Integration of Cooperation for Development in Survey Engineering curricula at the European Higher Education Area (EHEA) Framework

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Key words: Poverty, Cooperation for Development, university, European Higher Education Area (EHEA), Survey Engineering, Land Management, Education, curricula, integration.

SUMMARY

Survey Engineering curricula involves the integration of many formal disciplines at a high level of proficiency. The Escuela de Ingenieros en Topografía, Cartografía y Geodesia at Universidad Politécnica de Madrid (Survey Engineering) has developed an intense and deep teaching on so-called Applied Land Sciences and Technologies or Land Engineering. However, new approaches are encouraged by the European Higher Education Area (EHEA). This fact requires a review of traditional teaching and methods. Furthermore, the new globalization and international approach gives new ways to this discipline to teach and learn about how to bridge gap between cultures and regions. This work is based in two main needs. On one hand, it is based on integration of basic knowledge and disciplines involved in typical Survey Engineering within Land Management. On the other, there is an urgent need to consider territory on a social and ethical basis, as far as a part of the society, culture, idiosyncrasy or economy. The integration of appropriate knowledge of the Land Management is typically dominated by civil engineers and urban planners. It would be very possible to integrate Survey Engineering and Cooperation for Development in the framework of Land Management disciplines. Cooperation for Development is a concept that has changed since beginning of its use until now. Development projects leave an impact on society in response to their beneficiaries and are directed towards self-sustainability. Furthermore, it is the true bridge to reduce gap between societies when differences are immeasurable. The concept of development has also been changing and nowadays it is not a purely economic concept. Education, science and technology are increasingly taking a larger role in what is meant by development. Moreover, it is commonly accepted that Universities should transfer knowledge to society, and the transfer of knowledge should be open to countries most in need for developing. If the importance of the country development is given by education, science and technology, knowledge transfer would be one of the most clear of ways of Cooperation for Development. Therefore, university cooperation is one of the most powerful tools to achieve it, placing universities as agents of development. In Spain, the role of universities as agents of development and cooperation has been largely strengthened.

All about this work deals to how to implement both Cooperation for Development and Land Management within Survey Engineering at the EHEA framework.

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1. SCIENCE AGAINST POVERTY

It was held recently in Spain, under the chairmanship of the Kingdom of Spain, a Conference meeting in La Granja, Segovia, called Science and Poverty, on last 8-9 April 2010. If there is anything that can exemplify the contrast between the developed world and the undeveloped one are precisely the concepts of Science and Poverty. Consequently, these different poles science and poverty could be crucial for creating of cultural bridges, economic and social in order to close both real worlds. The contribution of all sciences is necessary to remove poverty.

Science itself, conceived as a structured and systematic knowledge, can not be an effective tool for poverty reduction. However social sciences can play a role on this matter by creating incentives for researchers to transfer scientific attention to relevant social problems; building partnerships and developing long term relationships between scientists and decision makers.

For example, problems related to climate change and access to renewable energies; health; nutrition and agriculture; water and sanitation and education and training are being approached by two different point of view: social-political one and scientific one. So that, research and innovation could contribute to answer these poverty issues because they are closing gaps in knowledge and technology.

Like the FIG Congress subject explains: "the changes in current world and the importance of cultures and understanding the differences in different parts of the world including professional development, traditions and legislation at the same time when the world is more harmonised with common standards and global markets".

It can be summarised like teaching and learning (university education) could help to transfer knowledge and technology to poverty countries societies. Cooperation for development should be learnt and taught in this context.

2. COOPERATION ROLE

University cooperation programmes are essential for this bridging approach. Cooperation means work together, learn together, and develop together. So that, people is an essential asset for that cooperation. But also, education is one of the basic foundation pillars for bridging, especially higher education at university. Unfortunately, the real world shows us not private promotion is not enough to push cooperation and political and governmental roll is required to meet success, basically due to the social and political society structure. The public sector has an important role to participate in creating regulations and flexible atmosphere favourable to knowledge and technology transferring and in supporting transparency in technology markets, furthermore, in avoiding for market malfunction. Following discussions at the "Science

against Poverty" Conference: "*Open innovation, a true bottom-up revolution and sustained long term research programmes need to be properly set to create a good environment for knowledge interaction*."

One of the most important mutual benefits between private and public bodies is based on efficient use of resources. The uses of resources are not only related to the energy or water, but to the land and its management. The land is the framework of rest of resources and the field in which resources reach more efficient use. However, it is not enough the Land Management like technology or science. It is necessary an ethical ingredient. Cooperation for Development implies to promote a new asset which is the ethical side of R&D on poverty.

3. UNIVERSITY AND COOPERATION FOR DEVELOPMENT

Education has a strong responsibility from our point of view. It is about the fight against social exclusion and poverty, by using new and free of charge or low-cost technologies and innovative methods. There is a need for researching in education and for training in order to contribute to strategy. Two discussed aspects are involved.

Involvement of universities is based on two arguments. First one, the social university role and their commitment to solidarity, based on academic, scientific and student communities for participating in Cooperation for Development tasks. Second one, the universities have knowledge skills and experience to improve the living conditions and contribute to the society development.

Cooperation for Development is focused on wide complex, differentiated and heterogeneous range of actions. It requires a clear institutional vision in order to be accurate in a framework of many specific actions without big impact.

Under these circumstances, the Spanish university meets next challenges:

- Training and qualification of human resources.
- Scientific and technological research on priority issues for Development.
- Distribution and transferring of knowledge and technologies.
- Analysis, diffusion and consciousness of Development issues and international cooperation.
- Training of technicians and managers on Cooperation for Development.

These challenges are also supported unequivocally within Master Plan for Spanish Cooperation 2009-2012 (*Plan Director de la Cooperación Española 2009-2012*), Ministry of Foreign Affairs and Cooperation, Government of Spain.

4. EDUCATION FOR DEVELOPMENT AND EUROPEAN HIGHER EDUCATION AREA (EHEA)

Education for Development can be defined as all educational activities related to training university teachers and students in Cooperation for Development. This set of actions has evolved from the assistance, critical development, and helpful education and, most recently, Education for Sustainable Development. The immediate future is based on the Global

Education for Development. This last challenge is defined as education for global citizenship, including cosmopolitan citizenship education. That is, membership of a universal community of people where the essence is the human condition and ethics is based on values of human rights. And, of course, this concepts (sustainability, citizenship, globalness, from the point of view of Land Management, where

Implementation of the new European framework for education, European Higher Education Area (EHEA), recently implemented in Spain allows formal changes which give us possibility to improve on Cooperation for Development and Education for Development.

It is well known EHEA is based on skills (specific, general instrumental, interpersonal) that permit a variety of new capabilities. We would like to articulate the most significance for our subject: interdisciplinary teamwork, working in an international context, interpersonal relationship skills, recognition of diversity and multiculturalism, critical thinking, ethical commitment, independent learning, adapting to new situations, creativity, leadership, knowledge of other cultures and customs, initiative and commercial character, motivation for quality, sensitivity to environmental issues, etc.

University offers a multiple ways to promote the Education for Development like formal training (subjects in degrees and postgraduate qualifications, practice public or private entities, projects...), training (teachers, volunteers, seminars, exhibitions, theme days, etc) and R&D+I (from projects to master and doctoral theses, publications, research groups, etc). Nowadays, Universidad Politécnica de Madrid is offering two ways on formal training: Graduate on Cooperation for Development and Master on Technology for Human Development and Cooperation (*Tecnología para el Desarrollo Humano y la Cooperación*)

5. SURVEY ENGINEERING AND MASTER IN GEODETIC AND MAPPING ENGINEERING

Topography studies in Spain have their origin in the creation, in 1954, the School of Survey Engineering, Ministry of Education. The motor of this institution building is the Geographic and Cadastral Institute (*Instituto Geográfico y Catastral)*, a public body which needs to get technical staff trained and educated. First official staff was called National Body of Surveyors Assistants Geography and Cadastre and they are the geographical base for Land Management.

On the 1st June 2005, it was agreed the establishment of the School of Engineering in Surveying, Geodesy and Cartography by transformation of the School of Survey Engineering. Its task is the organization, administration and management of education process for obtaining of the degree on Engineer in Surveying and Engineer in Geodesy and Cartography. This type of studies provides important knowledge and staff for Land Management teams in both public and private industry.

EHEA provides new framework, aspirations and challenges. A new master title is proposed to replace that of old degrees in Geodesy and Cartography. Technologies related to the geographic data acquisition and efficient management has grown rapidly in recent years in engineering and in many aspects of daily life of citizens. At least 80% of public and private decisions are based on aspects with a spatial component, and, of course, Land Management.

For this reason, GIS and Cartography is often called "infrastructure of infrastructures". In order to meet take right decisions, all countries conduct systematic mapping projects in their territories at different scales and on multiple environmental phenomena and society in general.

These ideas involve also Cooperation for Development and Development through some of the skills provided by the master studies: ethical and professional attitude, respect for human rights and recognition of diversity and multiculturalism, recognition of equal opportunity principles and universal access and non-discrimination.

6. GEOMATIC LAND MANAGEMENT

The master is developed with a modular structure within a thematic reference. The students might choose to structure learning according to their requirements. These are the three options (table 1):

- Spatial Information Management
- Geomatic Land Management
- Land Information Systems Management

The study strategy implies to implement Cooperation and Development into the Geomatic Land Management. So that, at the end of journey, the student has got the following skills in some level. All are according to the Development, Cooperation, Land Management, and the gap between cultures, uses or countries. Therefore, the expected results are:

- Identify all the elements of territory (layout and features)
- Provide negative/positive aspects that affect to territory.
- Get the basic documents (mapping) for the diagnosis of the territory.
- Recognize territorial elements which could help for achievement of the Millennium Development Goals.
- Analysis of the basic environmental parameters (risk, management, urban, etc)
- Interactions in the environment and human activities (infrastructures, urban, etc)

Next table 1 is showing the subject distribution in the option Geomatic Land Management. It is easy to find the mentioned goals and skills for each one. It is also showing, language, ECTS and semester where each one is applying. Under this scheme Cooperation for Development is found.

Matter	Subject	Semester	Type/ Language	ECTS
Geomatic Land Planning	Urban and rural development	1	Ob/I/E	4,5
	Urban Networks and Systems	1	Ob/I/E	3
	Land: administration, politics and legal system.	1	Ob/E	4,5
	Land economics	1	Ob/I/E	3
	Metropolitan areas development.	2	Ob/I/E	3
	Geologic Cartography applied to Land Planning	2	Ob/E	4,5
	Land Information Management System	2	Ob/I/E	4,5
	Cooperation for Development	2	Op	3
	Land Conflicts Management. International administrative borders	2	Op	3
	Land Distribution and Management at coastal area	3	Ob/E	4,5
Environmental Engineering	Sustainable Development and Environment	2	Ob/E	3
	Natural Hazards Management.	3	Ob/E	4,5
	Danger and seismic risk	3	Ob/I/E	3
Cadaster	Valuation methods. Financial Concepts	3	Ob/E	4,5
	Real Estate Valuation. Information Analysis.	3	Ob/E	4,5
	Property Management. Land Register and Cadaster	3	Ob/E	6

Table 1. Modular structure master within a thematic reference
Source: Studies Plan of Master Universitario en Ingeniería Geodésica y Cartografía por la Universidad Politécnica de Madrid. Approval date 23/07/2010 by ANECA (National Agency for Evaluation and Accreditation of Quality)

7. COOPERATION FOR DEVELOPMENT SUBJECT

The subject deals to understanding about development aid and development cooperation, main principles and historical evolution, the complexity of measurement about human development and poverty and how it is suiting with Land Management, not only from decision makers point of view.

A table of contents can summarize as the following:

1. Fundamental concepts.
2. Human Development
3. Measuring Human Development.
4. Inequality in Human Development.
5. Geography of Human Development.
6. Sustainable Development.
7. Development Theories
8. International organizations.
9. Geography of Underdevelopment.
10. Consequences of underdevelopment
11. Fight against underdevelopment.
12. Cooperation projects
13. Pilot Programs
14. Population and Resources
15. Crisis management.

8. CONCLUSIONS AND RESULTS

As far as we know it is the first time that this subject is being offered in a formal training in Spanish Land Management studies. It implies the importance of the subject, the social demand, the involvement of the University to meet those demands and the European trend towards globalization approaches.

First results are showing the attention that the students are paying for it. Most of the students have chosen it. At same time, other subjects related to any kind of management are also selected. We have not got results for all master period, but it is predicted to evaluate the importance and relevance for students and future jobs.

We strongly believe that the result of having developed a degree with these features goes beyond the mere profession of Survey Engineering and proves the importance Land Management linked to importance of cultures. It is marking the understanding of differences between different parts of the world, different professional developments and different traditions and legislation.

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