UPC's Institutional Transformation Towards Sustainability
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(To be published in GUNi (2011) Higher Education's commitment to Sustainability: from Understanding to Action)

1.0 Introduction: UPC's journey towards sustainability

Universities' commitment to sustainable development (SD) has been on the rise, driven by the growing awareness of the urgent challenges facing us as a result of the ecological, economic and social imbalances of the planet. During this decade, numerous networks, projects and actions emerged which have contributed to shaping the role of higher education institutions (HEIs) within this context.

The introduction of SD at any university or other institution usually involves an in-depth redefinition of the institution's practices, attitudes and foundations in a process known as "institutional learning". When an institution adopts a structure that is appropriate to new practices, and its agents accept this new structure, it is easier to promote the practices in question.

The fact that the Universitat Politècnica de Catalunya – BarcelonaTech (UPC) is a technological university presents additional challenges with regard to interdisciplinary issues like SD, which has deep bases in environmental sciences, socioeconomic and cultural aspects, and the like, not to the knowledge core of UPC.

Despite the implications of these challenges, the governing council of the UPC, in 2006, approved the 2015 UPC Sustainability Plan which was the result of a long journey that started at the beginning of the nineties and is now in a second five-year phase of the plan. Figure 1 shows the timeline followed by UPC from the 1990's to the present, and this paper explains a general overview of the process.

2.0 The roots: Social & environmental commitment of UPC community

The UPC was formally founded in 1985, after the approval of the University Reform Law of 1983. Its principal structure is nurtured by a collection of engineering and architecture schools within Barcelona and its metropolitan area, some of which date back to the middle of the nineteenth century.

At the beginning of the nineties, two actions marked the transformation of the UPC towards SD; the beginning of the separation of waste paper (well before it was a standard social practice), and the beginning of the activities of the Center of Cooperation for Development (UPC, 1992).

The environmental seed which is the separation of waste, reuse and recycling, began in environmental engineering courses and later spread throughout the entire university, over successive periods of time, mentioned later. What can be seen as a signal is that an element of sensibility towards sustainability has been consolidated as a method of management throughout the university community.
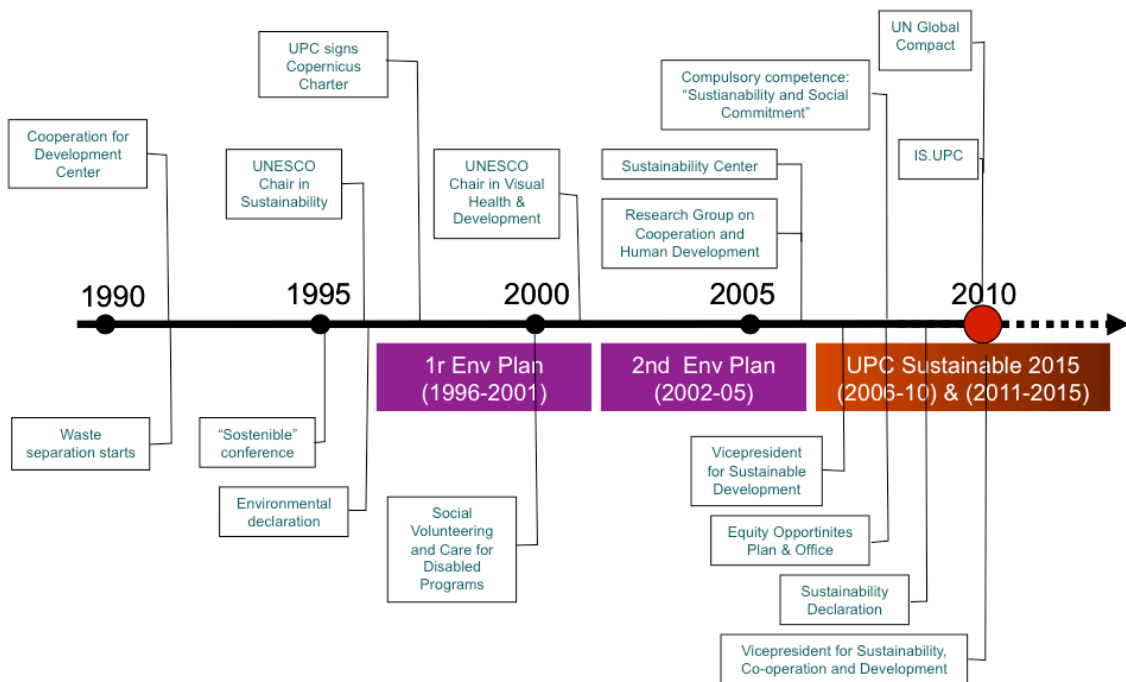
Figure 1. Evolution of UPC`s commitment to Sustainable Development.

On the other hand, the seed of social commitment, specifically in terms of international solidarity, materialized into a center, and regular financing of small transactions (about 100 a year from 2-3 people) by an annual corporate campaign called "Campaign 0.7%", reminding wealthy countries of their international commitment to global development. The creation of the center and the contribution of all external contracts for the University to the solidarity fund were approved by the Board of Trustees. The Board is the UPC body responsible for participation in society. Its function is to integrate and relate the University's activities with the public sector, civil society and industry.

We emphasize the international solidarity between the different dimensions of social commitment of the university, given that this time has been one that most contributes to its development (as much for common themes as for collective implication, Pérez-Foguet, 2008), it was not until a decade later that the UPC formed a program to assist the disabled within the Social Activities Service.

2.1 The Environmental Plan

In November 1996, UPC approved its first Environment Plan with the aim of introducing environmental aspects into all of the university's activities (UPC, 1996). The value of this plan was its integrative perspective that incorporated all fields and aspects of the university including training, research, university life and

communication and awareness activities. The basic idea of UPC's Environment Plan was to introduce changes into the university's own processes, so that these changes can be assimilated and have a real influence, instead of generating complementary actions that may contradict the key processes. Thus, instead of creating a degree in environmental studies at UPC, it was decided to go about greening UPC's curricula, following three phases:

1. Establishing the profile of environmental knowledge that students need to learn by the end of their degree
2. Determining the priority greening lines: modifying existing subjects and adding new subjects, if necessary
3. Defining a plan of action to train and qualify the teaching staff in the new task of greening their subjects

Over those years, numerous processes for greening UPC's basic activities were consolidated, such as those related to greening the curriculum. In 2005, roughly one in every five UPC subjects included environmental contents, when in 1997 it was one in every ten. In research, environmental research represented more than one third of all research carried out at UPC, in terms of scientific results. Both results reflected the effectiveness of the Plan, but it was also important to highlight that this strategy contributed to a cultural change within the university, and therefore, also contributed to individual changes in many members of the university community.

After the first plan was evaluated, it was decided to continue with the transversal approach for the integration of this plan into the university (Ferrer-Balas at al., 2006, and Ferrer-Balas and Sans, 2005). Thus, the UPC's second Environment Plan was approved in 2002 and covered the period from 2002 to 2005.

In 2003 the UPC's statutes were modified, including for the first time the word sustainability: *"The UPC, as an entity that generates and transmits knowledge, shall promote the protection of environment and the sustainable development, both in terms of training and research as well as institutional activities"*

3.0 The Sustainability Plan

After these two consecutive Environmental Plans, in 2006, the university proposed the 2015 UPC Sustainability Plan (UPC, 2006), which combines internal efforts with external alliances (Barceló and Ferrer-Balas, 2008). It is focused on a key date, 2015, which is the date that the United Nations set to complete the Millennium Development Goals and the year the Decade of Education for Sustainable Development ends as well. It is also a time long enough to produce deep changes, yet short enough to expect to witness the results.

It was recommended tackling in more depth the transition from the paradigm of environmental responsibility to SD within the context of the knowledge society and network-society. This means putting more emphasis on the social dimension of the University's responsibility, whether looking for internal connection points between different groups (for example working on cooperation, redesigning functions at the

university, education in values, and so on), or setting up meetings and platforms for dialogue with the external stakeholders of the university.

The overall goal was to develop a strategic sustainable development plan that establishes priorities and determines the activities to be carried out during its implementation period. The strategy involved facing four challenges, one for each area of the Plan:

- UPC will participate in and commit to the challenges of sustainability at the local, regional and international levels.
- UPC's research activity will respond to social challenges by integrating sustainability criteria.
- All UPC graduates will apply sustainability criteria in their professional activity and area of influence.
- UPC will operate as a sustainable organization.

One of the most innovative aspects of this plan was the design of the development and definition process. This process sought both the legitimacy afforded by collaboration with internationally recognized authorities on sustainable development and the active participation of the various bodies within the University. The goals of the participatory process were:

- To encourage the participation of all parts of the university community.
- To raise awareness of sustainability among the university community.
- To make all members of the University jointly responsible for the actions defined in the Plan.

Based on the lessons learnt in the previous plans, the process consisted of the following stages:
1. International external assessment. In July 2005, the UPC Board of Trustees entrusted a committee of three independent international experts with the task of carrying out this assessment.
2. Participatory assessment and diagnosis. At the same time, a six-month participatory assessment and diagnosis process was carried out involving people from UPC and various interest groups, through different active methodologies (open virtual forum, face-to-face meetings, online questionnaires). They concluded by identifying 40 high-priority proposals, which served as the starting point for the next stage in the process.
3. Participatory design of the new Plan. In this part of the process, participants made proposals and prioritized actions to be included in the new Plan. The participants worked in groups corresponding to the four areas of the Plan (education, research, university life, and social commitment and community). The process resulted in five strategic high-priority challenges.
4. Approval of the Plan. The Plan was submitted for approval to the Board of Governors, UPC's top executive body, and the Board of Trustees.
5. Execution and implementation. The various actions included in the Plan have been progressively implemented since its approval in May, 2006.
6. Assessment. UPC carried out an assessment of the Plan's progress. A progress report was published at the end of the first stage of the Plan (2010).

The actions defined in the 2015 UPC Sustainability Plan are based on the proposals and decisions reached during this participatory process. This fact sets the new Plan apart from its predecessors.

The process had a mixed financing scheme that involves UPC, government agencies and private entities. The Plan enjoyed the support of various internal and external bodies, including the Barcelona City Council, the Catalan Government, NGOs, professional associations, the entire university community and national and international networks and associations. These agents collaborated in different ways and with varying degrees of involvement.

It is difficult to summarize all results obtained during the first five years of the Plan but, main results directly related with the Plan were:
- UPC joined forces and established synergies with various complementary agents, such as experts in sustainable development and international networks, as well as national and local socio-economic and governing actors through continuous networking promotion and participation.
- An environmental management system on the UPC campus was promoted; including sustainable shopping and contracting, urban and special wastes management as well as sustainable mobility planning.
- A program to monitor water and energy consumption was established, and it was used to promote institutional efficiency and reduction of greenhouse gas emissions.
- A compulsory general competence titled "Sustainability and Social Commitment" was included in all new graduate programs adapted to the European Higher Education Area (EHEA), and its implementation was supported through all the schools and all academic structures. Remarkably, an interdisciplinary group of students was constituted with the aim of complementing the institutional efforts in this direction.
- Specific academic programs were also consolidated with this reform, one as a Master of Science in Sustainable Development and a Ph.D. program in Sustainability, Technology and Humanism.

During this time UPC strengthened its image as a leader in sustainability issues and contributed to a cultural change that favors sustainability within the institution itself, and the overall university community.

4.0 The Sustainability and Social Commitment of New Graduates

The path of the UPC in greening curriculum develops over successive Plans of the Environment (Mulder et al., 2004, Ferrer-Balas at al., 2006) and the momentum of Education for Development (Pérez-Foguet et al. 2005, Boni y Pérez-Foguet 2008). With the 2015 UPC Sustainability Plan, the proposal gains momentum and consolidates separate proposals and works (Pérez-Foguet and Lobera, 2008, Segalàs et al., 2009, and Segalàs, 2010), which give way to the adoption of general competency shared by all UPC's undergraduate curricula adapted to EHEA.

"The general competence on Sustainability and Social Commitment is the capacity to know and understand the complexity of the economic and social phenomenon

typical to society and wellbeing; ability relate wellbeing with globalization and sustainability; skill to use, in a balanced and compatible manner, technique, technology and economics (UPC, 2008)". This is one of the seven general competences shared by all graduates of the university.

A competence can be acquired progressively by three steps, typically through different subjects in the curricula, defined as follows:
1. Systematically and critically analyze the global situation, addressing sustainability and social commitment in an interdisciplinary manner, and recognize the social and environmental implications of professional activity in the same field.
2. Apply criteria of sustainability and social compromise in the design and evaluation of technological and/or architectural solutions.
3. Carry out projects and professional activities consistent with human development, sustainability and social commitment, taking into account the social, economic, and environmental dimensions in the identification of the problems and application of solutions.

For effective incorporation into subjects of various curricula, and taking into account the different dimensions from which Sustainability and Social Commitment of the university work, in a participative form with the implicated groups (institutes, departments, service units, teaching innovation groups), they have defined the following dimensions of the competence, recognized under the acronym VISCA, from a teaching innovation group of the Institute of Educational Sciences of UPC (UPC, 2011).

- **Ethical Values.** The dimension of ethical values for personal and professional development involves determination of an act (or omission) is correct or incorrect or adequate or inadequate, and act accordingly based on a scale of personal values, collective (universal rights, welfare responsible, democratic culture), or professional (codes of conduct), considering the action (or inaction) as much as the context, causes and direct and indirect consequences of it.
- **Equality.** The dimension of gender equality/equity implies recognition of an intervention in personal and professional situations that hinder and/or discriminate against the development and growth of women and men acting as agents of change with proposals that allow an improvement in the quality of social and working life of all people affected, recognizing them as equals while considering the concept of social justice..
- **Sustainability.** The dimension of sustainability implies design and evaluation processes and technical solutions from the triple perspective of Environment – Society – Economics, with a systematic and complete vision in a framework of biophysical restrictions that allow for the satisfaction of present and future human needs; involving the flow and cycle of material and energy, and the dynamics of socio-environmental systems and their interrelationships to optimize the use of available resources, ensuring fair and equal access to them.
- **Cooperation.** The dimension of cooperation for development implies identification, planning, design, execution and evaluation of actions oriented towards human development (economic, environmental, social and political) principally in developing countries, starting with the situation, needs and priorities of the populace, driving the formation, investigation-action and the

inter- and intra-community combined work, boosting independence and individual and collective abilities of people as agents of change to amplify their public and individual freedoms.

- **Accessibility.** The dimension of universal accessibility references the design and development of products, services and environments (digital, technological, physical, social and/or professional) in a comprehendible, useful and practical manner on behalf of all people in comfortable and secure situations, and in the most autonomous and natural manner possible.

Each of the five dimensions are specific learning outcomes for the three competence levels. Curricula, through their courses and learning guides, incorporate the content and activities that allow them to accomplish those, through one or various dimensions. In this way, it allows for a wide variety of proposals to contribute, from the experience of the faculty and academic environments, to the introduction of shared competences in Sustainability and Social Commitment.

5.0 Lessons learned and next steps towards 2015

The university has a privileged role in helping society advance towards sustainability by combining synergies between Research, Training, Management and Extension. A combination of a *top-down* vision and *bottom-up* pressure is essential, although the key factors are usually at the technical and management levels that continually promote the process of change.

It is necessary to focus efforts on obtaining grassroots criticism able to generate change. The human potential on which the strategic program is based is essential and should be given a great deal of attention.

Putting effort into environmental issues and sustainable development can be profitable on an economic level, generally in the mid- and long-term, due to improved efficiency in resource consumption (energy, water, and so on), as well as increased external investment in R&D. Making the university's processes greener is generally a lot more effective than creating new environmentally oriented processes.

Two major steps are being taken in the process of UPC's transformation towards Sustainability. One is the push of a new research institute on Sustainability Science and Technologies, a key tool for institutional transformation and academic commitment, and the second is a new structure and communicating policy of the overall activities that constitutes the UPC's approach to the its Social Responsibility.

Both actions will complement the expected results of the second phase of the UPC 2015 Sustainability Plan. This second phase will focus on the integration of SD principles into decentralized management structures, (campuses, schools, departments) with special emphasis on including sustainability in contracting and supplies.

5.1 The University Institute of Research on sustainability Science and Technologies- IS.UPC

This new Institute is devoted to advancing in the definition and contents of sustainability science and technologies through its own expertise and potential. Sustainability Science is a discipline that aims to facilitate the "transition towards sustainability", improving society's capacity to use the earth in ways that simultaneously promote equitable economic growth, environmental protection, and social wellbeing (Clark, 2007). Some of the central elements of sustainability science are inter- and intra-disciplinary research, co-production of knowledge, and system innovation instead of system optimization (Martens, 2006, Kajikawa, 2008). Sustainability technologies cover a wide range of academic disciplines (Meyers, 2012).

Local authorities have formally recognized the new IS.UPC at the end of 2010. The Institute's mission is to generate technical and conceptual tools to create a more sustainable production model, and to collaborate in the UPC's endeavor to provide scientific and technical support for social, cultural and economic progress. It is active in the following areas, in which the aim is the SD of skills in architecture, science and engineering:

• Research
• Postgraduate and doctoral education and other specialized teaching activities aimed at the achievement of academic diplomas or otherwise.
• Technology transfer.
• Internal promotion of a culture of sustainability (UPC 2015 Sustainability Plan).

IS.UPC aims to:

• Strengthen the postgraduate programs that it organizes and coordinates (master's degree in Sustainability, in Environmental Engineering and doctoral degree in Sustainability) by contributing the results of research in sustainability, and feed these results back into all of the University's educational programs.
• Open up sustainability science and technologies research to as many of the University's researchers as possible.
• Make the management of the University, as a source of research needs and a field of study and experimentation, a focus of the Institute's activity.
• Disseminate and spark debate on the results of research both to the university community and to society as a whole.
• Engage with society via economic activities and a range of social entities and give support to civil society's demands, with the aim of promoting progress towards more sustainable models.

5.2 Structuring and communicating University Social Responsibility

For the first time, the UPC prepared and presented the 2009 report Global Compact in 2010 (UPC 2010a). This report led to a reflection around ten points that are part of the four major areas of the report: Promotion of human rights, labor relations, environmental aspects and anti-corruption.

The UN Global Compact Initiative (http://www.unglobalcompact.org/) incorporates a transparency and accountability policy known as the Communication on Progress (COP). The annual posting of a COP is an important demonstration of a

participant's commitment to the UN Global Compact and its principles. Participating companies are required to follow this policy, as a commitment to transparency and disclosure is critical to the success of the initiative.

Having the UPC Global Compact report was made possible through the coordinated work done by the UPC Office of Planning, Evaluation and Quality, involving different actors representing various sectors of the university.

In order to delve into this dimension and enhance communication to third parties, UPC is planning to develop a specific plan throughout 2011, covering the basic points, but articulated and approved by the university's governing bodies, to facilitate the coordinated development of University Social Responsibility.

This plan will complement the second phase of the 2015 UPC Sustainable Plan, the 2015 UPC Cooperation Plan (under development throughout 2011) and the UPC Plan for Equal Opportunities (UPC, 2007). Remarkably, all this articulation of activities and politics constitute one of the six axes of the governmental plan UPC14 (UPC, 2010b).

Following this path responds to the will of government action for enhancing and extending the experience gained through the years.

6.0 Conclusions

This paper has explained the institutional path followed during the last 20 years in transforming the university towards sustainability. The initial seeds in the fields of social and environmental commitment have grown, resulting in a deeper and broader transformation of the institution. This transformation does not end, however as the university is actively developing and seeking a sustainable way that allows UPC to fit in the changing world, through strategic planning, government actions along with the new IS.UPC, and also empowering the planning and communication of University Social Responsibility.

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