January 2003 Issue Five

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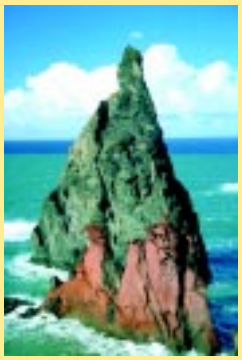
Learning and Teaching Support Network
LTSN Subject Centre for Geography, Earth and Environmental Sciences

Planet

Supporting learning and teaching in Geography, Earth and Environmental Sciences (GEES)



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http://www.gees.ac.uk/planet/index.htm

PLANET

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Have you seen this?

What is PLANET?

PLANET is the bi-annual publication of the LTSN Subject Centre for Geography, Earth and Environmental Sciences.

Its aims are to:

- Identify and disseminate good practice in learning and teaching across the three disciplines of Geography, Earth and Environmental Sciences and present examples and case studies in a "magazine" format.
- Provide a forum for the discussion of ideas about learning and teaching in the three discipline communities.
- Provide information for readers on Subject Centre activities and on related resources, conferences and educational developments.



Front Cover Photograph Acknowledgements

Left - Photo by Ted Nield, © The Geological Society of London
Stacks of red (Miocene-Pliocene) pyroclastics and green trachybasalts, Punta de San Lourenco, E. Madeira, Portugal. Pyroclastics cut by swarm of E-W trending dykes, mostly benmoreite, hawaiite and mugearite.

Middle - Photo by Ted Nield, © The Geological Society of London
Dolomite crystals under crossed polars (in cross-polarized light). There is a good dolomite rhomb just above centre, to the right. The dolomite is replacing a very dark, organic-rich calcite mudstone.

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Editorial

The expansion of our PLANET

Over the last couple of years, I have been delighted when someone else has offered to write the editorials for PLANET. Firstly, it is one less job for me to do, but more importantly it saves me from having to think of something inspirational and interesting to write! However, as editor, there comes a time when I think it is appropriate to say a few words about the publication and to reflect on its progress to date.

This is the ninth edition of PLANET since the publication started exactly two years ago. So far, we have had five standard editions, and four special editions. PLANET has been extremely well received by our GEES communities and I would therefore like to personally thank those of you who have taken the time and effort to provide constructive feedback on the publication. Your comments are most welcome. The enthusiasm and commitment of the many contributors (over 100 so far) and the efficiency and cohesiveness of the editorial panel have both made my life relatively straight-forward as editor. It is such professionalism and team-work on both sides - authors and editors - that has enabled the publication to prosper.

And, I am convinced that we *are* prospering - our distribution list has increased by over 100% in just two years, to over 2500 at present, mainly as a result of individual requests for personal copies. Our SENDA special edition was particularly sought after - resulting in a bun fight in one department so I was informed! We also have an extensive overseas mailing list and have benefited from our international submissions, which in subjects like GEES, can only add strength to the publication in terms of sharing good practice. In addition, we have been successful in engaging both pre- and post-1992 universities and all GEES disciplines; groups historically not always being the most comfortable bed partners! Also, in our 2002 needs analysis of all GEES departments, PLANET was one of the core Subject Centre activities that came out top in terms of community 'usefulness'.

Again, in this current edition, we see topical articles on issues such as using and embedding C&IT in the curriculum (Barbara Rumsby and Richard Middleton; McKenzie et al.), using online teaching resources (e-MapScholar team), recruiting the right students to GEES courses (Rosanna Breen), spotting and dealing with problems associated with group-work and its assessment (Peter Levin) and the scholarship of teaching (Brian Chalkley).

However, despite such encouraging signs and interesting and engaging submissions to PLANET, there is no room for complacency. Reading a magazine such as this is one thing, but changing practice and employing different and/or new methods of teaching and enhancing the student learning experience is another. For example, have you ever adapted or adopted any of the suggestions and ideas presented in PLANET in your own teaching? If yes, did it help and why? Do you ever discuss PLANET material with other colleagues and debate the benefits and disbenefits of using some of the ideas?

To me, these are critical questions and ones on which I would appreciate hearing your views, and perhaps sharing with other colleagues through a new PLANET reader-forum. There are many ways to produce and focus a learning and teaching publication such as this and we have chosen (to some extent by chance) a particular format that appears to work, for most of our colleagues. However, this doesn't mean that we are not open to new ideas and suggestions. I look forward to hearing from you on these matters, and in due course the HE White Paper due for publication as we go to print. I also look forward to many more editions of PLANET.

Happy New Year.

Steve Gaskin
Editor

Profile on...Mike Sanders

(LTSN-GEES Communication and Information Technology Manager)

What does he do?

Mikes looks after anything to do with Communication and Information Technology (C & IT) at LTSN-GEES. Responsibilities include harnessing the outputs of C & IT Projects, responding to C & IT based enquires from the GEES community, collation and review of C & IT materials, supporting the IT needs of the LTSN-GEES team, maintaining the website, overseeing the development of the resource database and eating biscuits.

Background

Mike was brought up all over the place (father was in the RAF) but has a soft spot for the Southwest and the sea. He is a graduate of the Environmental Sciences degree at the University of Plymouth and has a number of years' experience in learning and teaching / educational technology development, the environmental sector and IT support.

Professional Interests

Mike's professional interests revolve around the effective use of C & IT in learning and teaching. When involved in C & IT projects, in addition to ensuring that learning and teaching issues are given adequate consideration, he is keen to promote aspects such as evaluation, transferability and accessibility. Managed / virtual learning environments are a particular area of interest because of the potential to deliver flexible and innovative learning. However, Mike is concerned that this is potential rather than a given - there is a need to focus on how to get the best from electronic learning environments for our disciplines. Aside from his e-learning interests ,Mike enjoys the opportunity to keep closely in touch with Environmental Sciences through LTSN-GEES activities.

Personal Interests

Apart from biscuits, Mike is passionate about quite a few things but it is advisable not to talk to him about surfing, snowboarding, windsurfing, Hi-Fi or Photography as he is a self-acknowledged "nerd" with respect to all of them!

Using C & IT to Support Fieldwork on Tenerife

Barbara Rumsby and Richard Middleton
The University of Hull

Abstract

There has been a great deal of interest over recent years in the use of communications and information technology (C&IT) applications for fieldwork support, with the idea of virtual fieldtrips much discussed within the context of e-learning initiatives in geography (Lemke and Ritter, 2000; Stainfield et al., 2000). The concept of virtual fieldwork, however, is problematic to many geography, earth and environmental scientists in universities, who fear that managers may see this as a replacement for costly and risky fieldwork (Burnett et al., 1998). The increasing consensus seems to be that nothing can replace the field experience, but C&IT can provide an excellent support or supplement to fieldwork. This paper reports on world wide web (WWW) and information technology (IT) support materials developed for Stage 2 fieldwork on the island of Tenerife. Development of this material took place over a number of years, with support from the Geography Department and the University of Hull Staff Development fund. The fieldtrip has been run annually since 1996, with between 26 and 46 students and 3-4 staff on each trip.

Introduction and Objectives

The prime objective of the Stage 2 Tenerife fieldtrip is to develop students' field and research-design skills. The trip is one of four options within a compulsory Field Study module, which is part of the Core Skills strand within the department. Students are allocated to a particular fieldtrip on the basis of their degree course and choice of options. Thus, the Tenerife group comprises BSc students who have chosen to follow a strongly 'physical' strand. A second objective is to enhance students' understanding (and experience) of the physical geography of Tenerife, focusing particularly on volcanic geology and geomorphology, and on biogeography. Finally, the trip provides an opportunity for synthesis, a means to make linkages between material covered in other subject-based modules (bio-geo-environmental). This last point is an important one, as under the modular degree system, there is a tendency to compartmentalise learning and students often find it difficult to transfer material and ideas between different contexts.

The island of Tenerife lends itself very well to this sort of fieldtrip. The wide variety of environments, good exposures and recent origins (Tertiary-Quaternary) provide an exciting and stimulating field setting. In addition, the compact size (~2000km^2) and island situation of Tenerife mean that it is possible, within a one-week trip, to cover most of the key ecological, geological and geomorphological environments. Thus, students obtain a good 'feel' for the geography of the island and how the landscape as a whole has evolved over time.

Ethos

Despite the plethora of low-cost package holidays to Tenerife, most of the students taking the module have not previously visited the island (and those who have, usually did not venture very far outside their holiday resort!). Hence, the field destination is largely an unknown quantity to most students and the suite of IT- and WWW-based support materials described below have been developed, in part, to prepare students for the field. C&IT resources are also used on the trip itself, and on return to Hull to reinforce the field experience. The material is not intended as a replacement for fieldwork, but aims to enable students to gain maximum benefit from their relatively short time in the field.

Learning and Teaching Programme

The overseas visit takes place in the middle of the second semester (during the Department's reading week), usually falling in early March. This gives around six weeks available for preparation before departure, and 2-3 weeks on return for follow-up work and assessment prior to the Easter vacation. Table 1 outlines the Hull-based activities undertaken before and after fieldwork.

Week	Content and Structure	Teaching Mode
Week 1	Introduction	Lectures
	Climate & Hydrology	
Week 2	Geology & Evolution	
	Geology & Geomorphology	
Week 3	Biogeography	
	Groupworking	Practicals (students work in groups)
Week 4	WWW Resources	
	Field Notebooks	
Week 5	Project work	
	Project work	
Week 6	Logistics & equipment	
Week 7	**Fieldwork**	**Fieldwork**
Week 8	Computer test	Using field notebooks
Week 9	Project Follow up	Optional workshop sessions
	Project follow up	

Table 1. Pre- and post-fieldtrip activities in Hull

Pre-Fieldwork Activities

A series of introductory lectures focuses on the geography and geology of the island and highlights key reading that students should follow up from the accompanying reading lists. The lectures are presented using Powerpoint and summary outlines are made available on the University intranet for students to access in their own time. Much of the fieldwork is group-based, and at this point in the programme students are allocated to groups (5-6 per group) within which they work for the remainder of the preparatory classes. A practical session on group-working skills is conducted in a semi-light-hearted way (with a quiz designed to identify what roles individuals play within a group), but is designed to get the groups thinking about group dynamics and how the individuals in their group interact. It also provides an ice-breaker, as group members may not have previously known each other well (the groups are allocated by staff to obtain a mixture of skills and competencies, rather than chosen by students). Another practical focuses on the field notebook, which forms part of the module assessment (see below).

WWW-based resources are introduced in a computing practical, with an introduction to the in-house Field Guide (Figure 1) as well as other selected internet sites. The Field Guide has been written by the module team and provides a highly visual format, using digital photographs taken specifically for the guide. It is stressed that it is up to individual students to use the Field Guide as much or as little as they wish. Other WWW links include academic/official sites, such as the Instituto de Astrofisica de Canaries (http://www.iac.es/home.html), and other less academic, but still very informative sites such as Julio Rancel's Canarian Balcony (http://www.geocities.com/~jrancel/can-eng.html). Remaining sessions are dedicated to preparation for group project work. Three projects are undertaken in the field, with varying degrees of guidance and an increasingly hands-off approach by staff.

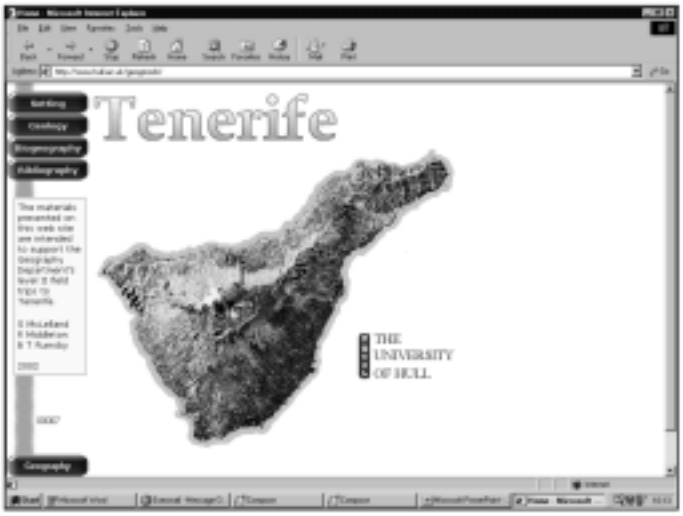

Figure 1. Front page of the WWW-based Field Guide (www.hull.ac.uk/geogmods)

Fieldwork Activities

Six full field days and evenings in the field, comprising a mixture of more general 'look-see' tours and group project activities are undertaken during the field visit (Table 2).

DAY	Locations and Topics	Evening work
Day 1	Las Cañadas - Geology and Biogeography	Notebooks, Presentations
Day 2	El Chinyero Project and Los Gigantes	El Chinyero data analysis
Day 3	Barranco del Infierno Project	Barranco data analysis
Day 4	Garachico and Volcanas Negras	Notebooks, Presentations
Day 5	Las Cañadas - Geological Mapping Project	Notebooks, Presentations
Day 6	Anaga and Santa Cruz	Conclusion

Table 2. The Tenerife Field programme

Students are required to keep field notebooks throughout the trip. These are provided within the module resource pack, and contribute 25% to the module assessment. Initial guidance is given in a preparatory session in Hull, although most students will already be familiar with taking field notes. Some time is also spent in the field on notebook skills, especially in the first day or two (e.g. what to include in a field sketch). All assessments at Hull are anonymous, thus students may only identify their notebooks with their student ID number. There is a potential problem in this respect, as over the course of a week certain students - and their notebooks - can become quite similar, especially in a small group! Notebooks are handed in at the airport on arrival back in the UK. The turn-around time for marking is rapid, and notebooks are returned to students within a few days so that they are available for the computer test which takes place 1-2 weeks after returning to Hull.

Evening sessions lasting two or more hours are used to follow-up and reinforce aspects of the day's work. On days when group projects have been undertaken, time is allocated to processing data and preliminary analysis of results. On the other evenings, students either work on field notebooks, reviewing and reflecting on their notes, or group presentations. These are aimed at providing a synthesis of material covered on the 'look-see' days and are done on a group basis. Students in two groups are given the use of a digital camera for half a day and access to a laptop in the evening to prepare a Powerpoint presentation. Around one hour is allowed for preparation and talks last about 10 minutes (Figure 2). Most of the students will already be familiar with Powerpoint, and no specific training is given, although staff are on hand to help if needed.

Figure 2. Pages taken from a student presentation based on material collected on day 1 of the trip in 1999. The group has chosen to focus on biogeography.

Post-Fieldwork Activities

On return to Hull, two project follow-up sessions are timetabled, run as optional drop-in workshops. Nearly all students choose to attend both the optional sessions, and spend the time planning and discussing group projects. In addition to the 25% based on the field notebooks, three further components each contribute 25% to the module: a WWW-based test, a group project report and an essay, although the latter has now been discontinued (too many items of assessment, and students get enough essay practice elsewhere).

The test comprises a series of short-answer questions, including diagram annotations, and students are allowed to refer to their field notebooks. Up to two hours is allowed to complete the test, the aim being to provide a means of reinforcing field learning and emphasising the need for making clear and comprehensive field notes. Although the questions are presented online in a WWW format (Figure 3), answers are written on a printed pro-forma, with different-sized boxes indicating the length of answer required. This may be replaced in the future with an automatically graded multiple-choice test. The tests give a much wider spread of marks than the other assessments, typically ranging between 35% and over 80%, and are considered to be a fair reflection of field abilities.

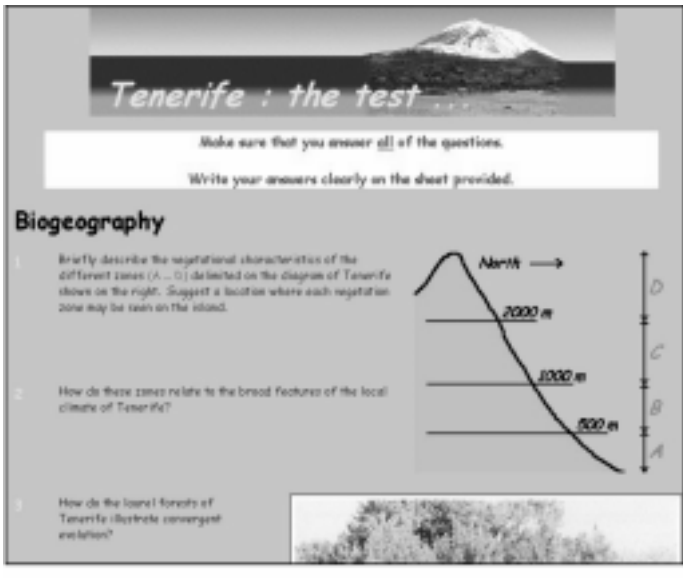

Figure 3. Extract from WWW-based test, completed soon after return from the field visit

Evaluation

2003 will be the eighth year the module has run in its present format, which reflects a high degree of staff satisfaction! Student feedback is obtained, as with all modules, using the WWW-based software. Scores are allocated for particular categories - lectures, practicals, fieldwork, etc - and marks are awarded on a scale of -10 (worst features) to +10 (best features); comments may be added at the end - see below. All student assessments are anonymous. The Tenerife module consistently scores positive marks in all categories, with 1999-2000 totals ranging between +1 and +8. There are no specific questions on C&IT facilities/resources, but students can comment on these in the 'additional comments' section. An indication of the successful integration of C&IT resources into the module is perhaps demonstrated by the limited comment on it, with only two out of eleven comments touching on computing. One of these stated that the test was hard, and the other highlighted technical problems that initially prevented some students logging on at the beginning of the test. This latter point is an important caveat to the use of online resources to support learning; we have experienced a number of networking problems at various times, which are due to faults at university rather than departmental level and outside of our control. At the wrong time, especially in the earlier years at university, this can deter staff and students from using C&IT materials.

Geography Department Student Evaluations 1999/2000

Student Comments

"The field trip for this was really good and allowed me to get a real idea of the features of the island"

"The unique learning environment was refreshing and stimulating"

"This was a very organised module but it contained too much work. With all the lectures and reading before, very long days in the field while out there, it would have been nice to have finished before 10pm one night!"

"Although hard work throughout, the field excursion was enjoyable and educational. The lecture course prepared you well for the field trip and provided a well-balanced background to the work"

"Excellent module with a wide spread of interesting subjects."

"Tenerife was really enjoyable - perhaps too much work in Tenerife, but this was compensated for less on return. There were difficulties with the computer test - for this reason, due to technical difficulties, my test results will suffer"

"The computer test I thought could have actually been made into a proper exam as the answers required were extremely hard"

Conclusion

WWW and IT resources are used extensively to support (but not replace) an intensive overseas field programme on Tenerife. A huge investment of time is required to develop and maintain materials; the suite of resources described above has been developed by a module team (4-5 contributors) over 8 years and the work is still ongoing. However, the benefits in terms of student learning are great, maximising what students get out of the field trip and providing a student-centered, resource-based approach, with a marked improvement in the learning experience.

Recommendations

Using the experience reported in this paper, we are able to offer the following recommendations for fellow practitioners who might be interested in using C&IT to support fieldwork in their own departments. They are:

1. Build up a database of images of the field venue that can be used when building resources, in teaching, and may be made available to students. A significant problem when we initiated the Field Guide project was the lack of suitable images (for our specific requirements), and issues of copyright on what material was available.
2. Visit the field venue without students. Staff teaching on the Tenerife field module have made two visits to the island separate from the student fieldwork, at different times of the year. These have been invaluable as they have allowed time for visits to areas of the island not on the student schedule, and for building the image database. The visits also provided opportunities for reflection (which is often very difficult to on field-courses where time is limited) - that have lead to significant changes to some aspects of the course.
3. Find additional time/resources to develop material. This work was supported by a project grant from the University of Hull Staff Development Fund, plus additional Departmental support. This enabled the extra visits to Tenerife, and purchase of a dedicated digital camera and laptop PC.
4. A key advantage of the web-based field guide as against a published document, is that it is readily updated and expanded. We are happy for colleagues at other Universities to use the resource (www.hull.ac.uk/geogmods) and would welcome comments and offers of additional material.

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Lemke, K.A. and Ritter, M.E. (2000) Virtual geographies and the use of the internet for learning and teaching geography in higher education, *Journal of Geography in Higher Education,* **24**: 87-91.

Stainfield, J., Fisher, P., Ford, B. and Solem, M. 2000. International virtual fieldtrips: a new direction? *Journal of Geography in Higher Education*, **24**: 255-262.

URLs:

http://geocities.com/~jrancel/can-eng.html

Julio Rancel's Canarian Balcony site has information on Tenerife's natural environment and socio-ecomonic situation, including climate, geological origins, indigenous population, etc

http://www.iac.es/home.html

Homepage of the Instituto de Astrofisica de Canarias, with links to the meteorological station at the Observatorio de Teide

http://www.hull.ac.uk/geogmods

Hull University Department of Geography's field guide to Tenerife, covering aspects of the island's geographical setting, biogeography and geology. Contributions are welcome!!

For further information on this project, please contact us as the email addresses given below.

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Running group projects: dealing with the free-rider problem

Peter Levin, LSE

Abstract

The use of group projects for academic work carries with it the risk of 'free-riding', one or more members of the group limiting the work that they contribute, in the knowledge that they will nevertheless benefit from the efforts of the other members. This paper describes factors that may lie behind intentional or unintentional free-riding, and suggest steps that academics can take (1) to minimise the incentive to students to take a free ride and maximise the incentive to work as a team; (2) to help to prevent the situation from arising where when a student is perceived by others to be free-riding but is in fact not deliberately taking advantage of them; and (3) to deal with genuine free-riding when it occurs. This article will hopefully be of interest to all GEES academics who set group-work as part of their module assignments.

Introduction

Many university courses today incorporate a 'group project'. Students are formed into groups and assigned a task designed to generate a 'product' of some kind. This article addresses the situation in which the product is given a mark, and the members of the group are themselves given that mark, which will count towards their individual score for the course as a whole. This situation provides an opportunity for one or more members of the group to refrain from 'pulling their weight', limiting the work that they invest, in the knowledge that they will nevertheless benefit from the efforts of the other members. They gain a 'free ride' – or, as social psychologists put it, they engage in 'social loafing' (West, 1994).

For teachers, there are – I think – three issues. First, what can they do to minimize the incentive to students to take a free ride and maximize the incentive to work as a team? Second, how can they recognise when a student is perceived by others to be free-riding but is in fact not deliberately taking advantage of them, and how can they help to prevent this situation from arising? Third, if genuine free-riding is observed, what can and should they do to deal with it? I shall consider these three questions in turn.

(1) Minimising the incentive to free ride, maximising the incentive to work as a team

It is manifestly the case that students, both before and during their university careers, are strongly socialised into a culture and an ethos, of individual achievement. Teams don't compete to get into university or gain good degrees: individuals do. To students who have always taken it for granted that their effort brings a reward for them alone, telling them that on this project they are to work and be rewarded as a team may amount to exposing them to a considerable 'culture shock', and academics – who have themselves got where they are through individual achievement – should be aware of this. What should you do? Here are some suggestions:

- *Tell* the students that they are being exposed to a culture shock. Prompt them all to be aware of the habits and 'taken-for-granted' that the individual achievement culture has inculcated in them, and ask them to reflect on how these are likely to affect their suitability for working in a team.
- As a preliminary to the project proper, get them to compose and agree a set of 'ground rules' to govern how they will work together. These should cover matters such as communication, the conduct of meetings, and taking decisions (including decisions about the allocation of the various tasks which together comprise the project work.) This will go some way towards synchronising their expectations of one another. It may also bring to light differences of opinion about how much time and effort it is reasonable to put in to the project, and stimulate students to seek a way of reconciling these differences.
- Review each set of ground rules with the group that produced them. If reviews are carried out with several groups at a time, circulate the rules so they can see what the other groups have produced: this is a good way of promoting reflection and second thoughts. In particular, although ground rules are on the face of it essentially to do with the mechanics of working together, some students are likely to come up with a mission statement, such as 'We will do our best'. Use this as a peg to stress to them the importance of appreciating each other's contributions. As West points out (West, 1994), individuals have a stronger incentive to contribute to the work of the group if they feel that their contribution is valued.
- If the students are from a mixture of cultural backgrounds, prompt them to discuss among themselves how the cultures that they 'carry' with them affect their expectations and what they regard as proper behaviour. The scope for misunderstanding and upset between students from a 'speak your mind' culture and those from an 'always be polite and try to reach consensus' culture is huge.
- Adopt a marking scheme that unambiguously rewards working together. A marking scheme that is based partly on the collective mark and partly on a mark for individual contributions not only incorporates an incentive to concentrate on one's own work and not to share but also gives a mixed message to students: this creates uncertainty, a frame of mind in which the deep-rooted individual-achievement culture is likely to reassert itself.
- In the marking scheme, provide for a proportion of marks to come from self- and peer-assessment. Group members can be asked to evaluate the contributions of themselves and other members with regard to attendance at meetings, interaction (including facilitating contributions by others), planning the project, leadership and management, and any report and presentation. This will help to make students more aware of how they are regarded by other members of their group. A marking system can be adopted which disregards a self-assessment that is appreciably higher (or lower) than the aggregate assessment of that student supplied by the other members of the group.

(2) Preventing unintended free-riding

Group projects sometimes take over students' lives, with the consequence that they neglect other parts of the curriculum. Some students may be more resistant to this than others. Thus, a group member may come under peer pressure to devote more time and effort to the project than they feel is appropriate and appear to back out of doing the work entailed. Thus he or she may seem to be free-riding despite having no intention whatever of taking unfair advantage of the work of others.

It may also happen that when tasks are being allocated, the noisier and more forceful members of the group are the first to bid for those that they prefer. The quietest, least forceful member may find himself or herself in a situation where there remains to be allocated only one task, and it is one for which they feel very ill-equipped: they may feel nonetheless that it is their duty to take it on, and so they volunteer to do so, while keeping their fingers crossed that they will be able to master it. Subsequently, they may flounder but be reluctant to ask for help, a situation that they deal with by withdrawing: absenting themselves, not replying to emails, etc. They will almost certainly be experiencing a great deal of discomfort and stress, but the other members of the group may well perceive their behaviour as free-riding.

How can teachers help?

Make known to students that you are aware of the propensity of group projects to drive out other academic work, and encourage them to look out for this happening. Make it clear what your expectations are – perhaps giving them some indication of what they need to produce in order to

get a particular grade and emphasising that you don't expect them to work through the night and neglect their other work. Ask them at regular intervals whether they feel the project is under control, and be on the lookout for different members of a group giving different answers to your question, which is likely to reveal the existence of an issue which needs to be discussed, possibly with yourself in the chair.

Also, encourage teams to adopt a procedure for allocating tasks that does not allow anyone to 'get in first' – a sealed-bid procedure, for example – and to check that everyone is positively happy with the outcome. Check for yourself, too. If anyone betrays unhappiness, it may be appropriate to suggest job-sharing or taking a fresh look at how they have broken the assignment down into tasks.

(3) Dealing with free-riding when it occurs

As their teacher, you may be the last person to know that there are students who consider that there is a free-rider in their group, taking advantage of them and their hard work. They are likely to feel that the issue is one that they should deal with themselves, and to be reluctant to 'tell-tales' on a fellow student. Underneath, though, they may feel very angry, and they may find the uncertainty very frustrating and difficult to handle. It is in the nature of group project work in an academic context that members take away their individual tasks and then come back to the group with the work they have done. Typically, free-riders will take away their task but not produce the work, absenting themselves or making excuses and promising to deliver 'soon', so other group members don't know whether to do the work themselves or to trust the other member and hold the project in abeyance until he or she produces; and to hope that what is produced will be what they need. The problem may be not so much that one member is unreliable and unproductive – aggravating though that is – but that the conscientious members are crippled by their feelings of anger towards the free-rider and of frustration resulting from their inability to influence events and their uncertainty as to what course of action they should take.

Again, what can teachers do to help?

- You can require each group to submit, soon after starting work, a schedule showing the task or tasks that each member is to undertake. Groups can also be required to notify you of any subsequent amendments to the schedule. This notification will be a factual matter, so giving it will not carry any connotation of telling tales, and it will allow you to see if work is being reallocated away from one member, and to enquire – if you think it appropriate – into the reasons behind such reallocation. Informing students at the outset of this requirement will itself be a disincentive to free-riding.
- You can point out to the conscientious students that dealing with 'free-riders' can actually be a worthwhile learning experience for them, if they can develop strategies to channel their anger and frustration into positive action. Such strategies might include: discussing their feelings with a neutral person, a facilitator; asking the free-rider if he or she is encountering difficulties that they haven't made known to the other group members; explaining to the free-rider their difficulty with the situation that they find themselves in; giving the free-rider a deadline for the producing of work; and agreeing among themselves how they will do the work if it is not forthcoming.

Conclusion

The above suggestions will all help to minimise the extent of free-riding and to assist conscientious students to deal with it if it does arise. The demands that they make on teachers are not onerous. They do, however, require teachers to do more than merely form students into groups, give them their assignment, and send them away to get on with it.

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See also various materials on http://www.teamwork.ac.uk

Acknowledgments

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e-MapScholar

The e-MapScholar Project: GEES-e resources

The e-MapScholar team

Abstract

This article brings you up to date with progress on the e-MapScholar project, which is creating a range of materials to support learning and teaching with geo-spatial data, including digital map data available from the EDINA Digimap service. The project is producing interactive learning units, which can be customised by tutors using a simple online Learning Content Management System. A novel aspect is that maps within the units are produced in real-time from the Digimap server. This allows localisation of the maps by the tutor. Other materials are geared towards the support of teaching. There is also a proof-of-concept virtual work placement, using a real-life workplace issue and a problem-solving approach. The project is based on the idea that the skills gap between creating online digital maps, and downloading/use of data in local software packages, can be bridged using new software tools and learning materials to support the learning of concepts and practice of skills. This article will be of interest to all GEES academics who use geo-spatial data and digital map data in their learning, teaching and research.

Introduction

Since the beginning of 2000, the EDINA Digimap[1] service has allowed subscribing HEIs online access to a number of different Ordnance Survey (OS) digital map data products. These products are free at the point of use for learning, teaching and research. Users can view maps online and print high-quality cartographic products, and they can also download data for use in local systems, such as Geographical Information Systems (GIS).

From January 2001, a team of teachers, software developers and evaluators from around the UK has been working on the provision of a range of materials to support the use of geo-spatial data, including that available from Digimap, in learning and teaching. The materials are being provided under a project funded by the Joint Information Systems Committee (JISC)[2] called e-MapScholar[3], which finishes in April 2003.

Skills Gap and Resource Development

A skills gap has been identified amongst spatial-data users, especially undergraduate students. Accessing and printing online digital maps does not generally require specialist knowledge (although a more advanced online mapping service is available through Digimap, which does require a higher degree of expertise), whilst knowledge of how to download data to local software packages requires skills development to enable students to undertake this work. The e-MapScholar project is developing innovative, interactive learning materials that bridge the gap between obtaining digital maps online and using geo-spatial data locally. It will offer elements of GIS functionality, without providing a full GIS online (see Figure 1 for screengrabs of the user-interface).

From discussing the project with teaching staff, and running beta tests with several institutions, we believe that the resources will support both undergraduate and postgraduate teaching in a range of subject areas, including those within the remit of the LTSN Geography, Earth and Environmental Sciences (GEES) Subject Centre.

An online user-needs survey conducted in the first months of the project, and a subsequent workshop, helped inform the design and development of the project deliverables[4].

Three types of resources are being developed:

- A range of teaching case studies;
- Online, interactive learning materials;
- A proof-of-concept virtual work placement.

The project is also developing an online Learning Content Management System (LCMS) that allows customisation of the online learning materials by tutors for their students. Tutors will be able to create new resources from existing learning units, customise the geographic area of maps, change the text of the learning units, and also alter the parameters of the software tools within the units that provide the interactive experiences for the student learners.

To ensure that the deliverables are pedagogically sound and fulfil project objectives, an evaluation team based at the Open University is evaluating software and tools directly with users and feeding back their findings to the developers and authors.

Teaching case studies

The teaching case studies will include work of interest to staff in the GEES disciplines. Examples include "Exploring spatial decision making through online GIS", "Modelling Site Suitability for Wind Farms" and "Use of Mobile Technologies". They are being authored by teaching colleagues from around the UK and consist of the data and materials used by the learners, along with descriptions of the uses made of the data and learning materials, and evaluations by staff and students, where available. It is hoped that the case studies will inspire educators to use the data in similar ways in their own coursework and will demonstrate the potential advantages of using these data, while helping to avoid mistakes and streamline teaching preparation by others. By the time you read this article, some of the teaching case studies should be available. (See the EDINA website references in this article for further details.)

Online learning materials and software tools

Customisable online learning materials, which incorporate software tools, are being developed in three areas: (1) working with digital map data, including concepts within areas such as understanding maps and working with maps; (2) data integration, including point, line and area digitisation and uploading of data from other sources, and (3) data visualisation, including 2D and 3D visualisations and problem solving.

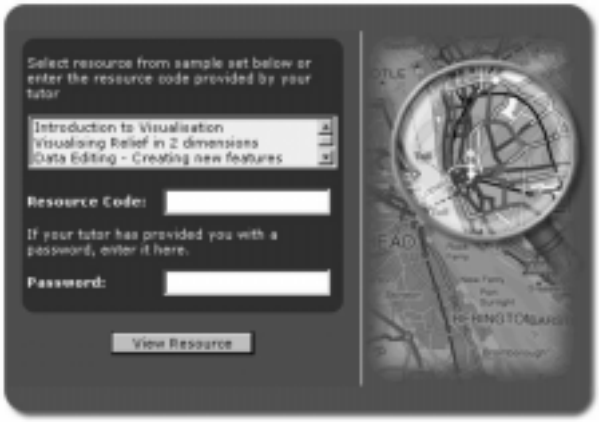
Key features of these resources are:

- A core set of learning materials is being developed at unit and resource level. Teaching staff can create and customise learning resources for their students from the learning units, which each address particular concepts or skills practice;
- Teaching staff can customise the resources and units through the e-MapScholar Learning Content Management System;
- The learning units contain interactive tools that are generic and can be used in different learning materials;
- The tools and learning materials are online resources that access maps and data from the EDINA Digimap service in real-time;
- Learning resources include self-assessment exercises for the students to test their own learning;
- A glossary of commonly used words and phrases will be accessible at any point;
- Students are invited to submit comments and feedback on the learning units to EDINA using online forms.

Virtual Placement

Problem-based learning represents a powerful pedagogic tool to develop student confidence and problem-solving skills. The team is now developing a proof-of-concept 'virtual placement', a real-life problem from an outside partner organisation, through which the learner has to work in order to arrive at a reasoned solution. During the placement, a student will carry out an assessment of the visual impact of wind turbines at the Nant Carfan development in Wales, using material provided by the Macauley Institute in Aberdeen.

In addition to using Digimap data to satisfy various elements of the placement work, the student will be provided with land cover data (Land Cover of Great Britain), wind turbine locations and height details (Countryside Council of Wales), road network (interpreted from



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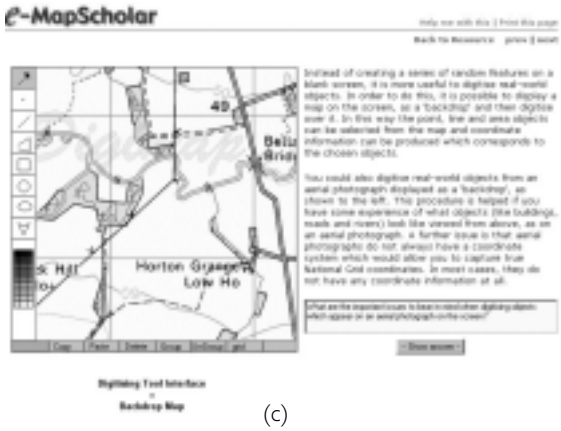

(c)

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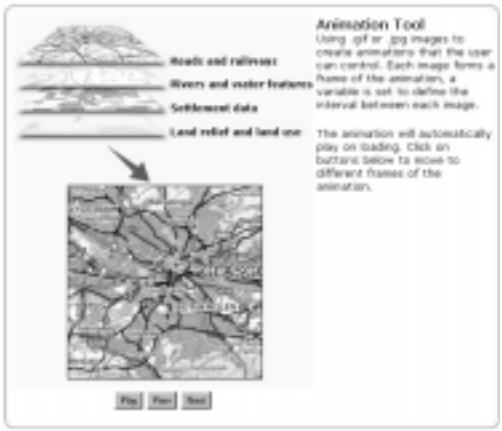

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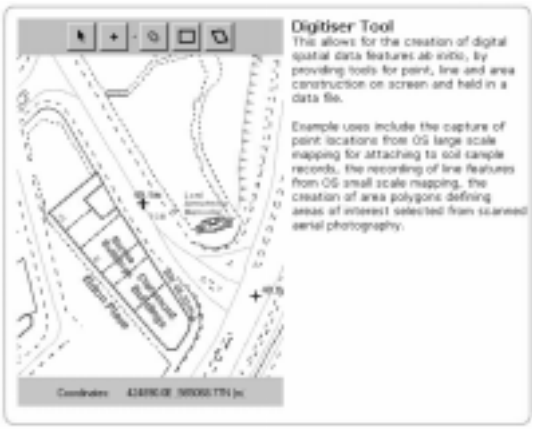

(f)

All images contain material that is Crown Copyright. An EDINA Digimap/JISC Supplied Service. (Crown Copyright Ordnance Survey NC/emap/24419.

Figure 1. Screenshots from the e-MapScholar project. (a) Resource selection from the opening page of the Learning Resource Centre (b) Introduction page for a learning unit. (c) Page from a learning unit, showing the digitising tool alongside text and self-assessment question. (d) Opening page for the e-MapScholar Content Management System. (e) Animation tool. (f) Digitiser tool.

Ordnance Survey Strategic data) and data on the boundary of common areas (Countryside Council for Wales).

Tutors will be able to set up the placement to control release of information to students and plant 'bombshells' to mimic real-life work problems through which the students must work. Students will have access to an online portfolio, in which they can store their work.

Project Team

The project is led by the EDINA UK National Data Centre in association with three partners: Institute of Educational Technology, Open University; Department of Geomatics, University of Newcastle; and Department of Geography, University of Edinburgh. The team also includes a number of associates from LTSN Geography, Earth and Environmental Science, LTSN Centre for Education in the Built Environment and Learning Technology Unit, University of Aberdeen; and a number of individual advisors with experience and expertise in geo-spatial data, including advisors from City University and Ordnance Survey.

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EndNotes

1 See http://edina.ac.uk/digimap This reference also allows you to check whether or not your institution subscribes to Digimap.
2 See http://www.jisc.ac.uk
3 See http://edina.ac.uk/projects/mapscholar/index.shtml
4 See http://edina.ed.ac.uk/projects/mapscholar/consultation.shtml

The use of C&IT to support fieldwork teaching and assessment at the University of Derby

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Abstract

C & IT is used at Derby in a variety of modes including pre-fieldwork training, post-fieldwork assessment and field-related courseware development as part of student project work. With respect to pre-fieldwork training, all students are required to undertake the UK Earth Science Courseware Consortium (UKESCC) 'Field Safety Tutorial' and to register their medical conditions on line using a Field Course Registration package. For field mapping, both the Field Safety Tutorial and the UKESCC 'Using the Compass-clinometer' courseware module are integrated into a programme of pre-course preparation sessions, involving the use of 'in-house' courseware, that must be completed by all students. Computer-based assessment of recent field experience is used on a number of modules to substitute for, or to supplement data obtained from, field assessments, and students are now able to submit field-related courseware modules as final-year projects. Future developments include integrated computer-based assessment of field, laboratory and theoretical work and the automated linking of records of progression through the UKESCC Field Safety Tutorial with a Field Course Registration program. These developments are planned in the context of rapidly changing course structures and the likely 'shelf life' of the software will be fully evaluated before committing resources to their production. This article will be of interest to GEES academics perhaps considering using C & IT to support fieldwork and assessment in their own departments/institutions.

Introduction

Current use of Communications and Information Technology (C & IT) in fieldwork teaching at Derby has built upon developments in the areas of interactive assessment that started in 1989 and of courseware production for the UK Earth Science Courseware Consortium (UKESCC) that started in 1992. The Division of Earth Sciences at Derby has provided the assessment software that underpins the HEFCE-FDTL funded TRIADS, Assessment of Learning Outcomes project (1996 to 2001, Universities of Liverpool (lead site), Derby and Open University). A description of the functionality and application of the TRIADS system may be found in Mackenzie (1999) or via the Centre for Interactive Assessment Development web site at URL: http://www.derby.ac.uk/ciad/.

C & IT is increasingly being used to support fieldwork in Earth Sciences in the areas of pre-fieldwork training, post-fieldwork assessment and as a suitable vehicle for student project work. Much of this is currently geared to the more efficient use of expensive field time and to ensuring that all students receive appropriate safety training. Future applications will address the integration of field and laboratory assessments .

General pre-fieldwork training

1. Field safety training and field course registration

Prior to entry into the field, all students are required to undertake the UKESCC 'Field Safety' courseware module (Mackenzie & Wilkins, 1999) and to register for each field course using separate 'Field Course Registration' software that has been developed 'in house'.

The Field Course Registration software for students provides online selection of field courses to be attended, together with facilities for input of medical information, dietary requirements, safety certification and next of kin. A separate program is in development that allows field tutors to retrieve this information for those students registered on any particular field course so that they are aware of potential medical problems that might arise during the course.

2. Geological Field & Map Skills and Geological Field Mapping

Extensive use of computer-based tutorials is made within the first year Geological Field and Map Skills module which acts as a preparation for the Introduction to Geological Field Mapping module that runs during the first three weeks of the second year of the course.

In the Geological Field and Map Skills module, students are required to undertake a series of mapwork exercises supported by weekly tutorial sessions and interactive courseware introducing the principle of structure contours and their application to predict outcrop patterns. As part of this software, we have developed computer-based questions using the TRIADSystem (Mackenzie, 1999) that require the student to draw geological boundaries on contoured landscapes. The closeness to the correct answer can be scored in some detail and different areas of the outcrop may be variably weighted in the scoring. Recent developments have facilitated the scoring of the positioning of multiple geological boundaries. This means that the geological map construction and interpretation skills of students may now be very accurately assessed. Some of the questions used in previous years assessments have now been incorporated into the formative courseware. A selection of these may be viewed in the current TRIADS demonstration that may be accessed via the CIAD site at http://www.derby.ac.uk/ciad/.

With respect to field mapping, both the UKESCC Field Safety module and the UKESCC 'Using the Compass-clinometer' courseware module (Mackenzie & Wilkins, 1994) are integrated into the preparation sessions for the Geological Field Mapping module. Students are required to attend two full days of preparatory sessions that additionally cover selection of mapping areas, safety procedures, accommodation arrangements and a Field Mapping Simulation exercise. The latter exercise is currently paper-based but it is planned to convert this into a computer-based exercise in 2003, now that the algorithms for testing the on-screen drawing of multiple curved lines have been developed.

We have found that the prior use of the UKESCC 'Using the Compass-clinometer' module saves a substantial amount of expensive field time, since most students are at least familiar with the instrument and require only a quick confidence-boosting revision of its use when in the field. The high level of interactivity in this module is designed to give users a real feel for the instrument and its application that would normally only be acquired by small-group tuition in the field (Figures 1a to 1d).

Post-fieldwork assessment

Computer-based assessment of students has been used at Derby for a variety of Earth Science modules since 1989 (Mackenzie, 1997). Computer-based assessment of recent field experience was first tried with respect to a structural geology aspect of a first-year field course in the Highlands of Scotland (Mackenzie & Stowell, 1998; Mackenzie, 1998). The assessment replaced a field examination that was often marred by bad weather conditions and generated a significant marking load of field notes in varying states of preservation. The new assessment was structured so that students were required to make full field descriptions of the locality in their field notebooks after some prior training at a related locality. The notebooks were collected at the end of the day and marked for quality and relevance of field sketches. The field notebooks were returned to the students for reference at the computer-based assessment some two to three weeks later. The rationale was to test the students' ability to record information and interpretations of the geology accurately in the field and then to retrieve them at a later date, once the memory of

the details of the locality had faded. This assessment worked well until the venue of the first-year field course was changed. This emphasises the need to ensure that where such computer-based assessments are planned, the fieldcourse will have a sufficiently long shelf life to make their development an economically viable proposition.

At a higher level, computer-based assessment of recent field experience has been investigated for field work in the final year module "Crustal Tectonics". The field course, based in Northeast Scotland, involves: Buchan and Barrovian mineral assemblages, regional metamorphic zones, isograds in pelites & calc-silicates, and PT interpretation; sedimentary structures for interpretation of way-up in metamorphic rocks and structural facing directions; mineralogy and timing of granite pegmatites and aplite sheets; migmatites, melting isograds and melt extraction relations; gabbros, metagabbros, serpentinites and augen gneisses; magma mingling and hybrid formation; shear zone deformation; and considerations for geochronology. An example question from this test is shown in Figures 2a and 2b.

Prior to 2000, participants were assessed by a field examination. The exercise was invigilated whilst the candidates collected field notes from a small area of rock outcrop in a controlled time. Field photographs, collected over several years on the same field trip, were initially used as a basis for a computer-based assessment that acted as a re-sit package for students who failed the field examination. Testing of the package on the 2000 cohort who had already sat the field exam, allowed a controlled trial of the technique as a possible complete substitute for the field exam. The results showed a reasonable correlation, although the students scored better on the field exam. This could simply have been explained by the time lag between learning and assessment being longer in the case of the computer assessment but there are other differences. A wider range of field structures was examined in the computer-based assessment and here it had potential advantages over the field exam. However, perhaps more importantly, the trial computer assessment gave less opportunity for the better student to demonstrate interpretative skills. The latter problem might not have been too serious for a re-sit package where a maximum of D- could be scored according to the University's resit regulations. However, it was clear that further development would be required before it could be used as a substitute for the field examination. This development took place in 2001 with the collection of more specific photographs linked to new questions built around interpretive skills (e.g. working out structural facing direction). The assessment was tested again with the new questions and earlier in the semester to achieve a shorter time lag between learning and assessment. The results were very good and, after some final adjustment to photograph quality and the distribution of subsections in questions, the assessment ran for the 2002 cohort in October as a substitute for the field exam.

It can be difficult to replace the three-dimensional aspects of field geology in a two dimensional medium but the judicious use of Quicktime-VR (a package that allows the creation of 360-degree panoramic views and images of objects viewable from all sides) greatly facilitates doing this. Controlled image panning sequences such as those used on Discovering Geology CD-Roms (Open University) can be used with some partial success to overcome this deficiency.

In general, we consider that computer-based assessments can be usefully employed to assess recent field experience, but require careful development in order to be able to test the full range of skills assessed in a field examination. Such developments can provide a substantial increase in the available field tuition time and are worthwhile where field examinations are held in localities that are likely to be used over many years. The real advantage of computer-based assessments lies in their objectivity and, when switched to formative mode, their ability to provide detailed feedback that is uniform for all students.

Field-related courseware development projects

At Derby, students are given a 'guided' free hand at defining the topics for their final-year projects. Recently a number have elected to produce field-related courseware packages. These are valuable, in as much as they develop transferable skills in addition to the geological content.

We have found that it is important to impress upon students undertaking such projects the need for very clear definition of educational aims, the scope of the content and level of the target audience. Such projects are not an easy option and require educational awareness, programming aptitude, graphic design capability coupled with sound geological fieldwork, organisation and planning skills in order to complete them successfully. This combination of abilities is not at all common.

Courseware packages that are of sufficiently high calibre may be developed into on-line tutorial material for all students. One of these is the subject of a separate paper in the previous issue of Planet (Smith et al. 2001).

Current and Future developments

1. Integrated field and laboratory assessments

One of the significant development areas for computer-based assessments lies in the provision of integrated assessments that are currently difficult to assess by any means other than individual project reports. For example, it would be possible to deliver assessments of fieldwork that cover field mapping, field observation, laboratory examination of field samples and the application of theoretical concepts to their interpretation. We have already noted above that it is now possible to test and score the position of curved lines drawn on a geological map. A petrological microscope simulator, such as the one shown in Figure 3, can be made available to test the student's ability to describe and interpret thin sections of samples as part of a field assessment. Scanning electron microscope images, heating-freezing stage simulations or chemical analyses could also be made available during the assessment to provide an integrated theoretical and practical environment for geological interpretation.

A current development is centred on an eight-day field course to Tenerife. The fieldwork supports the second year volcanology module and provides students with the opportunity to study a wide range of volcanological and petrological phenomena on an active volcano. Students will have their understanding of theoretical, practical and field aspects of the module assessed in a one hour on-line examination that integrates a computer microscope simulator, plotting and evaluation of geochemical data, and the identification and interpretation of randomly generated field relations and volcanological phenomena.

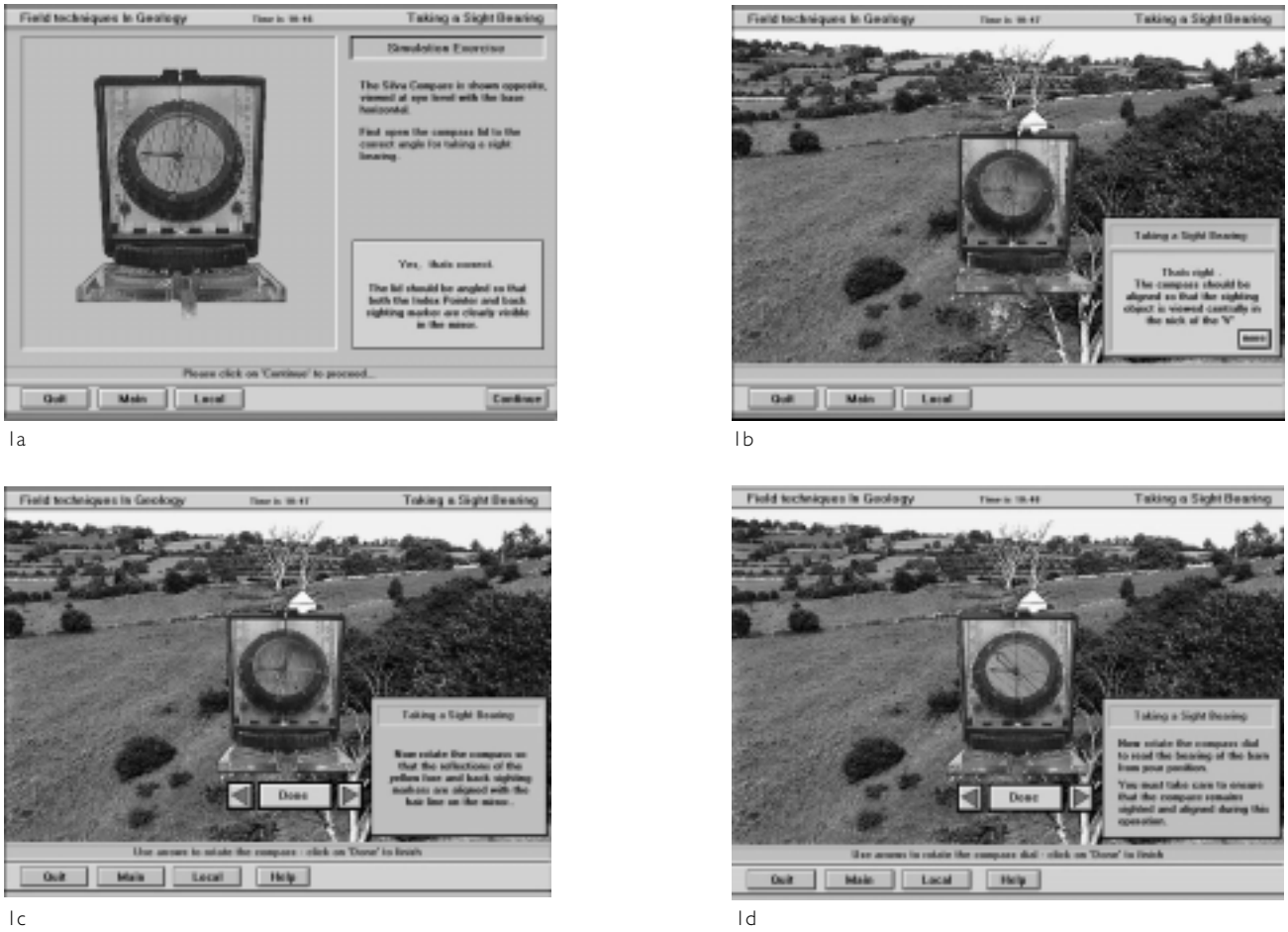
2. On-line submission of material to meet deadlines or for manual assessment

It is not possible to score all student activities by computer, but it is possible to use interactive computer programs to collect and collate assignments for manual marking by tutors.

Software with this functionality has been developed at the Centre for Interactive Assessment Development for the Law Division at Derby. Its operation has greatly facilitated the collection of project-proposal data and has the added advantage that the software enforces the pre-defined deadlines. It would be a short step to modify the package developed for Law into one that has generic application to the submission and on-line scoring and commenting for project proposals or any other assignment that was ongoing and required submissions at staged deadlines. A screen from the Law software modified to simulate a geological project-proposal data-entry page is shown in Figure 4.

Conclusions

Ensuring that students have progressed through the appropriate pre-field course training can be difficult. Linking the interactive training packages produced 'in house' and for the UKESCC to record files for each student will allow field tutors to check both the academic and medical preparedness of students on the course and to plan accordingly. Interactive pre-field course tutorials can allow much more efficient use of expensive field time.



1a 1b

1c 1d

Figure 1
Screens1 demonstrating the interactivity of the 'Taking a Sight Bearing' section of the UKESCC 'Using the Compass-clinometer' software.

a) Adjusting the compass for sighting. Students must open the compass to the correct setting using the arrow buttons. Warnings are given for incorrect settings.
b) Positioning on a sighting point. Students must drag the compass to the correct position.
c) Orientating the markers (using arrow buttons) with respect to the hair line in the mirror whilst maintaining sighting position.
d) Rotating the compass dial (using arrow buttons) to align arrow under the needle.

The objective assessment of field notebooks can be time-consuming and difficult. One of the most important features of the notebook is the ability to retrieve critical data from it at a later date. Interactive assessment of recent field experience can efficiently test the quality of recording of field data and its interpretation. The possibility of testing the student's ability to interpret field, laboratory and theoretical data in an integrated manner can be realised by the use of field images and software simulations of laboratory techniques.

The production of field related software can be a valuable addition to the range of topics suitable as final-year student projects. Careful counselling is required, however, in order to ensure that the student is fully aware of the level of planning and commitment that is necessary to complete such a project successfully.

The ease with which bespoke interactive software can be written using authoring packages such as Authorware Professional (Macromedia™) means that many tasks requiring data or assignment collection from students may be performed online. Nevertheless, the production of good quality courseware and assessments still requires a substantial design effort in an environment of rapid change in the structure and content of undergraduate courses. It is thus important to ensure that any proposed developments will have a sufficiently long 'shelf life' for their creation to be an economic proposition.

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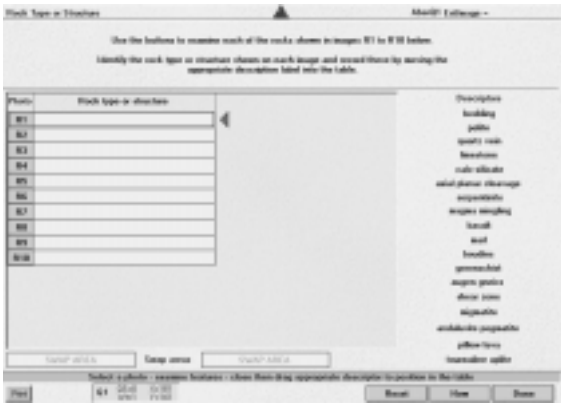
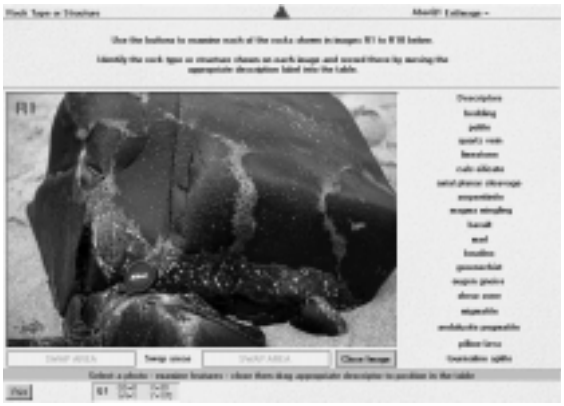


2a



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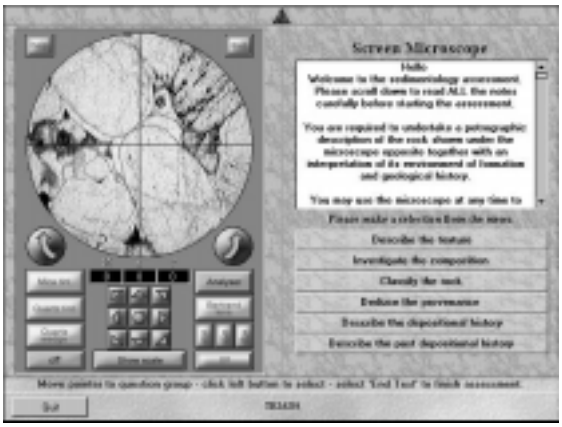

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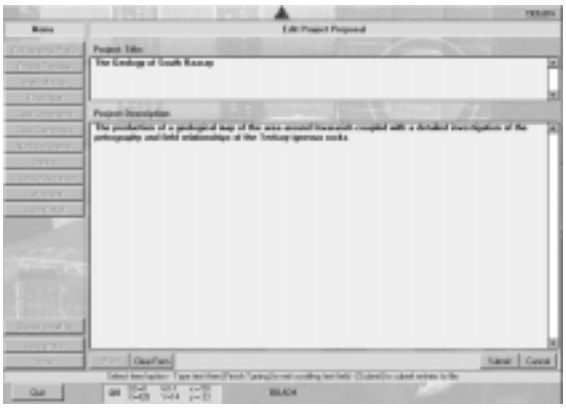

4

Figure 2

Screens for one of the questions in the final year, Aberdeenshire field course assessment.

a) Students are required to examine each of the photographs by accessing buttons R1 to R10 and match the rock type or structure with the image by dragging the appropriate descriptor into the table.

b) The image for R1. Images can be viewed as many times as desired. Previous answers can be changed by using the swap areas.

Figure 3

A screen from a sedimentology assessment showing the petrological microscope simulator.

This mimics all the functionality of a standard petrological microscope using image sequences. It can be active as a tool for use throughout an assessment.

Figure 4

A screen from the LawSkills program, modified to simulate the input of a project proposal for Earth Sciences.

This software would be easily modified to gather both the project proposals and the tutors' scores efficiently. Facilities for tutors' comments and feedback to students could be incorporated so that these could be viewed online.

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Attracting the right students to University courses

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Abstract

Getting accurate course information in university prospectuses is crucial. Here, we argue that if the prospectus descriptions about a particular course do not match the actual experiences of students on that course then they may feel demotivated and perhaps even drop out, at considerable cost to the department. Our study shows that when applicants decide whether to study their discipline at a particular institution, they consider how the information presented in the prospectuses matches their personal goals for study. We found that the way a course is described in a prospectus has an important influence on the choices of the student. Finally, we suggest how prospectus entries can be improved so that descriptions of course information match actual student experiences on a course. Geology is used as a focus discipline for part of this study.

The importance of personal goals in learning

When an undergraduate course does not live up to expectations, the results can be alarming. Students may drop-out, fail or develop a negative approach to learning. This problem is compounded by the fact that many students enter Higher Education with a poor idea of what is involved in their future studies.

When students fail or drop out of courses, the financial and psychological costs to them as undergraduates can be substantial. Student wastage is expensive for university providers too, and a high wastage rate can damage departmental reputations. Students who survive but under-perform waste their own time and resources, often become demoralised, and can de-motivate other students and the academics who teach them.

The most common reason for dropping out of university is a lack of commitment to a chosen field of study (Yorke, 1999). This occurs when personal goals for learning are not met by the principles and objectives of the discipline and course students have chosen to study.

School motivation versus university motivation

The dramatic difference between secondary school and university culture is often blamed for the under-performance of first year students at university (Rickinson and Rutherford, 1995). Secondary education is characterised more by a 'spoon-feeding' ethos whilst Higher Education (HE) requires more independent learning (Wankowski, 1991).

Personal goals for learning are understood to include any goal that implies an expectation that knowledge will be used in some future scenario. Examples include career goals ("I want to become a stress engineer"), and goals for personal development ("I want to become good at formulating an argument"). School leavers who choose science, engineering and technology subjects are thought to give much less consideration than older students to clarifying their personal goals (Yorke, 2000). With somewhat undefined personal goals, these students have little to go on when choosing a course and are more likely to make the wrong decision.

When considering Higher Education, students are put under pressure to think, perhaps for the first time, about why they should learn. From the student perspective, this means that they must take responsibility for setting their own educational goals. Students also need to consider what demands might be made of them at university and whether these are compatible with their own motivation for going to university in the first place.

Critical decision-making

The most critical time when students must think about their motivations for learning is when they make their applications for University undergraduate degree courses. There is now such a wide range of choice in the Higher Education market that this critical decision is an increasingly hard one for applicants to make. Making the wrong choice, however, could have severe consequences. When student experiences do not measure up to their expectations, it is harder for them to reap rewards from the effort they put into their studies, because their efforts are ill-directed (Breen and Lindsay, 2002). Motivation then begins to dwindle and students can give up (Tinto, 1993).

According to Anderson (1999), there are three key institutional factors that help students to refine the number of courses from which they choose. These are:

- reputation/status
- social life
- location

Academic departments have little or no control over how students choose with regards to these factors. The only remaining factors identified by Anderson (1999) over which departments do have some control are (a) the course content and (b) the employment prospects associated with the course. This information is widely available in University prospectuses and, indeed, prospectuses are the most influential source of information on student decisions about what course to take at university, according to the Institute for Employment Studies (Conner et al, 1998). Not surprisingly therefore, universities commit large sums of money and time to the production of prospectuses.

Good quality prospectus information depends on good market information about the needs of the students that departments want to attract. Accurate, and up-to-date information about courses is important, given the degree of weight placed upon prospectuses in student decision-making. It is through this kind of promotional material that departments can crucially influence whether a student makes a good informed choice, or a bad misinformed one.

The Research and Procedure

The research reported in this paper grew out of a desire to understand some of the motivations that lead typical University applicants to choose a particular degree programme. Although it is known that interest in the programme is an important predictor of choice (e.g. Aldosary and Assaf, 1996; Anderson, 1999 and Slee, 1996), the psychological processes that actually underlie choice behaviour are not well understood. It is thought, however, that the processes involve the formation and re-formation of personal goals through an assessment of the available information at the time of application (Medin and Bazerman, 1999).

Prospectus statements from various degree programmes at different institutions provided the research material for this study. The data accumulated were used to answer two separate questions, viz:

Question 1. Do university applicants choose degree programmes that present prospectus information relevant to their personal goals?

In other words, do students make a rational choice about which degree programme to study based on personal preferences and the prospectus?

Question 2. If so, how well does an institution's prospectus for a particular course match the personal goals of the students currently studying on that course?

In other words, do student perceptions and expectations about a course match their actual experience on the course?

115 students at all levels of undergraduate study in Economics (n=25), History (n=29), Geology (n=30) and Psychology (n=31) at one institution (university 'a') agreed to take part in this study. All students were asked individually to read a selection of randomly presented statements taken from the university 'a' prospectus, together with a selection of other prospectus statements taken from three other institutions also offering

programmes in Economics, History, Geology and Psychology (universities b, c and d), and then to rate how relevant they thought they were to their own personal goals. Geology students were only asked to rate statements pertaining to Geology courses and Economic students were only asked to rate statements from Economic courses etc. It is important to state that in presenting the random list of prospectus statements to the students, none of the institutions were actually named, and they were simply labelled as university 'a', 'b', 'c' and 'd'. For example, Geology students did not know whether any one prospectus statement actually came from their own institution's Geology prospectus or from another institution's prospectus. The statements were therefore presented 'blind'.

Participants were asked to rate each prospectus statement pertaining to their particular discipline for its relevance to their personal goals on a scale of 1-7. A rating of 1 denotes that the statement is *"not at all relevant to my personal goals"*, 4 = *"neither relevant nor irrelevant to my personal goals"* and 7 = *"very relevant to my personal goals"*.

The same cohort of 115 students from institution 'a' were also asked to choose which course they would, hypothetically, want to take from the four institutions 'a', 'b', 'c' and 'd'. Students of Geology were obviously asked only to consider sentences from prospectus entries for Geology courses and to choose between only Geology courses. Likewise, Economics students were only asked to evaluate sentences taken from Economics prospectus course entries etc. Although participation was voluntary, the incentive of entry into a prize draw for cash prizes was offered. This proved to be successful!

Results and Discussion

Question 1. Do university applicants choose degree programmes that present prospectus information relevant to their personal goals?

The analysis employed for this part of the study was a linear regression model, using the average relevance rating of all prospectus statements for each university and for each discipline, across all students as the independent variable (x) and the frequency of course choice as the dependent variable (y). Table 1 details the average relevance rating given to each of the four institution's prospectuses, by discipline.

Institution	Economics	Geology	History	Psychology
a	4.6	4.4	4.5	4.9
b	4.6	4.5	4.3	5.0
c	4.2	4.5	4.5	4.9
d	4.2	4.4	4.4	4.2

Notes: low relevance = 1, high relevance = 7

Table 1: Average relevance ratings given to each of four prospectuses (institutions a, b, c and d) by students in each sample population.

The resulting R2 value was significant ($F = 5.27$, $df = 1$, $p = 0.04$), demonstrating that the probability of the result occurring is significantly greater than chance alone. Furthermore, the regression model explained approximately 30% of the variance. Whilst this does not appear to be substantial, it is worth noting that a single psychological predictor of behaviour rarely, if ever, explains this much of the variance in course choice (usually it would take several predictors to reach this percentage of the variance). When these results are compared with previous studies of choice behaviour, relevance is the most successful factor in explaining variation in choice. (e.g. Anderson, 1999; Aldosary and Assaf, 1996; Slee, 1996; Feather, 1992; Lent et al. 1991). So, it would seem that students in this study do make some sort of rational choice between degree programmes based on prospectus statements relevant to their personal goals. This would appear to apply to all disciplines used in this study, including Geology.

As we have shown that to some extent student choices of degree programmes are influenced by prospectus statements and how these match (are 'relevant to') their own personal goals, it is therefore important to ascertain whether such prospectus statements which initially drew students onto the course, actually match student experiences. In other words, do prospectus statements appear to be accurate predictors of what the course is actually like? This forms the basis of the second research question.

Question 2. How well do an institution's prospectus statements for a particular course match the personal goals of the students currently studying on that course?

For this part of the paper, we focus on just the Geology student relevance ratings for the benefit of PLANET readers.

Geology student relevance ratings for the prospectus entry pertaining to the institution they were actually attending (institution 'a') were extracted from the whole data set for further analysis. Since all of the students who participated in this study were undergraduates at institution 'a', it would be worrying if many of the statements made about the course in the Geology prospectus did not actually match the experience of those studying on the course itself. In other words, it would be concerning if there was a disparity between pre-enrolment 'student expectations' and 'actual student experiences' on a particular course. (Note that it would obviously not be meaningful to carry out the same analysis on the other prospectuses since the participants in the study were not actually attending any of the other universities.)

Table 1 shows that on average, Geology students found the prospectus statements about their course at institution 'a' to be of relevance (a mean relevance rating of 4.4). This is at least moderately encouraging and goes some way to showing that the students on the Geology course at institution 'a' still find the programme relevant and matching their personal goals. So, it is unlikely that there is serious cause for concern. However, it is interesting (and perhaps surprising) to note that overall Geology prospectus statements from institutions 'b' and 'c' were of slightly more relevance to these same students (4.5). It is therefore useful to ascertain whether there are any statements in institution 'a''s prospectus that caused the comparatively lower rating of relevance.

If actual student experiences do not closely match their pre-course expectations, it could be that the course prospectus is making false claims about what students can expect to experience on that course. However, it is more likely that the particular statement is not expressed in a way that reflects how students actually experience the particular course element to which the statement refers. So, the statement could be improved so that it more accurately describes the student view.

Therefore, a final part of the research was to ascertain whether there were any particular prospectus statements which the majority of students rated 'high' or 'low' in terms of relevance to their personal goals. Such an analysis allows one to find out if certain prospectus statements are particularly important or alternatively irrelevant to the students currently on the course. Assuming that the current student population is statistically 'normal' and representative, such an investigation may help to determine the future content of prospectus statements.

The Geology students in this study had a wide range of opinions (in terms of relevance ratings) on how well the sentences in institution 'a''s prospectus actually matched their personal goals for studying there. This reflects the diverse range of interests of the current students with respect to individual Geology prospectus statements. On only 4 of the 72 sentences presented about institution 'a' were the students in general agreement with each other (all student relevance ratings being very similar). These four questions were uncovered using tests for skewness. Three of the four sentences described how the Geology course emphasised the

development of field skills in students. Most Geology students found these statements to be 'highly relevant' to their personal goals. There was also a fourth statement, detailing students' employment prospects that all the students agreed on and in this case, perhaps surprisingly, found to be less important to their personal goals.

Conclusions

It would seem from the results obtained in this study, that students do generally make a rational decision about what course to take using discipline-specific prospectus statements. This highlights the importance of producing clear and transparent publicity material when marketing university courses. However, academic departments may find it useful to assess how well their current prospectus statements match their actual student experiences. The example provided from the Geology prospectus entry for institution 'a' indicates that information about field mapping is actually highly relevant to most students taking the Geology course. On the other hand, (perhaps surprisingly), most students in this study do not appear to find the information in the prospectus on career prospects to be particularly relevant to their personal goals. Helping to match student expectations with student experiences through clear and accurate prospectus statements may go some way in reducing drop-out rates. Evaluations like the one reported in this paper may assist in improving the accuracy of future prospectus statements, by relaying course information in a way that makes the statements more relevant to students' personal goals.

The consequence of irrelevant or misleading information in prospectuses is that students may choose badly. The financial costs of student drop out to universities should be an incentive to improve prospectus design. The costs to the individual student, which include financial costs, damage to self-esteem, confidence and commitment to their personal goals, should also be an incentive to improve. However, Higher Education's responsibility for student choice does not stop there. On arrival, students also need help finding an area of the curriculum that reflects their life and career goals (Attinasi, 1989). Indeed, a great deal of student development in defining their personal goals will occur after they enter HE.

Recommendations

Two specific recommendations arising from this work are:

1. Make sure that future prospectus statements about a particular course reflect the current experiences of the students on the course.
2. Regularly review these prospectus statements so that they are up-to-date and therefore more likely to be relevant and to attract students who will not drop-out due to a mis-match between their expectations and their experience.

Other information

An article on this topic has been submitted to the *British Journal of Psychology* entitled "Knowledge-dependent motivation in learning and choice behaviour".

A poster presentation at the American Educational Research Association's annual conference 2002 (New Orleans) has also been delivered.

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What is PLANET?

PLANET is the bi-annual publication of the LTSN Subject Centre for Geography, Earth and Environmental Sciences.

Its aims are to:

- Identify and disseminate good practice in learning and teaching across the three disciplines of Geography, Earth and Environmental Sciences and present examples and case studies in a "magazine" format.
- Provide a forum for the discussion of ideas about learning and teaching in the three discipline communities.
- Provide information for readers on Subject Centre activities and on related resources, conferences and educational developments.

The Scholarship of Teaching

Brian Chalkley, LTSN-GEES

Abstract

A new star has appeared in the educational firmament. It is called the 'scholarship of teaching' and, according to its followers, it has the potential to lead us towards an enhanced status for teaching in higher education. But what does the term scholarship of teaching actually mean and will it make a difference? This paper provides a simple introduction for those not yet au fait with a concept which has recently become prominent in the higher education world.

Introduction

The professional life of academics is often made unnecessarily complicated by educational terminology, jargon and acronyms. New forms of language, fashions and concepts enter the higher education world with such rapidity that even seasoned campaigners can experience a sense of uncertainty or sometimes bewilderment. "What does it all mean? " One such apparently new term or concept is the 'scholarship of teaching'. For many of us working in HE this is a phrase which seems quite suddenly to have leapt from obscurity to prominence and which is now being liberally sprinkled across the educational literature both in the GEES disciplines and more widely. Conferences are organised on it, articles are written about it and lip service is paid to it in meetings and workshops up and down the land. So, for anyone in need of illumination this PLANET paper seeks, very briefly, to outline where the term has come from and what it appears to mean.

The Concept's Origins

The concept of the scholarship of teaching was first developed by Ernest Boyer in1990 and was subsequently taken forward by his colleagues at the USA Carnegie Foundation for the Advancement of Science (Glassick et. al. 1997, Hutchings 2000). Boyer and his colleagues were concerned about higher education becoming excessively focused on discipline-based research, which is often seen as the only form of properly valued and recognised scholarship. They argued that the honourable term 'scholarship' should instead be given a broader interpretation which would bestow legitimacy on the full range of academic work. Boyer therefore identified four separate, though related, areas of scholarship, namely: the scholarship of discovery research, the scholarship of integration and synthesis (e.g. writing textbooks), the scholarship of service (including the application of research knowledge) and, of course, the scholarship of teaching.

Interestingly, Boyer himself did not attempt to define the scholarship of teaching or to describe in detail its essential or principal characteristics. However, since the publication of his seminal text many others have stepped into the breach (e.g. Hutchings & Shulman 1999; Huber & Morreale, 2002), including some who have related the concept to their own discipline (e.g. Healey, 2000, 2003a, 2003b for geography). The result, for the enthusiast, is an increasingly rich, pluralistic and subtle seam of literature. Given, however, that few busy academics are likely to find time to dig into this rich seam of work, the purpose of this PLANET article is simply to lay bare some of the main features of the scholarship of teaching concept.

The Key Elements

Lest there be any doubt, we must begin by underlining that the term means much more than simply striving to be a good teacher and keeping up-to-date with one's subject. The key additional ingredients are as follows:

- Keeping abreast of developments in the theory and practice of teaching, particularly in one's own discipline or specialist field. This may, for example, be achieved by studying the relevant literature or attending appropriate conferences and workshops.
- Reflecting carefully and critically on one's own teaching and on its successes and failures in promoting high quality learning. Here the scholarship of teaching closely aligns with the model of the reflective practitioner (Kolb, 1984).
- Engaging in pedagogic research so as to help provide a firm basis of evidence for the adoption or rejection of particular learning and teaching methods. Such pedagogic research might on occasion involve large-scale surveys spanning different departments and institutions. More commonly, however, it takes the form of small-scale 'action research' designed to evaluate aspects of one's own teaching.
- Contributing to the communication and dissemination of good practice in the learning and teaching of one's discipline or specialist field. In our own case this might, for example, take the form of writing for PLANET or for journals such as the Journal of Geography in Higher Education, the Journal of Geoscience Education or Environmental Education Research.
- Bringing to one's work in teaching and curriculum development the same high standards of intellectual rigour and peer review which are commonplace in research.

Attitudes to Scholarship

In the United States the agenda outlined above has been given particular prominence through the work of the Carnegie Academy for the Scholarship of Teaching and Learning (CASTL) which funds a variety of schemes designed to disseminate examples of good educational practice at individual, departmental and institutional level. A key goal for the Carnegie Academy is to raise the status of higher education teaching and to promote the idea that staff reward systems need to value teaching as well as research.

Here in the UK the scholarship of teaching concept is increasingly prominent in the work of agencies such as the Learning and Teaching Support Network (LTSN), the Institute for Learning and Teaching in Higher Education (ILT) and the Staff and Educational Development Association (SEDA). Our own Subject Centre (LTSN-GEES) is in effect contributing to the application of the scholarship of teaching through our conferences, workshops and publications and through our projects on pedagogic research and fieldwork and on linking teaching and research. With respect to the literature on the actual concept, we have also benefited from the work of Mick Healey, our Senior Advisor for geography, who is one of the leading authors on the scholarship of teaching concept (2000, 2003a, 2003b).

For many academics who see themselves first and foremost as educators, the scholarship of teaching concept may seem self-evidently to be a good idea and one whose time has come (or is indeed long overdue!) Few, for example, would argue with the need to raise the status of teaching or to treat it as a serious intellectual activity. However, the concept does need to be examined critically. Among the questions which might be asked are the following:

- Is this a utopian model with little relevance to busy academics facing high student - staff ratios and low levels of resourcing? Is there time for pedagogic research? Is the scholarship model only for an elite minority or, more positively, is it essentially a statement of what most good teachers already do?

- How far is it appropriate to impose a partly research-based model and culture on teaching and learning?
- Will pedagogic research raise the quality of teaching and learning?
- Should staff rewards go to excellent practising teachers or to those who write about education?
- More positively, might the scholarship of teaching provide the conceptual basis and the political banner under which to unite those in HE keen to advance the cause of teaching?

Conclusions

Before coming to a judgement on the merits or otherwise of the scholarship of teaching concept or on the kinds of questions raised above, do bear in mind that this article provides only the quickest glimpse of the emergent scholarship of teaching arena. The references listed below could help you, of course, to dig deeper and to achieve a more scholarly understanding than that demonstrated here by the present author! In any event, if you have views on any aspect of the scholarship of teaching agenda, PLANET would be delighted to hear from you.

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Lawrie Phipps
Manager, TechDis