

Geographic Information Knowledge Transfer for a Sustainable Postgraduate Education

Marco PAINHO, Paula CURVELO

Abstract

In spite the recent expansion in higher education, Mozambique and Cape Verde still suffer from a critical shortage of highly qualified experts, capable of leading the necessary changing processes in society and able to educate future generations of professionals, especially in domains seen as fundamental for the development and execution of appropriate public policies. In order to give an appropriate answer to a lack of skilled work labour in a field considered strategically relevant to pursue the socio-economic development policies in these two countries, a Portuguese university (ISEGI-UNL), in partnership with the University of Cape Verde and Catholic University of Mozambique, with the support of ESRI-Portugal, conceived a three year project that, through an efficient use of GIS, aims at strengthening the human and institutional capacity for solving local and regional problems, and tries to create the conditions to multiply the benefits of the transfer of GIS education know-how.

1. INTRODUCTION

Although in the last few decades Cape Verde and Mozambique have registered an increase in the number of higher education institutions, their teaching systems have not had the capacity to absorb the growing demand for new applicants, nor have they been able to fight against acute regional disparities in wealth, development and qualified human resources (Accra *et al*, 2002).

The reduced offer of technology oriented courses by recently created higher education institutions and the economic situation of these two countries has been an obstacle for the implementation of a strategy aiming at strengthening the capacity to improve accessibility to quality higher education, set on the valorisation of human resources and based on the use and reinforcement of science and technology as instruments for the understanding and

resolution of national problems, related to the sustained economic growth and the challenges of economic and social development.

This situation emphasizes the quest for the development and delivery of more relevant and more technology oriented academic courses (that meet international quality standards) and is responsible for the continuous increase in the number of students seeking abroad a higher level of education, specifically concerning the courses in the areas of new information technologies, that aim at educating highly trained personnel prepared to deal, in an efficient way, with the challenges of the global and competitive open market in which we are inserted.

For historical, political, cultural and linguistic reasons Portugal remains one of the most important destination countries for Cape Verde and Mozambique higher education students. The choice of this particular destination for migrant students is also related to the source of funding of their studies (a significant number of scholarships is provided by Portuguese academic institutions).

However, the complex reciprocal relationships induced by this kind of “migration” are raising growing attention among researchers and policy-makers. If on the one hand, this kind of emigration tends to translate into negative phenomena such as brain drain and consequent human resources shortages in the origin countries (Dumont, J. C; Lemaître, G., 2005), on the other hand it may also have positive consequences for the development of emigration countries through temporary returns and other Diaspora options facilitating the transfer of human, financial, technological and social capital back to the countries of origin (IOM, 2005a, 2005b, 2006).

These positive consequences are being explored by some teaching institutions in Portugal, specifically by demonstrating the relevance of many of the courses given in order to satisfy labour market needs and socio-economic development priorities to the members of the Community of Portuguese Language Countries, on which Cape Verde and Mozambique are included.

The new learning and teaching methods possibilities aiming at improving students learning opportunities and increasing flexibility in how, when and where they study, is also a decisive factor in minimizing the negative effects associated with this migration phenomena, without, however, compromising the resulting benefits.

2. THE SuGIK SCOPE UNDER THE EDULINK PROGRAM

In order to give an appropriate answer to this shortage of GIS qualified professionals in Mozambique and Cape Verde, the Instituto Superior de Estatística e Gestão de Informação of the Nova University of Lisbon - ISEGI-UNL (as an applicant member) in partnership with the University of Cape Verde - Unicv and the Catholic University of Mozambique - UCM (as partners), and with the support of ESRI Portugal (Associate Member), presented a proposal to the **EDULINK Program**¹ for a **Sustainable Geographic Information Knowledge Transfer for Postgraduate Education - SuGIK**.

This three year project aims at strengthening the institution and human capital of these two selected ACP higher education institutions (HEIs) by supporting the transfer and the implementation of a curriculum development model in Geographic Information Science and Technology (GIS&T) and the training of local teachers who will be involved in GIS&T state-of-the-art postgraduate courses management and implementation in order to provide target HEIs with quality standards, resources and technologies for long-term enhanced cooperation in the area of GIS&T advanced education.

The target groups of the **SuGIK** are the senior management and faculty staff of the Geographic Information departments of the partner institutions, graduate students in GIS relevant areas and GI target professionals in local and regional government offices in both regions.

The final beneficiaries of the **SuGIK** project are: Community Based Organisation(s); Local authorities, Research organisations/Researchers, SME/SMI businesses which rely on the use of geographic information in a context of broader analysis, every community and population benefiting directly or indirectly from the progresses resulting from the efficient use of new GIS technologies in solving local and regional problems.

¹ **EDULINK** is a programme funded by the European Union (EU) and implemented by the ACP (African, Caribbean and Pacific Group of States) Secretariat to improve the effectiveness and the impact of ACP-EU co-operation in the field of higher education.

EDULINK's overall objective is to foster capacity building and regional integration in the field of higher education through institutional networking, and to support a quality higher education system, which is relevant to the needs of the labour market, and consistent with the socio-economic development priorities of ACP States (ACP Secretariat, 2007, 2008a, 2008b).

Further information is available at: <http://www.acp-edulink.eu>

3. THE SuGIK OVERALL OBJECTIVE AND THE PROPOSED APPROACH

Based on the previous experience of ISEGI-UNL's GIScience education and co-operation networking in the field of Geographic Information Science and Technology (Painho, 1999; Painho *et al*, 1995, 2007c), and framed on an adequate approach to combat the tendency towards brain drain and to mitigate the adverse effects of large scale migration of highly qualified resources from ACP Portuguese-speaking countries, the **SuGIK** project aims to develop, implement and disseminate a best practice model consortium of EU-ACP HEIs for the institutionalization of GIS&T postgraduate courses in Cape Verde and Mozambique in order to promote regional and multilateral co-operation, in the perspective of mutual interest, with a view to enhance and multiply the effects and the benefits of institutional networking between HEIs, in a scientific and technological field considered strategically relevant to support decision making in key social and environmental development areas

The specific objective of the action is to enhance the overall management, academic, and technological capacity of the University of Cape Verde and the Catholic University of Mozambique, in order to support the transfer and the implementation of the three editions of a GIS&T postgraduate course.

By supporting target HEIs with training, quality standards, resources and technologies, this action will provide scope for mutually beneficial structural and educational development in a perspective of long-term collaboration allowing other network co-operation initiatives and further study and skills transfer opportunities between the partners and other European institutions.

This course will have as a reference the current curriculum program of GIS&Science postgraduate and master program offered by ISEGI-UNL (Painho *et al*, 2007b, 2007 c), which will be, in the three years of the project implementation, the object of revision and subject to a process of adequacy consideration, ensuring its articulation and relevance with the needs of the labour market, as well as its articulation with the priorities of economic and social development established for both regions.

In the first year of the project the course will be delivered by the ISEGI-UNL professors to a group of selected students from both partner institutions. In the second year this course will be given by the teachers of ISEGI-UNL in a partnership with selected students from the first edition. Lastly, in the third year of the project, all teaching activities will be given by former students of this course (from the first and second editions), although the teaching staff of ISEGI-UNL will still maintain an overall supervision.

4. EXPECTED RESULTS AND PROPOSED ACTIVITIES

The relevance of the **SuGIK** project relies on the capacity to supply the needs and constraints of Cape Verde and Mozambique in GIS professional and GIS advanced education. For the target groups and, particularly, for the final beneficiaries, this relevance relies on innovative and effective ways to enhance and multiply the effects and benefits of advanced education co-operation, in a scientific and technological field considered strategically relevant to pursue the socio-economic development policies in these two countries (application of GIS knowledge and technologies in health, disaster prevention, planning action, etc), and to combat the tendency towards brain drain by mitigating the adverse effects of large scale migration of highly qualified resources from Cape Verde and Mozambique.

In this perspective, the **SuGIK** project intends to contribute to strengthen of the human capital in the two partner institutions, by transferring knowledge in the technical, didactical, and scientific domains, allowing for a gradual transition, based on quality criteria and adequate resource and technology use, necessary for the sustainability of the process and the continuity of GIS advanced teaching offer.

Therefore, the main outputs and expected results of this project are:

1. Establishment of a best practice model consortium of EU-ACP HEIs for institutionalization of GIS&T postgraduate courses;
2. Make available the required technical, organizational, and management resources able to support the delivery of a GIS&T postgraduate course;
3. Provide Postgraduate Diploma Certification of approximately 40 students of UniCV and 60 students of UCM in GIS&T;
4. Re-design and delivery of the eight current curricular units of ISEGI-UNL's postgraduate course in GIS&T in the UniCV and UCM by transferring state-of-the-art knowledge (curriculum contents, GIS technologies, educational approaches and technologies) to local teachers (Painho *et al*, 2006, 2007a) ;
5. Upgrade and enhancement of the qualifications of teaching staff and administrators of the two ACP HEIs for effective networking of higher education centres in research, science and technology innovation;
6. Best practices sharing and dissemination of results.

To achieve the above mentioned results, six major activity areas will take place.

1. Activity Area 1: Project management development - This activity area will include the development of the Project Management operations and will start with an opening workshop event allowing for project kick off and validation of the working

procedures related to the project management and the initial action plan operations review. These activities will initiate all project activity areas, the establishment of guidelines for project management procedures and the detailing of project schedule deliveries, actions and meetings.

2. Activity Area 2: Administrative and organisational project implementation – This activity aims at providing conditions for the management and quality assurance of GIS&T postgraduate course reformulation, delivery and assessment and to support ACP HEI's faculty during the transition period for the transferring of expertise and knowledge between the ISEGI-UNL and the UniCV and UCM faculty and staff.
3. Activity Area 3: Implementation and Delivery of the 1st edition of GIS&T postgraduate Course Training Activities and transition for the second and third editions. This activity area will include the set of actions directly related with postgraduate course delivery by ISEGI-UNL's faculty and selected teachers of UniCV and UCM.
4. Activity Area 4: Reformulation and design of the GIS&T course and curricula content development for the 2nd edition of the course. This activity area will assist the reformulation and design of the GIS&T course and *curricula* content development for the 2nd edition of the course.
5. Activity Area 5: Support a self-sustainable GIS&T postgraduate programme delivery and innovation during the course's 3rd edition – This activity will promote the upgrade and enhancement of qualifications of teaching staff and administrators of the two ACP HEIs, in order to ensure that knowledge transfer will be made in an adequate manner and that all conditions are fulfilled for an effective handover of responsibilities to the partner universities.
6. Activity Area 6: Promote research investigation concerning project achievements and disseminate results in order to encourage new cooperation between HEIs partners and GIS&T private sector. Fostering a closer relationship with both HEIs and other institutions, mainly by providing sources of research. Short training sessions will be offered to industrial sector employees, and students will be encouraged to spend time in private sector laboratories to prepare their final project modules.

These activities presuppose an active participation and continuous involvement of the applicant and partner institutions. A contribution from the Associate Member during the three years of the project is expected, specifically by providing GIS software licenses needed for the course teaching, but also by ensuring technical and scientific support to teaching staff and students.

AN APPROACH ENSURING THE LONG-TERM SUSTAINABILITY OF THE PROJECT

By addressing specific attention to management/administration, academic, research and technology levels of HEIs capacity building, and in an effort to pursue higher education policies already under way in Mozambique and Cape Verde, the **SuGIK** project is designed to directly address core problems that hinder effective partnerships between HEIs in ACP countries and the EU, and ensuring its continuity beyond the project's conclusion. Therefore, some of the potential difficulties addressed and solutions presented are:

- Ensure the correct administration of the inter-institutional network in order to support, policy, management, planning and administrative capacity, required to promote the envisaged institutional co-operation and for the effective cooperation of higher education centres in the areas of research, science and technology innovation,
- Promote the active involvement of target groups and the participation of the final beneficiaries in order to maximize GIS academic quality and the relevance of this action in the local and regional context
- Guarantee the implementation and delivery of GIS advanced program in accordance to the needs of the local and regional labour market, and consistent with each country's socio-economic development priorities.
- Integrate a set of solutions that try to support a self-sustainable GIS&T postgraduate programme delivery and an innovative approach during the execution stage of the project and, especially, after its conclusion, in order to go against the tendency towards brain drain and mitigate the adverse effects of large scale highly qualified resources migration from ACP Portuguese-speaking countries
- Promote the multiplying effects of the project through the exchange of experience with other higher learning institutions of the EU and ACP countries encouraging mutual knowledge sharing in GIS application and investigation areas.

The concepts of "knowledge transfer" and "capacity building", transversal to the proposed approach and the underlying specific objective that **SuGIK** project expects to achieve, aim at reinforcing the sustainability of this initiative, assuming that effective benefits of higher education networking rely on the creation of a suitable institutional framework that tries to integrate a set of measures able to respond to the main challenges and risks associated with each action proposed. These risks, by compromising the expected outcomes of the project, will be subject to detailed analysis in an initial stage. In this sense, the development of a thorough contingency plan during Activity Action 1, in order to promote a mutual knowledge exchange for detailed risk analysis, is considered of crucial importance.

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AUTHOR INFORMATION:

Marco Painho – painho@isegi.unl.pt

Paula Curvelo – pcurvelo@isegi.unl.pt

Organization - Instituto Superior de Estatística e Gestão de Informação da Universidade Nova de Lisboa.

Address – Campus de Campolide, 1070-312 Lisboa, Portugal

Telephone - +351 213870413 Fax - +351 213870400