

GEOSCIENCE LEARNING RESEARCH IN UK HIGHER EDUCATION

Dr Helen L. King

Introduction

This paper discusses a collaborative programme of learning research funded by the Learning and Teaching Support Network Subject Centre for Geography, Earth & Environmental Sciences (LTSN-GEES), and a cross-disciplinary project to explore the linkage between teaching and research funded by the LTSN Generic Centre. In order to place this discussion in context, a brief background to the current climate in UK Higher Education is also provided.

Background – the current climate in UK Higher Education (HE)

HE is going through an extensive period of change in the UK. Approximately five years ago students were required to pay their own tuition fees, and maintenance grants were gradually phased out to be replaced by loans. As a result, students are becoming more demanding of the quality of their learning experience and are also looking to undertake more vocational courses. This has contributed towards a decline in student recruitment in the sciences, and this, together with the effects of a reduction of geography and geology in the K-12 curriculum has added to the problems faced by the geosciences in HE.

As in many countries, there is a conflict of interest between teaching and research in HE. Research is funded, in part, by the HE Funding Councils and the level of this funding is dependent on departments' performance in the Research Assessment Exercise (RAE). Consequently, smaller departments and those that have more of a teaching focus are less likely to obtain enough funding to sustain their activities. Recently, several geology departments have had to close and others are being merged with other disciplines. Not only does this trend reduce the amount of geoscience research but affects the provision of geoscience teaching in HE. Until recently, learning research was only acknowledged by the RAE where it was conducted in Departments of Education and, consequently, there was no formal motivation to undertake discipline-based learning research. This has recently changed but, in order for departments to optimise their RAE results, individuals are still discouraged from undertaking any research outside their own discipline area.

"The Government has said that 50 per cent of young people should have the opportunity to benefit from higher education by 2010. This target has both an economic and a social purpose. More graduates are needed to enable the UK to sustain and develop a knowledge economy able to compete globally. And fair access for those from disadvantaged backgrounds to all forms of education, including higher education, is an essential part of addressing social exclusion." (HEFCE, 2002). The following areas of national priority have been identified:

- Widening participation,
- Ensuring fair access to HE (including students with special education needs and disabilities),
- Maintaining and improving retention rates,
- Enhancing employability of graduates, and
- Encouraging and disseminating good and innovative practice in support of high quality learning and teaching.

It is within this climate that the Learning and Teaching Support Network (LTSN) was launched in January 2000 and funded by the four HE councils in the UK (one each for England, Scotland, Wales and Northern Ireland). The LTSN consists of 24 Subject Centres which offer subject-specific expertise and information, a Generic Centre which addresses learning and teaching issues that cross subject boundaries, and a Technologies Centre and Technology for Disabilities Information Service. The LTSN aims to:

- Promote and transfer high quality learning and teaching practices in all subject disciplines,
- Provide a 'one-stop-shop' of learning and teaching resources and information for the whole HE community,
- Develop and support networks of practitioners.

The LTSN Subject Centre for Geography, Earth & Environmental Sciences (LTSN-GEES) is based at the University of Plymouth. Further information can be found at:

LTSN: <http://www.ltsn.ac.uk>

LTSN-GEES: <http://www.gees.ac.uk>

Learning Research into the Educational Effectiveness of Fieldwork

Until recently, discipline-based learning research has mainly been undertaken only by individuals on a relatively small scale, for their own interest, fuelled by their enthusiasm for their discipline and their commitment to the learning experience of their students, and with little or no external recognition or reward. However, with the increasing need for high quality learning and teaching, the declining recruitment in geosciences despite the Government's widening participation agenda, and a relative reduction in resources to support learning and teaching, learning research is starting to become recognised as a necessary aspect of scholarship and professionalism in UK HE.

In 2001, LTSN-GEES obtained £62, 000 to fund a programme of work to develop discipline-based learning research capacity through supporting collaborative research into the educational effectiveness of fieldwork in Geography, Earth and Environmental Sciences. The programme began in June 2001 and continues until April 2003. In addition to the LTSN-GEES team, it involves a total of around 30 academics from over 15 different geoscience departments throughout the UK, and two advisors with experience and expertise in generic learning research.

The programme arose as a result of four main factors:

- The need to develop the capacity of the discipline-based communities to undertake learning research,
- The central role of fieldwork to student learning in Geography, Earth and Environmental Sciences,
- The fact that fieldwork is, as yet, little theorised,
- Fieldwork lends itself well to a range of learning research methodologies.

To support these needs, the programme has the following aims:

- To build capacity for undertaking geoscience learning research,
- To undertake research into learning and teaching issues associated with fieldwork,
- To disseminate and embed the results of this research,
- To disseminate the research methodologies.

The programme consists of 5 mini-projects (each funded with up to £5000) supported by a series of staff development workshops. The first workshop, in June 2001, attracted nearly 60 interested individuals and helped to define the topics for the projects. Once the project teams were established, a two day event was held in September 2001 to discuss research methodologies and to refine the project plans. LTSN-GEES was extremely fortunate to have the support of Prof John Carpenter from the University of South Carolina to help out with event and to share his experience and expertise. Once the mini-projects were underway, a third workshop was held in May 2002 to provide an opportunity to discuss the issues involved in qualitative data analysis. A final event will be held in January 2003, to bring together all the project teams and to discuss their findings. The research will be written up in relevant journals and presented at the 2003 GeoSciEd IV conference in Calgary, as well as being outlined in LTSN-GEES's publication, Planet (available to download free from our web-site). The five projects are:

1. The Role of Fieldwork in the Curriculum

Initial research question: To what extent does fieldwork relate to Biggs' theory of constructive alignment (Biggs, 1999)?

2. The Impact on the Learning and Teaching Experience of the Removal of Fieldwork from Academic Programmes

Initial research question: At particular institutions, did the absence of fieldwork [due to the 2001 Foot & Mouth epidemic] impact on a) the module grades, b) on students perceptions of the learning environment, c) on staff perceptions of the learning environment?

3. Fieldwork is good? – the student view

Initial research question: What is the effect of fieldwork on the students' affective domains [processes that deal with emotions, feelings and values](Kern & Carpenter, 1984)?

4. Fieldwork Education and Technology

Initial research question: What is the relationship between C&IT [communication and information technology] and fieldwork education?

5. Learning to do Pedagogic Research

Initial research question: How far and in what ways has the programme succeeded in developing capacity to undertake learning research?

All the projects are currently in the data gathering and analysis part of the process, so, unfortunately, few results can be reported at this stage. However, the programme has a very positive feel and the participants seem to be enjoying being involved. For the geosciences community, the initial results from the second project listed above, shortly to be submitted to the Journal of Geography in Higher Education (JGHE), are extremely encouraging as illustrated by extracts from the draft paper copied:

"Internationally, fieldwork is generally seen as intrinsic to the very nature of geographical education. However, the educational objectives and actual outcomes of fieldwork have rarely been examined. During 2001 in the UK, fieldwork was withdrawn from many university degree programmes as Foot and Mouth Disease led to restrictions on access to the countryside. This restriction provided an unexpected opportunity to assess student perceptions of fieldwork in the light of its absence and to review those alternative learning strategies which were put in its place (where appropriate). To this end, Nominal Group Technique (NGT) was applied to five groups of students from five separate UK Universities to obtain information on the groups' perceptions of the value of fieldwork. NGT elicited almost 300 responses from 33 students representing a high level of group consensus on the issues involved.

"Results demonstrate that student evaluation of fieldwork supports many of the academic / practitioner views of the role of fieldwork in student learning. As such, the educational objectives of fieldwork (Gold et al, 1991) are being achieved from these students' perspectives. Students perceive the greatest strengths of fieldwork to lie in the experience of reality, enhancing understanding of the topic, using specific equipment and techniques, developing holistic and transferable skills and in developing interpersonal skills, both between peers as well as between students and lecturers. However, this paper has also shown that fieldwork may not provide a completely positive learning experience for students. Issues which most concern students in this study include the time spent on fieldwork, teaching / delivery (e.g. missing lectures), increases in assessment and workloads, concerns about understanding of subject-specific knowledge (e.g. less detailed notes complicating understanding), technical concerns to do with equipment, and financial concerns (e.g. too expensive). However, the results in this study show that the positive attributes of fieldwork far exceed the negative attributes reported by the students' groups, demonstrating fundamentally that overall fieldwork is a much valued student learning experience." (Fuller, Gaskin & Scott, in preparation).

Linking Teaching and Research

LTSN-GEES is involved in a project funded by the LTSN Generic Centre to explore the linkages between teaching and research. LTSN-GEES' contribution aims to identify, record and disseminate case studies of the way individuals, course teams and departments within Geography, Earth and Environmental Sciences enhance the learning of their students by developing the links with their research and to promote ways in which individuals and departments can maximise the benefits for students of these linkages. The project began in March 2002 and case studies are currently being identified.

It is recognised that students may benefit from research in a variety of ways including, where:

- The content of courses is informed by staff research,
- Students learn about research methods,
- Teaching methods adopt a research-based approach, e.g. through problem-based learning,
- They undertake their own research projects, whether individually or in teams,
- They participate in staff research projects as subject, as in, for example, perception studies,
- They assist staff with their research projects,
- Staff undertake learning research which benefits the quality of their teaching.

Research in this context is interpreted widely to include RAE-level research, consultancy for clients, and action research aimed primarily at improving practice. It is recognised that there are also potential negative impacts from staff involvement in research, such as staff absences and lower priority being given to teaching. For the benefits to be maximised and the disadvantages to be minimised, the relationship between teaching and research needs to be effectively managed.

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Dr Helen L. King
Manager, LTSN-GEES
University of Plymouth, UK
Email: h.king@plymouth.ac.uk
Web-site: <http://www.gees.ac.uk>

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