

Ethnographic Studies of Students pursuing Digital Geographies in the University Context

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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 having “very hard” techniques to master. However, students acknowledge their current, and future importance, to the 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 university GIS modules. Ethnography was used to examine perceived difficulties of ArcGIS with Level 1 geography students at Edge Hill University. This research established a way forward for improving the students understanding and skill mastery of ArcGIS in future modules. It demonstrates how ethnographic research 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 research techniques and geo-communication modules. “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 misconception 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. For some it is clear from their comments that Digital Geographies is a sufferance not always worth bearing.

In order to address their concerns a research project was commissioned to explore the reasons for the difficulties in the student learning experiences of Digital Geographies. Ethnographic techniques were used to collect this data. Normally end of module evaluations are used to elicit such data but they usually provide little in the way of meaningful or useful information normally consisting of bland and cursory comments. The project was conducted over a two year period (December 2005 - December 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, typically used by

social scientists and unfamiliar to geoscientists was used to forge a pedagogic way forward and remedy some of the student concerns. The findings were used to remodel the delivery of the Level 2 compulsory module Digital Geography as well as the other modules. Following on from this a detailed ethnographic survey and analysis of the student experience was completed as well as an analysis of module assessment scores. The research has been supported by the research group SOLSTICE (Supported Online Learning for Students using Technology for Information and Communication in their Education) which is part of a British government funded CETL (Centre of Excellence in Teaching and Learning) at Edge Hill University. In particular it demonstrated the value of collaboration between disciplines as the author was introduced to the art of ethnography during a staff development session for 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 as 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 cursory and dichotomous appreciation of Digital Geographies. Although they acknowledged their worth to both the pursuit of the subject and their future career options they complained (*sic*) of their difficulty in grasping 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* and students were advised that they had comply with both the course and programme requirements which insist on the development of high level IT skills.

Although this satisfied the demands of the programme it did nothing to assist students with their difficulties.

4 What is Ethnography?

Ethnography is one kind of qualitative research, a common methodology in the social sciences, 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 to *explore* students' perspectives and experiences - without preconceived ideas or predictions - and to gain a much deeper 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, Spiegel and Kinikin, 2004, Atkinson &. Pugsley 2005, Martin et al 2008).

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) - coined as the "*those who can.. do*" group. 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 the framing of questions, should they be needed, for the 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 - coined as “*those who can’t don’t*” group. These Level 1 students all subsequently followed the compulsory Level 2 module in September 2006 and 2007 and thus benefited from an ethnographically revamped module. Many of the 2006 cohort went on to opt for the Level 3 module in September 2007

- Ethnographic research with the Level 2 students in December 2007 (sample size 17) by digital questionnaire, group and individual interviews . This research revealed how the first delivery of the revamped module had been received and allowed the second delivery to be tweaked. The comments they made were much the same as in the first ethnographic sweep although it enabled the researcher to gain more insight and depth of analysis which culminated in more detailed interviews with four students following on a hunch.
- Further research was conducted with four very high achieving students following on from a researchers “hunch”(i.e. the critical self reflexive stance typical of the process) that there was more to be elicited.

6 Research Findings Summary

The Level 3 Advanced Digital Geographies students in the first ethnographic sweep 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 and 2 students, who had followed general and specific Digital Geographies courses module reported many issues which are summarised below:

- They found the CAD component of the modules, 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™ versions 9.1 and 9.2. They found the software difficult, confusing and were overwhelmed with the volume of data/information presented often at the same time on screen in the multiple desktops.
- 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 desktops 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.
 - Many demonstrated a (surprising) lack of computer literacy across the sample especially in the more mature age groups despite claiming literacy based upon their gaming/business software skills.
 - They complained of network performance issues - mainly reliability, and pathname/disk store naming conventions.
 - Lack of (network) storage space.
 - They wanted more assignments using GIS - further questioning by the author 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 such as their own homes or study carrels in the library.
 - Desired more comfortable and private learning spaces. 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 - yet they wanted even more!

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 was resisted on the grounds that it could damage the spirit and purpose of enquiry based learning. Similar end products are now revealed to them as a yardstick measures for them to emulate. Selected and anonymised exemplars of past work - good, bad and moderate quality - have been made available with the permission of the authors. The good work tends to shock many students into aspiring to even better constructions.
- The provision of paid student “*buddies*” to assist them was abandoned. I raised the potential of this resource with other cohorts and persuaded them of their value and in the 2008-2009 Digital geography presentations they will be used. “Buddies” have been used in other scenarios and found them to be very well received developing useful skills and providing valuable income for the buddies.
- The module will in future be delivered via a Virtual Learning Environment (Blackboard™) 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. In addition MS Powerpoint slides with audio tracks and Windows Movie Maker have been utilised to provide more friendly advisory support for the students.
 - 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.msp>) before they access the Digital Geographies component of their Level 1 study. This has helped many of the older students to develop, and mature, their IT skills
 - 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, 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 slow download times experienced over our network (despite it being Novell 6.5 with a 100mb link to desktop). The geography department purchased portable hard drives (80Gb) that were made available via a loan scheme to the Digital Geographies students. They proved to be a dramatic success and I now 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, ERDAS or the ERDAS freeviewer - ERDAS Viewfinder 2.1) 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 revelation. Our licensing allows our university to provide students with some individual software units but we have preferred to stay with the distributed computing option - this allows us to monitor and preserve the integrity of the ESRI and ERDAS licences and apply upgrades and patches. In especial circumstances

students are allowed individual copies of the software in line with our licensing conditions. In these situations they have to be responsible for all installation, patching and upgrades.

8 Ethnographic Hunches and Getting to the Bottom of the Situation..maybe.

Wolcott (1999) indicates that the intuitive “hunch” (p.70) can be an important part of ethnographic research. In this research after 18 months of analysis an intuitive insight resulted in the selection four students who fitted into the “*those who can ...do*” group. They were selected on the basis of their superior GIS skills - two of the sample had scored marks of nearly 90% in their GIS assignments or dissertations, the other two had scored marks in excess of 75% in the same work. All of these students gained very good first class honours degrees. Group and individual interviews were held and they largely revealed what had already been analysed except for one significant admission that the rest of the group eventually concurred with. This was that the distributed software enabled comfortable home working that was also “private”. This meant that they could develop their skills in comfort and with the embarrassment factor removed but more importantly they could develop advanced skills that placed them in a strong competitive position with their peers. They did not feel pressured to share their capacity in a laboratory situation and were able to achieve assignment scores in excess of their peers. This proved to be a surprising revelation in an environment where mutual support is encouraged. In the past degree classes were awarded on the basis of competitive rankings but this practise stopped in this university many years ago. It seems though that students relish competition and that the revamping of the digital geography courses actually promoted this within this client group. Competition between students is acknowledged in the literature and is known to promote learning in some respects (Pinnington, 2005).

9 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).

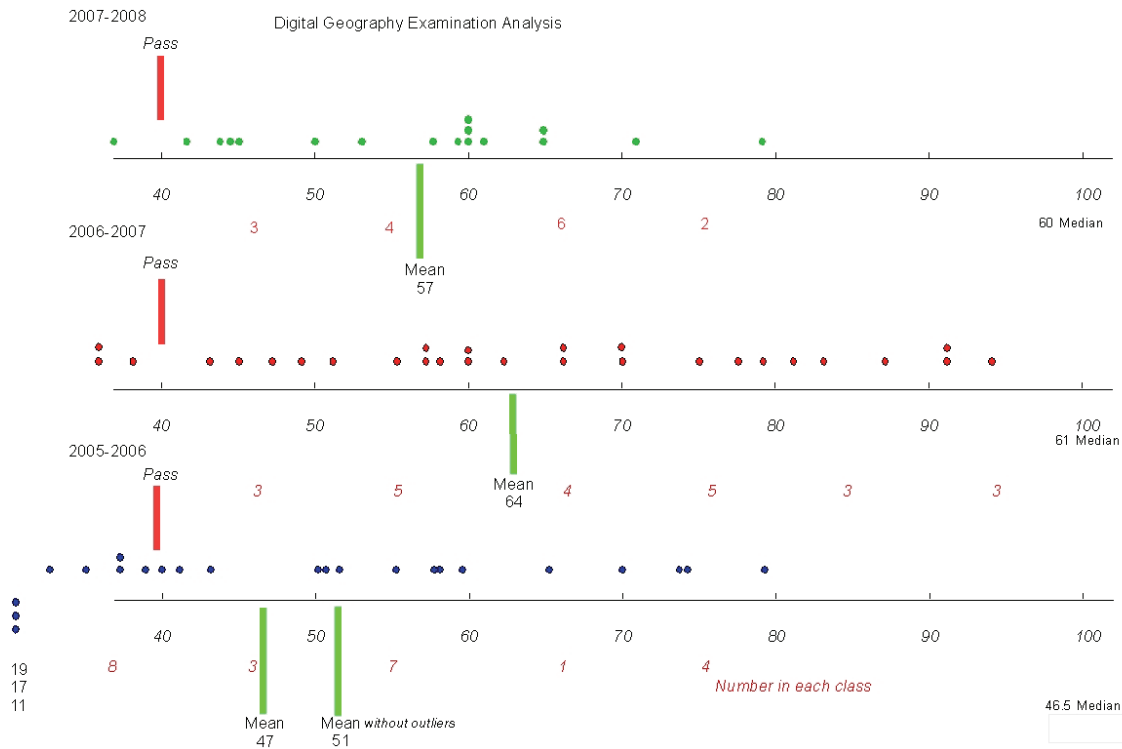


Figure 1. Comparisyyon of assessment scores for the Level 2 Digital Geographies course for successive years (2005-2008). The blue, red and green points represent individual percentage scores for the overall assessment in each cohort. The horizontal black lines represent the mark range. Red vertical bar is the pass/fail cut off at 40%. The vertical green bar is the mean score.

Although treating the assessment analysis with some considerable caution because of the limited time series and possibility of natural variations in samples between years the data show a significant change in student performance. The mean score has shifted positively some 13-17 points for 2006-2007 (if you choose to ignore the outliers), and a less impressive 6 points for 2007-2008. In addition there are fewer fails, and a much greater spread of marks into the higher mark classes. The median mark shows a positive improvement.

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 was been implemented in the 2006-2007 and 2007-2008 presentations of Digital Geography at this university with some considerable success. It seems that competition amongst peers is important in this university and may even promote learning. 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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