PROPOSAL FOR ECSS 2006 PRESENTATION
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Informatics Education as a Driver for Country Development

Submitted by:

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Attendance to the pre-conference program: highly probable

Preferred duration: 25 minutes

Section: Informatics/CS Teaching

Short Description: The core of the presentation is the implementation of the Bologna process and ACM/IEEE Curricula Recommendations at the Faculty of Mathematics and Informatics, University of Sofia – curriculum restructuring leading to new BSc programs in CS, IS and SE, as well as the wide spectrum of MSc programs in Informatics are discussed. The importance of bridging informatics education, research and international cooperation for building human capacity in the sector is also emphasized. A broader perspective - a strategic vision of the Informatics education as a driver for overall development of the country – is promoted. It builds on the model of *university-industry-government co-operation*.

Extended Abstract

Rationale

In order to achieve its goal to become "*the most competitive and dynamic knowledge-based economy in the world*"[1] by 2010 Europe requires well-educated and highly skilled people to take maximum advantage of the new technologies, not only in the high tech industries but in all other economic sectors[2]. Over the past few years, the knowledge-, skills-intensive and high-tech sectors have accounted for over 60% of total job creation in the EU. Europe still faces a chronic shortage of skilled ICT professionals – demand is expected to exceed supply by around 12% per year over the coming years. The ICT sector not only creates new jobs but it creates the conditions for change in existing jobs[3]**.**

The globalization of the society due to technological, political and economical reasons leads to higher mobility – real and virtual – of the work force in Europe and beyond. This tendency has strongly influenced the Central and Eastern European Countries (CEECs), where many computer specialists either left their countries, pursuing better carriers abroad, or work for foreign companies based on outsourcing or teleworking models. The commitment of the CEECs to the eEurope+ Action Plan[4] poses a great number of questions and problems related to the skilled ICT professionals in these countries, such as: What would be the role of the new member states and accession countries in this process – are they considered simply as e-skills suppliers for EU? Are they ready to join the efforts of the member states? It is acknowledged in many studies that the CEECs used to have very good capabilities to educate a substantial number of highly-skilled ICT specialists. They are still a rich reservoir of such specialists and popular as outsourcing destinations for software development and ICT services, as well as for establishment subsidiaries of large foreign ICT companies.

The increased demand for ICT specialists, both globally and locally, causes pressure to the educational institutions involved in their preparation. Sofia University (SU) with its Faculty of Mathematics and Informatics (FMI) is one of the major institutions in Bulgaria preparing computer science professionals. It is

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[1] Lisbon European Council, Presidency Conclusions, http://ue.eu.int/Newsroom/

[2] European e-Skills Summit Declaration 16–18 October 2002, Copenhagen, http://www.e-skills-summit.org

[3] Diamantopulou, A., Commissioner for Employment and Social Affairs – EC, "Jobs, Skills and People: Building the New Economy", e-Skills Summit organized by Danish Presidency, 17-18 Oct, 2002

[4] eEurope+ 2003, A Co-operative effort by the Candidate Countries to implement the Information Society in Europe, http://europa.eu.int/information_society/topics/international/regulatory/eeuropeplus/index_en.htm

the largest and most prestigious educational and scientific centre in Bulgaria and has always played an important role for the development of the country. Nowadays SU faces a lot of challenges related to the transformation of the economic and social system in the country, the changing models of education, the new role of the universities in the knowledge-based society and the opportunity to be actively involved in the development of the *European space of higher education*[5]. To meet the new demands and challenges, significant changes have been introduced in the recent years in the informatics education at FMI. This presentation discusses some new developments, emerging models and lessons learnt.

Developments at BSc level

Following the ACM/IEEE computing curricula recommendations, FMI restructured the informatics curricula and introduced three new BSc programs: Computer Science (based on CS2001), Software Engineering (based on SE2004) and Information Systems (based on IS2002). The main aims were to introduce curriculum standards and new style of teaching taking into account the market needs. The main challenge was how to combine the FMI traditions with recommendations coming from ACM/IEEE, Bologna declaration, and other European recommendations and guidelines[6]. Quality of education was considered as first priority while designing and implementing these programs.

Developments at MSc level

FMI offers a number of Master degree programs in Informatics, such as *Software Engineering*, *Information Systems*, *eBusiness and eGovernance*, *Artificial Intelligence*, *Mobile Technologies and Distributed Systems*, *Information Security*, *Mechatronics and Robotics*, *Computer Graphics*, *Computational Science and Engineering*, etc. To respond to the tendency of globalization of education, an MSc program in e-*Learning* was established as well. It prepares designers and developers of eLearning solutions for educational and business settings. The MSc programs are oriented towards the needs of the ICT industry and interdisciplinary education and the priorities of the European research in the ICT field. Most of the programs include student internship – in the country or abroad – as part of the study.

The role of the University in the Knowledge-based Society

The level of entrepreneurship and understanding of the commercial value of knowledge are considered to be key factors for adapting a university to the requirements of the Knowledge Economy. The university should have an impact on society by integrating its three basic tasks - teaching, research, and service to the community. In order to achieve this, the university should strive towards excellence in education and research and thus towards providing important service to the community and impact on society. SU aims to be not only the strongest educational and scientific centre in the country, but also to become a national and regional innovation and high technology centre, which provides a working model of *university-industry-government co-operation*. The Informatics education is in the core of this strategy.

Changes in the labour market, the demand for new types of qualifications and new graduate profiles, as well as the globalization of learning require more flexible, e-learning based educational solutions. FMI is one of the leading Bulgarian higher education unit in the area of eLearning – in the last 15 years it has been involved in more than 50 European and other international projects and initiatives. The eLearning industry could be considered one of the strategic directions of the New Economy; it is a 'meta-industry' since it could positively influence all other industry sectors. It could become Bulgaria's most important asset on its way to the Information Society and Knowledge Economy.

Dr. Roumen Nikolov is Associate professor in Informatics, Vice Dean of FMI (in charge of the MSc level), and one of the triggers of the curriculum changes at BSc level. He is also Director of CIST (Center for Information Society Technologies), which is a functional unit at FMI, involved in a number of European projects.

Dr. Iliana Nikolova is Associate professor in Informatics, Head of Department of Information Technologies, and Chair of the MSc in e-Learning. She is also coordinator of a number of European projects on ICT in education.

[5] Bologna Declaration of Creation European Space of Higher Education, http://www.europa.eu.int/comm/education/socrates/erasmus/bologna.pdf

[6] New ICT curricula for the 21st century: designing tomorrow's education ant others, http://www.career-space.com/cdguide/serv.htm