Introduction

During the last years, an important work has been achieved within the framework of the European programs in order to emphasize and allow the mobility of students, the exchange of teachers, the recognition of diploma (programs ERASMUS, now in the LLP program)…

These reflections have been done for classical programs within HEIs throughout Europe and also within the programs dedicated to vocational studies (LEONARDO, ValeurTech, EQF) to emphasize Life Long Learning and credit accumulation all around the life, with an approach based on competences [1].

The main purposes in these programs can be summarized as follows:

− Fostering the equality among citizens in Europe, giving them the possibility to obtain their diploma in any European country and also ideally to be able to work anywhere within the European Union;
− Fostering Life-Long Learning in order to allow citizens to adapt themselves to the rapidly-evolving needs of the society, all around their life, as far as jobs are concerned.

This paper presents the concept of ICN (International Curricula Network), which can act as a pedagogic committee at the European level for a particular discipline or sub-discipline.

Problems

Three challenges are now facing the European Union concerning mobility or "equal mobility" (which means equality of mobility opportunities for each European citizen):

− Mobility of students, that is partially achieved by the ERASMUS exchange program through the European Credit Transfer System (ECTS), and the Curriculum Development program (+ ERASMUS Mundus), for the development of joint degrees.
− Mobility of workers (recognition of diploma) which is at the moment only partial, even if an important work is done in order to adopt or to converge to a European Qualifications Framework and maybe to a European Accreditation [2] System or Methodology (EUR-ACE (Accreditation of Engineering Programs)).
− Mobility of LL citizens, which means the possibility for a citizen to accumulate credits and possibly to validate diploma during all her/his life, with a European recognition (credits, diploma) of the process she/he goes through. We can illustrate with an example, even if it is "theoretical":
  - Leave the university with a bachelor degree in a first country;
- Work in a company of a second country, with the diploma from the 1st country;
- Pass some credits in a professional specialty during this time at the company;
- Go to a third country in order to prepare some theoretical credits;
- Accumulate all these credits to get a master level, for instance, in another country;
- Finally, go to a fifth country with this master obtained through accumulation of credits to work in a company or at educational institutions (colleges, universities...), or to do a Ph.D.

The main purpose of this work is to enhance the employability of people by allowing them to learn and validate their knowledge all lifelong and to recognize these lifelong-acquired competences in the various European countries and systems.

Our reflection concerns the field of Electrical and Information Engineering (it is our specialty) and in the ERASMUS program (ERASMUS network) since it is targeted at the moment to Universities and HEIs, because there is a challenge in introducing these concepts to the universities and to provide them with some tools in order to develop and implement in the future a quality LL process, and we think our HEIs should be the main actors in that point, within the frame of the Bologna process [3].

International Curricula Networks (ICN)

An ICN is a cluster of partners who agree all together to a common or joint curriculum in a specialty. Ideally these shared curricula should be recognized at the accreditation level, but the process can be difficult in some cases. In order to initiate the ICN, we consider two pragmatic cases:

- Cross recognition of “curricula” (learning outcomes, competences, Tuning approach), which is the fact when at least two institutions agree on common modules for an ERASMUS exchange either of students or of teachers.
- Shared recognition of modules, which is the case when a set of modules is developed and implemented within the frame of a program; in particular distant modules can be used.
- Concerning this second point, we can consider the practical use of the module in various ways:
  - Distant Course without any tutor;
  - Distant course with a distant tutor;
  - Distant course with a local tutor;
  - Local course.

The last role of the ICN is to act as a “pedagogical committee” to identify good approaches in the setting of existing or new LLL curricula.

Example of an Erasmus-based ICN on networking at the bachelor level

Within the frame of the “Final year of the Professional Bachelor’s Degree In Computer Networks and Telecommunications specializing in Wireless Networks and Security” (WiNS) [4, 5] program, launched in Grenoble in September 2007 as an unexpected outcome of the previous Thematic network EIE-Surveyor (www.eie-surveyor.org), the following experiments have been achieved in 2009-2010, as a first attempt to define the precepts of International Curricula Networks and International Modules.

The first experiment concerns both student and teacher international exchanges.

Within the frame of the student ERASMUS exchanges, 4 students attended the autumn semester of the WiNS class:

- Two students from University of Vigo / Universidade de Vigo (partner P35 of ELLEIEC) in “Technical Telecommunication Engineering, specialty in Telecommunication Systems / Enxeñaría Técnica de Telecomunicación Especialidad de Sistemas de Telecomunicación (ETTST)”;
- Two students from Higher Education Institution of the Province of Liège / Haute-Ecole de la Province de Liège (P60) in “Bachelor in Industrial computing, option network and telecommunications / Bachelier en informatique et systèmes finalité réseaux et télécommunications”.

This semester with courses was recognized by the students’ home institution. For the spring semester, the Belgian students went back in Liège and passed some courses and a Training project. Both of these were recognized in Grenoble and as a consequence the students obtained the two diplomas. The Spanish students stayed in Grenoble in order to get some courses and went in companies for their internship in France: these were recognized both by Grenoble and Vigo meaning that the students got also two diplomas.

Therefore, this first experiment of an ICN done in Grenoble obtained concrete results.

Another experiment concerns the case of a Slovak student, who attended the autumn semester in Grenoble, and then went in Germany (within an ERASMUS agreement between Grenoble and the German institution). So this student, registered in Kosice, spent one semester in Grenoble and one in Germany, and got both the Slovak and French bachelors.

The last scenario concerns a Finnish student, who attended only the autumn semester, and then went back to Finland for the spring semester. In his Finnish curriculum, the student followed courses but no internship. He naturally got his Finnish diploma. Concerning the French Professional Bachelor, an internship experience was missing, on the formal point of view, but this student got a previous professional experience, working previously in some companies in networking and security; the final jury decided to give this student the “Licence Pro”, considering his professional experience as an AEL (Accreditation of Experiential Learning).

These are some examples of an ICN, composed of several universities in Europe, around an existing curriculum, based on ERASMUS exchanges.
Example of an Erasmus-Mundus-based ICN on vision and robotics at the master level

Erasmus Mundus Programs (Erasmus Mundus Master Course EMMC and Erasmus Mundus Joint Doctorate EMJD) are very good examples of ICN. Since the launch of the Program (2003) and the first round of EMMCs (2004), the number of ICN in the field of computer Vision and/or Robotics has increased and they have gained visibility for non European Countries and for non European students through actions developed within the ERASMUS program in order to give a “bit-size” module:

- “Firewall configuration and WiFi security” within the frame of the module “Security of networks” for the Spanish colleague;
- “IPV6 protocol” within the “network” module for the Belgian colleague.

These “bit-size” modules were of course recognized by Grenoble, by the home institution of the students but also on an informal way by the other institutions collaborating with Grenoble within this WiNS program: for example a student coming from AGH Krakow, following the WiNS course in Grenoble, validating the bit-size module of “Firewall configuration and WiFi security” from Vigo.

Various universities from the ELLEIEC project are partners of UJF Grenoble in this experiment:

- Technical University of Valencia (partner P55);
- Technological Educational Institute of Crete (partner P32);
- University of Vigo (partner P35);
- Technical University of Kosice (partner P41);
- AGH University of Science and Technology (partner P45);
- Technical University of Valencia (partner P55);
- Haute-Ecole de la Province de Liège (partner P60);
- Cracow University of Technology (new partner).

Another interesting experiment, not further developed in this paper, concerns the setting of 6 LLL modules, developed by a set of partners within the CD project ESPANT (http://www.advancednetworking.eu/), in the field of networking. A cross-fertilization experiment is on the way between ELLEIEC and ESPANT.

Within the frame of staff ERASMUS exchanges, Juan Carlos Burguillo from Vigo and Pierre de Fooz from Liège came in Grenoble within the staff ERASMUS program in order to give a “bit-size” module:

- “Extension on the same basis (double or multiple degrees) with non European universities is also happening for some of these programs. For instance, VIBOT is also proposing a similar scheme with Asian Universities in...
Indonesia and Malaysia, where students obtained a double degree by doing their first year in Asia and the second year in France. The course contents are elaborated jointly then validated by each university and the procedures (selection, grading system, diploma supplement...) are reported in a signed MOA.

All these masters running in parallel with national master, mobility through the usual routes (Erasmus Student Exchange, student exchanges through MOAs..) are therefore offered to students registered in the national degree.

Conclusions

In order to enhance the mobility of citizens during their life, following the white book of the European Commission on LifeLong Learning, we should invent new strategies, using existing tools such as ERASMUS exchanges, IP, CD, ERASMUS-MUNDUS and TEMPUS. The interests are to put energy in common to develop and propose High-Quality International Modules, validated by International Curricula Networks, considered as parts of normal curricula within at least 2 partner universities in the consortium, and being proposed for Life-Long Learning, to any interested citizens.

Within this frame, the paper illustrates two approaches, an Erasmus-based ICN in networking at the bachelor level and an Erasmus-Mundus based ICN in Vision and Robotics at the master level.

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References


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The ELLEIEC ERASMUS thematic network runs from October 2008 to September 2011. This project deals with several aspects linked to LifeLong Learning in Electrical and Information Engineering in Europe. One of the actions of the project is to set some ICN (International Curricula Networks) in some disciplines (specialities in EIE) and levels (Bachelor or Master) aiming at defining the necessary learning outcomes for some curricula. It is defined and agreed at the European level by the ICNs and can be used for AEL (Accreditation of Experience Learning) for European workers who want to validate some diploma, corresponding to their actual knowledge and skills. AEL could be partial, so it is crucial to have the possibility, for workers who need it, to validate some modules; these modules can be prepared either in a classical class or remotely. The modules (or pieces of modules) which are available remotely to students, and agreed by the partners of the ICN, are called IM (International Modules). Bibl. 5 (in English; abstracts in English and Lithuanian).


ELLEIEC ERASMUS teminio tinklo projektas susijęs su visą gyvenimą trunkančiomis elektrės ir informatikos inžinerijos studijomis. Vienas iš šio projektų tikslų – nustatyti mokymosi programose būtinus pasiekimus. Tai suderinta Europos mastu ir yra gana aktualū siekiant užtikrinti moduliai tarptautiskumą. Modulai gali būti destomi klasikinėje auditorijoje arba nuotoliniu būdu. Bibl. 5 (anglų kalba; santraukos anglų ir lietuvių k.).