European Thematic Network for Doctoral Education in Computing

A. Smrikarov, S. Smrikarova, M. Kruus, and A. Sudnitson
University of Rousse, 8 Studentska Str. 7017 Rousse, Bulgaria, Tel. 359 82 888743, ssmrikarova@ecs.ru.acad.bg
Tallinn University of Technology, Raja 15, 12618 Tallinn, Estonia, Tel. 372 620 2251, alsu@cc.ttu.ee

ABSTRACT: The European Thematic Network for Doctoral Education in Computing (ETN DEC) is established in accordance with the SOCRATES/ERASMUS Programme of the European Commission. The project aims at developing comparable European Doctoral Studies programmes in Computing, which will be used for teaching highly qualified specialists with deep theoretical knowledge and practical skills, with advanced abilities to independently do research, developing a system for quality control of the Doctoral Studies, developing tools and methods for assessment, validation and certification of the knowledge and skills of PhD students. This project will contribute to the advancement of the Bologna Process. The developed materials under the project and the achieved results can be applied in other scientific areas.

Introduction

In June 1999, twenty-nine European Ministers in charge of higher education signed the Bologna Declaration, which aims at establishing the European Higher Education Area (EHEA) as of the year 2010. They identified six action lines and have added three more in Prague in May 2001. A series of the existing projects under the SOCRATES programme are linked to the accomplishment of the action lines addressed in the Bologna Declaration.

Computing is going to be the major driving force and accelerator behind the development of the European Research Space. The *main goal* of this project is to help acknowledge doctoral studies as an important "third" cycle of education, to define a framework for increasing the quality of all doctoral studies and to develop tools and methods for assessment, validation and certification of the knowledge and skills of PhD students.

The thematic network is built upon the European Thematic Network European Computing Education and Training (TN ECET) and is open to all departments from all European countries training doctoral students in Computing, to all societies, associations and companies working in the field of Computing. The consortium has developed comparable professional standards, curricula and syllabi for Bachelors and Masters in the field of Computing, emphasizing on the main specialities: Computer Science, Computer Engineering, Software Engineering and Information Systems. It also developed a series of WEB based teaching materials and established a Virtual European Department of Computing [1].

The objectives of the project

The project aims at developing comparable European Doctoral Studies programmes in Computing, which will be used for teaching highly qualified specialists with profound theoretical knowledge and practical skills, with advanced abilities to independently do research. A database of PhD holders in the field of Computing will also be created. This would be of use, if other branches of science in Europe need certain kind of specialists and do not know where to find the needed information and/or expertise. The overall objectives of the network are to establish the principles of effective, high quality, Europe-valid doctoral studies and the tools for doing this through analysing the existing systems, exchanging experiences and disseminating good practices among all partners. They are directly connected with the main activities of the project - joint development of quality assurance system in Doctoral Education, of tools and methods for assessment, validation and certification, including the development of comparable curricula for teaching PhD students and the joint development of teaching materials and e-Learning courses.

The main outputs to be developed by the project

- Creation of European Thematic Network for Doctoral Education in Computing (ETN DEC) [2].
- Creation of Recommended Curricula and Syllabi for doctoral degree in Computing. Developed comparable curricula and syllabi for teaching doctoral students in the main specialities of Computing - Computer Science, Computer Engineering, Software Engineering, and Information Systems.
- Jointly developed teaching materials and e-Learning courses. Such courses should be developed for all main courses of the comparable curricula.
- Organization of Workshops and Summer schools for PhD students conducted. The topics of the workshops and summer schools should be connected with the main taught courses.
- A system for quality control of doctoral studies in accordance with the requirements of EN ISO 9001: 2000 developed.
- Development of tools and methods for assessment, validation and certification of the knowledge and skills of PhD students.

- Evaluating and disseminating DEC project results. Work should be monitored periodically. In order to achieve impartiality, the consortium plans that evaluation be made by both internal and external experts. Large-scale dissemination of project results will be sought after and they will be made available to all interested parties.

The main activities of the project
- Developing of comparable curricula for teaching PhD students.
- Developing of comparable syllabi for the courses from curricula.
- Joint development of teaching materials and e-Learning courses of the main subjects of the comparable curricula.
- Organising and conducting Workshops and Summer schools for PhD students.
- Developing a system for quality control of doctoral studies in accordance with the requirements of EN ISO 9001: 2000.
- Conducting a virtual seminar on the questions of quality control of doctoral studies.
- Developing tools and methods for assessment, validation and certification of the knowledge and skills of PhD students.
- Analysis and evaluation of the results.
- Dissemination of the activities.

The main pedagogical concepts and methodological approaches underlying the project
The pedagogical approaches that will mainly be promoted by the project are as follows: The learner-centred training approach and the problem-based training approach. These will reflect and underlie all project tasks including the development of training materials. Another concept, which will be promoted by means of the project, will be the concept of autonomous, semi-autonomous and directed learning based on the use of state-of-the-art information and communication technologies in the training and information materials provided by the Network. This will be achieved through establishing work groups, through team-working of representatives of the participating European countries and through discussing and finding optimal solutions to the educational and training problems to be solved.

The innovative aspects of the project
- Addressing the third main cycles (Doctoral Degree), which is going to be on the agenda of the Bologna Process;
- developing comparable teaching documentation for Doctoral education in Computing;
- creating a system for quality control of doctoral studies in accordance with the requirements of EN ISO 9001: 2000;
- developing teaching materials using ICT in accordance with the e-Learning Action Plan of the European Commission;
- the participation of 73 partners from 30 countries will help fight racism and xenophobia and will bring about the deepening of the intercultural dialogue and cooperation;

The methods used within the project to monitor and evaluate its progress towards the stated objectives
Monitoring and evaluation will be an integral part of the Project to ensure that objectives are met in the most effective and efficient ways, and that they address the needs of all project partners.
Monitoring and evaluation will comprise both internal and external components:
- Internally, periodical evaluation and evaluation interim results at the end of each project year by the EB; The Co-ordinator will be fully responsible for the fulfilment of the project tasks.
- the External Evaluator (independent) will provide an objective view of the Project's outputs, successes, failures and degree of achievement of objectives.

Concluding Remarks
The new European project of doctoral education in computing is presented. The expected impact of the project is multifaceted. The results achieved will contribute to acknowledging the doctoral studies as the third cycle of education in line with the resolutions of the Bologna process, increasing the quality of doctoral education, developing a comparable educational documentation for PhD students in computing, as well as to updating the training resources of the educational institutions. The network will be used as a vehicle for disseminating good practices not only among project partners but also among the other players in the field of doctoral education.

REFERENCES
[1] European Thematic Network ECET. http://ecet.ecs.ru.acad.bg
[2] European Thematic Network DEC. http://ecet.ecs.ru.acad.bg/etndec