ORIGINAL PAPER

Information Technology – a Tool for Development of the Teaching Process at the Faculty of Medicine, University of Sarajevo

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ABSTRACT

Introduction: Information Technologies, taking slow steps, have found its application in the teaching process of Faculty of Medicine, University of Sarajevo. Online availability of the teaching content is mainly intended for users of the Bologna process. **Aim:** The aim was to present the level of use of information technologies at the Faculty of Medicine, University of Sarajevo, comparing two systems, old system and the Bologna process, and to present new ways of improving the teaching process, using information technology. **Material and methods:** The study included the period from 2012 to 2014, and included 365 students from the old system and the Bologna Process. Study had prospective character. **Results:** Students of the old system are older than students of the Bologna process. In both systems higher number of female students is significantly present. All students have their own computers, usually using the Office software package and web browsers. Visits of social networks were the most common reason for which they used computers. On question if they know to work with databases, 14.6% of students of the old system responded positively and 26.2% of students of the Bologna process answered the same. Students feel that working with databases is necessary to work in primary health care. On the question of the degree of computerization at the university, there were significant differences between the two systems ($p < 0.05$). When asked about the possibility of using computers at school, there were no significant differences between the two systems. There has been progress of that opportunity from year to year. Students of Bologna process were more interested in the introduction of information technology, than students of old system. 68.7% of students of the Bologna process of generation 2013-2014, and 71.3% of generation 2014-2015, believed that the subject of Medical Informatics, the same or similar name, should be included in the new reform teaching process of the Faculty of Medicine, University of Sarajevo. **Conclusion:** Information technologies can help the development of the teaching process, and represent attractive and accessible tool in the process of modernization and progress.

Keywords: Faculty of Medicine Sarajevo, Information Technologies, Bologna process.

1. INTRODUCTION

It is generally accepted that Information Technology (IT) is a highly desirable and a very necessary ingredient of modern health care (1). According to the "Office of Technology Assessment," "Medical technology is a set of techniques, medicines, equipment, tools and procedures used by the health professionals in providing health care to the individuals and systems, in which such technology is used (2, 3, 4). Advances in medicine in recent decades are in significant correlation with the advances in the information technology. Modern information technologies have enabled faster, more reliable and comprehensive data collection (5, 6, 7, 8). Information Technology, with slow steps, have found its application in the teaching process of Faculty of Medicine, University of Sarajevo. The introduction of computerization of administrative tasks, enabled students easier and faster implementation of their obligations, which applies particularly to students of the Bologna process, in terms of easier application to exams, and faster access to the results of the exam, as well as insight, at any time, in their grades. Bologna process was firstly introduced at the Faculty of Medicine, University of Sarajevo, from 2007/08 school year, and from that moment, two school systems are taking place on Faculty, the pre-Bologna (old)

system and the Bologna process. Online availability of the teaching content is mainly intended for users of the Bologna process, which puts students outside Bologna process, with earlier remnant exams, and duration of schooling, in an untenable position (9).

In recent years, the progress of information technologies and their application in education goes even further. Unlike the earlier mini and micro computer systems in classrooms, libraries and at home, today we are increasingly using web-based networked computer systems for education (10). Information technologies can be used in the teaching process through several directions: interactive classroom, distance learning, interactive distance learning, web based learning and virtual classroom. Through new methods, information technology, it is attempted, that accumulated material becomes closer in easier and approachable way to new, computerized generations.

Hardware development initiated the development of software, and its application in all human spheres, especially those most in need to people. The use of information technology has entered the daily basis of work of hospital centers. The first major effect of this, in the early 90's, was the evolution of data sharing concepts and the emergence of integrated in-

formation systems (11). Hospital information systems developed and started to take rich data (sounds, images, movies) on board the acquisition, storage and transmission of medical data, especially from medical instrumentation, became increasingly digital, rendering the total electronic health record feasible (11). The second major effect of networking, in the mid 90's, was the explosive growth of the Internet (11). It became feasible to move data and information quickly and cost-effectively between any two networked PC's on the planet -this increased the potential for the communication of medical information among health professionals and patients immeasurably (11).

Although with years of delay, the use of information technology, in Bosnia and Herzegovina, has become an essential item for doctors who work in primary care, with electronization of the health system, which tends to raise the quality of health services. That leads to more efficient satisfaction of the health needs of the population.

2. AIM

The aim was to present the level of use of information technologies at the Faculty of Medicine, University of Sarajevo, comparing two systems, old system and the Bologna process, and to present new ways of improving the teaching process, using information technology.

3. MATERIAL AND METHODS

The study included the period from 2012 to 2014 and included 365 students from the old system and the Bologna Process, who had answered prepared questionnaire. P-value of less than 0.05 was considered statistically significant. Study had prospective character.

4. RESULTS

Students of old system are older than students of the Bologna process, whose average age is increasing from generation to generation (Figure 1).

Figure 1. Average age of subjects

In both systems a higher number of female students is significantly present (Figure 2).

Analyzing the last three generations of both systems, it was noted that all the respondents have their own computer, and use it daily. The purpose of using a computer is shown in Figure 3., where students spend most of their time on social networks.

Applications that students use most frequently are Office package (Word, Excel, PowerPoint) and web browsers, in both systems. On question if they know to work with data-

Figure 2. The gender distribution of subjects

Figure 3. Purpose of using a computer

Figure 4. Knowledge in working with databases

Figure 5. Comparison between two generation about opinion of the degree of computerization

Figure 6. Comparison between two generation about opinion of the possibility of electronic access to the literature

bases, 14.6% (three generation included) of students studying under the old system responded positively, and 26.2% of students of the Bologna system answered the same (Figure 4).

On question from which areas they should improve their knowledge, for easier work in primary care, 56% of students

Figure 7. Comparison between two generation about opinion on the possibility of using computers at the university

of the old system (in three generations) consider that to be an area that studies the work with databases, and 88.6% of students of the Bologna process think the same. There are significant differences between the two systems (score 1-5) ($p < 0.05$), regarding opinion of the degree of computerization at the Faculty (Figure 5).

There is no significant difference in the possibility of electronic access to literature between two generations (Figure 6).

When asked about the possibility of using computers at the Faculty, there were no significant differences between the two systems (Figure 7). There has been progress of that opportunity each year respectively.

In average, through three generations, 12.3% of students of Bologna process, consider that there is no need for introducing information technologies in the teaching process, and 14.6% of the old system have the same opinion. When asked about developments in the teaching process, both in a majority percentage, believe that there is certainly room for the

Figure 8. Comparison between two generation about opinion needs of introducing the tools of information technology in the teaching process

Figure 9. Rating of quality of work at Department of Medical Informatics

introduction and application of these technologies (Figure 8).

Students of Bologna process were more interested in the introduction of information technology, than students of old system.

Rating of quality of work of the Department of Medical Informatics and the teaching process itself is increasing (Figure 9). Respondents were only students of the old system who had the opportunity to become familiar with this subject.

Furthermore, 68.7% of students of the Bologna process of generation 2013-2014, and 71.3% of generation 2014-2015, believed that the subject of Medical Informatics, the same or similar name, should be included in the new reform teaching process of the Faculty of Medicine

5. DISCUSSION

By their structure, the old system and Bologna process show large differences and rivalry. Students studying under the old system are quite older and by that, harder accustomed to new things and changes. Students studying by the Bologna process are more open to new ideas and ready to accept various new ways of learning, such as using information technology in that process. The Bologna process introduces students who are in touch with informatics since childhood which is what this research shows. These students are willing to accept changes in terms of introducing new methods in the teaching process and differing from the classical teaching model where the professor is in the center of attention and in that way transfers his knowledge. The Bologna process students use computers more often in their daily work. Results of the study according to the given parameters have indicated an obvious difference in the level of knowledge, use and practical application of IT knowledge among students studying at the Bologna process in relation to the students who are educated under the old system in favor of the first ones (12).

Information technologies in the teaching process can be used in few ways: interactive classroom, distance learning and virtual classroom. All these possibilities are very much desired by the students, especially the ones in Bologna process, where even 60-70% of students through three generations want to use one of the mentioned technologies. Progress is ev-

ident in last two generations through online access to data and through the computerization of the teaching process. These reforms mostly affect the Bologna process students who are more satisfied by the work the faculty has done. Essentially, all students own a computer at home that is mostly used for social networks brought to us by modern era. Access to computers at the university is still not at a satisfactory level. Students of our faculty are left behind in modern technology and their knowledge is mainly based on the basics of informatics. The Office packages, along with web browsers are most commonly used, which is not enough. Students get familiar with the computerization in their institutions through education and practical work when they notice the lack of knowledge while handling databases. Only 13% of all students took informatics courses, while the rest of them gained knowledge by themselves.

Many types of information technologies are important, but three deserve particular attention because of their potential significance for the day-to-day delivery of health care services: the electronic health record (EHR), the personal health record (PHR), and clinical data exchanges (13). Primary health care, as the core of any health system, made quite a problem to senior staff by introducing the electronic system. Due to lack of IT education, the senior staff now shows reduced work efficiency in terms of having a larger number of patients. Providing excellent primary care is central to the delivery of high-quality medical care and, more broadly, to the health of populations (14).

The fact is that the students should be introduced to working with databases and in that way prepared to work because many young doctors will begin their careers in primary health care. Students studying under the old system are satisfied with the work of the Department of Medical Informatics and this score continues to increase. Even though the Bologna process students don't have a subject dealing with medical informatics, they are well aware of this issue and willing to learn the basics of information technologies. These students consider that this area of studies should be included in new reforms of the teaching process. The use of information technologies can certainly facilitate the work of the doctor. Telemedicine as well as mixing informatics with medicine and biology (genetics) through the prism of biomedical engineering, provides great opportunities for the development of Medicine. In the Western world, the position of a biomedical engineer is extremely wanted which makes the need for this kind of personnel in Bosnia and Herzegovina increasing. The use of information technology, new forms of knowledge transfer must be imperative because it is the only way to attract a new, modern, IT generation with a desire to learn. Medical schools must teach core biomedical informatics competencies that address health information technology, including explaining electronic medical record systems and computerized provider order entry systems and their role in patient safety; describing the research uses and limitations of a clinical data warehouse; understanding the concepts and importance of information system interoperability; explaining the difference between biomedical informatics and health information technology; and explaining the ways clinical information systems can fail -barriers to including these topics in the curricula include lack of teachers; the perception that informatics competencies are

not applicable during preclinical courses and there is no place in the clerkships to teach them; and the legal and policy issues that conflict with students' need to develop skills (15).

The use of information technologies at the Faculty of Medicine, University of Sarajevo will bring the faculty closer to European standards and put it in a position where it will be able to attract foreign students to come and study at this faculty.

6. CONCLUSION

The Bologna process students are more open to new ways of learning in comparison to the students under the old system. Also, they are better prepared for reforms that would introduce information technologies in the teaching process. The fact is, that both teaching processes don't offer sufficient knowledge considering this issue. This could lead to problems in the future work of students because of the computerization of the health system. The imperative must be to introduce students to the basics of medical informatics, thus preparing them to come to grips with the demands of modern medicine. Information technologies can help the development of the teaching process, and represent attractive and accessible tool in the process of modernization and progress. Continuing with the introduction of information technologies in the teaching process is crucial and it is the only way of bringing Faculty of Medicine, University of Sarajevo closer to the Western world, which will be a great pleasure to the teaching staff and students themselves. The internationalization of the Faculty must be imperative.

CONFLICT OF INTEREST: NONE DECLARED.

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