WCLTA 2013

Retrospective Vision of a Long Term Innovative Experience

Jose Manuel Lopez-Guede a, *, Manuel Graña b, Fernando Oterino c, Jesus Maria Larrañaga d

a Dept. of Systems Engineering and Automatic Control, University College of Engineering of Vitoria, Basque Country University (UPV/EHU), Vitoria, 01006, Spain
b Dept. of Computer Science and Artificial Intelligence, Faculty of Informatics, Basque Country University (UPV/EHU), San Sebastian, 20018, Spain
c Dept. of Electronics, University College of Engineering of Vitoria, Basque Country University (UPV/EHU), Vitoria, 01006, Spain
d Dept. of Business Management, University College of Engineering of Vitoria, Basque Country University (UPV/EHU), Vitoria, 01006, Spain

Abstract

The purpose of this paper is to look back on a long term informal innovative experience carried out during the last nine years until the present one, and try to discern, with a retrospective and a long time vision, whether it has been as beneficial as expected once it has concluded. This experience has taken place in the University College of Engineering of Vitoria (Basque Country University, Spain) since the year 2004, and it has been accomplished in the subject Company Networks of Technical Engineering in Management Computing. After the analysis of a number of data collected along these years, we found that we have reached the initial objective of increasing the enrolment in the subject that has driven the project, and other unexpected ones that are more important from a long time point of view. Once that nine years have lapsed and the project is going to be finished, we conclude that it is a very positive experience and we recommend doing the same with the new degrees of the European Higher Education Area (EHEA), as we plan.

Keywords: Company Networks, Active Learning, Educational Innovation Project, Cooperative Learning;

Introduction

Active Learning is a wide learn philosophy which groups several methods, all of them based on the responsibility and the involvement of the learners in their learning (Bonwell, C. & Eison, J., 1991) and (Felder, R.M. *Corresponding Author: Jose Manuel Lopez-Guede. Tel.: +0034-945-014084 E-mail address: jm.lopez@ehu.es

© 2014 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/3.0/).
Selection and peer-review under responsibility of the Organizing Committee of WCLTA 2013.

1877-0428 © 2014 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/3.0/).
Selection and peer-review under responsibility of the Organizing Committee of WCLTA 2013.
doi:10.1016/j.sbspro.2014.05.005
One of them, named Cooperative Learning, is a paradigm in which the learning activities are planned looking for positive interdependence of the learners (Felder, R.M. & Brent, R., 1994) and (Felder, R.M. & Brent, R., 2001). In this paper authors describe an informal educational innovative project in the field of Company Networks based on both active and cooperative learning. This formal project is motivated by a simple objective: the necessity of increasing the number of enrolments in that optional subject. The structure of the paper is the following. The second section describes the context in which the educational innovation project is developed, paying attention to the syllabus and the institutional context. The third section introduces the educational innovation project itself, while the fourth section discusses the results achieved along it, focusing specially on the long-time achievements. Finally, the last section gives our conclusions.

1. Global framework

1.1. Syllabus context

This experience has taken place in the University College of Engineering of Vitoria (Basque Country University, Spain), and it has been accomplished in the subject Computer Networks, inside the curricula of Technical Engineering in Management Computing. This is an optional subject, and this means that only enrol student who want to do it. The subject is located in the last year of the studies, after having passed a compulsory subject named Computer Networks, and this was a weighing circumstance since this one was a hard subject and makes that students were afraid of continuing its knowledge branch. Due to this fact the enrolment in the Company Networks subject was very low. The learning method in both subjects was the traditional based on expositive master classes, as in the remaining subject of the syllabus in 2.004 that was the year in which the authors started this informal project. This is the last in which the subject is offered because the studies of Technical Engineering in Management Computing are going to extinguish as planned by the University.

1.2. Institutional context

The educational innovation project was developed informally along a number of years. This means that when it started the Bologna Process was a very far process, but today the first generation of the degrees has been released. Along this time the learning methodologies have changed and the authors have profited from a structure and a number of services that Basque Country University UPV/EHU (Spain) has been established, which contribute to create a global framework that encourages this kind of projects and that we are going to explain in this section. The Vicerectorship for Teaching Quality and Innovation is structured in four main areas:

- Quality Cathedra: Contributes to the knowledge, implementation and improvement of quality management in all areas of the organization of the university, helping to achieve the highest standards of excellence.
- Institutional Evaluation Service: A service of the university which aims to guide and promote the process of evaluation, verification and accreditation as well as those related to improving the quality of higher education. It also works with reference quality agencies in developing their programs in the university.
- Faculty Evaluation Service: A service dedicated to promote, design, develop, advise, facilitate and train faculty evaluation process with the desire to contribute to the improvement of teaching quality.
- Educational Counselling Service: It is a service which manages courses and training according to the needs of the faculty. It puts in place processes to gather information about which are the formation necessities.

All these areas converge towards a methodology named IKD-Ikasketa Kooperatibo eta Dinamikoa in Basque (Dynamic and Cooperative Teaching-Learning in English), characterized by the following principles:

- Active Education: IKD invites students to become the architects of their own learning and an active element in the governance of the university. To get this, it encourages learning through active methodologies, ensures continuous and formative evaluation, articulates the acknowledgement of its previous experience (academic, professional, vital and cultural), and promotes mobility programs (Erasmus, SENECA) and cooperation.
Territorial and social development: The IKD model development requires an ongoing process through which the university is committed to its social environment and community, with public vocation and economic and social sustainability criteria, promoting values of equality and inclusion. It also takes into consideration peculiar characteristics of each of the three provinces where sits our university, to contribute to their empowerment and to extract from them their formative potential. A curricula development responsible with the social environment is done through internships, collaboration with social initiatives, social networks, the relationship with companies and mobility programs that promote international experience and cooperation of our students.

Institutional Development: IKD curricula development drives institutional policies that promote cooperation between the agents involved in teaching, in an environment of confidence and dynamism. It promotes programs that encourage institutional structuring through the figures of the course or module coordinator, quality commissions and promoting teaching teams, which are key elements in this new teaching culture. Other institutional actions such as offering different types of education (part-time attendance, semi-face, non-face), significant and sustainable use of ICTs, institutional regulations concerning assessment, infrastructure design of educational institutions and public spaces (IKDguneak-IKDplaces), the extension of hours of use of space, should be considered from a perspective that encourages IKD culture.

Professional development: First, the continuous training of the people involved in teaching activities (faculty and support staff to teaching), in order to promote adequate professional development. Training programs (ERAGIN, BEHATU, FOPU), projects to support educational innovation (PIE) and assessment tools for teaching (DOCENTIAZ), among others, are actions that support the construction of IKD.

2. Description of the Educational Innovation Project

As stated before, at the beginning the main issue to solve with regard to the Company Networks subject was the low enrolment. The subject was running a number of years, but always using a traditional methodology based on expositive master classes. So, in 2.004 the authors decided to experiment only one year changing the methodology and introducing some active and cooperative learning components. In those years, there was neither a great culture nor tradition about this kind of methodologies in the University College of Engineering of Vitoria.

The first idea was realize that we did not know which the students were thinking about the subject, and so we proposed an anonymous survey the first day of classes, on which we asked about several questions. The following were those questions:

- Do you know what the course is about?
- Why have you enrolled in this course?
- What do you think about the content of the course program?
- What do you think about the practical content of the program?
- Please, write what percentages of the course you would like to were practical and theoretical.
- Would you like that practices were exposed in class?
- How many people should form a working group?
- If you had the possibility to join your fellow group members to prepare practical work in class time, would you like? How would you distribute that time?
- Would you like to have extra material of the course?
- Using percentages, how would you like to be the evaluation of the course? (Working group, Practice, Exam, Attendance)?
- What percentage of the exam would you like to be theory and problems?
- How many questions would you like to have the test?
- How long would you like to be the test?
- Suggestions.

In the design of the formal project several departments of the university were involved: Systems and Automatic Control Department, Electronics Department and Business Management Department of the University College of Engineering of Vitoria, and the Computer Science and Artificial Intelligence Department of the Faculty of
Informatics, all of the of the Basque Country University. The first one is the department responsible for imparting the course in which the project is developed. The second department is in charge of helping the working groups with issues related to electronics and signal processing, while the third is charged with helping the students with issues related to the management of resources as time and human efforts. Finally, the fourth department has to help the students with problems related to programming. Specific technical details of the knowledge area of the subject are omitted intentionally to make the explanation extendible to other knowledge areas, and focusing only on the innovative learning and teaching aspects of the project, we state that the main idea of its design is based on the development of a collaborative work distributed among all the students of the subject, grouped in several teams or working groups. Each lesson of the subject was delivered to each working group, and the students of each group had to prepare that lesson. Once a predetermined number of weeks have elapsed, each group has to explain the assigned lesson by means a public exposition. In this way, the project implements the active learning paradigm in two ways. On one hand there is an intragroup active learning because all the members of each group have to prepare a lesson and explain it to the other members of the group. On the other hand, there is an intergroup active learning because each group is responsible for teaching to the remaining groups the assigned lesson. At the end of the project, all students should understand the whole subject by means of the explanations of every group.

3. Results of the project

In this section we report the results that we have achieved as a consequence of the work developed through the informal innovative education project. Authors state that a number of short time positive results were reached, as a greater attendance and involvement of the students and a high ratio of passed in evaluation tests. Besides the main objective that was appointed when the project was launched was reached, i.e., the remarkable increase of the number of enrolments in an optional subject. After the first year of project implementation, the best advertisements of the subject were made by the students themselves.

However, one nine years have elapsed in this paper authors prefer to focus on the long-time point of view advantages, so only those sustained over time are reported. The authors recognize that these improvements were achieved in unexpected way. We state and ensure that these achievements have been measured by means of objective and systematic data recollection along years about the students who have participated in the project.

- Published works: This positive result is classified as long time one because it remains in international databases after the project had finished. This informal project has generated tangible results that have visibility in the international scientific world. Derived from the cooperative work developed by several groups of students, two publications have been published in different scientific international journals, (Lopez-Guede, J. M., Fernandez-Gauna, B., Graña, M., Oterino, F. & Larrañaga, J. M., 2012) and (Lopez-Guede, J. M., Fernandez-Gauna, B., Graña, M. & Oterino, F., 2013).

- Better performance in future subjects: Faculty of following subjects of the same studies have reported that the performance of the students who have been involved in the project is much better than that of the previous students who have not participated. Their attitude is more active and constructive. Besides, the results achieved in the final tests of evaluation are superior.

- Higher affinity with related subjects: Faculty has also reported that they have observed a higher affinity with related subjects. This circumstance is demonstrated by means of much more higher matriculation in those subjects. Besides, these subjects have registered a lower rate of abandoning than others.

- Better performance in internships in companies: The University College of Engineering of Vitoria has a Vicedean responsible for managing the contacts with companies. The final objective of these relations is to facilitate the development of formative practices by the students is a real world environment, and later, the subsequent recruitment by the companies. After the period of realization of the practices, companies have to make a report relating how practices have developed. Over the years, the reports of the students who participated in the project get a better acknowledgement by companies and better final reports. This circumstance impacts on a higher recruitment by the companies of these students.
• Liking for lifelong learning: Finally, we dare to state that there is an increasing liking for lifelong learning. It is very difficult to assess this affirmation, but we have three sources of this circumstance. The first one are the surveys that the students are asked to fill one year after they have finished their engineering studies. The second is the information provided by the companies where they are recruited, since by means of the correspondent Vicedean there is always a communication channel open. Finally, the third source of information is that the administrative staff of the University College of Engineering of Vitoria keeps track of the students that a time after finishing their studies are enrolled in complementary training courses of the College. That staff informs the faculty about the enrolled students, and we can check whether they participated in the project. Since we have these sources of information, we have verified objectively that there is an increasing liking for lifelong learning.

4. Conclusions

In this paper we have introduced an informal educational innovation project in the area of Company Networks. We have described first the original objective and the global context of the project. Then we have introduced the characteristics of the project itself and finally, we have analysed the results obtained based on objective data collection along nine years, finding out a number of long time positive and unexpected results, which encourage us to follow the implantation of these active and cooperative methodologies.

Acknowledgements

Funding for the publication was provided by Grant 6397 of Teaching Innovation Projects 2011-13 of the Education Advisory Service, Vicerectorship for Teaching Quality and Innovation, Basque Country University.

References