Quality of Life through Quality of Information
J. Mantas et al. (Eds.)
IOS Press, 2012

doi:10.3233/978-1-61499-101-4-1153

Multiple Disciplines Synergy Tools for Ph.D. Students of Biomedical Informatics at Charles University in Prague

Jana ZVAROVA[a,b,c1], Stepan SVACINA[a,b], Tatjana DOSTALOVA[a,b], Michaela SEYDLOVA[a,b] and Karel ZVARA[a,b]
[a] *European Center for Medical Informatics, Statistics and Epidemiology*
[b] *Charles University in Prague, The Czech Republic*
[c] *Institute of Computer Science, Academy of Sciences of the Czech Republic*

Abstract. The poster describes doctoral degree studies in biomedical informatics at Charles University in Prague. Particularly important in educational programmes and knowledge dissemination is the role of Internet. Therefore we also describe special activities concerned with the specific research at the First Faculty of Medicine of Charles University in Prague. These are selected tools for blended learning tools, ExaMe system and the role of the European Journal for Biomedical Informatics (EJBI), an official multilingual journal of EFMI, for Ph.D. student's cooperation and understanding the multidisciplinary field of biomedical informatics [1].

Keywords. Doctoral education, biomedical informatics, blended learning, semantic interoperability

Introduction

The leading role in promoting activities concerning education in biomedical informatics has been given by the International Medical Informatics Association (IMIA) at MEDINFO congresses, special topics conferences and activities of the IMIA working group on Health and Medical Informatics Education. This working group initiated the development of the first IMIA Recommendations on Education in Health and Medical Informatics that were updated and the second version published in [2]. The recent information on medical informatics and bioinformatics education was published in [3]. It is expected that an increasing development of *e*Health applications considering not only electronic but also environmental and economic context [4] will influence also the biomedical informatics education and training.

1. Ph.D. studies in Biomedical Informatics at Charles University in Prague

The agreement of cooperation of Charles University in Prague and the Academy of Sciences of the Czech Republic in the doctoral degree study programmes in biomedicine was signed on April 23rd, 1997. There are now 20 boards of scientific

[1] Corresponding Author. Jana Zvarova, email: zvarova@euromise.cz

disciplines in postgraduate doctoral studies in biomedicine at Charles University in Prague. By the initiative of the First Faculty of Medicine the scientific board of Biomedical Informatics was established in the year 2001 [5]. Studies are given in Czech and English languages. The doctoral degree study programmes are provided in a full-time or in a combined form. The full-time form lasts four years and the combined form lasts nine years as a maximum. The requirements for successful completion of the study with the award by the Ph.D. degree are: (1) to pass the state doctoral examination in a chosen field, (2) to defend a thesis, compiled on the basis of own published papers.

The scientific board of Biomedical Informatics accepts 10 students on average per year. During Ph.D. studies students have to complete successfully at least two courses approved by the scientific board and pass an exam from English language. These courses often use blended learning tools used also in some courses for undergraduate students at Charles University [6]. Moreover, Ph.D. students in biomedical informatics can also participate in specific research projects running at Charles University in Prague.

2. ExaMe system, Interactive Tools, Blended Learning and EJBI journal

In biomedical informatics courses, designed for doctoral degree studies, we regularly use interactive electronic books, audio presentations and video films, e.g. the video film on electronic health record in dentistry with voice-controlled data entry [7]. Other video films show interoperability issues (e.g. a transfer of data between a hospital information system and an ambulance), information and organizational features of kiosks working at out-patient cardiology departments or bioinformatics technologies. Audio presentations of lectures given in five biomedical informatics courses were developed. Participants in biomedical informatics courses receive relevant lectures on DVD as the material for self-study. Since 1998 the ExaMe system for evaluation of a targeted knowledge has been developed [8]. The idea of the system is based on *generalized multiple-choice questions*, with no prior restrictions on the number of answers provided to the students. .Evaluation of students´ knowledge can be supported by the ExaMe system with multiple choice questions derived from teaching materials, e.g. monographs “Biomedical Informatics” (in Czech) “Dentistry” (in Czech) or “Dentistry and Oral Diseases” (in English) [8].

There are other tools used in biomedical informatics education. The system *BAYES* helps to explain the Bayesian approach to the design of research studies in health sciences. The system works in Czech and English languages. The *TECOM* system supports teaching of medical decision-making. The *TECOM* system can help clinicians to reveal more explicitly their decision-making competencies and enhance their medical knowledge from cases and correct decisions stored in the database. We use in courses for Ph.D. students also blended learning. The first part of the course is presented by the traditional way by lectures provided by university teachers and the second part is based on their self-study of students and above mentioned electronic materials and tools. We also use ExaME system for the self-evaluation of knowledge of students on distance. Automated tests of the ExaMe system, based on random selection of questions from the ExaME knowledge repository, improve the self-study of students. They can reveal where their knowledge is not sufficient and use other electronic materials and tools for self-study. The progress in students´ work on their Ph.D. thesis can be followed at students´ conferences. The conferences have been regularly

organized since 2010 with the support of specific research projects at Charles University in Prague. Students are writing papers in English and Czech languages on topics connected with their Ph.D. thesis. Papers are submitted for review process to the European Journal for Biomedical Informatics (www.ejbi.eu). Moreover, students are presenting lectures at students´ conference, describe selected specialist terms in both Czech and English languages and classify them by SNOMED-CT and other classification systems.

3. Discussion

There are many data and knowledge sources and increasing possibilities for their use in education and training mainly in the English language. However, the use of these sources in national languages is also very important. Therefore, we focus on the educational support of the multilingual journal EJBI and on semantic interoperability issues connected with topics of students ´papers published in EJBI and presented at students´ conferences, e.g. in 2011 [10].

Acknowledgement

The work was supported by the specific research project no. 264513 “Semantic Interoperability in Biomedicine and Health Care”, Charles University in Prague.

References

[1] Haux R. On the methodology and Scientific Fundamentals of Organizing Representing and Analysing Data, Information and Knowledge in Biomedicine and Health Care. Methods Inf. Med 2011; 50(6): 487- 490

[2] Mantas J. et al. Recommendations of the International Medical Informatics Association (IMIA) on Education in Biomedical and Health Informatics, First Revison. Methods Inf. Med. 2010; 49(2): 105-120

[3] Hasman A., Mantas J. (eds). Education in Medical Informatics and Bioinformatics, European Journal for Biomedical Informatics 2011; 7(2):1-78

[4] Zvarova J, Zvara K. e3Health: Three Main Features of Modern Healthcare. In: Moumtzoglou A, Kastania A. E-Health Systems Quality and Reliability: Models and Standards 2010; 18–27.

[5] Zvarova J, Svacina S. New Czech Postgraduate Doctoral Program in Biomedical Informatics In: G. Surjan, R. Engelbrecht, P. McNair (eds). Health Data in the Information Society, Proceedings of MIE2002, Amsterdam, IOS Press; 2002:766-769

[6] Zvarova J, Svacina S, Dostalova T et al. Biomedical Informatics Education at Charles University in Prague for Undergraduate and Doctoral Degree Studies. European Journal for Biomedical Informatics 2011; 7(2):72-78

[7] Dostalova T, Seydlova M, Zvarova J, Hanzlicek P, Nagy M. Computer-Supported Treatment of Patients with the TMJ Parafunctions. In: Blobel B, Pharow P, Zvarova J, Lopez D (eds) eHealth: Combining Health Telematics, Telemedicine, Biomedical Engineering and Bioinformatics to the Edge. Berlin, IOS Press; 2008:171-177

[8] Zvarova J, Zvara K. Evaluation of knowledge using Exa-Me program on the internet. In: Iakovidis I, Maglaveras N, Trakatellis A (eds). User acceptance of health telematics applications, Amsterdam, IOS Press 2000; 145-151

[9] Dostalova T, Seydlova M. et al. Dentistry and Oral Diseases. Grada, Prague; 2010

[10] Svacina S, Zvarova J. (eds), Semantic Interoperability in Biomedicine and Healthcare, European Journal for Biomedical Informatics 2011; 7 (1):1-74