

Developing successful partnerships in Electrical and Information Engineering Education (EIE) with EU-programs

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Abstract

This paper presents the objectives and goals of the EAEEIE and results of the thematic network projects and activities run under its patronage. The **EAEEIE** – European Association for Education in Electrical and Information Engineering was established in order to enhance partnerships, cooperation, recognition of engineering degrees and exchange of students and staff between European universities. The EAEEIE organization was actively involved in a number of thematic network activities supported by EU-programs spanning 20 years. Participants from many European universities worked together on five different projects since 1996. These five projects gave the Association an opportunity to develop and strengthen cooperation and partnerships in the educational area in Electrical and Information Engineering (EIE) in a European dimension. The paper presents examples of some of the new partnerships, cooperation agreements between universities and double degree programs are given and shows that the Association body that is truly adding value to the key stakeholders in EIE education across Europe and beyond.

Introduction

Mobility, recognition, Lifelong Learning, and accreditation are very important keywords for Europe, and beyond Europe. The global policy for technology development is to encourage mobility of people, workers and citizens, during their studies and during their professional lives. Lifelong Learning means that people should learn, study, improve and adapt themselves to the continuing evolving society¹. Recognition can be considered both as the possibility for a student to have credits obtained in one country or system recognized in another country, and for a worker to have their diploma and qualifications be recognized in another country. Recognition is strongly connected with accreditation, which makes it possible for students and graduates to receive a certified degree from an official organization. A person can also receive personal accreditation from a professional board.

The EAEEIE² is governed by the French law of 1st July 1901 and the decree of 16th August 1901 on Associations. The Association is a non-profit making organization. The management of the Association is undertaken by a group of members elected by the General Assembly of members, which is called the Council.

The objectives of EAEEIE are:

- to foster good practices in education for Electrical and Information engineering,
- to improve the understanding of educational practices throughout Europe,
- to determine corresponding educational criteria with a view to establishing common standards of education in Electrical and Information Engineering,

- to establish mechanisms for industrial participation in the work of the Association so that the needs of industry might be met and kept under constant review,
- to promote Continuing Education as a necessary means for maintaining professional effectiveness of engineers,
- to develop Credit Transfer schemes between collaborating establishments,
- to contribute to the initiatives of the European Commission related to education and research in Universities,
- to foster a strong technological research base and develop educational research,
- to encourage the exchange of staff and students between collaborating institutions.

Consortia of EAEEIE members have applied for and successfully won European Union Thematic Network projects for the two past decades. The projects, in chronological order are: Init-Mucon, THEIERE, EIE-Surveyor, ELLEIEC and SALEIE. In this paper, we briefly describe the last three projects, our experience with these projects and the impact they have on development of cooperation between the universities working together during the projects.

Common EU-projects

In the following, we describe the main goals of the projects: EIE-Surveyor³, ELLEIC⁴ and SALEIE⁵.

1. EIE-Surveyor³ was an ERASMUS thematic network project funded by the European Commission (project no: 225997-CP-1-2005-1-FR-ERASMUS-TNPP). EIE-Surveyor took place for a three-year period, from October 2005 to September 2008. The aims of the project were to reflect and make concrete propositions for the problem of mobility of students, readability of contents, and recognition of diplomas. The project was organized as four main tasks:

- Reflection on generic competences and subject-specific competences in Electrical and Information Engineering (EIE)
- Implementation of quality assessment methodologies on some educational resources available in EIE
- Reflection and proposition of a methodology for accreditation, in order to enhance comparability and common certification procedures
- Proposition of a census of the existing curricula in EIE in Europe, the multinational degrees, and the situation of the implementation of the Bologna-process in EIE, at the bachelor, master and PhD levels

The project had 117 partners coming from higher educational institutions and research organizations from 29 different countries, mostly from Europe.

2. Project ELLEIEC⁴: Enhancing Lifelong Learning in Electrical and Information Engineering; Supported by EACEA. (2008-2012); ERASMUS NETWORK; N° 142814-LLP-1-2008-FR-ERASMUS-EN. The project run under from October 2008 to September 2011. The consortium was composed of 60 partners from all around Europe. The project deals with

several aspects linked to Lifelong Learning (LLL) in Electrical and Information Engineering in Europe. The project established, as the main output, a virtual center for the development of enterprise skills and competencies, and investigated and reported on the implementation issues and impacts of Lifelong Learning on the employability of people over Europe in the Electrical and Information Engineering field. The work done in the project consists of three parts:

- The first one is dedicated to the Analysis of LLL in EIE in Europe at the undergraduate and postgraduate levels, together with some recommendations.
- The second part concerns best practices for the use of new technologies in EIE education in Europe and proposes Guidelines for e-learning and intensive course's assessment.
- The last one proposes two demonstrators of good practice for enhancing LLL in EIE in Europe: Virtual Centre of Entrepreneurship (VCE) and International Curricula Network (ICN)

3. Project SALEIE⁵: Strategic Alignment of Electrical and Information Engineering in European Higher Education Institutions, run from October 2012 to November 2015. The project was financially supported by the EU-EACEA in the framework of Lifelong Learning Programme, under the SALEIE grant no. 527877-LLP-1-2012-1-UK-ERASMUS-ENW. In the SALEIE project there were individuals from 44 European universities plus one Russian university. The project firstly explored and then provided models for ways in which Higher Education Institutions of Europe in the Electrical and Information Engineering disciplines can respond to current challenges. The main challenges addressed by SALEIE project are:

- Ensuring graduates are prepared to enable Europe to respond to the current global technical challenges in the Green Energy, the Environment and Sustainability, Communications and IT, Health, and Modern Manufacturing Systems (including Robotics), that is, a “new skills for new jobs” approach.
- Ensuring that programme and module governance is sufficiently well understood and that issues of mobility, progression and employment are understandable by appropriate stakeholders including the accrediting bodies for professional engineers.
- Ensuring all learners, irrespective of their background or personal challenges, including: dyslexia and dyspraxia; visual and audio impairments; aspergers, autism, depression, and anxiety are given equal opportunity to education and are appropriately supported.

The projects results help to build a shared understanding of the skills and competence needs of graduates to help European Companies respond to the current global technical challenges. As well as: enhancing current understanding of academic programmes and modules in terms of technical content and level of learner achievement; and improving clarity of learner skills and competence for mobility, academic progression and employment.

Cooperation and common programs

The work with the named EU-projects was a great opportunity for cooperation between project partners and also motivation to start new cooperation with universities beyond Europe. The following activities are specifically identified as being outcomes of these collaborations:

- Several exchange agreements between universities under the SOKRATES-Erasmus program have been signed. As a result, students spend a semester in the partner university taking courses, which are fully recognized by their home university. Examples are exchange agreements between the Copenhagen University College of Engineering in Denmark (now merged with Technical University of Denmark) and the Technical University in Cracow⁶, Poland, and the Kavala Institute of Technology, Kavala⁷, Greece. Both exchange agreements resulted in student exchanges and professors' visits including teaching and lectures at the partner institutions.
- Developing new programs for students taking their education in more than one university and country. Examples are two programs taking place at the University Grenoble Alpes, France, and AGH University of Science and Technology, Krakow, Poland, with full recognition in the French and Polish accreditations. The programs are Professional Bachelor⁸ in "Networks and Telecommunications" specializing in "Wireless Networks and Security" and a Master⁹ program in "Systems, Control and Information Technologies"
- An international Master¹⁰ (double diploma in France and in China) in Microelectronics. This master is successful and the reason the associated partners are working towards the creation of an International Doctoral Institute in Nanjin, China.
- New international projects supported by the EU. The projects are the PELARS¹¹ and gLINK¹² projects, both funded under the Erasmus Mundus Program.

Conclusions

The EAEEIE has led to the establishment of a number of value adding projects and partnerships between universities and started many common activities involving students and professors. Students from different countries have had the opportunity to study abroad and gain international contacts and experience. Academic members of partner Institutions have benefited from engagements with colleagues from other Institutions. EIE education in general has gained from the outcomes of the projects the Association has facilitated. It is, as a result, a good example of a mechanism through which the specific needs of an academic discipline can be researched, experimented with and developed for the benefit of all stakeholders.

Finally, most of the members of the Association maintain contact with each other and the network provides appropriate skill sets for the creation and application for new international projects and the ongoing advancement of practices in EIE education it has as its underpinning objectives.

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