Towards a Framework for Supporting GIS Competencies in Local Government

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1. Background

Information and communications technology (ICT) has become essential to the operations of organisations and communities worldwide, with huge sums of money, resources and user expectations invested in their implementation (ODPM, 2002). Yet many ICT projects fail to achieve their objectives, which may in part be attributed to a failure to understand how individuals and organisations learn to use and adapt to ICT (British Computer Society, 2005; Cabinet Office, 2000). This paper is based on research undertaken in 2006 that explores the implementation of one particular form of ICT, Geographical Information Systems (GIS), in a particular type of organisation, namely local government, where GIS usage continues to expand rapidly. The technology is considered fundamental to the achievement of local e-government, facilitating 'joined-up' services and access to information. GIS are complex, offering numerous opportunities for future development as well as considerable scope for things to go wrong, and thus present a particularly acute learning issue. Key constraints to unlocking the full benefits of GIS in organisations include organisational structure and remit, lack of awareness of potential applications, the skills base, and management support (Birks et al., 2003; Grimshaw, 2001; IGGI, 2002).

The study started from the position that staff are the most important factor in the successful organisational implementation of GIS, and in order to make the best use of GIS, local authorities and their GIS users needed to move into a position that allowed them to 'act-with' the technology (Zuboff, 1988), developing levels of learning which promote understanding of the principles and capabilities rather than simply knowing the operations required to carry out a specific task (Quinn et al., 1998). It aimed to explore the means by which local authorities and their staff can develop the 'human factors' for success, summarised as 'ability', 'effort' and 'support' (Birks et al., 2003) which promote the knowledge and skills necessary to make best use of GIS technologies. It thus addresses issues related to both individual and organisational learning and development (Sfard, 1998; Elkjaer, 2004). In order to do this three 'communities' were identified, namely suppliers of GI systems and training to local government customers, GIS managers in local authorities and GIS users in local government. Overall the research

examined three questions:

- What GIS training and development is currently provided?
- How is training and development delivered to GIS personnel in local government? Plus a secondary question: Are there any discernible differences in organisations holding the award of Investors in People?
- What do users require of GIS training and development?

This paper addresses these questions and outlines how they have facilitated the specification of a framework of learning and training options to support the development of GIS skills across all levels of staff in local government.

2. Methodology

To investigate these questions, a multi-stage, multi-method approach was adopted comprising primary data sources (material collected using survey and case study methods) and secondary data sources (a review of services provided by GIS training suppliers). The three linked stages were:

- A review of education and training providers
- An e-survey of local authorities
- A series of case studies

The findings of this multi-stage approach informed the proposal of a framework for enhancing GIS skills within local authorities in the UK.

This paper focuses on the e-survey undertaken in summer 2006, which aimed to establish the range of GIS training and development delivery methods, attitudes to, and experiences of, training in the local government sector. In order to do this, a questionnaire survey was conducted across county, district, unitary and metropolitan authorities in England, Wales and Scotland. It also sought to establish whether there were any discernible differences in Investors in People organisations.

The survey targeted GIS managers, strategic managers, and 'power users' (users involved in geographical data management and GIS development, and advanced frequent users) in these authorities. The response rate of 52% (253 questionnaires), above average for a self-completion questionnaire (Flowerdew and Martin, 1997), indicates that this is a highly topical issue, and, while the purposive nature of the sample means that the results cannot be considered representative, the response rate, mix of types and geographical spread of responding authorities provide results broadly indicative of local government throughout Great Britain.

3. Results and Analysis

The survey revealed that GIS use is widespread, and its adoption as a corporate information tool is steadily increasing. GIS managers and 'power users' are generally a committed, motivated and knowledgeable group. However, the situation is inconsistent, both between and within local authorities, in terms of level of GIS application, senior

management commitment, staffing levels, and training.

Specifically in relation to training:

- **Training and communication gaps:** a quarter of respondents worked in authorities where it was difficult for staff to get the training needed.
- **Skills gaps:** there is an indication of skills gaps, both amongst general users and GIS managers and 'power users'.
- **Emphasis on tasks or competencies?:** the training and development emphasis appears to be on ensuring staff know what they need to do in specific circumstances, rather than on whether they have the understanding and ability to carry out these and other future tasks.
- **Mix of methods**: there is clear support for a combination of training methods to suit the topic, staff and requirements.
- **Preferred modes of delivery:** small group or individual hands-on training by professional trainers, product or software vendors, especially when customised to the organisation's specific requirements, and on-the-job training from colleagues were preferred.
- **E-training**: although not widely used at present, there is a growing interest for the future.
- **Trainers:** much training is delivered by colleagues who are not trained trainers; whilst not a bad thing per se, there may be inconsistencies in delivery as well as gaps in knowledge.
- **Flexible programme timing:** some respondents prefer to learn incrementally, whilst some are keen to learn at any time indicating a need for flexible delivery of training
- **Obstacles**: unsuitable location, timing and topic are the most common reasons for declining the offer of training.
- **Wide user base/different training needs:** a widening user base for GIS, and its incorporation into the range of ICT tools available to local government staff, is accompanied by different training needs.
- **GIS or information management?:** there is debate about whether GIS training should be offered separately or as part of wider information and data management and ICT awareness and training programmes. These aspects are needed alongside GIS skills, but are unlikely on their own to generate spatial analysis, interpretation and presentation skills.
- **Knowledge- and experience-sharing:** there is no consistent approach to sharing GIS knowledge and experience - word of mouth is relied on to large extent.
- **Training budgets:** training budgets are generally small and training courses, especially those delivered by vendors, professional trainers, or leading to qualifications, are expensive, limiting availability to local government staff.
- **Investors in People:** there were no conclusive differences between the main sample and local authorities holding Investors in People status.

The survey results contributed to the specification of a set of criteria and conceptual model which allowed an innovative framework of training and learning options to be formulated, capable of customization to individual user needs and requirements.

4. Conclusion

This survey supported the view that the development of GIS knowledge and skills through the delivery of training opportunities in local government is by no means straightforward, and is surrounded by issues of many types, social, economic, political, technological and organisational in addition to educational. Further, there is unlikely to be a 'one size fits all' solution. This was explored in more detail by focussing on how selected case study local authorities seek to help their staff learn (not described here).

The findings of the multi-stage research process led to the proposal of a framework for enhancing GIS skills within local authorities in the UK which will be outlined in the paper. This proposes a series of 'pathways' of learning options which may be followed by staff with varying levels of GIS knowledge, skills and requirements in order to build the understanding necessary to make good use of GIS technologies now and into the future.

5. Acknowledgements

6. References

BIRKS, D. F., NASIRIN, S. and ZAILANI, S. H. M., 2003, 'Factors influencing GIS project implementation in the UK retailing industry', International Journal of Information Management, 23, pp. 73-82.

BRITISH COMPUTER SOCIETY (BCS), 2005, BCS Thought Leadership Debate, Why Are Complex IT Projects Different?, http://www.bcs.org/BCS/News/ThoughtLeadership/pastdebates/complex/ (accessed 8 April 2005).

CABINET OFFICE, 2000, Successful IT: Modernising Government in Action, Review of Major Government IT Projects (London: ODPM).

ELKJAER, B. 2004. 'Organizational Learning, The "Third Way", Management Learning, 35 (4), pp. 419-434.

FLOWERDEW, R. and MARTIN, D., (eds.), 1997, Methods in Human Geography (Harlow: Longman).

GRIMSHAW, D. J., 2001, 'Harnessing the power of geographical knowledge: the potential for data integration in an SME', International Journal of Information Management, 21, pp. 183-191.

INTRA-GOVERNMENTAL GROUP ON GEOGRAPHIC INFORMATION (IGGI), 2002, Departmental Geographical Information Strategies, Best Practice Guide (London: ODPM).

OFFICE OF THE DEPUTY PRIME MINISTER (ODPM), 2002, The National Strategy for Local E-government (London: ODPM).

QUINN, J.B., ANDERSON, P. and FINKELSTEIN, S., 1998, 'Managing Professional Intellect: Making the Most of the Best', Harvard Business Review on Knowledge Management, pp. 181-205 (Boston: Harvard Business School Press).

SFARD, A., 1998, 'On two metaphors for learning and the dangers of choosing just one', Educational Researcher, 27(2), pp. 4-13.

ZUBOFF, S., 1988, In the Age of the Smart Machine: the Future of Work and Power (New York: Basic Books).

Biography

Ann Hockey is a Senior Lecturer in Spatial Planning, with 16 years prior experience in local government managing spatial data and implementing GIS. She sits on national and local committees concerned with geographical data and spatial planning, including the Census Academic Advisory Group and RTPI East of England regional committee.