Feet on the Ground: Using Participatory GIS as a Tool for Marketing the Geomatics Profession

Kevin MUSUNGU and Siddique MOTALA, South Africa.

Key words: Active recruitment, Constructivism, Marketing, Surveying, Geomatics, Participatory GIS, Student-centred Learning.

SUMMARY

It has been noted that it is becoming increasingly difficult to attract the required number of Geomatics students in various university departments around the world. Consequently, several universities have either closed their Geomatics departments or merged them with others in the built environment such as Civil Engineering or Architectural departments. The solution to this problem has formed the focus of a number of studies and workshops. However, quite often it is seen as a problem demanding novel marketing strategies that have nothing to do with the different branches of Geomatics such as Geographic Information Systems (GIS), Remote Sensing etc. In fact, in spite of the increase in participatory studies in GIS, no assessment has been done on the impact of those studies in marketing Geomatics.

Various authors on social learning theory purport that knowledge, and implicitly interest, can be created by an individual based on observations of the behaviour of another individual. Using a case study of participatory GIS research in a flood prone informal settlement in Cape Town, this paper demonstrates how participatory research can be used as a marketing tool to further interest in the Geomatics industry. The overall contribution of this work lies in demonstrating a practical sustainable approach to marketing the Geomatics industry.

Feet on the Ground: Using Participatory GIS as a Tool for Marketing the Geomatics Profession

Kevin MUSUNGU and Siddique MOTALA, South Africa.

1. INTRODUCTION

Land surveying is arguably one of the oldest professions in the world. Yet various academic institutions offering land surveying and more recently Geomatics qualifications in South Africa, have found it increasingly difficult to attract the necessary number of students. Since government subsidies are linked to, among other things, the numbers of students in the department, many departments have had to adapt financially in response to the diminishing numbers. Consequently, some surveying departments have opted to merge with other departments such as Architecture e.g. University of Cape Town (UCT), and Civil Engineering e.g. Cape Peninsula University of Technology (CPUT) in order to subsidize their costs. This situation is not unique to South Africa. In some Geomatics departments in universities across Australia and the United Kingdom, there has been an increased reliance on the fees of the international students which are generally significantly higher than those of local students (Bramald *et al*., 2009; McDougall *et al*., 2006).

The failure to attract the necessary number of students has formed the focus of various studies. Some authors assessed factors such as starting salaries, university funding, and length of study and found surveying to be just as competitive as other professions in the built environment (Ghilani, 2001). However, a number of scholars agree that the profession is largely unknown to the general public and the solution lies in marketing the qualification and the profession better (Potts *et al*., 2007). Hence, substantial research has focussed on developing marketing strategies that could be employed to attract students to the Geomatics qualification. These include among others (Ghilani, 2001; Potts *et al*., 2007; Bramald *et al*., 2009):

- Using open days to market the profession to prospective students and their benefactors
- Writing of articles on innovation in surveying and mapping in the local press
- Regular advertisement of the profession in the local press
- Development of single flyers with information on the profession and academic qualification for distribution
- Requesting professional members to visit high schools in their locale to speak to students about the profession.
- Rebranding of the academic qualifications

Studies have shown that these innovations have had varied success. For instance, many institutions rebranded the qualification to Geomatics partly in a bid to diminish the image of an old-fashioned professional working in solitude outside. The Geomatics profession adopted newer technologies such as Remote Sensing and Geographic information Systems (GIS) and seemed a more marketable product to the prospective students (Potts *et al*., 2007). However, it was found that the new name often confused existing traditional surveying and related professionals and created an identity crisis (ibid). Hence they were unable to help with the marketing of the profession. Consequently, many universities are returning to the term 'Land Surveying' (Mahoney *et al*., 2007). On the other hand, it has been observed that active recruiting through one-on-one interaction of students with professionals at high schools sparked an interest in the profession (Potts *et al*., 2007).

2. A LOCAL CONTEXT

The Department of Civil Engineering and Surveying at CPUT in Cape Town offers, amongst other qualifications, two undergraduate Geomatics diplomas, one in Surveying and the other in GIS. In order to assess the factors that attract students to South African universities, interviews were held with current undergraduate students at CPUT to find out what drew them to a qualification in Surveying or GIS. A questionnaire was also used in conjunction with the interview process to get a more comprehensive picture of the students' motivating factors. Both first year and final year students were interviewed, and the 61 respondents constituted 57% of the total number of students enrolled for the qualifications. The five main responses were:

- A visit from a professional land surveyor or lecturer to the student's school;
- Discussions with a relative in the profession;
- Observing surveyors working in their neighbourhood; and,
- Availability of bursaries.

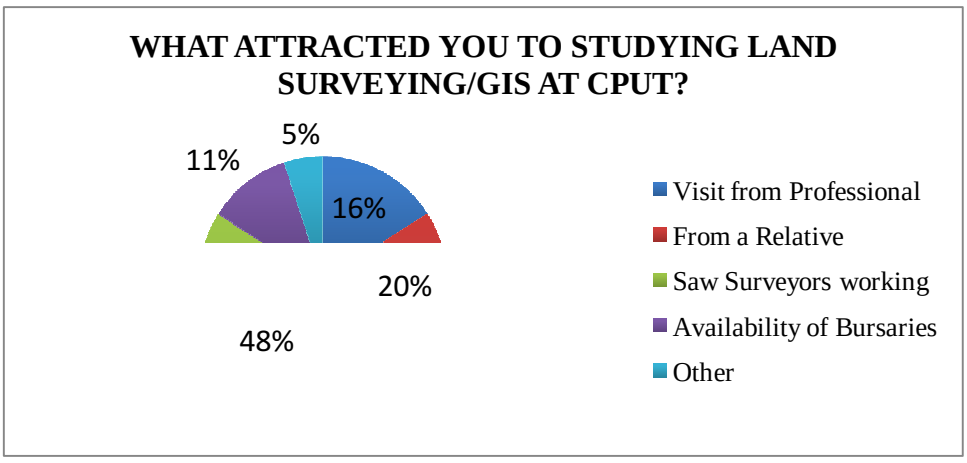

Figure 1. Reasons for studying Surveying or GIS at CPUT

Statistics showed that 48% of the students reported that they were drawn to their current studies by observing surveyors working in their neighbourhoods (Figure 1). Also, 20% of the students stated that they had been influenced by discussions with a friend or relative. It is noteworthy that the availability of funding only attracted 11% of the current students.

These results show that interaction of the students with professionals around their neighbourhoods, in their families and at their schools drew them into pursuing a surveying or GIS qualification. These three factors all point to active recruitment since the students could visualise and contextualise the relevance of the course in solving local problems. Thus, although no singular marketing solution has been put forward, authors on the subject (Turrell *et al*., 2002; Etunovbe, 2006; Potts *et al*., 2007; Bramald *et al*., 2009) agree that the solution lies in:

- Eroding the antiqued image of an unfashionable surveyor working in isolation and emphasizing the relevance of the profession in meeting societal needs;
- Emphasising active recruitment involving both teachers and students in order to erode ignorance about the profession. Such recruitment could include using female role models to show that all genders are welcome in the profession; and,
- Emphasising the modernity and diversity of the available technologies and methodologies and their relevance in problem solving.

3. THE CASE FOR PARTICIPATORY GIS

In recent years, there has been an increasing awareness of the relevance of spatial information by the general public. Consequently, it is now common place for people with no cartographic training to use navigation devices and access web-based products such as 'Google Earth' and 'Google Maps' on their cell phones (Cartwright, 2012). In fact, research has shown that several Geomatics academics have called for increased community involvement in the development of Geographic Information Systems (Laituri, 2003). The resulting track of research has been termed *Participatory GIS* (PGIS) and it has covered a wide range of applications such as risk mapping, planning, politics, and land reform (Abbot *et al*., 1998, Ghose & Elwood, 2003; Weiner & Harris, 2003; Bouchard *et al*., 2007; Raaijmakers *et al*., 2008; Rambaldi *et al*., 2006; Tripathi & Bhattarya, 2004; Musungu *et al*., 2012).

A common thread in all this research is that communities were afforded the opportunity to access data or contribute data to a particular GIS. As a result, such communities were exposed to some of the modern technologies being employed in Geomatics. Hence, such interaction could be used to

facilitate active recruitment. In order to assess the potential for PGIS to be used as a marketing tool, the attitude of communities involved with PGIS was assessed.

4. CASE STUDIES USING PARTICIPATORY GIS

4.1 Working with Non-Governmental Organisations

As part of Masters research in Participatory GIS at UCT, the authors had to develop a GIS for flood risk assessment in informal settlements in Cape Town. This necessitated the involvement of various stakeholders such as community members, Non-governmental Organisations (NGOs) and local municipal officers. An NGO, Slum dwellers international (SDI) partnered with the authors in the research. It is worth mentioning that SDI was initially vehemently opposed to using GIS because it was felt that that it frustrated community participation. Subsequent presentations on the abilities of participatory GIS convinced the SDI officials to try it on one of the informal settlements they were dealing with. The research involved using questionnaires to gather flood-related information from informal settlement community members and simultaneously map the locations of their shacks (Musungu *et al*., 2012). Subsequently, areas in the settlement prone to high levels of diseases, fires and flooding were mapped and presented to the community (Figure 2)

Figure 2. Presenting the maps back to the community using GIS (Source: Musungu *et al*., 2012).

The success of the project prompted SDI to adopt GIS as their tool of choice in creating maps (SDI, 2011). As a result of observing the benefits of GIS to the organisation, SDI paid for one of their staff to attend training workshops in Kenya and Namibia. After the training, that staff member was tasked with training the staff members in the other SDI offices across South Africa in employing GIS in the context of risk assessment. Furthermore, that staff member intends to enrol for a Masters qualification in GIS in 2013.

4.2 Working with schools

As part of another Masters research project at UCT, vulnerability to flooding in an informal settlement near the Cape Town coast was assessed. The study also involved mapping community perceptions of vulnerability, as well as mapping the locations of existing physical features that could cause risk (Tyler, 2011).

Figure 3 Students conducting questionnaire survey with hand held GPS (Source: Tyler, 2011)

Geography teachers and students at a local high school were partnered with in gathering data in the settlement. The students and teachers were taught to use hand held GPS instruments and they had to capture the locations of shacks (Figure 3).The results were subsequently reported back to the high school and proved very effective in enhancing the students' understanding of geography. It remains to be seen how many of these students will apply for studies in either Land Surveying or GIS.

5. CONCLUSION

It has been observed that being exposed to Geomatics, either through observation of, or personal contact with, a Geomatics professional greatly improves their chances of prospective students being attracted to the profession. Also, actively participating in Geomatics-related tasks constitutes marketing of the profession. This (unintended but welcome) marketing can be attributed in part to the fact that PGIS created a learning opportunity that was active, collaborative and student-centred, enabling students to construct rather than acquire knowledge. This conforms to the constructivist view of learning which has been gaining popularity in engineering and science education, as it aided in attaining the goal of deep learning through engagement with appropriate tasks (Motala, 2011).

Participatory processes can help raise awareness of communities to the role of Geomatics in solving real-world problems that they are concerned with. These processes, by their very nature, contextualize problems and provide attractive solutions due to their use of knowledge and modern technologies.

REFERENCES

Abbot, J., Chambers, R., Dunn, C., Harris, T., de Merode, E., Porter, G., Townsend, J., & Weiner, D. 1998. 'Participatory GIS: Opportunity or Oxymoron.' PLA Notes, Vol. 33, pp. 27–34.

Bramald, T., Mills, H., Mills, J, Edward, S. 2009. 'Recruitment, retention and progression', *FIG International Workshop*, Vienna.

Bouchard, B., Goncalo, A., Susienka, M., & Wilson, K. 2007. Improving flood risk management in informal settlements of Cape Town. E-project-121307-110919. Available at: http://www.wpi.edu/Pubs/E-project/Available/E-project-121307-110919/unrestricted/FinalReport.pdf. Accessed on 14 January 2011.

Cartwright, W. 2012. 'Neocartography: Opportunities, issues and prospects', *South African Journal of Geomatics,* Vol 1 (1), pp. 15-31.

Etuonovbe, A.K. 2006. 'Improving participation of under-represented group: Projecting the image of the Nigerian female surveyor', *FIG Newsletter 4/06*.

Ghilani, C.D. 2001. 'Recruiting and marketing', *Surveying and Land Information Science*, Vol 61(2), pp.69-74.

Ghose, R. & Elwood, S. 2003. 'Public Participation GIS and Local Political Context: Propositions and Research Directions.' URISA Journal: Special Issue on Access and Participatory Issues, Vol. 15, No. 2, pp. 17-24.

Laituri, M. 2003. 'The Issue of Access: An Assessment Guide for Evaluating Public Participation Geographic Information Science Case Studies.' Journal of the Urban and Regional Information Systems Association, Vol. 15, APA.II, pp. 25-31.

Mahoney, R. F., Plimmer, F., & Hannah, J. 2007. 'Where are we heading? The crisis in surveying education and a changing profession', *Strategic Integration of Surveying Services, FIG Working Week*, Hong Kong SAR, China

McDougall, K., Williamson,I., Bellma, C.& Rizos, C. 2006. Challenges Facing Spatial Information and Geomatics Education in the Higher Education Sector, *Combined 5th Trans-Tasman Survey Conference & 2nd Queensland Spatial Industry Conference 2006* , Cairns, 18-23 September.

Motala, S. 2011. 'Constructive Alignment of an introductory university Geographic Information Systems course', *FIG Working Week 2011,* Marrakech, 18-22 May

Musungu, K., Motala, S., Smit, J. 2012. 'Using Multi-criteria analysis and GIS for Flood risk assessment in informal settlements of Cape Town: The Case of Graveyard Pond', *South African Journal of Geomatics*, Vol.1 (1), pp. 77-91.

Potts, L.V., Greenfeld, J. & Hanna, T.K. 2007. 'Toward a Student Recruitment Model for a Surveying (Geomatics) Degree Program', *Surveying and Land Information Science, Vol. 67, No. 4, pp. 245-254*

Raaijmakers, R., Krywkow, J. & van der Veen, A. 2008. 'Flood risk perceptions and spatial multi-criteria analysis: An exploratory research for hazard mitigation.' Natural Hazards, Vol. 46, No.3, pp. 307–322.

Rambaldi, G., Kwaku Kyem, P., McCall, M. & Weiner, D. 2006. 'Participatory Spatial Information Management and Communication in Developing Countries.' The Electronic Journal of Information Systems in Developing Countries, Vol. 25, No. 1, pp. 1-9.

Slum Dwellers International. 2011. *SDI South African Alliance Publications.* Accessed on 1st February 2012 at *http*://www.sasdialliance.org.za/project-profile/informal-settlement upgrading/page/Europe

Tripathi, N. & Bhattarya, S. 2004. 'Integrating indigenous knowledge and GIS for participatory natural resource management: State-of-the-practice.' The Electronic Journal on Information Systems in Developing Countries Vol. 17, No. 3, pp. 1–13.

Turrell, P., Wilkinson S.J., Astle V., and Yeo, S. 2002. 'A gender for change: The future for women in surveying'. *JS16 The modern Profile of Surveyors—Gender Aspects II. FIG XXII International Congress*, Washington D.C., USA, April 19-26.

Tyler, R. 2011. *Incorporating Local participation and GIS in Assessing Flood Vulnerability in Informal Settlement: Masiphumulele Case Study*. Unpublished MPhil dissertation, University of Cape Town, Cape Town.

Weiner, D. & Harris, T.M. 2003. 'Community-Integrated GIS For land Reform in South Africa.' URISA Journal: Special Issue on Access and Participatory Issues, Vol. 15, No. 2, pp. 61-73.

CONTACTS

Mr. Kevin Musungu
Department of Civil Engineering and Surveying
Cape Peninsula University of Technology
Symphony Way, Bellville
Cape Town
South Africa
Email:Kevin.musungu@gmail.com
Web site: www.cput.ac.za

Mr. Siddique Motala
Department of Civil Engineering and Surveying
Cape Peninsula University of Technology
Symphony Way, Bellville
Cape Town
South Africa
Email:Motalas@cput.ac.za
Web site: http://www.cput.ac.za/civil-engineering-a-surveying