

# GIS Virtual Communities: Thinking, Living and Breathing GIS

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## Abstract

ISEGI - New University of Lisbon (UNL, Universidade Nova de Lisboa) teaches, since 2002, a MSc in Geographical Information Systems and Science (GIS&Sc) through eLearning which is the first MSc in Portugal offered in distance learning mode. The MSc is now on its seventh edition with more than 240 students enrolled and 9 professors, creating a large group of people with a special interest on Geographical Information Systems (GIS) and forming a community of practice. In order to keep our alumni in close contact and pursuing long life learning objectives, we have created and developed a Virtual Community (VC) with a special focus on GIS. This community, amongst other things, has encouraged social interactivity and scientific and technologic knowledge sharing. At the end some of the accomplished results are discussed and some conclusions are presented.

**Keywords:** Information and knowledge systems; Collaborative learning; Non-formal and informal communication; Student-teacher interaction; Learning communities; Social Networks; Geographical Information Systems

## 1. Introduction

Universitary electronic distance learning has become a credible alternative to traditional presential teaching methods. Long-life learning is a need imposed by Information Society (Livro Verde 1997). eLearning fulfils this need as it allows people to reach universitary knowledge whenever they need, minimizing impacts on their professional careers caused by absenteeism that presential learning methods impose. The development of information technologies has made possible the reformulation of distance learning courses. New tools for education were made available using the Internet. eLearning is the term used for designating the use of these tools in educational environments. A new paradigm in knowledge transmission emerged. Universities are no longer just places where students go physically to get in contact with knowledge. Instead, they are becoming knowledge mediators. Traditional classrooms are becoming VCs that share common interests and exchange knowledge. These new tools are replacing some of the traditional methods that were used in distance learning and are also competing with presential methods. The main reason for this increase is the wide range of ready-to-use eLearning solutions available in the market. These solutions are quite similar in providing multimedia resources like video, sound, synchronous

sessions, instant messaging, discussion boards, etc. On the other side, knowledge acquisition strategies are needed to motivate students. The existence of good quality pedagogical materials, synchronous sessions, discussion boards, technical and emotional support running over an appropriate information and knowledge systems is crucial for the successful implementation of this type of courses. Some of these new tools are labeled as social tools because they help interaction behaviors and promote the emergence of VCs.

Although groups have been interacting online since the 70s, the concept of VC is relatively recent (Turkle, 1995). VCs can be defined as “social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace” (Rheingold, 1994). VCs facilitate knowledge exchange in ways such online group meetings that were not possible before, people exchange knowledge without even meeting one another in the real world. Nowadays more and more people participate in VCs to acquire knowledge and to solve specific problems. The biggest challenge in fostering a VC is the willingness to share knowledge with other people. As Dixon, 2000, pointed out “build it and they will come” is one of the myths of knowledge sharing in VCs, it won’t happen just like that. To smother this concern at least two issues are involved: personal cognition and social influence. Personal cognition is based in self-efficacy and outcome expectations and social influence is based on trust (Bartol et al., 2002). Outcome expectations are related with reward systems and are important factors influencing the decision to share knowledge, if VC participants believe that they will receive intrinsic benefits such as self-satisfaction, social recognition, then they will also have pleasure in knowledge sharing (Kankanhalli, 2005). Trust is another important factor in the success of VCs, the lack of face to face communication makes it harder for VC participants to share their knowledge. Trust provides the necessary environment that enables interaction with other people in a more generously way (Ridings et al., 2002).

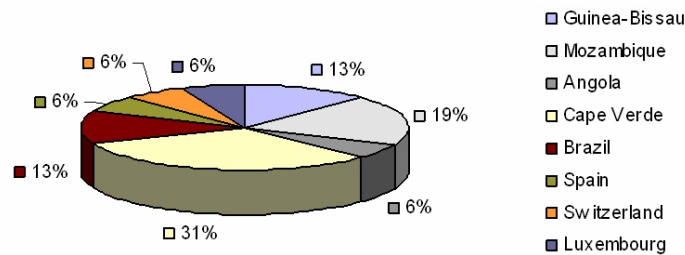
Another important concept in this study is the Community of Practice (CoP), that can be described as a group of people who share a passion for something that they know how to do and who interact regularly to learn how to do it better (Wenger, 2000). In this study our CoP is a learning community formed with the students and teachers of the MSc GIS&Sc.

## **2. The MSc course in GIS&Sc (E-learning)**

This MSc uses the know-how acquired in several years of GIS teaching at ISEGI-UNL. It targets all geographically dispersed persons in Portugal, Brazil, African countries of Portuguese language, East Timor and all dispersed communities of Portuguese expression. It aims everybody that has to deal with geographical information like, researchers, educators and GIS managers of private and public organizations. Candidates must hold a degree in Statistics and Information Management, Geography, Economy, Engineering, Computer Science, Mathematics, Regional and Urban Planning or other to be selected by curricular evaluation. This is a web-based course and is currently on its 7<sup>th</sup> edition (Table 1). More than 240 students from several Portuguese speaking countries have already taken this course (Figure 1).

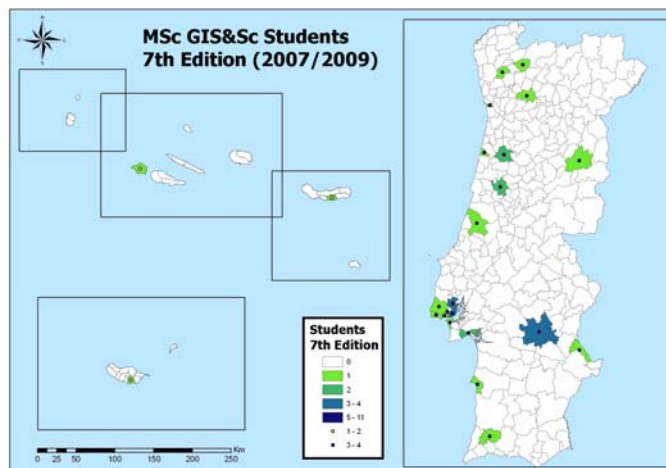
	1st Edition	2nd Edition	3rd Edition	4th Edition	5th Edition	6th Edition	7th Edition
Angola	1					1	5
Brasil	1		1				1
Cabo Verde	2	1	1		2		3
EAU			1				
Espanha				1			1
Guiné-Bissau	2						
Moçambique	2			1	3		
Portugal	32	39	38	36	26	26	37
Suiça					1		
Luxemburgo						1	
<b>Total</b>	<b>40</b>	<b>40</b>	<b>41</b>	<b>38</b>	<b>32</b>	<b>28</b>	<b>47</b>

**Table 1** - Origin of students for all the 7 editions of the Msc in GIS&Sc.

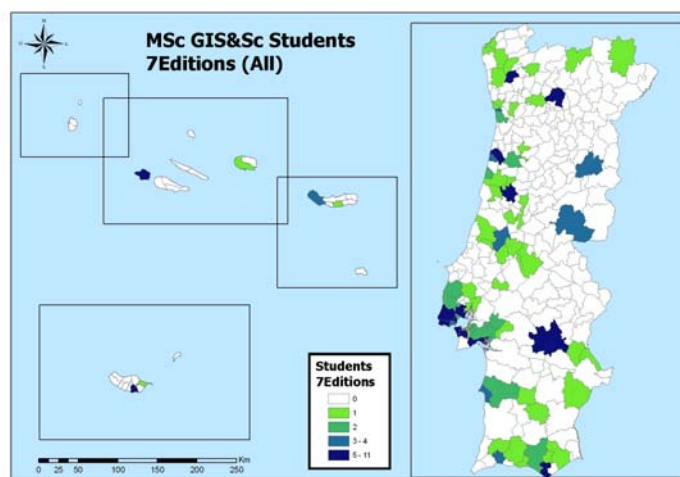


**Figure 1** - Distribution of the international students by country of origin.

On its 7<sup>th</sup> edition had 55 students (spatial distribution on Figure 2), 47 new students and 8 students from previous editions. This course has also 9 Teachers and 1 Coordinator. Joining all the participants from the 7 editions we have VC with 243 participants (spatial distribution on Figure 3). The 8<sup>th</sup> edition is planned to start in September 2008 and on this edition will be used a new set of social tools: Audio Discussion Boards, Audio e-mails, Wiki's and Blogs.



**Figure 2** - Origin of students for the 7th edition of the Msc in GIS & Sc (2007/2009).



**Figure 3** - Origin of students for all the 7 editions of the Msc in GIS&Sc.

The MSc in GIS&Sc is fully adapted to the Bologna Convention and its structure comprises the following elements:

- A Specialization course assembled with a set of Curricular Units, equivalent to 60 ECTS (European Credit Transfer System), lasts two curricular semesters.
- A scientific Dissertation, Professional Training or Project Work, equivalent to 35 ECTS with the duration of one semester.

The structure of this course is illustrated in Figure 4. Course Units are composed of several modules. Each module is composed of pedagogical materials, exercises and exams. The pedagogical materials, depending on the Course Unit, are in diverse formats (e.g. geographical data, documents, etc.). There are also exercises related with the topics of the discipline module that students can practice. In the end of each module there is a progression exam. In the end of each module, there is a 2 hour synchronous session.

The eLearning platform used enables the use of synchronous and asynchronous tools. The synchronous tools are the instant messaging and the synchronous sessions that take place in the end of each Course Unit module. The instant messaging is a tool that allows students to communicate between them and with the course teachers whenever they want. The synchronous sessions are virtual classes with, approximately, two hours length. They are scheduled in the beginning of the year and each discipline has between 4 and 6 sessions. These virtual classes take place after 20:00 during the week.

Besides the pedagogical content, there is a set of Social Tools. This set of tools includes instant messaging, e-mail, discussion boards, synchronous sessions, social bookmarks and a digital drop box. This structure is permanently accessible to all type of users: students, teachers and coordinators. It is a privileged environment to exchange ideas. E-mail can be used to contact all the

students and students can also send questions by e-mail to teachers. Teachers must answer e-mails until 48 hours after. All these resources are permanently available allowing students to define their working rhythm.

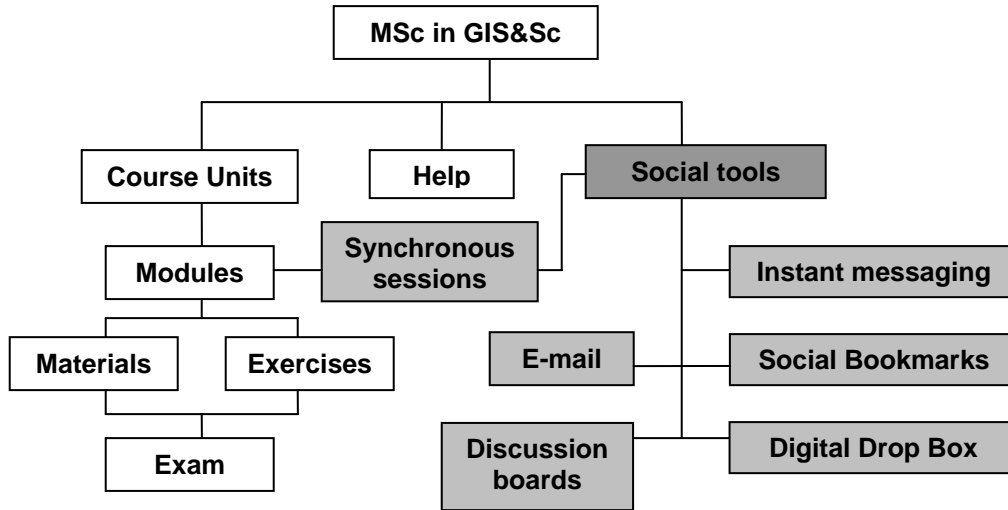


Figure 4 - Structure and Social Tools of the MSc course.

### 3. The MSc GIS&Sc Virtual Community

The MSc GIS&Sc is presently on its 7th edition, joining all the 243 Students from the 7 editions, 9 Teachers, 1 Coordinator, 2 Academic Services staff members and 1 Documentation Services staff member, forming a VC with 255 participants. This VC has a particular interest in Geographic Information Systems & Science. The MSc GIS&Sc VC started in October 27, 2007 and is supported on NovaeLearning, UNL's eLearning platform. Most of its students are Men (60%) and the largest age group is 25 to 35 years (61%), Figure 5.

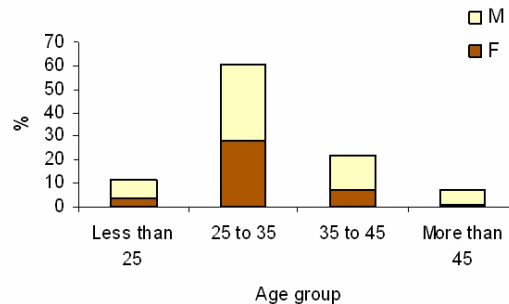
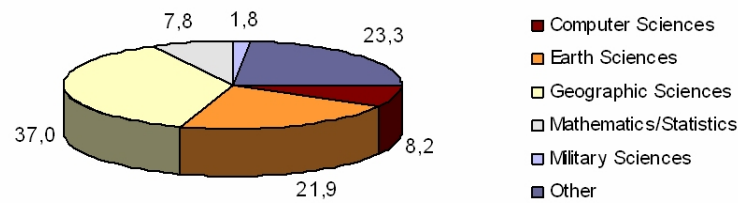


Figure 5 - Distribution of female and male students by group age.

58.9% of the MSc GIS&Sc VC students have an academic in background in GIS related sciences: Earth Sciences (21.9%) and Geographic Sciences (37%), Figure 6.



**Figure 6** - Students academic background (%).

The MSc GIS&Sc Virtual Community provides to its participants the following set of tools: My Grades; Announcements; Digital Drop box; Calendar; Electric Blackboard®; Glossary; Personal Data; My Contacts; User Manual; My Scholar Home (Social Bookmarks); Discussion Boards; Pronto (Instant Messaging System); Tasks.

The main content areas are: Documents; Information; External Links. In the Documents folder participants can access to:

- Photo Albums (Photos from opening sessions and student meetings);
- Manuals;
- News;
- Guides to write dissertations, Projects, Professional internship report;
- Calendars
- Software
- Bibliographic Resources

The VC has 6 thematic discussion boards: I'm in trouble and don't know what to do; GIS&Sc News; From Technology to Science; GIS Technical Support; Conferences, Seminars and Courses; Jobs and Grants.

#### **4. Results and Conclusions**

New information and communication technologies changed the way of teaching. eLearning does not have the pretension of replacing presencial methods but surely constitutes a credible alternative. To build a successful GIS VC is not enough to buy and install one of the many existing eLearning solutions available in the market. The following results prove that this VC had

participation and its participants really interacted with each other solving problems and sharing GIS knowledge.

Students accessed 3889 times to the following Content Areas: Documents (92,04%); Information (2,77%) and External Links (1,55%), figure 8.

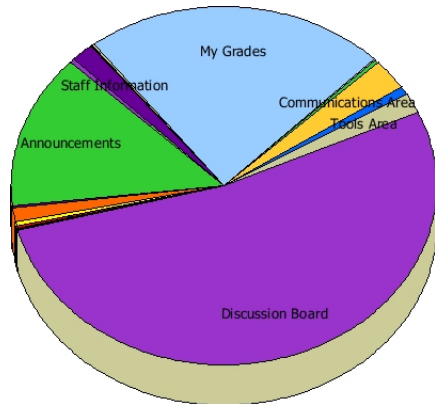


Figure 7 - Accesses by area.

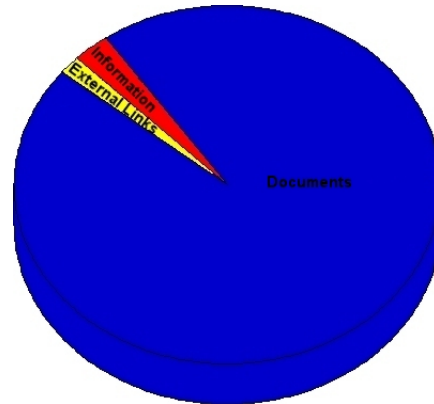


Figure 8 - Accesses by content area.

The VC discussion boards were accessed 2796 times: I'm in trouble and don't know what to do (6,04%); GIS&Sc News (7,44%); From Technology to Science (15,52%); GIS Technical Support (4,01%); Conferences, Seminars and Courses (42,63%); Jobs and Grants (24,36%). The most accessed discussion board was Conferences, Seminars and Courses with 1192 with an average of 4,67 times per VC participant, overall the discussion boards had an average access of 10.96 per VC participant.

The MSc GIS&Sc VC had accesses 24 per day but its participants preferred to access to the VC between 9:00 a.m. and 1:00 a.m. (96,56%), Figure 11. The VC was also accessed 7 day per week but the most popular period was between Tuesday and Friday (70,07%), Figure 12.

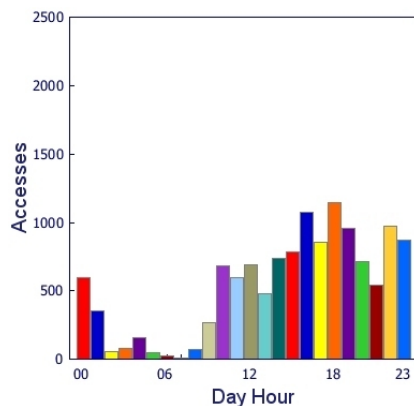


Figure 11 - Access per Day Hours.

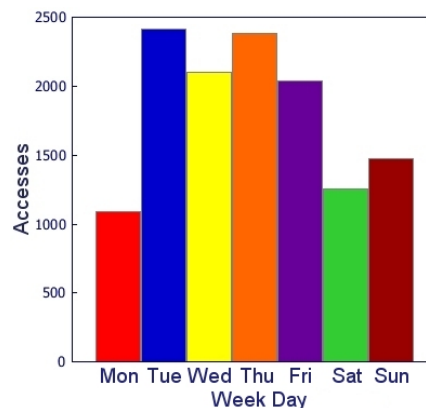


Figure 13 - Access per Week Days.

The VC was accessed 10392 times, that's an average of 40,75 times per participant. The most popular tools were the VC discussion boards (52,78%), being accessed 5485 by its 255 participants.

## References

- Bartol, K. M., Srivastava, A., (2002). Encouraging knowledge sharing: the role of organizational reward systems. *Journal of Leadership and Organizational Studies* 9 (1), 64.
- Dixon, N. M., (2000). *Common Knowledge: How Companies Thrive by Sharing What They Know*. Harvard Business School Press, Boston, MA
- Kankanhalli, A., Ta, C. Y. B., Wei, K. K., (2005). Contributing knowledge to electronic knowledge repositories: an empirical investigation. *MIS Quarterly* 29 (1), 113-143.
- Livro Verde para a Sociedade da Informação em Portugal, (1997). *Missão para a Sociedade da Informação*, Ministério da Ciência e Tecnologia.
- Rheingold, H., (1994). *The virtual community: Finding connection in a computerized world*. London: Minerva.
- Ridings, C. M., Gefen, D., Arinze, B., (2002). Some antecedents and effects of trust in virtual communities. *Strategic Information Systems* 11 (3-4), 271-295.
- Turkle, S., (1995). *Life on the screen: Identity in the age of the Internet*. New York: Simon & Schuster.
- Wenger, E., (2000). Communities of practice and social learning systems. *Organization*, 7(2) 225-246.

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