at biomedical faculties, etc.

BiH Universities:

- The mutual for all the universities in Bosnia and Herzegovina is the connection on the Internet mostly slow of 1 Mbps and with inadequate reliability. This technical limitations and relatively high prices are the limiting factors of wider introduction of ICT and e-Education into the educational institutions.
- Currently estimated number of users of Internet is about 10% of population. The prices of telecommunication services are high and one from the key obstacle through connecting and using Internet in research and educational process in Bosnia and Herzegovina.
- In development of distance learning there are some individual initiatives, mostly on faculties/universities which results with realization of small pilot projects.
- Serious initiative was generated by WUS Austria (World University Service of Austria) in B&H. During 2002 and 2003 WUS Austria, through its programmes, Distance learning 2002 and Distance learning 2003 year, supported the development of the educational processes at B&H universities.
- At the University in Tuzla by the beginning of 2003 was formed the University center for the developing of distance education – UCED, aims to give technical, organizational and didactic modern multimedia hall, equipped for the needs of videoconference and training in the field of IT; the center possesses the own computer and communication equipment. To the students through web-based platform for Tele-education Learning Cubes, offers more multimedia interactive courses.
- At the University in Banja Luka at the Electro-technical Faculty since 1999 works the Center for open education and education from distance, whose primary role is to promote, develop and improve learning methods based on the contemporary information

technologies. The basic recourses of the center are: computer classrooms, the rooms for the staff, e-educational platform of learning cubes software for the work with libraries, and computer and communication equipment.

- The University Džemal Bijedić in Mostar, Faculty of the Information technology provides the possibility of studying by the system for the distance learning since 2001/2002 school year. The student can approach to all practical works and lectures which get be found at the faculty web page. It is enabled to them also the on-line application, as well as the asynchrony communication with the teachers by e-mail and of the forum.

University of Sarajevo:

At the University in Sarajevo in year 2003 is open the e-learning centre for the support to the faculties the distance studies by use of the information technology. At Medical faculty of University of Sarajevo at Cathedra for Medical informatics since 2002 is in progress realization of the project named: “Possibilities of introducing distance learning in medical curriculum”, approved by the Federal and the Cantonal ministry of science and education. The purpose of the project is to facilitate improvement of educational process at biomedical faculties, applying contemporary educational methods, methodologies and information technologies in accordance with strategy and goals proclaimed by Bologna declaration. Pilot project was realized during three past school years, theoretical and practical education of subject Medical informatics are adapted to the new concepts of education using world trends of education from the distance. One group of students was included in the project finalized by electronic exam registration and electronic exam on 20 June 2005, publicly, in the Physiology amphitheatre of the Medical faculty in Sarajevo.

Conclusions:

Bologna processes, started few years ago in European countries, enable us to promote and introduce modern educational methods of education at biomedical faculties in Bosnia and Herzegovina. Cathedra of Medical informatics and Cathedra of Family medicine at Medical Faculty of University of Sarajevo started to use web based education as common way of teaching of medical students. Satisfaction with this method of education within the students is good, but not yet suitable for most of medical disciplines at biomedical faculties in Bosnia and Herzegovina.

Key words: Medical education, Distance learning, Bosnia and Herzegovina, information technologies, education, distance learning.

1. Introduction

Definition of distance learning as “use of technologies based on health care delivered on distance” covers areas such as electronic health, Tele-health (e-health), telematics, telemedicine, Tele-education, etc. Distance learning or learning from the distance represents the educational technique which keeps significant position in the actual medical education of the health care professionals abroad, especially in postgraduate and continuous medical education (1,2). Tele-education is conventionally defined as: any educational or learning process or system in which the teacher and instructor are separated geographically or in time from his or her students; or in which students are separated from other students or educational resources.

With two projects in this area: “Possibilities of introduction of Distance Learning in Medical Curriculum” and “Introduction and Implementation of Distance Learning in Medicine”, professor Masic and his associates from the Cathedra for Medical Informatics, Faculty of medicine, University of Sarajevo have made tremendous progress in education of

undergraduate students and medical professional in Bosnia and Herzegovina (3,4). Recommendation for sustainable Distance Learning and really lifelong educational process and described activities and efforts on introduction of distance learning in teaching process at Faculty of medicine, University of Sarajevo, Bosnia and Herzegovina and shown the key aspects of modern tele-education system. This is for the first time in B&H that students are able to apply for exam, take the exam and see results on the web site as well as his/her picture and all other significant data (4).

2. Traditional way of learning and learning from the distance

The traditional studying method is gradually replaced by the new aspect of the education, the distance learning (tele-education), especially in the countries where Internet and new technologies are used everyday. The computers and the communication systems enables that the education system, including biomedical faculties, may be modernized by new teaching methods like “learning on the distance” (2).

- Results of different tests prepared by lecturers have trend to show advantages in comparison with traditional learning methods and there is significant distinction in affirmative attitude to educational materials between distance and traditional learning.
- Traditional methods demonstrate better organization and they are clearer in respect to distance learning.
- Organization and needs for more efficient influence of distance learning very often improve traditional methods by teachers.
- Future research should focus on critical factors in determining student involvement in development of educational process.
- The variety of teaching and learning options provided by technology allows education to be provided in an appropriate manner to a broader student demographic then ever before.

By late 1994, the Internet consists of 3.2 million computer nodes spread across more than 57,000 institutions in more than 80 countries, with an estimate of 30 million users. By end of the century the Internet linked more than 400 million persons. The 2002 Euro barometer survey showed that an average of 78% of EU medical GPs were online, with at the highest level – 98% in Sweden and 97% in United Kingdom. Number of “online patients” grows every day as well. The 2003 Euro barometer survey on health information sources showed that 23% of Europeans use Internet for health information and that 41% of the European population considers that Internet is a good source of information on health. But, every 60th citizen of Bosnia and Herzegovina uses Internet (50.000 citizens of 3.000.000 citizens in Bosnia and Herzegovina) and in Slovenia every fourth Slovenian is familiar and uses Internet technologies. That is reason why biomedical and other faculties in Bosnia and Herzegovina do not have many possibilities to introduce and improve larger distance learning as common way of teaching students and other medical professionals.

3. Introducing of Distance learning in medical curriculum at Faculty of medicine of University of Sarajevo

In October 2003, University of Sarajevo began with Distance learning education, opening University Distance Learning Centre at University of Sarajevo (UTIC – University Tele-informatics Centre). Cantonal Ministry approved and supported two projects: “Possibilities of introduction of Distance learning in Medical curriculum” and “Introduction and

implementation of Distance learning in medicine”. Projects are implemented over special designed Centre for distance learning - “LUCIS CENTRUM” located at University Campus in Sarajevo (Figure 1).



Figure 1. Centre for distance learning - “LUCIS CENTRUM”

Opening the University Distance Learning Centre, as coordination body and leader in all activities in connection to Distance learning, has provided opportunity for development and growth of this kind of lifelong education.

On UTIC web site, seven students enrolled from Medical faculty, for the subject Medical Informatics are able to learn from the distance location. So far, teaching staff uploaded thirteen lectures at the web site:

- Hardware and software
- Medical documentations
- Medical informatics
- Methods of data manipulation
- Nomenclatures and classification systems
- Structure and data organization
- Data, information and knowledge
- Systems and communication
- Expert systems in biomedicine
- Artificial intelligence
- System of biomedical scientific and research information
- Application of Information technologies in medicine
- Health information systems

Lecture contents are presented in our virtual classroom. In our case, learning material from the subject of medical informatics and from family medicine, are available on web sites, www.imasic.org/mi and www.imasic.org/pm (Figure 2).

In this “classroom,” learning materials, power point lecture presentations as well as practice exercises with step-by-step instructions, are easily accessible to students. Moreover, on this

web site, students will be able to find subject relating literature as well as English version of the presentations. To access this information requires only one click on a download option (picture 3.) as well as one second patience depending on student's internet speed connection. In short, our virtual classroom gives students the opportunity to access needed information, at any time, and in any place without having to be bound to the classroom. Student is able to browse through the "classroom" using standard navigations. Using these simple navigations, maximal efficiency and fast access to needed material is possible.

As we can see on the picture, all links are in chronological order according to the plan and program of the lecture as well as practice. Special attention is given to the link "kvizovi".



Figure 2. Web sites: www.imasic.org/mi and www.imasic.org/pm

In year 2002 at Cathedra of Medical informatics of Medical faculty in Sarajevo conducted first tele-exam in the history of education in Bosnia and Herzegovina between Podgorica (Montenegro) and Sarajevo (Bosnia and Herzegovina). In June this year we provided first on-line examination of medical students after distance learning in the field of Medical informatics and Family medicine (Figure 4). Student's satisfaction was very high.

4. Advantages and disadvantages of distance learning

Distance learning compared to traditional way of learning had many its advantages as well as disadvantages. Some of the main advantages of distance learning are: the economical factor; student has 24 hour access to needed information; he/she is given the opportunity to learn the subject in his/hers own time and speed; he/she can access learning material independently of place or time; he/she is given the opportunity to learn how to work independently; using e-mail or chat rooms he/she is able to contact professor or his/hers assistant if there are any questions or confusions regarding lectures; etc.

Fundamental advantages of flexible education in terms of classical education are:

- More efficiency;
- Increase capacities of educational institutions;
- Education can be easily adopted to the needs of education on-the-job;
- Costs of educational process are smaller;
- It is possible to distribute the education uniformly, thus the new educational programs are available for fields outside of educational and economic centres;

- It enables the possibility of access to the foreign educational resources to the various institutions;
- Superior quality of the knowledge gained.

Many critics consider that using e-mail or chat rooms to obtain contact with the professor is actually the main disadvantage of this system of learning. Question arises whether this way of professor-student communication is helpful to students because face-to-face contact is missing as well as the opportunity of student-professor relationship building. However, in many universities across Bosnia and Herzegovina students' contact with professors are almost impossible (unless one needs to orally take the exam), due to many professors other jobs or responsibilities; students are mainly able to communicate with professor's assistants.

Moreover, thru traditional way of teaching, during the lectures, students from their professors obtain mostly the information which they can find in the literature or on the internet. Rarely, there is student-professor interaction or lecture discussion during the class. From this one can conclude that an ambitious student using tele-education will experience minimum lose. We live in "Age of Information". These technologies are changing the way we perceive the world, how we think and communicate with another. Established cultures are being transformed and new cultures are forming. New virtual environment affects the way we build our sense of who we are. Some characteristics of the Internet with which are people in B&H know a little are:

- Large volume of users and potential users,
- Lack of physical boundaries which allows for the manipulation of time and space,
- Information can be accessed in a concurrent fashion using different media,
- Concept of redundancy.

In the virtual environment we are applying for information in a way that is expanding our senses and one must to take into account that experience is occurring in the context of the virtual environment. Information without a context has no meaning (5,6,7,8,9,10,11,12).

5. Conclusion

Distance learning or learning from distance represents the educative technique which occupies significant place in the actual medical education of health care workers at the international plan, also in Bosnia and Herzegovina. This method of education is very useful in the domains of all kind of educational process: for undergraduate, postgraduate and continual medical education. It represents the educative technique of the significant effectiveness, which has to have at the disposal both the adequate technological infrastructure as well as previous education of the lecturer and user, adopted the teaching plans and the evaluation mechanisms of knowledge. By use of the rich choice of technological models, in relation to the traditional method of learning, enables the simultaneous education to the great number of students of the various profiles, the approach to all the relevant forms of data bases and data knowledge as well as the mechanism of the evaluation by the eminent institutions and lectures.

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CORRESPONDING AUTHOR

**Prof. dr. Izet Masic, Univerzitet u Sarajevu, Medicinski Fakultet, 90/4 Cekalusa street,
71000 Sarajevo, Bosnia and Herzegovina
E-mail: imasic@lol.ba, <http://www.imasic.org/mi/>**