DOING ETHNOGRAPHY TO IMPACT ON STUDENT EXPERIENCES OF DIGITAL GEOGRAPHIES

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Abstract:

Digital Geographies encompasses GIS and other geospatial software. They are acknowledged to be difficult subjects for undergraduate students to master. Students feel intimidated by using them and often describe Digital Geographies as "very hard" techniques to master. However, students acknowledge their current and future importance to geospatial disciplines as well as their own job prospects.

The diffusion of Digital Geographies is accelerating. Teachers need to develop pedagogic strategies to reduce student anxiety and promote effective GIS learning. This paper explores feedback from a Level 1 university GIS module. Ethnography was used to examine perceived difficulties of ArcGIS with Level 1 geography students at Edge Hill University. Research established a way forward for improving the students understanding and skill mastery of ArcGIS in future modules. It demonstrates how collaboration between a geoscientist delivering the GIS module, and an ethnographic researcher who promoted the technique, improved student engagement with Digital Geographies.

Key words: digital geographies, ethnography, pedagogy, GIS module delivery

1   Overview

All undergraduate students studying for a BA or B.Sc Honours degree in geography or geoenvironmental science at Edge Hill University take modules in Digital Geographies. Level 1 students follow a selection of Digital Geographies as part of a broader research techniques and a geo-communication module. "Digital Geography" is a Level

2 compulsory core module and there is also an optional Level 3 module entitled "Advanced Digital Geographies" that about 25% of the cohort opt to follow. A preconception exists, and end of module evaluations confirm this, that students consider Digital Geographies to be difficult modules to master. Many students acknowledge their value and importance but complain about their difficulty and for some it is clear from their comments that Digital Geographies is a sufferance.

In order to address their concerns we commissioned a research project to explore the reasons for the difficulties in the student learning experiences of Digital Geographies. We used an ethnographic technique to collect the data considering that end of module evaluations provided little in the way of meaningful or useful information that could be used to. The project was conducted over an 18 month period (September 2005 – March 2007) and involved all three levels of the BA/B.Sc degree programme. Apart from discovering the reasons why students found the modules difficult to absorb it illustrated how the process of ethnographic research, unfamiliar to scientists (GL), and also conducted by a novice (GL), was used to forge a pedagogic way forward. The findings were used to remodel the delivery of the Level 2 compulsory module Digital Geography as well as the other modules. A detailed ethnographic survey of the student experience has been completed following this module presentation as well as an analysis of module assessment results. The research has been supported by the research group SOLSTICE (**S**upported **O**nline **L**earning for **S**tudents using **T**echnology for **I**nformation and **C**ommunication in their **E**ducation) which is part of a British government funded CETL (**C**entre of **E**xcellence in **T**eaching and **L**earning) at Edge Hill University. In particular it demonstrates the value of collaboration which brought together a geoscientist and an ethnographer as part of their roles as Solstice Fellows.

2   The Nature of Digital Geography

Digital Geographies (often referred to as GIS in the past) is a relatively recent term developed to describe a set of often complex geospatial, domain specific, information technologies used not only by geo specialists but increasingly by many other disciplines ranging from archaeology to zoology. It encompasses many information technologies including, the advanced use of spreadsheets and relational databases, remote sensing and digital image processing, geographical information systems and the writing of scripts in computer processing languages such Visual Basic. Its history

can be traced from at least the 1960's but it has only been in the last decade that hardware, software and data sources have evolved to cope with the complexity required coupled to a cost which is acceptable to the wide variety of potential users. The use of Digital Geographies is a core to many (international) geo courses as well as an undergraduate and postgraduate degree course subject in its own right (Sui 1995, Reeve 2000, Wikle and Finchum 2003). Clearly, there is a need to ensure that students engage with the content successfully not just for their benefit but for the successful and ongoing development of the discipline.

3   Digital Geography and Student Perception

Casual and more formal (module evaluation) enquiries with geo students prior to this research project indicated a somewhat dichotomous appreciation of Digital Geographies. Although they acknowledge their worth to both the pursuit of the subject and their future career options they complain (*sic*) of their difficulty to grasp its concepts, the demand for a lot of laboratory practice to learn the software routines and the misconceived perception that it was more relevant to the scientific enquiry carried out by physical geographers and geoscientists. Some commented on its apparent relevance to the complete range of geography modules which is a further issue raised by other authors who lament that despite its modern day core position many other geo sub disciplines have been indolent to the integration of GIS. (Lloyd 2001, Hall and Scott-Walker 2005). Occasionally somewhat limp comments for the first decade of the Twenty-First century surfaced such as "I am no good with computers" or "I don't like computers" and these were dismissed as *non sequiturs.*

4   What is Ethnography?

Ethnography is one kind of qualitative research in which the researcher aims to understand the views of participants, for instance student experiences, while asking broad, general questions and collecting text-based data in a naturalistic setting, such as the student classroom. Aiming at description, analysis and interpretation while trying to make sense of the larger meanings of findings, ethnographers typically conduct their inquiry in a subjective, biased manner (see also Creswell 2005).

The ethnographic approach uses inductive (bottom-up), interactive (immersive) and recursive (cyclic) analytic strategies, while drawing on various data collection methods, notably participant-observation and interviewing, but also descriptions of the group within its setting, and exploration of themes or issues that develop over time as the group's participants interact with each other. Research questions thereby continuously emerge and change, and are actively shaped by participants' responses and the critical self-reflexive stance of the ethnographer.

As a result, the ethnographic approach provides a detailed picture of a cultural group's shared patterns of behaviour, concepts and beliefs, and sheds light on the ways in which people construct and make meaning of their world(s) (LeCompte and Schensul 1999). In this particular situation, ethnography has been deemed particularly suitable to gain an understanding of student experiences of GIS, as it enabled the tutor (GL) to *explore* students' perspectives and experiences – without preconceived ideas or predictions – and to gain a deep understanding of a complex phenomenon. Other authors are reporting using the same or similar techniques to improve the accessibility to their disciplines (Bradbeer ,Healey and Kneale, 2004, Atkinson &. Pugsley 2005).

5   The Ethnographic Process and the Digital Geography Research Project

The research project proceeded along the following lines:

- Preliminary meeting and ethnographic research with the Level 3 Advanced Digital Geographies students in October 2005 (sample size 8) – *those who can.. do.* Because this Level 3 module is optional the purpose of this meeting was to establish why this group chose to follow a "difficult" module. It allowed us to frame questions, should they be needed, for the Level 1 ethnographic research that was to follow and was the main focus of the research project.
- Selection with ethnographic research of Level 1 students (sample size 10) in March 2006 who had followed and completed the introductory research techniques module (which included Digital Geographies) and had already declared an anxiety – *those who can't don't.* These Level 1 students all subsequently followed the compulsory Level 2 module in September 2006 and thus benefited from this ethnographically revamped module.

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– Ethnographic research with the Level 2 students in March 2007 by Digital questionnaire, group and individual interview . This research revealed how the the revamped module had been received and we were pleased with the results.

6   Research Findings Summary

The Level 3 Advanced Digital Geographies students in October 2005   reported the following :

– They found the content and techniques of the Advanced Digital Geographies module *"easy"* to understand and follow and as such was an obvious module to select because they knew they would succeed with it
– Graphics packages (Canvas™) taught in Level 1 and 2 courses served as good preparation for multi-layered GIS packages
– The majority had purchased, or arranged access to the use of a suite of Digital Geography software that allowed them to practise with it at home. They insisted that they had all learned to use it proficiently, and with a pleasurable understanding, as a consequence of this home access

The Level 1 students, canvassed in March 2006 who had followed the more general Digital Geographies course component as part of their research techniques module reported the following :

– They found the CAD component of the module, delivered using Canvas™, relatively easy and thought it was good preparation for the GIS that was to follow!
– However they felt intimidated by GIS – ESRI ArcGIS™ version 9.1. They found it difficult, confusing and were overwhelmed with the volume of data/information presented often at the same time on screen
– They wanted to see the end product of the class exercise first before they themselves completed the exercise
– They wanted more help/assistance with the practical work – but did not like the suggestion that paid student *"buddies"* might be made available. They thought that the *"buddies"* might be placed in an invidious position outside their paid

hours if assistance was requested from them whilst they were carrying out their own studies on campus

- They wanted simpler handouts in addition/instead of the recipe sheets they are normally provided with
- They found the screen layouts confusing and multiple screens difficult to work with
- They wanted a "show me how to do" facility for the times when they got stuck on accessing menus or performing a routine
- They did not like (or use) paper or *"electronic paper"* manuals
- They wanted more teaching/smaller classes
- Demonstrated a (surprising) lack of computer literacy across the sample but mainly in the more mature age groups despite claiming literacy based upon their gaming skills
- They complained of network performance issues – mainly reliability, pathname/disk store naming conventions
- Lack of (network) storage space
- They wanted more assignments using GIS – further questioning by the observer (GL) indicated that they wished that other tutors would set assignments that required them to use Digital Geographies – an all too often observation by GIS practitioners (Fargher, 2006)
- Required more time to practice in less stressful/embarrassing situations
- Desired more comfortable and private learning space. Some reported an embarrassment block to learning when they were appeared to be incompetent in the use of the software in front of their peers

And finally

- They wanted more access to computers – physically and temporally. We already possess a dedicated GIS laboratory and a 24 hour walk in facility with GIS software.

7   The Ethnographic Analysis and a Nascent Pedagogy

Following an analysis of the summaries present in the above section the following pedagogy was constructed to address the issues that were raised:

- The request to show them the end product of the exercise has been resisted on the grounds that it could damage the spirit and purpose of enquiry based learning. It is likely that a similar end product will be revealed to them as a yardstick measure for them to emulate. However, selected anonymised exemplars of past work – good, bad and indifferent – have been made available with the permission of the authors.

- The provision of paid student *"buddies"* to assist them was abandoned. We intend to raise the potential of this resource with other cohorts however. We have used "buddies" in other scenarios and found them to be very well received.

- The module will in future be delivered via a Virtual Learning Environment (WebCT™) and this will allow them to use the embedded discussion group facility where they can gain on line support from other students following the module).

- "How to do" handouts have been made simpler and students have been asked to provide examples of how they would produce a "how to do handout" The simpler "how to do handouts" have been completed by engaging a student under fiscal contract. The student converted the academic produced handouts into more student digestible material – they have been very well received.

- There has been a development of Macromedia *Captivate* the "how to do" operations. *Captivate* is an Adobe™ product and is considered to be an easy to learn e-learning development tool that combines the advantages of Microsoft Powerpoint and Flash.

- All Level 1 students are now required to complete the Microsoft Digital Literacy Certificate course (http ://www.microsoft.com/citizenship/giving/programs/up/digitalliteracy/eng/Curriculum.mspx) before they access the Digital Geographies component of their Level 1 study.

- Network staff were approached regarding the network issues but they resisted the request to simplify the pathnames of the folders that students are required to access for data supply. However, we acknowledge that the students would be expected to cope with complex terminologies in the workplace and as such any simplification could result in a vocational disservice.

- Network storage is not so much an issue as the download times experienced over our network (despite it being Novell 6.5 with a 100mb link to desktop). We have purchased portable hard drives (40Gb) that are made available via a loan scheme to the Digital Geographies students. They have been a fantastic

success and we recommend that all Digital Geography students purchase these at the start of their university course.

- It is acknowledged that wider use of Digital Geographies in other modules would be beneficial. It would help impress the value of Digital Geography and increase the students familiarity with the software packages. This raises, but does not answer , the wider issue of GIS, being currently perceived as an add on rather than a core component of the geospatial disciplines and demands a much deeper analysis and solution than can be provided here,

- The provision of home access to the Digital Geography software (ArcGIS and ERDAS Imagine) suite by authentication to the University's geography server has been by far the greatest innovation to follow this ethnographic research. Providing the student has a broadband connection (preferably) and a static IP address this allows them to access costly software at any convenient time and in the comfort and privacy of their home. Not only does this extend the notion of e-learning but addresses their desire for comfortable and private learning spaces where any peer group engendered embarrassment factor is removed. Of all of the commentary this has been the most significant discussion we have analysed. Our licensing allows us to provide students with individual software units but we have preferred to stay with the distributed computing route – this allows us to monitor and preserve the integrity of the ESRI licence and apply upgrades and patches.

8   Conclusion

Recent analyses of the ethnographic research have shown a marked change in the students view of Digital Geographies at Edge Hill University. Most report that their learning has been less anxious and thus more enjoyable. There are still a few comments regarding the indigestibility of some of the module content and these comments have been confined to the mature members of the group. Two indicators of the improvement in the delivery of Digital Geography module this year are the uptake of applicants to the Level 3 Advanced Digital Geography module (+260%) and the improvement in the assessment scores (Figure 1).
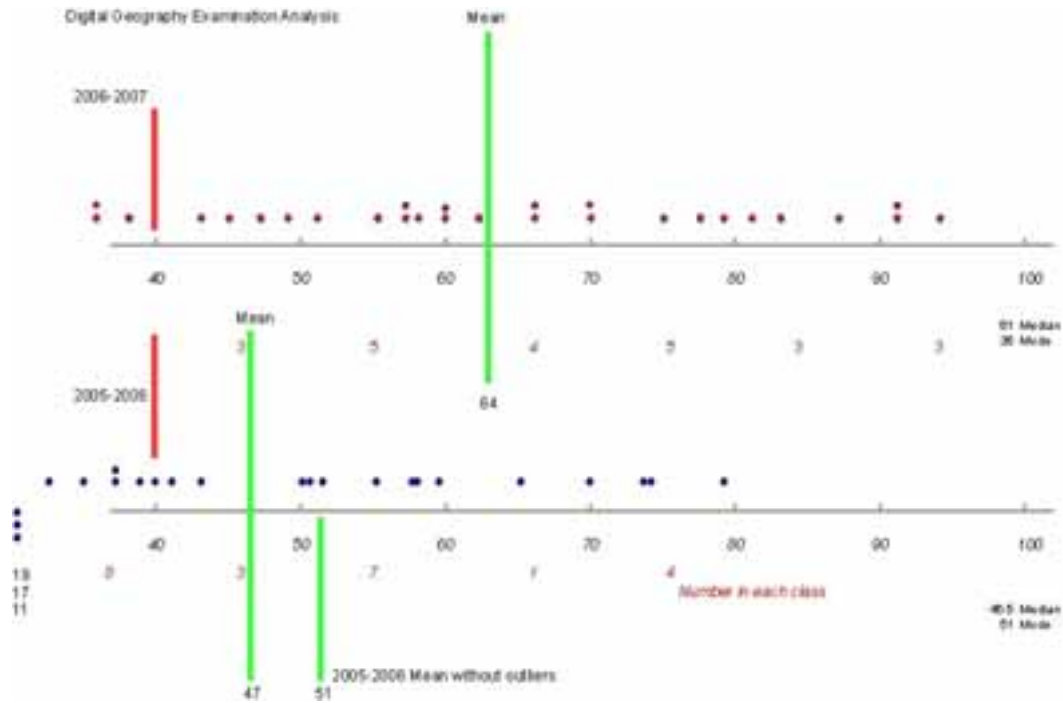
Figure 1. Comparison of assessment scores for successive years (2005-2006 & 2006-2007). The blue and red points represent individual percentage scores for the overall assessment in each cohort. The horizontal black lines represent the mark range. Red vertical bar is the pass/fail cut off. The vertical green bar is the mean score.

Although we are treating the assessment analysis with some considerable caution because of the limited time series and possibility of sample variation between years the data show a significant change in student performance. The mean score has shifted positively some 13-17 points (if you choose to ignore the outliers), there are fewer fails, and a much greater spread of marks into the higher mark classes.

Ethnography has elucidated known and unknown anxieties associated with the learning of Digital Geographies at Edge Hill University. The ethnographic analysis has informed a nascent pedagogy that has been implemented in the 2006-2007 presentations of Digital Geography at this university with some considerable success. In addition this research project is an exemplar of the SOLSTICE values (http://www.edgehill.ac.uk/SOLSTICE/) and demonstrates the values of interdisciplinary collaboration.

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9 Acknowledgments

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