

“Gis us a clue!” Quantitative Methods teaching in the geography departments of UK Schools and Universities.

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1. Introduction

The ESRC, jointly with the British Academy and HEFCE, has recently launched a number of programmes to support better quantitative methods teaching within UK social science. This is a response to a number of reports (including ESRC, 2010; Hodgen, 2010; MacInnes, 2010; ACME, 2011), all of which point to the lamentable quality and marginalisation of quantitative methods, and to the cost this imposes on the ability to compete internationally in research and in commerce. Amongst these projects, a joint collaboration between the Royal Geographical Society (with IBG) and the Universities of Bristol, Cardiff, Leicester, Liverpool and Sheffield argues that the urgent and necessary aim of addressing the critical shortage of skills in undergraduate quantitative methods teaching will be most effective only if university-level teaching is recognised as part of a pathway leading from secondary schools, through higher education and into paid employment. It notes the somewhat schizophrenic position that geography has reached, with high-end expertise in areas such as GIS, geostatistics, spatial statistics, spatial econometrics and the use of geoinformation in scientific visualizations yet also, like many allied subjects, a general deskilling in, abandonment of and suspicion towards quantitative methods in social scientific research especially (i.e. human geography). It also recognises the disconnection between the widespread use and application of geographical data analysis in industry and the teaching of geography within universities (Unwin, 2005). As such, the outcomes of the project will be:

- (1) To undertake a scoping study of teachers' experience, familiarity and understanding of quantitative methods, of the importance given to them in upper secondary school and early years undergraduate curricula, what the barriers to learning are, and what might be done to overcome them.
- (2) To produce a range of web-enabled case studies and vignettes demonstrating the importance of quantitative methods in geographical research and in the sorts of jobs geography students might go into.
- (3) To catalogue the resources available to support teachers of quantitative methods, especially within higher education, and to provide a simple website as a point-of-entry to those resources.
- (4) To develop a peer network to support the teachers and teaching of quantitative methods in

geography, meeting face-to-face and with special sessions at the RGS-IBG annual conference.

(5) To provide evidence for and provide strategic guidance to the review of the A-level curricula and of the benchmark statement in geography to stress the importance of quantitative methods as a core part of what it means to learn and to undertake geography.

2. Why Geography?

Geography is an unusual subject in the ways it bridges between physical science, social science and the humanities. Its status as a part-STEM subject groups it with science, technology, engineering and maths. Yet, it is not obviously a vocational subject with degree-level geography students going into a wide range of jobs including retail, business, finance, government and public service, conservation and environment, IT, health, media, teaching and research. The recent White Paper (BIS, 2011) listed geography as one of eight disciplines that offer a wide range of career opportunities.

In Britain, in 2009-10, there were approximately 28 795 students taking a degree in geography, of which 20 300 were full-time undergraduates. In recent years almost one third of undergraduates have gone on to further study across a range of disciplines. Impacting a change in the quality of quantitative methods teaching within geography will diffuse into the social sciences and into industrial sectors more widely.

Geography has a long tradition of quantitative methods research and teaching, leading the development of spatial statistical approaches and process modelling in the late 1960s and early 1970s, and being quick to adopt, develop and apply GIS technologies especially in the late 1980s and early 1990s. More recently, the discipline has also embraced earth observation technologies and numerical modelling as techniques for studying the planet's surface and subsurface.

The 'quantitative revolution' of the 1960s and 1970s represented a period when economic theory and appeal to physical principles such as laws of gravity were used to model and to explain social process and the patterns of, for instance, migration, trade or development generated by those processes. Such approaches fell out of favour from a period beginning in the 1970s following criticisms that alleged their uncritical adoption of ideas and theories that support hegemonic capitalist practices, power structures and inequalities, because of their lack of sensitivity to issues of gender, sexuality, disability (and so forth), and because of their general focus on the aggregate and on presumed rational behaviour as opposed to individual whim, emotion, trust, fear and other human traits.

It is now better recognised as a mistake to associate quantitative methods only with positivism, to miss their use in critical social analysis or to suggest they are necessarily antithetical to qualitative approaches (Kwan & Knigge, 2006; Barnes, 2009; Harris & Jarvis, 2011). However, a general hostility to such methods lingers in human geography, borne from a misunderstanding of both these philosophical aspects and of the techniques themselves.

Nevertheless, it would be a mistake to regard the situation as merely bleak and to not see the opportunity to impact change. In fact, geography has a strong track record of peer support, knowledge sharing and supporting pedagogic goals through institutions such as the Geographical Association (GA), the RGS-IBG, the CTI Centre for Geography, Geology and Meteorology, contributions to the JISC-funded Teaching and Learning Technology programme, the HEA subject centre for Geography, Earth and Environmental Sciences, and

Spatial Literacy in Teaching (SPLINT), a HEFCE-funded Centre for Excellence in Teaching and Learning of which four of the current team were directors, managers or researchers. The discipline always has retained a strong desire to teach quantitative methods effectively (see, inter alia, Unwin & Maguire 1990, Unwin 1997).

Furthermore, geography remains characterised by a belief that there are common patterns of behaviour, the understanding of which is critical to appreciating society. It is this perspective that feeds so effectively into evidence-based public policy (including crime or disease mapping) and also to private sector strategies (e.g. locational decision-making supported by large firms such as ESRI or Experian).

3. Teachers' perspectives

In fact, a recent Royal Statistical Society report identified geography as one of the best subjects for teaching statistics (RSS, 2012) because it does so with a clear purpose in mind (exemplified by the classic collection and analysis of data 'in the field'). However, the requirements for 17 and 18 year old students (at A and AS level) vary between the examination boards. For example, whereas one (AQA) includes measures of central tendency, dispersion and inferential testing, another (Exexcel) is much more focused on the interpretation and understanding of tabulated or visualised data. In meetings with teachers, some have expressed their dislike especially of teaching statistics that they neither like nor understand but have to because the curriculum requires it. Whether this helps numeracy is a moot point. Crawley (2007) wryly describes chi-square that is something taught to geographers at school and misunderstood thereafter!

At the time of writing, we are undertaking a survey of teachers in British geography departments, investigating their knowledge of, use of and attitudes towards quantitative methods in their teaching, as well as what shapes those attitudes. The results will be presented at the conference. A parallel survey of University geography departments assessing what is taught and to what level will also be presented.

4. Conclusions

Although the project evidently is at an early stage and there is little by way of results to present in this abstract, we hope to be able to provoke discussion about what actually we mean by quantitative methods, what they should look like in an era of 'big data', crowdsourcing and so forth, and whether there are minimum standards we can expect of any undergraduate student in geography and related disciplines. This follows other successful discussions – though with few clear answers! – at this year's AAG and RGS-IBG annual conferences.

The project has a website/blog that can be found at www.quantile.info Links to teaching resources that you have found to be helpful are especially welcome: suggestions to Katharine Fitzpatrick or to Rich Harris, please.

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Biography

Rich Harris is a Reader in Quantitative Geography. Recent work has been in geographies of education, focusing on choice and markets in educational systems, measures of segregation, supporting the transition of pupils from primary to secondary schools, and on supporting quantitative and statistical literacy amongst geographers and undergraduate social scientists.

Katharine Fitzpatrick is the project officer on the ESRC/BA funded joint initiative to support quantitative methods teaching in geography from school through to postgraduate level. After completing a physical geography degree at the University of Sussex, Katharine went on to complete a NERC funded PhD in palaeoecology/palaeoclimatology /physical geography.

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