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RIMA project: activities and initiatives communion and sharing in educational innovation at UPC-BARCELONATECH

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Abstract

The RIMA project (Research and Innovation in Learning Methodologies, http://www.upc.edu/rima) is a proposal from Education Science Institute (ICE) of the *Universitat Politècnica de Catalunya* (UPC-BARCELONATECH). The aim of this project is to become a forum for sharing experiences between Communities of Practice (C of P) related to innovation teaching, learning methodologies, or generic research skills in engineering education. Gradually, several professors and C of P have been incorporated during this time, setting up a work map on teaching innovation areas and main items developed in our university.
Last years, in parallel with Bologna process in from ICE-UPC (BARCELONA-TECH), RIMA Project was designed for keep together, in a virtual common space, all the Communities of Practice (C of P) related to skills and abilities. In this paper, by analyzing RIMA C of P map, relating to technical degrees taught in UPC-BARCELONATECH, consolidated research areas in educational innovation can be identified, related to skills and knowledge areas, in order to help improvement in teaching and learning. The RIMA project has been identified as an innovative and helpful initiative, in technical universities ambit.

Keywords: Communities of Practice, Teaching Innovation, Learning Methodologies, Education Science.

1. Introduction

UPC-BARCELONATECH (*Universitat Politécnica de Catalunya*, http://www.upc.edu) is a technical university with engineering and architecture degrees. Under the new degrees of the European Higher Education Area (EHEA), learning competencies takes a very important role, and Spanish universities, including UPC-BARCELONATECH, have been modifying their curricula degree in order to achieve items of EHEA (European Higher Education Area) [1]. EHEA goals are related to adopt a system of easily comparable degrees across Europe, by means of a two main cycle system (undergraduate and postgraduate). For this purpose, a European credits system (ECTS) and common strategies to achieve European dimension in higher education, also teaching quality, were defined and established. Main differences of this new scenario were related to:
- Mobility promotion for students, lecturers, and administration members
- Cooperation program promotion in order to ensure quality and comparable criteria and methodologies with other European universities.

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This new model's main features include a commitment to design curricular flexibility and diversification as means of responding to society requirements in a context of constant changes. Therefore, in depending of university autonomy concept and accountability, curricula design involves innovative proposals, based in prestige reference models, by creating a network for sharing information and collaboration between academic members. Since EHEA implementation, a curriculum is proposed as an implementation project of university education (objectives, planning, feasibility, expected outcomes, monitoring system, and quality assurance) as a warranty for achieving professional skills in parallel to academic contents [2,3]. Several teaching models have changed in order to keep into account EHEA paradigm items, mainly for introduction student learning process in a context of lifelong learning highlighting how overcoming main obstacles: the social pressure in the sector, as companies require specific profiles of graduates, and the lack of commitment among the students for technical studies, which have lost most attractive workload and dedication

As a result, new roles for undergraduates and faculty have been defined and developed in order to introduce skill definition (general and specific skills) to complement "traditional" contents learning and bringing some added value to degrees [4-7]. Mechanisms for generic curricula integration have fostered skill development and specific routes design to ensure students can reach the 7 generic skills committed by UPC-BARCELONA**TECH**:

- CG1-Entrepreneurship and Innovation
- CG2-Sustainability and social commitment
- CG3 Third language (English preferably)
- CG4-Effective oral and written communication
- CG5-Teamwork
- CG6-Information resources use
- CG7 Self-learning

In this scenery, Universitat Politècnica de Catalunya, UPC-BARCELONATECH, consists of 9 campus, located in 6 different towns surrounding BCN, with 23 schools that host a total of 2,800 teachers and 30,000 students. Geographical peculiarity has enhanced an even more complex implementation of the Plan of Bologna at the 132 degrees taught

2. Education Sciences Institute, as a basic unit of UPC-BARCELONATECH

In this context, the Education Sciences Institute at *Universitat Politècnica de Catalunya* (ICE-UPC) is a relevant basic unit, also as an observatory for all levels at UPC-BARCELONA**TECH**. ICE-UPC main objectives, based on innovative teaching initiatives analysis, development and assessment, as well as solutions identification, are focused on ensuring a true smooth process of teaching and learning for the university community (Fig. 1.a). ICE-UPC activities, related to learning improvement, are linked to three main areas of activity (Fig. 1.b):

- Initial training (ProFi) and continuous teacher training (training on research, on management, on teaching improvement and instrumental training).
- Support to educational projects for teaching improvement at university.
- ICT resource management and use at university education (ATENEA-Moodle, La Factoria)

Activities related to these three areas are carried out through training courses (internal or external trainers), initiatives of Communities of Practice (C of P), project development, training in new learning methodologies, etc, as shown in Fig. 3 diagram, emphasizing the element of RIMA- C of P. In this context, from ICE-UPC, RIMA project has been developed as an strategic project, with main objectives focused on:

- Highlight participation, involvement and development of UPC-BARCELONATECH innovative projects, related to teaching and learning methodologies implementation and engineering education research.
- Dynamization of projects design for advances enabling focussed in UPC-BARCELONA**TECH,** but extended to academic community, as the best way for improvement and innovation in teaching.

- Identification of strategies towards achieving objectives and results for transmission in academic level, while achieving the greatest impact possible in the academic community.
- Build-on a teacher core from our academic community, in order to participate in training activities and advice, while supporting other academic communities, if requested, about educational innovation and learning methodologies development.
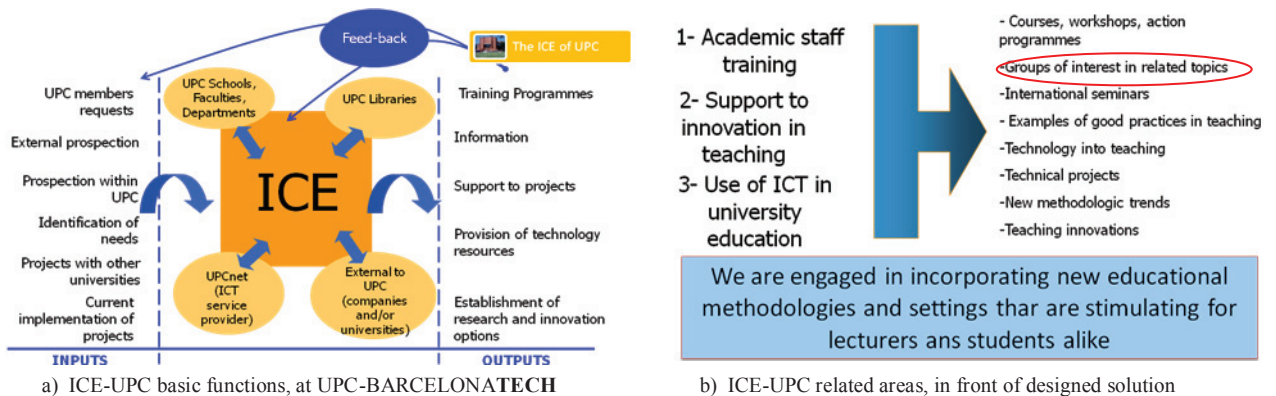

a) ICE-UPC basic functions, at UPC-BARCELONA**TECH**

b) ICE-UPC related areas, in front of designed solution

Figure 1   Education Sciences Institute (ICE-UPC) functions and structure at UPC-BARCELONA**TECH**

3. RIMA project: an innovative initiative in UPC-BARCELONATECH

The RIMA (Research and Innovation in Learning Methodologies) project's aim is related to enhance teaching innovation visibility currently developed at Universitat Politècnica de Catalunya, UPC-BARCELONATECH. At the same time, it seeks to promote lecturers participation in educational research and innovation activities, from RIMA stakeholders impulse (RIMA Communities of Practice, C of P) [8-9].

Related to the RIMA project, several Communities of Practice (C of P) have been created, related to generic skills or related to basic subjects or related to assessment and teaching-learning methodologies. C of P relationship is showed below:

- GENCAD, C of P in engineering creativity and ingenuity.
- GIAC, C of P in cooperative Learning.
- GIDF, C of P in physics teaching.
- GIDMat, C of P in materials teaching innovation.
- GiLABViR, C of P in virtual and remote labs.
- GIPBL, C of P in project/problem based learning
- GIQUAL, C of P in classroom quality
- GIUM-A, C of P in ATENEA Moodle uses
- GRAPA, C of P in academic practices assessment
- GRAPAU, C of P in autonomous learning
- GRECO, C of P in skills research
- GReDiQ, C of P in chemistry didactics resources
- GRIMAth, C of P in maths innovation teaching methodologies
- GtPOE, C of P in students' portfolio
- LINGUATECH, C of P in 3rd language (english) teaching-learning
- VISCA, C of P in human values, gender, sustainability, cooperation, and accessibility

C of P currently in RIMA project, are related to some of the generic skills described above (GRAPAU, GRECO, VISCA), or learning methodologies related to basic subjects (GReDiQ, GIDF, GRIMAth) or specific (GILABVir, GIDMat), learning methodologies (GENCAD, GIAC, LINGUATECH) or assessment methods (GRAPA, GIUM-A,

GTPOe, GIPBL, GIQUAL), as shown in the following scheme (Fig. 2.a). Geographical distribution of RIMA groups and members, related to UPC-BARCELONATECH campus and centers, is shown in Fig. 2.b.
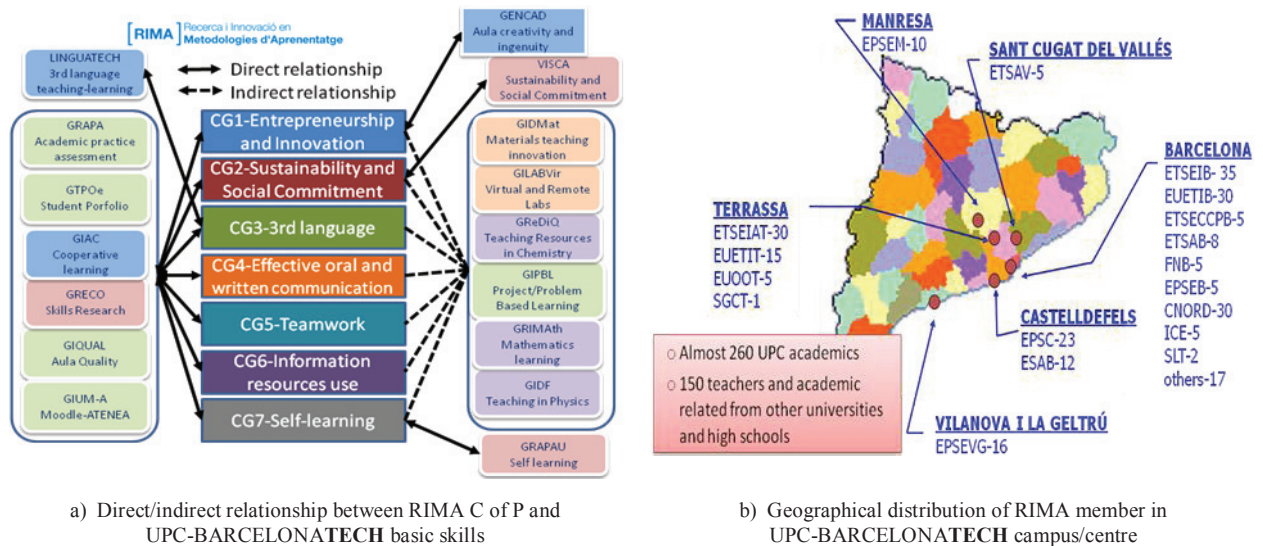

a) Direct/indirect relationship between RIMA C of P and UPC-BARCELONA**TECH** basic skills

b) Geographical distribution of RIMA member in UPC-BARCELONA**TECH** campus/centre

Figure 2 RIMA project Communities of Practice (C of P) characteristics and geographical distribution at UPC-BARCELONA**TECH**

Since the RIMA project inception, different communities of practice have developed support materials, reference documents communication for conferences and/or meeting and referent papers (more than 50 communication and papers in national and international journals and conferences).

Research results and production of all C of P related to the RIMA project is incorporated into the project homepage. Furthermore, electronic version of all documents has been incorporated to UPCommons free access repository, in order to easy dissemination. Materials that can be found in this repository are, for example, Bibliography on learning methodologies (Cooperative Learning-GIAC, Materials Science and Technology-GIDMat) [9]; Monographic, notebooks, handbooks and guides, (Quality-GIQUAL, Sustainability and Social Commitment-VISCA, Portfolio-GTPOe, Autonomous Learning-GRAPAU, Skills research-GRECO), [10-14]; Guide to Lab Skills Assessment (GRAPA)[15-17]; RIMA meeting proceedings volumes (JID-RIMA 2009, JID-RIMA 2010)[18]; Teaching Quality Awards (GReDiQ)[19,20] and Videos and low cost videos (Teaching YouTube Channel)[21-23].

Which one is the relationship between lecturers dedication to educational innovation in their teaching and students assessment? Many RIMA members usually used SEEQ survey, and results shown that students get much more confidents in several subjects, and they have performed better on assessment. Mission accomplished! In terms of quality, RIMA-GIGUAL constitution, for teachers not accustomed to quality management, has facilitated how to identify a training process in classrooms, from beginning to end, with traceability and control managing for continuous improvement.

4. Conclusions

RIMA project has been designed and created by ICE-UPC, as a joining space for teaching and learning research group, for sharing experiences between communities of practice, and also activities and results. The main objectives of the RIMA project are: a) Improving educational research and innovation in university teaching, focusing on students learning; b) Encouraging research in teaching innovation at university, also C of P creation in different educational areas, and c) Providing information, support, and solutions related to the educational needs arise as a result of EHEA new scenario.

RIMA project has generated synergies between different groups, thus making an efficient use of resources and initiatives. By using collaborative virtual spaces for sharing experiences, materials and/or resources, RIMA groups

get all information related to Communities of Practices. In this way, C of P, and independent groups, can share experiences and results, and also update them in RIMA platform, helping virtual networks arising.

Acknowledgements

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