

STUDENT EXCHANGE PROGRAMME IN INTELLIGENT COMPUTER SYSTEMS BETWEEN EUROPE AND CANADA

George Papadourakis,
*Dept. of Applied Informatics and Multimedia
Technological Educational Institute of Crete
Heraklion, Crete, GREECE
papadour@cs.teiher.gr*

Claude Frasson
*Department of Informatics and
Operational Research
University of Montreal
Montreal, Québec, H3C 3J7
frasson@iro.umontreal.ca*

Ali Ghorbani
*Faculty of Computer Science
University of New Brunswick
Fredericton, NB, E3B 5A3
ghorbani@unb.ca*

Andrew Ware
*University of Glamorgan
School of Computing
Pontypridd, Wales
jaware@glam.ac.uk*

Michel Eboueya
*Department of Computer Science
University of La Rochelle
La Rochelle, France
michel.eboueya@univ-lr.fr*

Abstract

In this paper we'll report on a "Student Exchange Programme in Intelligent Computer Systems (SEPICS)" between Europe and Canada started in October 2009, spanning for three years and supported by EU – Canada Programme for cooperation in higher education, training and youth. The project aims in reinforcing a European Community and a Canadian value-added dimension to transatlantic cooperation in higher education, to strengthen a mutual cooperation in the field of Intelligent Systems in Computer Science. The project will result in the creation of an advanced pool of courses, highly in demand in the Industry (Web Intelligence, Intelligent Gaming, Intelligent Tutoring Systems, Artificial Intelligence), taking into account the training needs from both sides. The innovation of the project is the development and experimentation of an International Virtual Laboratory in which students will use Web techniques and methodology to cooperate and exchange on their work and aspiration. These means should highly amplify the impact of the cooperative project, providing a real and new type of transatlantic exchange of knowledge

Keywords: *Intelligent Computer Systems, student mobility, EU-Canada.*

1. Introduction

The possibility of EU/Canada co-operation in education and training was envisioned in the Transatlantic Declaration on EU-Canada Relations adopted in November 1990 [1]. A formal Canada/EU Co-operation Agreement was concluded in November 1995 and renewed in December 2000 for an additional five years to continue to fund projects focusing on international curriculum development and student mobility, with a greater emphasis on vocational education and training, and language training. In 2006, Canada and the European Union renegotiated the long-standing programme for an additional eight years (2006-2013) [2]. The new Agreement enables the continuation of activities such as the development of curricula, international internships, exchanges and study abroad with provision for credit recognition.

To date, a total of 89 transatlantic consortia have been funded involving over 550 EU and Canadian institutions of higher education and training. These projects will have mobilised no less than 4,000 students and learners, faculty and staff over their lifecycle and contributed to strengthening overall EU-Canada relations.

In 2009, support was provided for new projects implemented under Action 1: Higher education and training. This call provided funding for projects that:

- support collaboration between higher education and/or training institutions with a view to promoting and developing joint study and/or training programmes and student/faculty mobility;
- improve the quality of transatlantic student mobility by promoting transparency, mutual recognition of qualifications and periods of study

and training, and where appropriate, portability of credits.

The total funding amount for a three-year project is:

- a maximum of EUR 138.000 for the EU partners and
- a maximum of CAN\$ 200.000 for the Canadian partners.

The EU-Canada consortium must be composed of at least four institutions in total – i.e. two from the EU and two from Canada. Each project should aim at utilizing funding from the EU-Canada program to send and receive a minimum of 20 students both from EU and from Canada (i.e. 40 students in total) during the three-year duration of the project.

Under this framework the project entitled “Student Exchange Programme in Intelligent Computer Systems (SEPICS)” was awarded and started in October 2009. The project aims in reinforcing a European Community and a Canadian value-added dimension to transatlantic cooperation in higher education, to strengthen a mutual cooperation in the field of Intelligent Systems in Computer Science.

The paper is organized as follows: In the introduction, an overview of the EU – Canada Programme for cooperation in higher education, training and youth was described. Then the specific objectives and activities of SEPICS will be outlined followed by the proposed implementation of the project. The development of an international curriculum will be presented. Finally, the expected outcomes and results will be reviewed.

2. Student Exchange Programme in Intelligent Computer Systems

In the recent years, the domain of Intelligent Systems in Computer Science received a particular interest from the industry. In fact, they represent an industrial revolution derived from various topics such as Artificial Intelligence, Human Computer Interaction, Cognitive Science, Web Intelligence, Machine Learning, Multiagents Systems, Web Semantic, Intelligent Gaming, Privacy and security, Intelligent Tutoring Systems. As numerous applications can be found, the domain is very attractive and on demand from graduate students.

Under the framework of the *EU – CANADA Programme for co-operation in higher education training and youth* the project entitled “Student Exchange Programme in Intelligent Computer Systems (SEPICS)” was awarded and started in October 2009, spanning for three years with the participation of three European Institutions and two Canadian. The European Institutions are: a) Technological Educational Institute of Crete, Greece, b) University of Glamorgan, UK and c) University of La Rochelle, France. The Canadian Institutions are: a)

University of Montreal and b) University of New Brunswick.

The objectives of SEPICS are:

1. Establishment of a framework for cooperation in higher education, training and youth leading to a curriculum in Intelligent Systems between the European Community and Canada.
2. Improvement of the quality of human resources in both the European Community and Canada, by facilitating the acquisition of skills required to meet the challenges of the global knowledge-based economy in the area of Intelligent Systems.
3. Development a new experimental research framework under the concept of Virtual Laboratory.
4. Promotion of the understanding between the peoples of the European Union and Canada including broader knowledge of their languages, cultures and institutions.

The main activities will consist in selecting good students and building a curriculum of courses in intelligent systems. Courses will be progressively improved by a cooperative effort of discussions and sharing of knowledge. A virtual laboratory will be developed including Web-Based techniques, cooperative tools and internet communications means. Language courses and culture consideration will facilitate a broader understanding between respective people, on both sides of the Atlantic. A large dissemination of results will be done through web site, brochures, conference publications, newsletters, forums and discussions. In detail these activities will consist of:

- ❖ Selection of potential students for exchanges.
 - Students’ assignment.
 - Definition of a preliminary curriculum.
 - Definition of students’ research projects associated with a course of the curriculum.
 - Improvement of the curriculum
- ❖ Improvement of content attached to the curriculum by additional information, comments, advices.
 - Development of video presentations.
 - Development of research projects.
 - ECTS assignment to modules in both sides.
- ❖ Creation of a dedicated Web site.
 - Installation of various collaborative tools enabling forums, discussions, exchanges of practices.
 - Installation of Web-Based discussion inside a EU-Canada Virtual Laboratory.
- ❖ Installation of language and cultural courses.
 - Dissemination of results through journals, conferences, video presentations, web-site discussions, poster presentations, newsletters.

The exchange between Europe and Canada will consist of twenty (20) from the European Union, plus twenty (20) from Canada, a total of 40 (forty) exchange students over the period of three years, of

four (4) months each. In addition 2 faculty members from Canada will spend two weeks per year in the EU institution. And 3 faculty members from EU will spend one week per year in Canada.

3. Implementation of SEPICS

In order to succeed the objectives stated, exchanges and joint projects shall be organised, including academic and student exchange, faculty and staff mobility, thematic networks and language courses. The first activity will be to cooperatively design an international curriculum on Intelligent Systems and first projects attached to this curriculum. Furthermore, some extra-curricular activities, such as international and intercultural campus events will be scheduled.

During their thesis students have to acquire knowledge normally necessary to achieve their research work. To realize the first objective students will follow courses including specialized training on Intelligent Systems in the host university. The content of the courses will be accessible from students of both universities under control of their research director. The different laboratories involved in the project will be permanently informed not only about their respective projects (with their students) but also about the projects of all the students participating to the exchanges, their research topic, their progress, through the availability of mini conferences available.

For the implementation of the project we introduce the preliminary concepts of a Virtual Laboratory. The Virtual Laboratory is based on a Web framework in which each student is able to comment his/her project on a dedicated Web site, elaborate on the progress, add training materials to the curriculum which will have been considered as useful, add specific advices for subsequent students. All students will have the feeling to be in one single EU-Canada international laboratory, strengthening the global work and the cooperative objective between EU and Canada.

The second objective will be initialized by hosting students in each University; they will work on research subjects of common interest, communicate the advancement of their work to the respective laboratories (through the Virtual Laboratory), and encourage the continuation of their subject by other students who will participate in the subsequent exchanges, creating and fostering a flow of research activities on selected topics.

Research projects and tools to be developed will be selected, able to foster the acquisition of knowledge in the curriculum. Furthermore, we will experiment with various tools and show their impact on improvement of knowledge acquisition.

Students will participate directly in the improvement of the curriculum on Intelligent Systems: they will collect complementary documentation, comments, scientific papers, studies, illustrations, able to improve the content of the

curriculum. They will put all these materials on the dedicated Web site of the project. Students will be also encouraged to work on specific papers to publish.

A first database of projects related both to intelligent systems and cultural characteristics will be established and will be also accessible through the common Web site.

At the final year of the project evaluation of the previous results of projects and the pertinence of the curriculum and increase of cooperation within the partners will take place. Definition of new research projects able to strengthen the concept of Virtual Laboratory.

The different laboratories involved in the project will be permanently informed not only about their respective projects (with their students) but also about the projects of all the students participating to the exchanges, their research topic, their advancement, using also mini conferences available and recorded on the Web site for further consultations.

At that time we will evaluate the impact and progress made through the Virtual Laboratory, in analyzing the complementary documentation brought by the students and how they have improved the quality of knowledge on Intelligent Systems. We will also evaluate the impact on cooperative aspects of the project and the advancement in terms of understanding of different cultures.

Results and reports will be organized on the dedicated Web site so as to increase the possibility of new cooperation projects.

4.4. Development of an international curriculum.

The Curriculum in Intelligent Systems in Computer Sciences will be derived from existing courses in the following domains: Artificial Intelligence and Expert Systems, Pattern Recognition, Neural Networks, Multi Agent Systems, Intelligent Tutoring Systems, Intelligent Computer Games Development.

More precisely the following existing courses will serve to elaborate a pool of courses (the international Curriculum) on Intelligent Systems:

- Multiagent Systems, Artificial Neural Systems, Data Mining Methodologies (University of New Brunswick, Canada)
- Intelligence Artificielle, Traitement des connaissances, Algorithmes d'apprentissage, Reconnaissances de formes, Systèmes Intelligents (Université de Montréal, Canada)
- Artificial Neural Networks, Pattern Recognition, Computer Vision, Artificial Intelligence and Expert Systems, Robotics, Computer Graphics, Digital Image Processing, Human Computer Interface (Technological Educational Institute of Crete, Greece)

Mise en forme : Puces et numéros

- Internet Computing, Computer Games Development (University of Glamorgan, UK)
- Interface Homme-Machine, Multi-agent Systems, Computer Graphics, (Université de la Rochelle, France)

Strategies to integrate the curriculum into existing programmes of study.

The exchange students will have the opportunity to be integrated to the local students' community, by attending the courses that already take place as part of the already developed programmes of studies in each participating university. Lectures and tutorials will be given to students either in English or in French. All communications and examinations will be given according to the choice of the student.

To access to a variety of courses, which could be useful for the student's work, all pertinent courses will be made available on the Web for students participating to the exchange. The new curriculum will be composed of a selection of parts of existing courses which will be available on our Web site.

The curriculum will be enriched by additional documentation, scientific papers, studies, and experimentation which will be brought by the students as a result of their work. In fact, the curriculum will constitute a rich database of knowledge.

5. Expected results of SEPICS

We expect to obtain several important results and outcomes of the project:

- First, in terms of training we expect to contribute to the training in research of about 40 M.Sc. students (20 EU, 20 Canadians).
- The training received by the students will be on different topics attached to the domain of Intelligent Systems for which a curriculum will be defined and projects will be experimented. Training will be supported by research projects related to each course of the curriculum.
- The students will bring their own contribution to the curriculum by enriching the initial curriculum with pertinent content, serving as a basis of references.
- The students will have the opportunity to work collaboratively into a Virtual EU- Canada Laboratory with a complete Web based framework that will be implemented and tested.
- The Virtual Laboratory framework could serve to support other Canada-EU programme for co-operation in Higher Education, Training and Youth.
- Results will be largely visible through conference communications, printed documentation, forum of discussions, newsletters

In SEPICS, the emphasis is on providing high level training coupled to more traditional skills such as good software engineering practice. To this end, the

programme will tie the principles and paradigms of Intelligent Systems with more established computing domains. It is also envisaged that most students pursuing the programme will concurrently study a foreign language and attend cultural courses while abroad, so that they become familiar to the country of the receiving institution.

SEPICS will prepare professionally trained graduates for industry and commerce using advanced means to cooperatively build knowledge, a very important orientation of the industry. These graduates will be able to develop applications using a thorough understanding of the principles and paradigms underpinning the development of Intelligent Computer Systems.

References

- [1] Delegation of the European Union to Canada, **Declaration on Transatlantic Relations**, 1990, http://www.delcan.ec.europa.eu/en/eu_and_canada/official_documents/instruments/eu-ca_dtr_1990.shtml.
- [2] Council Decision 2006/964/EC of 18th December 2006 (OJ L 397 of 30th December 2006).