

HOW TO INTRODUCE DEVELOPMENT EDUCATION INTO UNIVERSITY? INSTRUMENTS AND EXPERIENCES OF SPANISH TECHNICAL ENVIRONMENTS

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Abstract

In this paper we present some experiences of Development Education (DE) introduced in the three main Spanish Universities with Technical Studies: Technical University of Valencia, Catalunya and Madrid.

The concept of DE we are following in this paper is the next one: DE as a strategy of international cooperation aimed at the citizens/people of the North. Its main goal is the empowerment of people through a teaching and learning process, which develops knowledge, skills and values in learners, thus enabling them to become members of a global community of equals [1].

First of all, in this paper we present a typology of different instruments that the University owe in order to develop development education activities. This proposal is based on the conclusion of the Committee of University Development Aid (CEURI) and was reelaborated by the authors of this paper and collaborators [2,3].

Secondly, we discuss about the main characteristic of four strategies we have developed in the three Universities referred above:

- 1) Ethical codes such the Ethical Code of the School of Industrial Engineers of Technical University of Valencia.
- 2) Teaching innovation groups such the GREVOL group of Technical University of Valencia, the Interest Group of Collaborative Learning of the Technical University of Catalunya and the Development Education Group of Information and Communication Technologies of the Technical University of Madrid.
- 3) Free elective courses in bachelor studies dedicated to international development aid in the three universities and posgraduate studies which link development education and technology for human development.
- 4) Mobility programs in coordination with NGOs developed in the Technical University of Catalunya.

The description of these initiatives would like to illustrate the great potential of the DE activities developed in the three Spanish Universities. We will introduce some considerations about the impact of the European Higher Education Area (EHEA) in those strategies.

Keywords

Education, development, engineering, ethical codes, grade courses, civil society, Third World Countries, educative innovation.

1. University instruments that facilitate the introduction of DE

In this section, we give a general description of the instruments available to universities to carry out development cooperation projects, and their relationship with DE. This taxonomy is based on the University Strategy for Development (ESCUDE) [4], and other studies [3,5].

1) Subjects of free choice or configuration.

The first instrument refers to complementary subjects in student education. Their content, duration and academic standing depend on the departments, schools and faculties, although in many cases the universities have allowed lecturers to make proposals freely, later validated by the institution. This situation has given rise to the appearance of development cooperation subjects based on DE

pedagogic proposals. As has already been mentioned, the introduction of EHEA will make it necessary to think about adapting the initiatives to the new context. In our opinion, as we explain in the following section, free choice has been shown to be one of the most interesting options for the introduction of DE into universities.

2) Main, optional and compulsory subjects.

The main and compulsory subjects contain the basic degree curriculum, with the main subjects being common to all degrees recognised in Spain. On the other hand, obligatory subjects are those that an individual school or faculty establishes as its own and which must be taken by all students. Optional subjects compose the options for specialising within degree courses, and though they may be fairly flexible, do form an explicit part of the university course, so that to be modified they require, unlike optional subjects, the explicit agreement of the institution. Course activities that seek the introduction of contents transversally related to human development and promote skills and values related to DE can be included in these subjects, not only in the ambit of social sciences, economics and humanities, but also in applied science and technical subjects and even in the most theoretical vocational subjects. Here we should emphasise that universities often receive aid for educational innovation and this aid is usually designed to give priority to improving the most "stable" part of the state controlled teaching, i.e. the compulsory part of the curriculum. This situation could provide an opportunity for the transversal incorporation of DE.

3) End of grade works and end of grade projects.

These exercises are a compulsory part of the course: they may include exercises in applied research or development. Since these activities are usually practical in nature, interesting projects could be considered with North and South comparisons in order to promote the DE perspective.

4) Practice in public and private enterprises.

Throughout the student's university career, some of his credits may be obtained by working in public or private enterprises. A suitable strategy for the objectives of human development would be to give an incentive for this practice to be carried out in multilateral and non- government organisations dedicated to development.

5) Postgraduates.

There are diverse possibilities for introducing DE into postgraduate studies. On one hand, a transversal strategy can be defined, which, as in undergraduate studies, will aim to promote DE knowledge, skills and values in MAs and different specialities. Another line of work is to consider Ed in postgraduate studies as a professional qualification in international development and cooperation. Various authors [6,7,8] emphasise the importance of training in certain aspects of international cooperation. In our opinion, if the DE is incorporated into postgraduate studies, this could contribute to making future development professionals carry out their work with values that tend to create a democratic environment, fight against discrimination, help the disadvantaged and promote dialogue, progress and participation, all of which are basic principles which should direct the efforts of professionals in international cooperation [7].

6) Training of teaching and research staff (TRS) and administration and auxiliary staff (AAS).

These are training programs offered by educational science institutes or similar bodies. As we shall see in the initiatives in the following section, the promotion of teaching innovation in teacher training based on concepts such as DE a good strategy for development cooperation in the universities.

7) Doctoral theses.

We refer to doctoral programs offered by research departments and institutes which end in publishing a thesis based on original research work. The EHEA almost completely eliminates specific training in the third cycle. In our opinion, therefore, the only possibility of introducing DE into this level of university education is to encourage the writing of theses based on DE itself. In fact, if we consider the entire international development and cooperation field and its ties with the technology for human development, there exists here a very wide choice of possible subjects for doctoral theses.

8) Lines of R&D&I.

University research into DE on a very small scale. This is mainly due to the shortage of public financing for lines of investigation into international cooperation and development. Besides demanding more financing for this field in general, we should emphasise that in the case of DE support could be obtained from areas close to education. DE also has ties with Education for Sustainability, or sustainable development, which in turn receive further support from the area of environmental conservation.

9) Networks.

These are networks created by teachers, researchers and administrative staff on national and international scales with objectives in education, research and development. They appear to be a good instrument for directing the attention of the universities towards sustainable human development, since they would allow work to be carried out jointly with professionals from the South. However, the negative aspects that we have already mentioned concerning research, are, in our opinion, serious obstacles to the formation of stable teams to work in the field of DE.

10) Technical assistance (Transfer of technology and knowledge).

This has to do with cooperation between universities and other public and private organisations, both national and international, for the transfer of technology and knowledge. Here again we have to point out the existing structural deficiencies for this transfer in the field of international development and cooperation. Few research resources are applied to the needs of local communities. Teaching, especially at the post-graduate level, is designed to suit the characteristics of the universities of the North. This inclines us to think that in this field also the combined efforts of public and private organisations involved in development are required to make advances. Interesting studies have been published in the form of consultations by NGOs for certain public administrations, with the participation of university staff, which could be taken as good examples of the transfer of knowledge and technology from the university to other social areas. As other authors have stressed, the ties with universities should not only be at the individual level but the role of the university in this field should be seen in academic circles [8,9,10].

11) Mobility programs for TRS, AAS and students.

These programs are designed to increase the mobility of the members of the university community for reasons of teaching, research and administration. The AECI (Spanish International Cooperation Agency) has in recent years created programs of this type (such as INTERCAMPUS, absorbed by the Interuniversity Cooperation Program, although it eliminated the mobility of students and TRS) within which personal ties were established. This encouraged some of the participants to continue working in cooperation for development [9]. We should point out that some universities have their own mobility support programs, while others participate in international volunteer programs (such as UNITes, created by the UN). Some NGOs have also started mobility programs between universities, which we shall examine in the following section. We consider this to be an interesting instrument but which should clearly include DE criteria, especially in the previous training and subsequent work activities of the participants.

12) Preparation and promotion programs for university participation.

Here we refer to information and promotion programs for volunteers directed to the university community. Many universities, using the structures that exist to encourage internal solidarity, organise activities to inform public opinion such as conferences, campaigns, debates or exhibitions. They may also encourage the university community to take part in the activities of voluntary social, environmental, international solidarity or even linguistic organisations. Such activities are frequently carried out in cooperation with NGOs. When these voluntary activities occur within the framework of non-government regulated education (including initial training, follow-up and evaluation of the volunteer experience), they are often recognised by the assignation of credits to the students who request them, in conformity with the academic requirements of the schools and faculties.

13) Lobby activities.

These include those activities specifically designed to achieve a suitable institutional *ethos* for the human development objectives. This minority working environment has suddenly grown in the last year due to changes in the regulations with the coming into force of the Organic Law of Universities in 2001. The incidence activities possible within the university community are not only confined to the aspect of the regulations but can also include declarations and agreements between lecturers associations and university governing bodies or in adopting ethical codes or other similar initiatives designed to promote the values inspired in the Universal Declaration of Human Rights.

14) Documentation and publications.

This final aspect includes support to the documentation centres (real and virtual) as well as establishing policies of producing publications to support the introduction of DE and those that in general refer to the field of international cooperation and development. These instruments strengthen most of those others already mentioned and receive feedback from them. Involving university records and libraries is especially important, given their strong long-term impact on the community, even if it is also somewhat costly due to the operational conditions of these institutions [11].

In the following section, we present four specific initiatives which, in the opinion of the authors, covers the wide spectrum of the above-described instruments. They are also actions in which the authors have either taken part or on which they have reliable information, which makes it possible to highlight key aspects of their implementation. To obtain further information on these and many other actions carried out in the course of scientific and technical studies, we recommend the reading of the 2001 editions of the minutes of the congresses *The University and Cooperation for Development* (U. Valladolid), 2004 (U. de Murcia) and 2006 (U. Complutense de Madrid). The fourth edition is due to come out in 2008, edited by the Autonomous University of Barcelona.

2. DE initiatives in scientific and technical studies.

In scientific and technical studies diverse experiences have been published concerning the promotion of DE, especially in teaching related to engineering. Some of the most important are as follows:

- Ethical codes as an instrument to orient the moral climate of the university institution towards the moral values that underlie human development.
- The offer of specific training for teachers and the formation of teachers' working groups.
- The coordinated offer of government-regulated teaching, with special emphasis on its inclusion in the strategic planning proposals of the university.
- Mobility and visiting programs for university students and teachers coordinated with NGDOs.

2.1. Ethical codes

In the transmission of values, institutional *ethos* is fundamental, both the explicit and implicit, as embodied in the values held by the university institution. Even when democratic values are given intense and systematic attention in the lecture halls, if the institution itself and the teachers who give the lectures do not act according to the criteria and norms of a plural democratic institution, students will consider democratic standards to be an interesting classroom exercise, outside which they have no practical interest or value.

We thus enter on another topic which we wish to include in the initiatives for promoting ED in the universities: the drawing up of *self-regulating ethical instruments*, and in particular, *ethical codes*. Ethical codes are the written expression of "The will to formulate the responsibilities shared by an organisation and to publicly express the criteria, values and aims that identify it" [12:186]. In the light of this definition, some of the essential features of an ethical code are as follows: Firstly, after reflection, in a process in which all can participate, to formulate personal and organisational responsibilities; Secondly, we are referring to shared responsibilities, there is co-responsibility; Thirdly, there is a need to inform the public, to generate legitimacy among those affected who do not belong to the organisation; Finally, it includes reflection on the criteria, values and aims of the organisation. Another distinguishing feature of ethical codes is the importance of the process by which they are created. This

process is essential to the ethical quality of the code and a basic condition for its effectiveness. The participation of all those involved in deciding the norms and ethical values of the organisation is fundamental to ensure the efficacy of this self-regulating instrument [13].

One of the interesting experiences in this field was the drafting of the Ethical Code of the Higher Technical School of Industrial Engineering of Valencia (HTSIEV), passed by the School Board in November 2005. This code, apart from the values of liberty, respect, dialogue, responsibility, integrity and commitment, describes a series of attitudes consistent with these and invites the respect of all the bodies that constitute the HTSIEV (lecturers, students, administration personnel, etc.). This document is available at : www.etsii.upv.es A similar experience was the work carried out by the Polytechnic University of Catalonia at the end of the nineties, consisting of the Ethical Code Proposal presented by the University Board in July 2000. (This document can be seen at www.upc.es/catala/la-upc/govern/bupc/ under the number JG 24/7 2000.)

2.2. Training of university lecturers

One of the principal strategies for promoting DE in universities, in our opinion, involves teacher training. The effects of a good teacher training program leaves its mark in their understanding of the teaching-learning concept, which is changed from a reproductive concept of teaching to a transforming one [14].

The Educational Science Institutes could play an important role in promoting activities of this nature, offering training workshops to university teachers that include the DE perspective and supporting teaching innovations in this area. In this connection, we think the experiences of the Group for Teaching Innovation in Educational Values in Scientific and Technical Studies, of the Technical University of Valencia (GREVOL) and the Interest Group for Cooperative Learning (GRAC), of the Technical University of Catalonia are specially interesting.

The first of these groups is formed by 23 persons (mostly university teachers but also administration and services staff and members of NGOs committed to teaching-learning for change) who want to learn how to put into practice, in their respective spheres, the perspective of education in values. They are mainly young teachers with great teaching responsibilities. In most cases, the reservations held by these teachers are not shared by other members of their departments, either because they know nothing about education in values, or because they consider these proposals impractical within the context of university scientific and technical studies. The profiles of the members are highly interdisciplinary (with degrees in Industrial Engineering, Agricultural Engineering, Civil Engineering, Chemistry, Philology, Philosophy and Law), as well as in the subjects they teach (from statistics, electronics, drawing, hydraulic engineering, business economics, material chemistry and environmental projects to applied ethics, fundamentals of cooperation for development, French, and others). Most are teachers in scientific and technical subjects, in which it is difficult to deal with moral values. The main activities carried out by this group have involved learning subjects related to ethics and ethical learning, the creation of pedagogical tools for classroom applications (e.g. moral dilemmas), in presenting the experiences of group members in national and international forums, and in training other UPV teachers in these topics. To learn more about the characteristics, methodology and results of the experiences of GREVOL the web page of the group can be consulted (www.upv.es/grevol) and also a book edited by the members of the Group [15].

The GIAC appeared in February 2000 after an international seminar with teachers from different universities (especially from the Polytechnic University of Catalonia) interested in going deeper into the application of cooperative learning (CL) in teaching. CL is a generic term used to refer to a set of teaching procedures which begin with dividing the class into small mixed, heterogeneous groups. Students work together in coordination to solve academic exercises and investigate their own learning process. The aims of the GIAC teachers are to experiment with cooperative learning strategies, share their experiences and spread the use of cooperative learning to other groups. The group's main activities are periodic meetings to exchange experiences and the compilation and diffusion of interesting material within the area of cooperative learning. GIAC holds an annual conference whose papers are available at giac.upc.es. They receive institutional support from the ICE of the UPC and the Deusto University and belong to International Association for the Study of Cooperation in

Education, www.iasce.net. It should be pointed out that GIAC has received special mention in the form of the ninth prize for Quality in University Teaching, awarded by the Social Counsel of the UPC in 2006 for its project "GIAC (Cooperative learning Interest Group): Six years of cooperative learning at the UPC".

2.3. University studies

Within this area, various activities are carried out that have been described in the typology mentioned in the previous section. The conceptual framework of the technology for human development (TFHD) [16] has permitted the development and expansion of a series of DE events in Spain that began in the mid nineties and are still going on. However, the DE events do not only include TFHD. Other events are organised in fields such as Sustainability, starting from environmental analysis. These events will be described in a later section.

Below, we give a brief general vision, with a few specific examples. Then an analysis will be given of certain strategies to handle the transition to European Higher Education Area (EHEA), in which the importance will be emphasised of fomenting global actions directed towards strengthening DE subjects in academic planning.

General vision

The first point to clarify is the offer of specific subjects, fundamentally, though not exclusively, of *free choice*. To date, free choice has been the usual way of introducing DE to technical studies. In the Polytechnic Universities of Valencia, Catalonia and Madrid and the University of Coruña, among others, there has been a wide experience [17; 18, 19]. In Valencia, more than 2,600 students have taken the two free choice DE subjects on Cooperation for Development since the academic year 1995/96: Introduction to Cooperation for Development and Development Cooperation Projects [19]. The efforts to characterise the offers included in DE deserve special mention, both in terms of content and competencies, a need that is felt when monitoring and promoting the transversal extension of DE [17,19].

On the other hand, in the area of scientific and technical studies, there already exists considerable experience in carrying out *projects, studies and end of course projects* on the subject of international cooperation and development, reinforced by the existence of a national competition that awards prizes to the best projects in this field [20]. Various specific aspects for this type of project can be pointed out in academic regulations (formal requisites, formulation by objectives, a study of social impact, characterisation of subjects included or the obligatory condition of participating in real projects and programs of cooperation for development). Here we should emphasise the special difficulty of university institutions in offering viable proposals that are both useful to NGOs and external institutions, due to the difficulty of knowing their respective capacities and possibilities. Establishing ties with groups and lines of investigation greatly widens the opportunities for collaboration.

Another strategy is participating in *activities with social volunteers*, periods of *overseas social work* (which will be dealt with in the next section) as well as *work practice* in organisations and institutions involved in cooperation for development, normally regulated by educational cooperation agreements. There are many options and strategies to incorporate DE activities and many more for cooperation for development in general. The academic regulations are the formal instruments from which to choose the available options.

Finally, regarding *postgraduate and MA studies*, we should point out the profound changes that the adoption of the EHEA model is causing in these instruments. Up to now, the social perception of postgraduate studies has been intimately related to the permanent training offered by the degrees of foundations associated with universities. With the change in the educational model, the link between undergraduate and postgraduate studies will be closer, and there will be a clearer relation between postgraduate and doctorate studies by the adoption of official master degrees, issued either by the Spanish state or the Autonomous Communities. This change is considerable for its serious implications for universities and departments in the definition of the new offer. Up to now there have been very few opportunities in specific postgraduate studies in the area of engineering and

cooperation (the best example is the ISF program, developed with the UOC from the academic year 2002-03). But there are still many initiatives both in international cooperation and social work.

Free choice

The adaptation of already existing initiatives to the new context is fundamental. Therefore, *we suggest that the best strategy is to start from the experiences most consolidated and accepted by the universities; the freely chosen subjects*. Specifically, we suggest *three academic strategies* of concentrated effort, which provide a way to overcome the uncoordinated offer and an improved capacity to adapt to the change. They can be carried out simultaneously or in sequence, according to the possibilities and institutional interest. We will come back to this point later for the specific case of the Polytechnic University of Catalonia, documented with an analysis of its academic offer in the period 2002-03 – 2005-06. We will now deal with the three strategies based on free choice.

A. The first option consists of *grouping the free choice subjects in each centre* into categories so as to form groups of subjects that produce specific training itineraries. For example, joining free choice cooperation for development subjects with others with an international dimension, so that a student who completes them all will be qualified to work in an international context. These classification proposals could be an advantage if in the university there exist specific diffusion canals for the classes on offer. On the other hand, it is the simplest and most flexible option, since it does not require the express intervention of the teachers involved.

B. The second possibility is to *design a specific training itinerary of free choice subjects associated with an educational centre, school or faculty*. This can include doing end of course work and/or work practice in organisations dedicated to development to finish off. This way is feasible if there is considerable institutional support (and/or a favourable regulatory framework) and if there is a consolidated training offer accepted by the community. It involves a more concentrated effort than the first option since, while a faculty can design and propose a specific itinerary on these subjects it provides the necessary human and material resources and alliances.

C. The third possibility is to offer *a single training itinerary* in the university so that it can be followed by any student. This option has the disadvantage that it may cause the training offer to be reduced and that, according to the centre involved, there could be problems about which entity is competent to offer and run it (department, vice-rector, centre). It has the advantage of being easily defended in those universities in which cooperation for development is incorporated in the institution's policies at the highest level.

The three strategies were materialised in different contexts; for example, the first was conceived in the 2003-04 year by the Higher Technical Engineering School of the UPV. Alliances were procured among the free choice subjects as well as to direct a speciality of the centre's own offer.

The second strategy gave rise to the design of a specialist professional degree offered by the Higher Technical Engineering School of the UPV which, unfortunately, could not be consolidated for lack of interested students. This same activity was proposed by the engineering school of the UPC in the strategic planning process defined in 1999, although in the end there were only two free choice subjects. In this case the problem was not of the demand but was due to the teaching capacity offered by the centre.

The third strategy was implemented by the UPC in the area of Sustainability in the mid nineties, with the establishment of the UNESCO Chair of Sustainability, Technology and Global Change (later converted to UNESCO Chair of Sustainability and the basic unit of the UPC with the regulatory changes due to the new Spanish University Law), which finally became the offer of one subject.

With the aim of analysing these strategies in a specific case, the free choice subjects offered by the UPC in the year 2005-06 were studied. They were divided into four areas: Cooperation for Development (CD), Values and Skills (VS), Sustainability (S) and Science, technology and society (STS). The quantity and the time in existence of the offer were included in the analysis as well as student demand. It should be pointed out that the total offer is a little greater than two complete academic years (170 credits), with cooperation for development forming around half of the total. On the other hand, half of the offer can be considered as consolidated (taught for three or more consecutive years) and the other half was recently created (one or two years). In the UPC the free

choice subjects offered are renewed every year, according to the interest of the teaching centres and teachers involved.

These results show that the capacity exists to offer classes in these areas on a large scale (each subject usually involves more than one teacher) and that, due to the above described strategies the free choice subjects on offer have been specialised towards the field of cooperation for development and sustainability (the total university offer has not increased, but rather has been reduced).

The brief analysis shows that it is possible to undertake the reform of higher education integrating the present free choice offer into the definable degree options, and also that there exists a potential (among teachers) and demand (among students) to undertake collectively the challenge of postgraduate studies. It is important to point out that before the incorporation of the new EHES in certain circles there was a desire to cancel the free choice offer in order to give preference to personalised teaching and small groups in a “zero cost” reform context. With the aim of overcoming these pressures, it is considered to be specially important to have elements available to prepare for the change. This is why we conclude by emphasising the importance of an element that has already been successfully used in the experiences described: strategic planning.

All the elements mentioned can form a part of strategic planning, both in universities and other associated institutions. A good example is the process of the engineering school of the UPC, already described, extended thanks to the involvement of the Catalan ISF Association and, included in the project “Impuls de propostes d’Educació per al Desenvolupament Humà i Sostenible a la UPC 2000 – 2005”, received the ninth prize for Quality in University Teaching from the Social Council of the UPC in 2006. We should also point out the “Sustainable UPC 2015” plan approved by the governing Council in April 2006 (see www.upc.es/catala/la-upc/govern/bupc/, CG 7/4 2006), which recognises the university’s previous environmental record and its objective of sustainable human development.

Global interventions in the universities allow changes to be undertaken with better prospects of success than when subjects are uncoordinated. It is possible to design positioning strategies in teaching areas, both postgraduate for specialised studies, if they can be considered equal in rigour and academic quality to the rest of the proposals, and in undergraduate studies, if study plans are created that allow for the recognition of subjects associated to these topics or from another perspective. Both the UPC and the UPV are, at the present time (2007) designing proposals in both areas, using the previously described experiences as a base. Within a few years it will be possible to analyse the real impact of the proposals in the new context.

Mobility programs and overseas stays with NGOs for students

The final initiative presented in this work focuses on student mobility programs coordinated by universities and NGOs. We should point out that mobility programs can form part of university studies so far as they are included in training and solidarity programs with recognition of credits. We should also point out their ties with promoting technical assistance from the universities to the NGOs. This can happen directly, thanks to the design and execution of the mobility activities, and others indirectly constitute the first step in the training of experts qualified to carry out wide ranging applied research work.

“Reality recognition Projects” (RRP) is a program designed by the ISF with the aim of encouraging the participation of engineering and technical students in long term development cooperation programs. The program was conceived by the Catalan ISF in the UPC in 1999 as part of its strategic planning of ED activities in the university. There had already been consolidated exchange and international volunteer programs (e.g. those of the NGO Setem or related to peace programs such as those of the NGO International Social Service).

The novelty of the proposal described here lies in it being *specifically for engineering students as well as being designed for participation in cooperation programs with a considerable technological component.*

The program was developed thanks to the support to mobility in cooperation for development by the Centre for Cooperation for Development (CCD) of the UPC. The CCD is a functional unit under the direction of the rector and one of its principal activities is an annual fund-raising project to which

students donate 0.7% of their registration fees and university staff the same percentage of their salaries to carry out cooperation for development activities from the university. The fund also receives 0.7% of educational cooperation agreements between the university and the private sector. One of the principal objectives of the CCD is to promote mobility, providing clearly identifiable benefits to the university community.

From the beginning of the association, at the same time as the beginning of CCD in the nineties, ISF-Catalonia has sought subventions for the annual CCD campaign to contribute to diverse projects, since most of their volunteers were and still are members of the university community. The growth of the organisation meant that it needed a new organisational framework at the end of the nineties to deal with the planning of diverse micro projects. This framework was inscribed in the general ED program of the organisation. Two activities were foreseen, one short stay of two months (the PCR program, dealt with in the following section) and another of longer duration lasting four months or longer connected to initiation to research activities.

The PCR program consists of the following stages.

- 1- The creation of a list of place offers and PCR profiles related to ISF cooperation programs in developing countries (preferably at the beginning of the academic year) and later publication of the offers.
- 2- Selection of participants, bearing in mind among other criteria, previous experience in cooperation or solidarity, associative trajectory, technical profile, etc.
- 3- Basic training in cooperation for development and international volunteer work with the aim of, on one hand, ensuring students recognise the dynamics and actors belonging to cooperation programs in developing countries, and on the other to guarantee specialised technical training to ensure the quality of the activities. This training usually lasts for a month.
- 4- The assignment of a group (normally 3 or 4 persons) for a minimum of two months to a project or activity in a development program (coinciding with summer vacation).
- 5- Subsequent evaluation of the experience and awareness and support activities for the next group of PCR participants (in the course of the following academic year).
- 6- A total of 61 UPC students took part in these activities between 1999 and 2004. The growth of the program is closely tied to the capacities of ISF-Catalonia, which had a budget of €500,000 for the first time in 2004.

In spite of the fact that the impact of the program in terms of quantity is small (around 15% of the mobility produced by the CCD of the UPC), we should point out that the focus has always been more interested in terms of quality. The experience has strengthened the institutional and creative capacities of the ISF as a result of this approach. In general, students who participate both in the technical and strategic aspects of cooperation programs repeat the experience, either with ISF or in their subsequent professional careers. The subsequent involvement of the participants has been "strong" in around 40%, "moderate" in another 40% and "low" in 20% (according to the evaluation of the group coordinators. About 20% of the participants have subsequently acted professionally in international cooperation projects. The average direct costs per place offered in this period has been around €2,000 (apart from inventory and materials), co-financed, in the case of UPC students, by 10% from the participants, 75-80% from the CCD and 10-15% from other sources [21].

It should also be pointed out that the initiative has spread to other university-ISF partnerships in other associations of the Spanish federation. Furthermore, similar initiatives have been organised (with no initial coordination) by NGOs of Engineers without Borders (ISF/EWB). The experiences of ISF/EWB in the US and Canada have been cited in the report *Innovation: applying knowledge to development* (2005) of the team of Science, Technology and Innovation of the Millennium project of the UN. With the objective of illustrating the variety of the international proposals, we give below a brief description of those of the UK EWB and EWB-ISF Canada.

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