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Planet

Planet is the biannual publication of the Higher Education Academy 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.
- 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.

***Planet* welcomes contributions on topics related to learning and teaching in GEES subject areas.**

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Front cover images

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1. Fieldwork, from Aberdeen University
2. Students working on GIS
3. Guantanamo Bay, from the Geophysical Institute, Alaska

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EDITORIAL

Helen King

As Heather Sears describes in her 'Busy Academics Guide' (pages 4-5), a lot of attention has been paid in recent years to supporting research postgraduates. However, relatively little has been done to develop learning and teaching at taught postgraduate level despite the fact that, in the UK, "in 2002-03, almost 120,000 postgraduates embarked on taught Masters programmes compared to 16,000 starting PhDs" (HEPI, 2004).

In 2003-04 the GEES Subject Centre funded a programme of small-scale projects focused on learning and teaching at the taught postgraduate level. Our rationale for this theme was based on the following issues:

- The numbers of students undertaking postgraduate-level training is increasing.
- Additional specialisms may become increasingly favoured by discipline-specific employers as graduate numbers increase.
- There is currently little guidance on course design or specification for postgraduate level teaching compared with the undergraduate level.
- There are currently very few specific resources to support learning and teaching at this level.
- Some issues may be concentrated due to the short-term nature of postgraduate courses.

in 2002-03, almost 120,000 postgraduates embarked on taught Masters programmes compared to 16,000 starting PhDs

This edition of Planet captures the findings from these projects and other work in the area, and provides a platform on which the GEES Subject Centre can build further resources, services and activities.

Following on from Heather's general policy overview, the drivers and issues for the development of taught Masters programmes in the GEES disciplines are outlined by Lindsey McEwen and Dave Eastwood in their introductory articles. The following feature articles then provide a wide variety of examples and perspectives on learning and teaching at taught Masters level. The first two articles provide a general introduction to some of the key issues. Lindsey McEwen *et al* note how little guidance there is on course development, and suggests there may be questions on 'what is M level?'. Their research with over 80 students suggests that, in their personal experience, the Masters course is of a higher level than their undergraduate studies because it is more challenging, has an increased depth of engagement, utilises more co-learning with peers and staff, and has a more applied nature of study. The authors note that "the students see a definite progression" but what this progression actually is appears to be hard to capture tangibly within level descriptors or learning outcomes.

In contrast to the above students' views from a group of HEIs, Pauline Kneale outlines the perspectives from new members of staff in a single institution. They feel that teaching at Masters level should be about the lecturer doing all the talking as it is about their area of expertise. It is interesting that despite the movement towards innovation and experiential/active learning at undergraduate level, the 'chalk and talk' perception still persists, for some staff, at Masters level. This is a key professional development issue throughout higher education (HE) and, I suggest, may relate to self-confidence and personal preference in terms of teaching style. For many staff, running highly interactive sessions where the students are 'given permission' to challenge the lecturer can be a long way outside the comfort zone. Pauline recommends that given the nature of Masters courses and the link to graduate employability, they should be more about 'learning how to learn and to keep up to date' than about specific content. This is particularly pertinent given the rapid turnover of knowledge, technical skills and the likelihood that the graduates will go into jobs at a tangent to the course content. Pauline, as with other authors in this edition, makes the link between course design and work-related activities – Masters courses are very much tending towards professional/vocational courses rather than purely academic endeavours; and the best way to set the students up for the world of work is to simulate the chaotic, problem-solving, team-based environment they are likely to enter. Finally, another key issue that Pauline raises with respect to staff development, is that of student diversity particularly with respect to international students who may have undertaken their undergraduate studies in a different HE system or through different teaching styles.

Emma Treby and Anita Shah pick up some of the above general themes in their description of the development of a Masters course which provides an excellent example of work-related learning and the issues therein. Norman Moles *et al* also emphasise this 'real world' element in the design of a module and describe a publicly available resource that they suggest can help to "bridge the gap between scholarly activity and the work place."

Many Masters courses are intended to be taken up by a very broad range of students: in contrast the UHI Millennium Institute course, outlined by Price *et al*, clearly addresses a specific need in the region and provides an award directly relevant to the particular community the University serves. Interestingly, they also describe the use of technology not just for the delivery of tuition but also as a medium for administrative communication between geographically disparate University staff.

This e-learning theme is discussed further by Glynn Skerratt and Clodagh Murphy as a key issue for Masters programmes both as a means to supplement 'face-to-face' learning and a sole learning environment for distant or part-time learners. Their general discussion highlights considerations of student-tutor interaction, factors influencing student retention and institutional issues (particularly when working with overseas partner institutions). Paul Elsner illustrates this theme with a specific example of distance learning on a GIS course. He introduces the various communication methods available and raises the technical advantages and constraints. Robert Abrahart *et al* build on the idea of e-learning in taught Masters courses and suggest its use for other postgraduate level qualifications such as MPhils and PhDs.

In the articles by William Slattery and Randy Alexson, another dimension of Masters courses is explored: many Masters students have not come directly from undergraduate studies, or are even full-time students, but are undertaking the course as formal professional development related to their place of work. Both of these articles illustrate this with respect to in-service training for school teachers in America. William's article describes a full Masters course, and Randy's discusses the use of Masters level modules as a means to expose teachers to formal learning experiences at a graduate level from more remote or less densely populated areas who may not have the finance or time to undertake a full course.

Finally, an interesting article on taught postgraduate level in Jamaica illustrates the similarities and differences in issues, course content and distance-learning emphasis compared with the UK. This example, together with those from the USA, illustrates the international possibilities for sharing good practice in learning and teaching at all levels. Due to the global nature of the content of our disciplines, this is something that the GEES Subject Centre has been involved in for some time – although HE systems may vary from country to country, course content and learning & teaching issues are often very similar. We very much welcome these international perspectives and would encourage other overseas colleagues to contribute also.

For me, this edition of *Planet* clearly illustrates the need for the GEES Subject Centre to take forward its work with respect to supporting taught postgraduate provision. A lot of good practice clearly exists but needs to be captured and shared, particularly with newer members of staff and with those who are setting up MSc courses for the first time. I would like to thank all the contributors for sharing their practices and perspectives.

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A busy academic's guide to recent policy developments and publications in postgraduate education

Heather Sears

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Join me for a quick whiz around the latest policy developments and publications in postgraduate education.

1) The new Code of Practice for research degree programmes

The Quality Assurance Agency (QAA) published a revised 'Code of Practice for postgraduate research programmes' in September 2004. The revised Code is more student-focused than previous versions. It presents a series of precepts that cover all aspects of research programmes across key areas such as supervision, feedback mechanisms and assessment.

Institutions' implementation of the revised Code will be evaluated via a Special Review of postgraduate research degree programmes to be conducted by the QAA in 2005-06 in England, Wales and Northern Ireland.

QAA (2004) Code of practice for the assurance of academic quality and standards in higher education: Postgraduate research programmes

http://www.qaa.ac.uk/academicinfrastructure/codeOfPractice/default.asp

QAA (2005) Operational description of the special review of postgraduate research degree programme (England and Northern Ireland)

http://www.qaa.ac.uk/news/circularLetters/CL0305.asp

2) Transferable skills training for postgraduate research students

A number of initiatives, outlined below, have put skills development firmly on the PhD training agenda in recent years.

In 2001, the UK Research Councils, the AHRB and major charities that fund PhD research set out their common view of the skills and competencies that PhD students would be expected to have, or to develop during their research training in the Joint Skills Statement (JSS). The JSS has been widely adopted as a framework for skills development and recording.

The JSS covers skills and competencies in 7 areas:

A. Research skills and techniques
B. Research environment
C. Research management
D. Personal effectiveness
E. Communication skills
F. Networking and team working
G. Career management

Research Councils/AHRB Joint Skills Statement (JSS)

http://www.grad.ac.uk/cms/ShowPage/Home_page/Universities/Policy/Joint_statement_of_skills_training_requirements/p!egiklFf

In 2002, Sir Gareth Roberts' Review *'SET for Success'* concluded that: "skills acquired by PhD graduates do not serve their long-term needs. Currently, PhDs do not prepare people adequately for careers in business or academia".

Roberts recommended that:

"…the training elements of a PhD – particularly training in transferable skills – need to be strengthened considerably;

…include the provision of at least two weeks' dedicated training a year, principally in transferable skills."[4.2]

Roberts also recommended an increase in the length of a PhD to an average of 3.5 years and an increase in the stipend for PhD students.

The Government accepted the main recommendations of the Roberts' report and allocated £29.8m (over 3 years) to the Research Councils to implement additional transferable skills training for Research Council-funded PhD students and research staff. The funding, often referred to as the 'Roberts money', applies to PhD students starting on or after October 2003 and is allocated pro rata the number of eligible Research Council-funded PhD students and research staff in each institution. The average amount per Research Council–funded PhD student is in the region of £850 per academic year. Although the funding is intended primarily for Research Council-funded PhD students and research staff, institutions are able to use the funds to benefit all PhD students through course development, seminars and symposia.

The arrival of the Roberts money has prompted much debate about what constitutes transferable skills training for PhD students. 'Training' has been broadly defined by the Research Councils as: "demonstrable acquisitions of skills by a wide variety of means and includes a process of preparation, reflection and review." The consensus is that 'transferable skills' should mean transferable beyond employment in the specialist area of the student's research and that a good working definition is provided in sections C-G (Research Management, Personal Effectiveness, Communication Skills, Networking and Teamworking, and Career Management) of the JSS. The research skills outlined in sections A and B of the JSS (Research Skills and Techniques and Research Environment) are deemed to be specialist and hence training in those skills cannot be funded using the Roberts money.

Sir Gareth Roberts Review (2002) 'SET for success

http://www.hm-treasury.gov.uk/documents/enterprise_and_productivity/research_and_enterprise/ent_res_roberts.cfm

The increased emphasis on providing development opportunities for postgraduate research students is reflected in the revised QAA Code of Practice. Embedded within the code are the JSS, training needs analysis and the use of personal development portfolios:

> Precept 18: Institutions will provide research students with appropriate opportunities for personal and professional development.
>
> Precept 19: Each student's development needs will be identified and agreed jointly by the student and appropriate academic staff, initially during the student's induction period: they will be regularly reviewed during the research programme and amended as appropriate.
>
> Precept 20: Institutions will provide opportunities for research students to maintain a record of personal progress, which includes reference to the development of research and other skills.

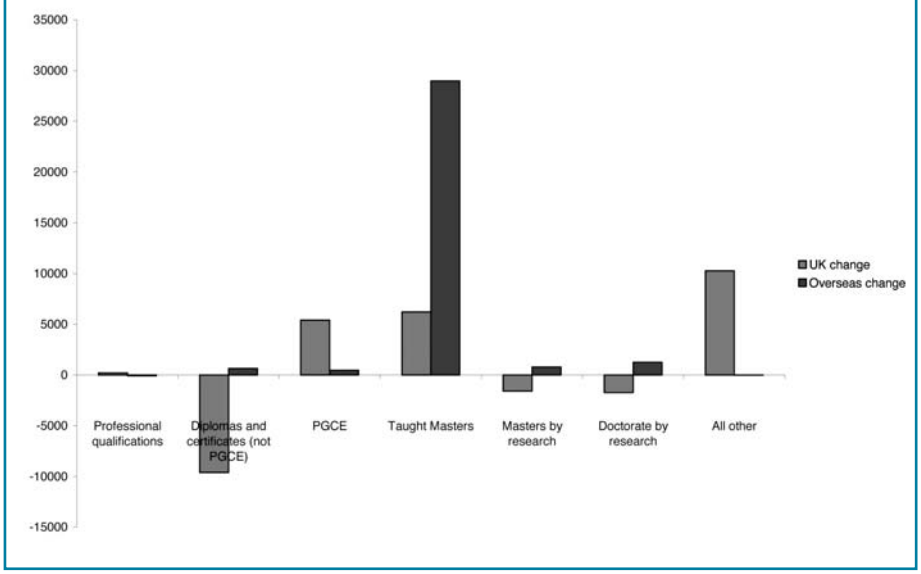
3) Entry and completion rates of PhD theses

The first comprehensive report on entry and completion rates of PhD students was published by the Higher Education Funding Council for England (HEFCE) on January 2005. The report 'PhD research degrees: Entry and completion' tracks a single cohort of PhD students that began their research degrees in 1996-97.

Of around 18,500 postgraduate research students, 57% on full-time programmes and 19% on part-time programmes had completed within five years. By 2002-03, seven years after starting, the completion rates had increased to 71% for full-timers and 34% for part-time students.

HEFCE (2005): PhD Research Degrees, Entry and Completion: http://www.hefce.ac.uk/pubs/hefce/2005/05_02/

Figure 2: Growth in numbers of postgraduate entrants



Source: HEPI 2004

4) First destination statistics of PhD students

'*What Do PhDs Do?*' is the first ever analysis of the official first destination statistics of PhD graduates in the UK. The report concludes that PhD graduates are more geographically mobile, and more fully employed than less highly qualified graduates. Their unemployment rate (3.2%) is less than half that of first degree graduates and only 1% are in 'stop gap' jobs which bear no relation to the level of their qualifications. Surprisingly, less than half of this cohort are employed in the education sector, fairly equally divided between teaching and postdoctoral research. Significant numbers are found in all sectors of the economy. As well as providing an overview of first destinations for all PhD graduates, the data is futher analysed by four broadly discipline-based groups: arts and humanities; social sciences; biological and biomedical sciences; and physical sciences and engineering.

UKGRAD (2004): What do PhDs do?

http://www.grad.ac.uk/cms/ShowPage/Home_page/Online_resources/What_Do_PhDs_Do_/p!eXeccLa

5) NERC Training Awards Strategy review

NERC has updated its training awards strategy following an extensive review of its training activities during 2004. The review covered NERC's overall approach to training and early career development as well as looking at the effectiveness of individual schemes (fellowships, PhDs, Masters and short courses). The report's recommendations include: greater emphasis on supporting Masters courses with strong links with employers; greater flexibility in the length of the PhD and more jointly-funded multidisciplinary studentships

NERC Training Awards Strategy Review 2004

http://www.nerc.ac.uk/funding/training/report.pdf

6) Developments in Europe

The Bologna Declaration aims at creating a European Higher Education Area by 2010, facilitating the mobility of students throughout Europe, by easing recognition of qualifications and introducing a European credit transfer system. The Bologna process initially focussed only on the first two 'cycles' of higher education: Batchelors and Masters. At the follow up meeting held in Berlin in September 2003 it was agreed that the 'third cycle', the PhD, should be included in the process. At the Bologna Seminar on "Doctoral Programmes for the European Knowledge Society" (February 2005) participants agreed a set of ten core principles to go into the drafting of the Bergen Communiqué by Ministers in May 2005.

In March 2005, the European Commission adopted a European Charter for Researchers and a Code of Conduct for the Recruitment of Researchers. The European Charter for Researchers addresses the roles, responsibilities and entitlements of researchers and their employers or funding organisations. It aims at ensuring that the relationship between these parties contributes to successful performance in the generation, transfer and sharing of knowledge, and to the career development of researchers. The Code of Conduct for the Recruitment of Researchers aims to improve recruitment, to make selection procedures fairer and more transparent, and proposes judging merit on a wide range of evaluation criteria, such as teaching, supervision, teamwork, knowledge transfer, management and public awareness activities.

Bologna Seminar (2005) 'Doctoral Programmes for the European Knowledge Society'

http://www.eua.be/eua/en/Salzburg_Seminar.jspx

European Commission (2005) European Charter for Researchers

http://europa.eu.int/eracareers/europeancharter/

7) Trends in postgraduate study

In November 2004, the Higher Education Policy Institute (HEPI) published a report describing the entire postgraduate sector in the UK. The report highlighted the strong growth in postgraduate study in the UK with numbers of first year postgraduates increasing by 21% between 1995-96 and 2002-03. This growth is largely accounted for by an increase in taught Masters students from overseas – their numbers almost doubled in between 1996-97 and 2002-03. In 2002-03, almost 120,000 postgraduates embarked on taught Masters programmes compared to 16,000 starting PhDs.

HEPI (2004): Postgraduate Education in the United Kingdom: http://www.hepi.ac.uk/pubdetail.asp?ID=164&DOC=reports

However, despite the importance of taught Masters to institutions, the majority of the policy developments and publications described above are exclusively concerned with postgraduate research students - postgraduate taught students are noticeable by their absence! It can only be a matter of time before the sector realises that postgraduate taught programmes have been overlooked and they need to be put back on the political agenda to ensure their future development.

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Postgraduate taught course developments in geography, earth and environmental sciences in the UK: an initial assessment of drivers

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The oft-quoted drivers for taught postgraduate developments in the higher education sector in the UK are multifarious, embracing the need to generate income beyond undergraduate numbers, increase international student numbers and tie into the market training needs of the regional and national economy. Evidence from the Prospects website (www.prospects.co.uk) indicates a rapid expansion in taught postgraduate provision in UK HEIs, with a trend towards more vocational courses and with conversion courses dominating over those with more traditional academic extension. As an introduction to this special *Planet* edition on postgraduate education, it is useful to reflect more fully on the other drivers for postgraduate taught course developments and evaluate the role of staff and student aspirations in steering postgraduate taught course developments. To fuel the debate, this introduction is grounded on the evidence drawn from a GEES Subject Centre funded small project on the development phase of taught postgraduate courses in geography and the environment in five institutions that deliver postgraduate provision. These vary on the basis of size, location, strategic setting and funding context (University of Gloucestershire, University of Dundee, Oxford Brookes University, Coventry University and Farnborough College of Technology). The stakeholders interviewed comprised course development team leaders, the development team, academic and practitioner reviewers, Heads of Postgraduate courses and Heads of Quality Assurance.

To the question: '*In your opinion, what has motivated postgraduate taught course development within your institution / the department?*' we received this feedback:

To ensure vertical integration of provision including research degrees: possession of a range of courses at different levels is a fundamental part of the work of a university; Masters is a step between undergraduate and research.

To respond to a logical extension to previous course provision: postgraduate qualifications are an attractive offering, adding extra career paths.

To ensure the development of a vibrant postgraduate community in the university: benefits exist to institutional status, staff and other students; additional research benefits include, for example, potential research assistants.

To provide an opportunity for additional academic development: Masters level courses help students to grow academically and vocationally, either to go back to the workplace, or towards research or vocational PhDs.

To provide extended skills training: some skills and knowledge require the underpinning of an undergraduate degree; Masters level allows students to expand on undergraduate training, and also brings in skills from the workplace.

To respond to market demand: different vocational provision requested from the university portfolio; to secure increased student marketability.

To allow more advanced student engagement with University research activity: research experience helps students with problem identification and their real world application.

To help alter the status of the institution: raising the profile of postgraduate courses benefits status.

To allow staff the opportunity to engage with teaching at a higher level: staff have the benefits of engaging with increasing student expertise; increased quality / level of work, leading to greater staff satisfaction.

To develop business links with regional communities: good links are positive for public relations.

To introduce courses that are recruiting well elsewhere: e.g. motivation for a current course came from a course developed at another university, expanded in line with new skills.

To respond to student demand for jobs in related topic area: student motivation is typically vocational; many students are not getting jobs with only an undergraduate degree so need a postgraduate qualification; there is also demand by students' changing careers.

To allow the opportunity to trade at an institutional level: demand from industry/employers for postgraduate qualifications.

To develop the vocational dimension of academic courses: responding to the needs of professional bodies and employers.

To allow internationalisation and positioning: e.g. European Masters, run between several institutions to maintain international presence; to deliver on targeted growth in international students.

To allow departments to develop integrated portfolios: institutional approach is hands off; institutional champions are extremely important in the development process.

In summary, the evidence suggests that the drivers for postgraduate taught developments are complicated and multifaceted within the overarching financial imperatives of institutions. Themes drawn out of the above responses include: institutional status and its progression; increased vertical integration of course provision; synergies with applied research activity; development of the staff resource; increased external links and networking with 'the workplace'; and the internationalisation of course portfolio with associated positioning in national and international markets. Are there different drivers in your institution? Please let us know your views.

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A growth market: the increase in taught postgraduate numbers in the Environmental sciences

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This brief article looks at the development of taught postgraduate Masters courses in Environmental Sciences across the UK over the last 6 years. It is entirely based on figures from the Higher Education Statistics Agency (HESA).

Unfortunately, HESA figures are collated on a slightly broader (and somewhat ambiguous) basis than from Environmental Sciences per se. Hence, their interpretation has to be treated with a significant measure of caution. Additionally, for 2002/3, the latest year for which HESA figures are currently available, Environmental Sciences information was collated on a completely different basis from the previous 5 years. Between 1998/9 and 2001/2, HESA's Category 47 classification was defined as 'Environmental science and other (related) physical sciences'. Category 46 was defined as 'Geography studies as a science'. However, in 2002/3 Categories 46 and 47 were combined into Category 60, ' Physical and terrestrial geographical and environmental sciences'.

Nonetheless, even with these caveats, the 1998/9-2002/3 HESA data clearly illustrate one broad trend – that over this period, when Environmental Science undergraduate numbers continued to decline (down from 9087 in 1998/9 to 7540 in 2001/2, a fall of 17%), taught postgraduate numbers steadily increased (see Tables 1 and 2)

Interestingly, between 1998/9 and 2001/2, when Categories 46 and 47 can still be analysed separately, the entry rates in Environmental Science taught Masters courses grew faster in full-time, than in part-time mode. In contrast, for 'Geography as a science', the part-time entry grew faster than full-time entry, (possibly illustrating a substantial growth in part-time GIS courses/students over this period).

The contrasting Environmental Sciences' fortunes between undergraduate and taught postgraduate numbers since 1998/9 is interesting, and enhances speculation that students come disproportionately very 'late' into Environmental Sciences (i.e. from other graduate disciplines), as opposed to direct from school (with their limited Environmental Science A-level opportunities).

Finally, the extent to which the Environmental Sciences taught postgraduate market can continue to grow remains interesting conjecture. However, what is already certain is the extent to which the development of 'virtual', web based M.Sc's has already substantially enlarged this particular market - especially in part-time mode. For example, since 2000/01, my own University of Ulster's Category 46/47 'virtual' part-time Masters numbers have rocketed from 40 to 190, (i.e. to the equivalent of 14% of the entire 2002/3 UK figure). It will therefore be interesting to look again at HESA's 2004/5 figures to see the extent to which this growth is being mirrored across the UK. However, it does look as if the expansion in Environmental Sciences taught postgraduate student numbers is set fair, not just to continue, but to accelerate.

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For further information on course categories and statistics see: www.hesa.ac.uk

Table 1. U.K. Taught Postgraduate numbers: 1998/9 – 2002/3

		1998/99	1999/00	2000/01	2001/02	2002/03
Category 47 'Environmental Sciences and other physical sciences'	Full-time Part-time Total	786 1022 1808	850 1090 1940	955 1250 2205	955 1055 2010	
Category 46 'Geography as a Science'	Full-time Part-time Total	271 147 418	280 150 430	360 200 560	320 310 630	
Category 46 and 47 From 2002/3 = Category 60 'Physical and terrestrial geographical and environmental sciences'	Full-time Part-time Total	1057 1169 2226	1130 1240 2370	1315 1450 2765	1275 1365 2640	1425 1360 2785

Table 2. Percentage Change in U.K. Taught Postgraduate numbers 1998/9 – 2002/3

	Environmental Science (47) 1998/9 –2001/2	Geography as a Science (46) 1998/9 – 2001/2	46 & 47 Combined 1998/9 –2001/2	Category 46 & 47 Combined (1998-2001) And Category 60 (2002/3)
Full-time	+ 25.7	+ 18.1	+ 20.6	+ 34.8
Part-time	+ 3.2	+ 110.0	+ 16.7	+ 16.3
Total	+ 11.2	+ 50.7	+ 18.5	+ 25.1

Source: HESA. www.hesa.ac.uk

FEATURE ARTICLE

Evaluating the 'postgraduateness' of vocational taught Masters environmental courses: student perspectives

Lindsey McEwen[1], Rob Duck[2], Martin Haigh[3], Steve Smith[4], Liz Wolfenden[5] and Katie Kelly[1]

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Abstract

A survey of students on taught vocational courses finds that the student group is diverse, in terms of prior learning and cultural experiences, and in terms of expectations and priorities. There are high levels of student motivation and engagement, and staff time needs to be used differently than on undergraduate programmes. The most frequent student expectations of a postgraduate taught programme are that it will increase their personal 'commercial capital', specialist knowledge and transferable skills. Others include satisfaction and self-esteem. Postgraduate taught provision can be strengthened by exploring areas of commonality with staff perceptions of 'postgraduateness' and skills development.

Background, context and rationale

Strong drivers exist for postgraduate level taught course developments within Higher Education Institutions (HEIs) in the UK (McEwen, 2005). These include the target to grow overall student numbers despite the UK Government's cap on undergraduate student growth; to develop advanced training in line with regional economic needs; and the need to be proactive in meeting rapidly-evolving student markets. Many HEIs that possess undergraduate geography, environment, earth science subject areas are therefore working to develop new vocational postgraduate degrees as an important area of potential expansion or are revalidating/ updating existing programmes to make them more attractive and vocationally relevant. There are, however, a number of tensions that require resolution.

While there is significant guidance on programme development and benchmarking at undergraduate level (see Jenkins, 1998; Quality Assurance Agency (QAA) Benchmarking documents), there is currently very little guidance for those embarking on course development at postgraduate level (see Knight, 1997; Thorne, 1997). Presently subject-based benchmarking statements pertain to undergraduate courses rather than to postgraduate level. In any case, the interdisciplinary focus of much postgraduate provision mitigates against the easy use of such statements in course planning. There are, additionally, on-going debates as to what Masters (M) level means in the context of more vocational postgraduate taught programmes and courses that 'convert' at least in part as well as 'extend'. Extending the spatial scale of reference, the Bologna Declaration (1999) requires a harmonisation of EU higher education systems and a European credit transfer system that includes postgraduate level provision and hence comparability in levels of endeavour.

Within this context, this paper reports outcomes from a GEES Subject Centre small-grant funded project that has focused on the development phase of postgraduate taught vocational courses from different stakeholder perspectives. The project is multi-institutional (with partners from University of Gloucestershire, University of Dundee, Oxford Brookes University, Coventry University and Farnborough College of Technology) and uses feedback from the HEA GEES/HERG swop-shop (July 2004) to contextualise the survey beyond these institutions. The project team capitalises on the experience of colleagues that have recently been involved in developing and evaluating postgraduate taught environmental programmes with a vocational flavour within HEIs of differing size, location, strategic setting and funding contexts. The overall project aim was to identify, debate and disseminate good practice in the development of vocational postgraduate taught courses in geography, earth and environmental sciences.

Part I of the project involved a student survey that was designed to explore taught postgraduate students' expectations of postgraduate learning. Part II analysed the motivations for postgraduate course development from other stakeholder perspectives (e.g. development team, development team leader, external reviewers etc.) and debated the special attributes of a postgraduate taught course that mark it as 'postgraduate' and 'vocational'. This article focuses primarily on Part 1, the learning experience from a student perspective.

A questionnaire was developed to investigate student perspectives on the postgraduate taught learning experience. The questions were a mixture of closed and open questions around five inter-related themes: (a) comparison between current learning experience and previous course of study, (b) experiences of postgraduate study, the special attributes of a vocational taught programme that make it (c) 'postgraduate' and (d) vocational; and (e) student views on to what personal benefit/outcomes they expect to have on graduating. The survey was distributed to current students in taught postgraduate environmental/ geographical courses across the five institutions. This paper outlines the results and evaluates the implications for the development of postgraduate taught provision in environment/geography.

Eighty current students across the five institutions responded to the survey (Table 1) and the varied composition of the respondents mirrored the heterogeneity of the postgraduate student group. 65% were UK-based, 10% European and 25% International.

Table 1: Summary characteristics of respondents (gender broken down by age)

	20-24	25-29	30-39	40-49	>50
female	12 (15%)	7 (9%)	6 (8%)	6 (8%)	3 (4%)
male	14 (18%)	19 (24%)	6 (8%)	3 (4%)	4 (5%)

Previous qualifications varied from HNC through European Diplomas to PhDs. 57% of respondents graduated with their first degree in 2000 or later and their median level of previous work experience was 3.5 years but ranged from 0.3 to 46 years. The group included full-time international students, part-time students from the workplace, 'returners to learning' and recent graduates extending their studies.

Table 2: Differences between postgraduate taught study and previous learning experience

Theme	*Detail*
Level of knowledge	much deeper; more demanding; faster pace, more intense
Academic focus	more applied and practical
Teaching and learning styles	more reading, more discussion and group-work; more independent work
Opportunity to participate	increased; environment better for participation; encouraged to lead sessions
Peers	different level/ background in fellow students
Coursework	less of it/ more of it; ability to focus; emphasis on coursework (cf. examinations); course work more research-based than lecture-based.
Combining work with study	organisational skills and dedication.
Increased development of personal skills	confidence and personal skills
Work experience	opportunity to develop vocational skills
Relevance	'linked to real world of industry/ business/ government much more than previous degree'
Student personal motivation	higher; 'more engaged, interested and eager to learn'
Nature and quality of staff contact	less formality; more contact time; 'expected to be 'friends' with lecturers; 'real support from staff with a great wealth of knowledge'
Differences in educational culture	Multicultural learning experience

Table 3: How does your current learning experience compare with that of your previous course of study? Selected quotations

'smaller class means more discussion as opposed to lecturing. More hands on with practical techniques. Access to guest lecturers and presentations from people working in related fields'…..

'utterly different - much more coursework, group work, much heavier work load'…..

'it is much more intense, with a large amount of assessment work involved. It is a much smaller contingent which allows a lot more scope for group discussions and people feel less threatened about speaking out.'

'I find that compared with my BSc I am far more engaged, interested and eager to learn. I find the research very rewarding and because I have more self confidence and experience I am able to give back more.'

Results

Comparison with previous learning experiences

In assessing the differences with their previous learning experiences, students identified a number of distinctive elements (see Tables 2 and 3). These included an increased emphasis on the 'vocational' within the course, a steep learning curve in skills development as well as knowledge acquisition, the increased active nature of the learning environment, the different (less formal) nature of staff-student relationships, the changing nature of the staff and student rôles in the learning process and the additional value of prior cultural and learning experiences brought to peer group engagement.

Nature of the learning experience

Students were then asked to provide five keywords that best described their learning experience within the taught postgraduate course. Table 4 groups the main responses by

Table 4: Nature of the postgraduate vocational learning experience

Category	*Detail*	*Frequency*	*% total responses*
Rewarding	enjoyable, fun, enriching, fulfilling, satisfaction, achievement, stimulating, inspiring, goals	50	12.5
Challenging	demanding, burden, scary, hard work, taxing, difficult	49	12.3
Interesting	engaging, stimulating	37	9.3
Team work	communication, participation	24	6.0
Vocational	applied, broadening, practical experience	23	5.8
Negative	irrelevant to practice, repetitive, inflexible, anti-social, isolation	17	4.3
Stress	pressures, tiring	16	4.0
Time-consuming	more studying, large workload, busy	16	4.0
Intensity	sustained	15	3.8
Specialist	knowledge / skills	15	3.8
Opportunity to specialise	-	10	2.5
Discipline	time-management, deadlines, organisation	9	2.3
Autonomy	independent	9	2.3
work environment	intimate, informal, relaxed	9	2.3
Money	expensive, costly	8	2.0
Focused	relevant	8	2.0

theme. The words used were disparate but with 'reward', 'challenge', and 'interest' as key themes. The majority of words reflected positively on the postgraduate learning experience; there was, however, a small amount of negative feedback where expectations were not fully met.

Special attributes as 'Postgraduate'

When students were asked about the special attributes of their course that made it 'postgraduate', there were again a number of recurrent themes (Tables 5 and 6). These included the greater depth of engagement, the approaches to learning (e.g. problem-based; research-linked; active; student-focused), the increased inter-disciplinary focus and differing staff rôles/ attitudes in learning. The strong applied nature of study (linking theory to application) was also considered to be part of the 'postgraduate' package.

Only one student responded 'don't know' and the sole negative comment indicated that 'modules were relevant but some very general'.

Special attributes as 'Vocational'

Students also identified a large number of special attributes of their course that made it 'vocational'. These included: the subject focus combining theory and work experience; utility 'degree is useable'; and practitioner links (guest speakers who work in the field/ 'real world'). Other important attributes identified were the distinctive approaches to learning (case-study analysis) and course work that mimics the expectations of the workplace, e.g. 'writing of reports as would be expected in employment'. The flexibility of topics negotiated for assignments was considered to force students to reflect on personal interests and long-term career paths throughout the course. Skills developed were perceived as matching the needs of the workplace, for example the aim to train problem solvers; 'relevant methods used in proper jobs'. Students also commented positively on the personal approach to guidance with 'personal interest by tutors on each and every student' extending to more formal career planning. Practical elements were also rated highly - doing fieldwork and carrying out real life studies (see Table 7).

Outcomes from taught postgraduate study

Increased personal commercial capital/ vocational outcomes are major expectations as outcomes from taught postgraduate study (74% of students), with 20 students putting up to 2-4 responses in this category (Table 8). There are, however, other important drivers at an individual level including personal skill development, knowledge acquisition (a range in specialism and breadth), personal capital and transferable skills. Formal accreditation of courses and hence student membership of professional bodies ranked much lower as a key student outcome.

Table 5: Special attributes of a taught postgraduate programme that make it 'postgraduate'

Theme	*Detailed comment*
Depth of engagement	level of academic maturity; intensive; assumed higher level of knowledge
Subject matter	more specialised; emphasis on matching theory to applications; more current; more closely aligned to the 'real' world and the workplace
Personal skills	greater emphasis on analytical skills
Problem-based learning	anticipating situations and solving problems; 'see through' situations
Perspective	more interdisciplinary
Staff attitudes	'greater expectations and greater respect from admin and lecturing staff!'
Individual tailoring	'designed so you achieve what you personally want to achieve'
Student responsibility	for subject matter – higher; greater freedom of choice for negotiating topics in assignments
Resources	access to more facilities
Time-management	more and better than undergraduate programmes
Approach	course taught on more personal level; more emphasis on the individual
Skills	attention to vocational and transferable skills; communication skills
Teaching and learning	more student-led; more independent study

Table 6: Special attributes of the course that made it 'postgraduate', selected quotations

'Different level of thinking, i.e. research methods was challenging in terms of philosophy and new terminology introduced.'
'Geared to individual choice, allows choice to suit own needs….'
'The in-depth level of each aspect that makes it "postgraduate". It requires a level of academic maturity that continues to grow. It also helps me to see through a situation or policy etc. and enables me to see the next question / anticipate next aspect / clarify area of working/academic life more than I did in my previous degree i.e. instead of learning facts, I now think about these facts in depth'.

Table 7: Special attributes of the course that made it 'vocational' - selected quotations

'Illustrates applied learning in real-life situations with imperfections of information, people, understanding, conflicts of interest.'
'Emphasises more professional attitude to project work and presentation. Also covers subjects relevant to work place and current practice/issues. Combines theory and work experience.'
'Emphasises more professional attitude to project work and presentation. Also covers subjects relevant to work place and current practice/issues. Combines theory and work experience.'

Table 8: Themes from student expectations from postgraduate taught vocational study (ranked in terms of overall frequency)

Category	*Details*	*Frequency*	*% total*
Personal commercial capital	vocational outcomes, career development, employability, contacts, extra qualification in field, future, reward, retraining, professionalism, able to work globally, more potential, increased marketability, managerial, portfolio	78	19.5
Specialist knowledge	in depth, specialist, research skills, specific topics mentioned (disposal, waste, sustainability; legislative background; key agencies, environmental change)	40	10
Transferable skills	meeting deadlines, advanced problem-solving, presentation, writing, visual, multi-skill	36	9
Knowledge	breadth, linkage, up-to-date	36	9
Self-esteem	empowerment, confidence, assertiveness, achievement, self-worth	33	8.2
Experience	work experience, practice, consultancy	28	7
Personal capital	maturity, stretching, vision, completeness, realism, growth, self-improvement, direction, awareness, education, increased personal performance, direction, challenge, advanced, exposure, assessment of strengths and weaknesses, connection with background, knowing new culture	26	6.5
Satisfaction	achievement, good experience, enjoyment, fulfilment	12	3
Personal skills	organisational skills, commitment, focussed, social skills, competency, motivation, insight, accountability	11	2.8
Status	recognition, credibility, influence, advanced, trust, respect	10	2.5
Personal state	happiness, good, freedom, thoughtful, hope, pressure	9	2.3
Understanding	-	8	2
Specialist skills	e.g. computing, remote-sensing, urban design	8	2
Team work	leadership, participation	4	1
Support	friendship, people, colleagues	4	1
Accreditation	Chartered status	4	1
Intellectual stimulation	ideas, interest, theoretical understanding	3	0.8
Language	improvement	2	0.5
Study environment	independent, uninterrupted	2	0.5

Discussion

A number of points arise from a synthesis of these results.

- Prior educational experience both in terms of educational system and subject expertise is very varied and when combined with cultural educational differences, prior learning and life skills cover a large spectrum.
- Although some common themes come out of the survey (e.g. in terms of how the learning experience is summarised), there was frequent diversity in the responses given. Students have the potential to tailor some aspects of courses to their needs and the taught postgraduate experience can potentially have a high degree of individuality. Course development may need to cater for the needs of disparate groups who can learn together in many courses. Such diversity is rarely typical of undergraduate courses.
- Students as individuals generally have a clear perception of the differences between Level III (Level IV in Scotland) and Level M, but taken across the postgraduate group, expectations of postgraduate education are clearly multifaceted.
- The smaller-group research-led, learning experience in postgraduate taught provision shows some similarities to undergraduate learning experiences in the old University sector in the 1970s / early 1980s. However, the emphasis is more on active, problem-based learning, where students' prior learning experiences and more advanced personal skills add significantly to interdisciplinary debates within the learning environment. This provides a different slant on small group teaching where process can be as important as final outcomes.
- Although academic debates have focused around the challenges/tensions in developing a taught course that is both vocational and 'postgraduate', these tensions are not evident in student responses. They see a definite progression from the undergraduate experience but that progression has many tangible and intangible facets, including level and mode of engagement; steepness of the learning curve and the role of peers in the learning process.
- The distinction between conversion and extension courses from a student perspective is blurred, despite the national and international academic debate about M level. One strong theme to come through is the emphasis on skill development (personal, specialist, transferable and practical) as well as specialist academic 'knowledge' per se. No students mentioned learning level descriptors, which suggests that they engage with these implicitly rather than explicitly.
- There are issues about how postgraduate skills levels are perceived by students. Part of the 'vocational' focus of the course can be construed as the development of practical skills but what does practical skills development mean at postgraduate taught level?
- Students make strong links between high quality taught postgraduate provision and: (a) applied course content (the knowledge needs of the 'workplace'); (b) course delivery that simulates external modes of engagement (e.g. team-based activities); and (c) advanced skill development (specific, transferable and personal) that equips for employment.

These are critical in the development of personal commercial capital. Well-integrated practitioner involvement within courses is an important aspect of this provision (see McEwen et al., 2003).

- Increased personal commercial capital is a major driver for study but it is not the only one. There are many other intangibles including personal challenge and satisfaction.
- There is a strong relationship between staff involvement in applied research and consultancy (client–based) and students' perceived quality of the taught postgraduate learning environment (see Healey, 2003; 2005). Students see learning close to the research-teaching nexus as a key element of their learning experience but in a variety of ways, including case-study approaches to learning, active learning, co-learning and networking.
- A strong theme that runs through student responses is the large benefits of what students themselves bring to the learning environment. The notion of co-learning has been explored elsewhere (Le Heron et al., 2005). Co-learning with peers who frequently have different prior learning, disciplinary or cultural experiences adds vibrancy to the learning environment. Co-learning with staff who are active in applied research and consultancy has significant additional benefits.

Recommendations

There are several recommendations as an outcome of this study that can feed into postgraduate taught course developments. These include the need to:

- harness the strengths provided by the potential variety of the student group in peer learning;
- systematically appraise the roles of staff and students in the learning processes. Staff contact time needs to be used differently from undergraduate programmes, including increased facilitation, greater input into debate and dialogue, higher degrees of student-led learning and greater integration of students with live projects and active learning; and
- capitalise on high levels of student motivation and engagement in tailoring the learning environment to the needs of specific groups.

A larger survey would allow further breakdown of student responses by different elements of student character (e.g. age, gender, ethnicity, prior academic and work experience).

Conclusions

The taught postgraduate layer is a diverse student group that reflects a variety of prior learning and cultural experiences. While there is some commonality in the themes that emerge from the student survey, there is also considerable diversity in individual perspectives and priorities. In the development and delivery phases, it is extremely important to engage the student group and get early feedback on different elements of the planned provision. It is also important the students engage with the learning descriptors associated with postgraduate study so there is a shared expectation of the outcomes. Students have universally high expectations about the nature and quality of the learning experience.

The challenge now is to match this evidence with the outcomes of the staff survey (development leaders, course development team, academic and practitioner evaluators; Heads of Quality Assurance) into 'postgraduateness' and skills development. The identification of areas of commonality and difference in expectation can help aid the development of postgraduate taught provision. Feedback to date from both staff and students indicates that M level courses can be a distinctive and rewarding part of a University's provision, with strong vertical integration of both undergraduate and research elements and strong external links.

1. The courses included in the study were:

University of Gloucestershire: Programme of Postgraduate Environmental Taught Courses (PPTEC) including: MA/MSc Environmental Policy and Management, MSc Water and Environmental Management, MA Tourism and Sustainable Development.

Dundee University: MRes Environmental History (joint with Stirling), MSc Managing Environmental Change, MSc Geo Environmental Engineering and Management

Coventry University: MSc Environmental Assessment and Management, MSc Environmental Management and Technology, MA Tourism and Environmental Management

Oxford Brookes University: MSc Environmental Management and Technology.

Farnborough College of Technology: MSc Environmental Management (FT)/
MSc Integrated Environmental Management (PT).

References

Healey, M with Blumhof, J. and Thomas, N. (2003) *Linking Teaching and Research in Geography, Earth and Environmental Sciences*. http://www.gees.ac.uk/projtheme/linktr/ltringees.rtf

Healey, M. (2005) Linking research and teaching to benefit student learning. *Journal of Geography in Higher Education* 29(1) forthcoming.

Knight, P.T. (1997) Learning, teaching and curriculum in taught Masters programmes In Knight, P.T. (ed.) *Learning, Teaching and Curriculum in Taught Master's Degrees*. Cassell Education, London. pp16-27.

Jenknins, A. (1998) *Curriculum Design in Geography*. Geography Discipline Network (GDN), Cheltenham and Gloucester College of Higher Education.

McEwen, L. J., Haigh, M., Smith, S., Steeles, S. and Miller, A. (2003) 'Real world' experiences? Reflections of current and past students on practitioner inputs to environmental taught Master's courses. *Planet* 10, 18-22.

McEwen, L. J. (2005) Postgraduate taught course developments in geography, earth sciences and environment in the UK: an initial assessment of drivers. *Planet No 14, 6.*

Thorne, P. (1997) Standards and quality in taught Masters programmes In Knight, P.T. (ed.) *Learning, Teaching and Curriculum in Taught Master's Degrees*. Cassell Education, London. pp16-27.

Le Heron, R., Baker, R. and McEwen, L. J. with Bradbeer, J. and Jenkins, A. (submitted) Co-learning: Re-linking research and teaching in geography. *Journal of Geography in Higher Education*.

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Enthusing staff delivering taught Masters programmes

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Abstract

New staff have described their taught Masters programmes as 'traditional heaven', 'my place to talk about me and what I do' and 'the main opportunity I have to present my research'. This reflection is based on personal experience and reflections from staff; it raises four areas of concern, and suggests some strategies for encouraging staff development. It suggests there is plenty of scope for significant innovation to the benefit of all concerned.

Concerns for staff delivering taught Masters programmes

This reflection and comment focuses on four areas consistently raised at an annual workshop for staff on the Postgraduate Certificate in Learning and Teaching at Leeds University which discusses teaching on taught Masters programmes. Workshop size varies between 18 and 30. Comments in italics below have been sought from individuals who completed the Certificate in 2001 and 2002, and from the 2004 and 2005 class. It should be remembered that these are comments from a small group from one institution, and that the workshop is probably the first formal support activity experienced by these individuals. Participants at the session come from all parts of the University, but the individual discussions reported here in italics have been with various GEES colleagues who are thanked for their input and time.

1 Should a Masters module be a very different experience to an undergraduate course?

The answer is consistently yes, but I have yet to find someone who has planned a module from this point of view. This question leads to a wide ranging discussion with the following commonly raised points:

- *The standard should be higher, more focused and much deeper than undergraduate work,*
- *It should feel like a real job, and it helps when they treat it as such. Really putting in complete days. Interestingly, students who have moved from other universities are more likely to adopt a full-time approach, our own students can continue with their part-time employment and may behave more like undergraduates. This is something I think needs looking at.*
- *It should incorporate professional development,*
- *It should make students feel their money is well spent.*
- *Our students are already in work, this is the opportunity to escape any workplace realities and immerse themselves in the academic content. They understand what's needed for essays, they know where they are.*
- *It is not good enough just to treat them like third years, we have to be more proactive in making students feel special.*
- *The real problem is that they have such a mixed range of backgrounds. Our own (UK) undergraduates are fine and you can do really challenging things with them, but some of the international students have really basic problems with English, the literature, reading, and just coping with life, so it is difficult to expect them to perform like UK students.*

2 Who should be doing the talking?

An assumption generally made by new staff with their Masters module in their own preferred research area, is that the lecturer is the expert and that therefore they should be doing most of the talking. New staff argue that *this is what the students expect, they are paying us to teach them*. In my view this does tend to lead to more chalk and talk amongst Masters modules than amongst the undergraduate modules. Developing opportunities for module participants to create their own inputs and understanding seems to me to be absolutely essential.

A class of bright Masters students present an ideal opportunity for a lecturer to really discuss work at the research frontiers; to generate many opinions and ideas, to explore and evaluate ideas from the outrageous to the mundane, developing both the staff and the students in the process.

students deserve to continue to develop through argument and discussion

If you buy this argument it does mean putting in extra effort to create student centered activities. And the counter-argument is: *My students don't know enough to contribute at this level so I am not prepared to change the way I teach my class*. The challenge to the lecturer is to create ways to make sure postgraduates are at this level at least in some areas. I argue that students deserve to continue to develop through debate and discussion, and that by creating a classroom atmosphere where this is the norm, they will learn and understand more deeply.

3 No one mentions it

Various quotes from three newish staff:

Everyone just assumes that you can teach MSc. You just get on with it. It is where you do your own research thing, so I suppose people are taking it for granted that what you do will be fine. It will be OK but it would be nice if somebody actually told you it was.

No-one in my department has talked to me about the module. We are all following our own specialities and it just seems to happen. I have a mentor who came to my undergraduate lectures but no one who comes to listen to the Masters class.

It is fascinating that the Masters courses which are generating direct funding, are very short sharp learning experiences for the students, and are likely to have a greater mix of international and UK students, seem at first glance to be peer reviewed and discussed less frequently than undergraduate programmes. This perception on the part of new staff may well belie the reality, but the new staff appear to feel relatively unsupported in this area. The '*but it would be nice if somebody actually told you it was*', comment is reflected by many people for whom a small additional confidence boost and reassurance is probably what is needed.

4 Conservatism and inertia

My learning and teaching committee would not allow me to do this. I am on probation and I can't risk my Prof not liking my teaching. I can't risk having the students complaining about my teaching. You might not like me saying this but I have far too many other pressures to put lots of time into the Masters.

These are common reasons given by new staff for traditional lecture-based teaching. I argue that there is much to be gained from using a variety of learning opportunities:

- It benefits the students with learning styles which are not compatible with lectures and note taking.
- Variety cheers up the class and creates new enthusiasms.
- Being involved in delivering the sessions generates deeper learning in the student group.

Clearly, international students who are unfamiliar with different formats must be well supported in preparing for group work, case study discussions, simulations and games. BUT one unexpected benefit of an emphasis on working as a group, is that international students become better integrated into the groups, and they benefit from having their contributions valued and developed.

it will take time to generate a more flexible approach to teaching

I realized that what I had been doing in the past two years with my Masters course was entirely of the 'me talking and they can take notes' variety. That session made me consider a variety of ways of changing what I suppose you would call a rather traditional approach. The discussion we had about group work I still find very difficult, but I have now asked groups to do some group discussion of papers and that has helped the understanding, there is more reading happening. I think some of the ideas are a bit too radical for now.

Activities to inspire course design

The problems outlined above are common across many Masters programmes, and for some new staff simply raising these issues makes a big difference to their planning style (Scheyvens 2003).

What will your students do when they graduate?

Ask: What processes and activities are undertaken by graduates of the MA or MSc you teach? The answers to this question range very widely but in my experience never includes essays, and for new graduates rarely involves solo work.

Activities undertaken by MSc hydrologists in their first five to 10 years at work include:

- Draft reports – for group development and refining
- Team projects – with final reports delivered through group writing
- Conference / day training delivery to both new and more experienced staff
- Software evaluations
- Protocols to ensure quality
- Daily / weekly self evaluations
- Identifying international collaborators for future projects
- Assessment of new analytical approaches
- Critical evaluation of colleagues'/competitors' work
- Library / resource purchases, costing and justification
- Installing equipment

Having researched your own list, the challenge is to create student activities and assessments which match each element. For example:

- Workplace-standard presentations (in seminars)
- Team reports
- Report with executive summary
- Fully costed proposal for the purchase of …..
- Critical comparison of 3 papers / reports / approaches / techniques
- Literature review of research or practice published since 2000, with a coversheet of recommendations for future activities
- Technical / safety protocols
- WWW evaluation of the 'competition'
- A job and person specification.
- Running a day conference with external speakers, posters and sponsorship
- In-house library [information resource] proposal
- WWW documentation

Thinking outside the normal timetable.

Thinking 'out of the box,' in small groups, participants are asked to design/redesign their module to be delivered in either:

- Three days nine to five, or
- With 22 hours contact time but where the academic can speak for a maximum of four hours, or
- As a three hour evening class, or
- As a three day student-led session, with students preparing in the previous six weeks with e-mail support only.

These ideas appear artificial, although used in fact for certain modules, but in thinking about different delivery frameworks one creates new approaches to materials and activities. Where staff availability is an issue, the three-day or weekend approach can be very useful in staff time terms, and lecturing for eight hours is not appropriate.

The 'outside the box' game seemed very strange at the time. I didn't really see the point of this as I am tied to a one hour teaching slot each week. But we did come up with some very good ideas for activities and I did try the guided reading seminar approach which went okay and got people more involved than before.

In my view it is critical to emphasize to staff that it will take time to generate a more flexible approach to teaching; this definitely means making time to think around the issues and possibilities. Getting the timetable changed is win-win. Teaching in longer blocks, two and three hours allows the class to get into material much more deeply. For hydrologists with consulting as a next step, creating scenarios which parallel the professional workplace is clearly relevant. For hydrology graduates, it is likely that the knowledge we can give them will be out of date in five years time. So that 'learning how to learn and to keep up to date' is to a certain extent as important as content. It is also likely that in the first year at work the topics likely to emerge will not have been covered on their MSc. This is because the diversity of practice and scope of applications cannot be totally covered. From this point of view, having an element of the course which considers the professional as well as the academic aspects is a

bonus. It is very important to take time to explain the process, and to support it where necessary, especially for international students. For hydrology students team roles, group writing, preparing budgets, writing lucid information to support code in programming are all important.

Support through the literature

New staff have many 'literatures' to explore: it seems reasonable to direct them specifically to relevant support for taught postgraduate teaching. However, addressing issues through the literature is limited; Knight (1997) is almost the only text available.

Without labouring the point, sharing some of the literature - for example Fejes et al. (2005) on reactions to seminars by Masters students, Keller and Kros (2000) on the need to address writing issues with MBA students, and Ridley (2004) on issues around discourse analysis for students where English is not their first language - with the group has broadened understanding and created new avenues for exploring classroom practice.

One of the benefits of the session was looking at the Keller and Kros (2000) paper. I didn't do anything about it that first year, but in the following year I was much more aware of the problems the Chinese and some of the southern European students were having. I have changed the way I talk about reading to the students and I suppose you could say that I now look at the reading lists in a different way. I didn't change anything directly because of reading the paper but it did make me think about what I was doing and how I could help some of my group.

Tapping into the potential creativity of a class, letting ideas flow freely benefits everyone

In the workshop participants are given the references with the abstracts attached as a way of generating discussion and leaving them with a resource. While this might seem over supportive I argue that it is unlikely that new staff will chase this literature without further encouragement. The unexpected bonus from this being:

I used the 'mini reading list with the abstracts 'cut and pasted' with one of my groups and that got a discussion going in class, well before they left which was quite helpful. It seemed to help the groups to focus on the issues involved. I couldn't do it all the time, too much paper but cool sometimes.

Postscript

Taught postgraduate students have the potential to be very creative and developmental. Their programmes tend to be narrowly-focused and directed towards interesting research projects. Tapping into the potential creativity of a class, letting ideas flow freely benefits everyone in the room. This group has the potential to reach out and understand the research frontier and to be creative in searching for crosscutting themes and ideas. A traditional lecture – seminar based session can stifle this kind of input from bright postgraduates. Creating opportunities for group interaction that leads to deeper engagement with the academic materials is a crucial part of Masters postgraduate teaching and helps the academic refresh, re-evaluate and develop.

References and support materials used with PGCTHE students in 2005

Bell, PC, and Haehling von Lanzenauer, C. (2000) Teaching objectives: The value of using cases in teaching operational research, *The Journal of the Operational Research Society*, 51, 12, 1367

Fejes, A., Johansson, K. and Dahlgren, M.A. (2005) Learning to play the seminar game: students' initial encounters with a basic working form in higher education, *Teaching in Higher Education* 10, 1, 29-41

Keller, C and Kros, J. (2000) Teaching communication in an MBA operations research/management science course, *The Journal of the Operational Research Society*, 51, 12, 1433

Knight, P.T. (1997) *Masterclass : learning, teaching and curriculum in taught Master's degrees*, London, Cassell

Kroll, L.R. (2004) Constructing constructivism: how student-teachers construct ideas of development, knowledge, learning, and teaching, *Teachers and Teaching: Theory and Practice* 10, 2, 199 - 221

Ridley, D. (2004) Puzzling experiences in higher education: critical moments for conversation, *Studies in Higher Education* 29, 91-107

Scheyvens, R., Wild, K. and Overton, J. (2003) International Students Pursuing Postgraduate Study in Geography: impediments to their learning experiences, *Journal of Geography in Higher Education*, 27, 3, 309-323

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Bridging the gap between academia and practitioners: training coastal zone managers

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Abstract

This article describes how a Masters Coastal Zone Management (CZM) course has been designed to ensure the gap between academia and practitioners has been bridged to develop students who are well-equipped for the workplace. The course has a robust underpinning of science, but it is strongly vocational to ensure students develop a wide range of knowledge and skills. The MSc CZM in Bournemouth has been guided by practitioners in the field, including placement hosts and employers, to ensure that skills development is embedded into the curriculum. Existing best practice is discussed and evaluated with a view to providing recommendations for postgraduate level courses requiring a fine balance of academic content and vocational relevance.

Introduction

Masters level training for coastal zone management requires the gap between academia and practitioners to be bridged in order that students on the course are equipped with the skills they need to enter the workplace after graduation. Whilst debates questioning the nature of 'postgraduateness' and postgraduate skills development continue (e.g. Knight, 1997; O'Reilly, 1996), the strong message from industry (O'Brien and Hart, 1999; Owen, 2001) is that students need to have experience of the workplace. In essence, students need appropriate skills to communicate across disciplinary and institutional boundaries in order to be effective in their careers. But how can skills be defined as 'Masters level' and how should they be embedded into Master's level curricula?

vocational Masters degrees must be focussed to provide the skills their students will need in the workplace

What is 'postgraduateness' and what are postgraduate skills?

In the context of MSc CZM, the 'worthiness' of a Masters course can be achieved by a strong underpinning of science (or academic content) which is specialised and applicable to the workplace i.e. it is vocational. According to QAA (2001):

> 'Much of the study undertaken at Masters level will have been at, or informed by, the forefront of an academic or professional discipline. Students will have shown originality in the application of knowledge and they will understand how the boundaries of knowledge are advanced through research. They will be able to deal with complex issues both systematically and creatively, and they will show originality in tackling and solving problems'.
>
> If students are to gain the qualities needed for employment not only does the academic focus of the course have to be suitable, but also, transferable skills need to be developed beyond Level H (Honours) to ensure critical awareness, initiative in complex and unpredictable situations, originality and creativity, self-reflection and personal responsibility (SEEC, 2003; QAA, 2001).

Units within Masters courses need to be constructed in such a way as to ensure the academic focus is applied, practically-oriented and specialised yet often (though not always) interdisciplinary in approach and perspective. Transferable skills are ultimately what the employers want and need (Owen, 2001), hence vocational Masters degrees must be focused to provide the skills their students will need in the workplace.

There are many existing examples of embedding skills development into taught programmes. Broadly speaking, this can be achieved through the teaching of skills either as a 'stand alone' taught unit or embedded within and throughout the curriculum. Furthermore, skills development is enhanced by the inclusion of teaching staff with industry experience, the addition of visiting speakers, other good contact and input from relevant professionals and the opportunity to undertake work-based learning e.g. 'live' projects, work experience or placements.

Skills for Coastal Zone Management students

Coastal managers rarely manage the physical processes of the coast. Instead, they have become facilitators, project managers, consensus-builders and even marketers for the coast, interacting with specialists and non-specialists from a wide range of disciplines and backgrounds. This challenging role requires the ability to communicate and interpret information from and for a variety of audiences together with general management abilities in costing, timing and running projects.

In the case of CZM, one of the most important skills to develop is the ability to communicate across the many groups involved in CZM. One of the most widely known divides is between academia and the CZM practitioners. Traditionally, this divide continued to be reinforced by the inability of academics to communicate effectively to the practitioners, largely due to inappropriate use of language (academic or scientific jargon), unnecessary depth of message and an incorrectly assumed scope of understanding. Therefore, in order to train CZM students, they need to understand the challenges of communicating to different audiences in different ways, but prior to this, they need to be made aware of the problems that exist in their chosen career path. The role of the Masters course must be to ensure students understand the science, realise the context and appreciate the importance of appropriate communication and messaging of that knowledge.

For our CZM students to enter a competitive job market and begin to undertake such a complex role on completion of the course, there is a need to ensure that their people-management skills are developed. Interactive group work, using problem-based learning lends itself to the task of training to produce independent learners and practitioners. 'Live' issues and the involvement of relevant practitioners ensure a highly motivated environment where students can build their skills through fact-finding (workshop facilitation, interviewing, literature searching), group work and role-play, and reporting (oral and written).

Course 'relevance' to students will be guided by two drivers:

(1) The skills CZM students require need to be driven by an understanding of the workplace. Therefore, the curriculum needs to shift to reflect changes in the industry and the specifics of the workplace.

(2) The students need to gain a wide range of skills specific to CZM but which are broad enough for them to enter employment outside the coastal sector or to enter a career

outside the remit of environmental management.

Skills development within MSc CZM at Bournemouth

Vocational skills are considered critical to the training of CZM students. The CZM programme benefits from the feedback of visiting practitioners, course reviews and placement experiences, ensuring that it continues to evolve as the needs of the market place change. Moreover, staff involvement and membership of local and regional coastal fora and other coastal networks ensure advances in the field are reflected in the programme. All taught units are constructed to enhance the ability of the student to further develop their skills. For example, many assignments and field work activities require group-work or collaboration amongst peers. The mode of assessment is varied to ensure communication skills are developed in the written, visual and oral form. Guest speakers are used to ensure students are exposed to leaders in the field (both academic and practitioner), and many projects are simulated or real live projects to develop the sense of 'reality and relevance'.

One unit entitled 'Aquatic Pollution and Contingency Planning' utilises a simulated event to develop academic knowledge and practical skills. To inject realism into an operational issue such as contingency planning, it was considered beneficial for students to become actively involved in a simulated emergency oil-spill event. Emergency planning is particularly relevant to students studying coastal zone management. There are a number of potential hazards at the coast including landslide, flood, oil spill and terrorist attack to name a few. Within lectures, the students discuss the academic context for contingency planning before preparation for the simulated event commences. The simulated event itself is a day in length and is held in the emergency planning office of Dorset County Council as if it were a live event.

The oil spill event is simulated to affect the Dorset coast, which holds multiple (conservation) designations including its recent recognition as a World Heritage Site, as well as the busy ship-to-ship transfer zone in Lyme Bay. Dorset County Council already have a detailed oil spill contingency plan and an emergency response for oil pollution incidents. The simulated exercise with students offers the Council an opportunity to refine their training courses for emergency planning officers and hence there is mutual benefit in the exercise being undertaken.

The strengths of the exercise include:

(1) Realism of the event – students have to think on their feet, work as a team, communicate with other teams (across the disciplinary divide), continually synthesise new information and disseminate it to relevant departments in an unpredictable and high pressure-high stress situation.

(2) Student interaction – students must work with each other, their tutors and the council officers.

(3) Learning by doing – improving knowledge in the area of emergency planning and skills which are transferable.

Weakness of the exercise:

(1) Time consuming – planning for each year's activity is time-consuming for staff and involved practitioners. A number of staff are also involved throughout the activity.

Evaluation of current practice

Students and tutors involved in the simulated exercise are consistently enthusiastic: 'It is fun, hard work and a huge learning curve'. Practitioners are involved at all stages and together with the lead tutor, the practitioner refines the procedure each year.

Student feedback via unit evaluation forms over a number of years includes comments specific to this activity. The students see the simulated event as a challenge and, hence, an extremely useful learning experience.

Recommendations

The involvement of practitioners through projects/exercises is enormously beneficial to the course as it enables an injection of realism to the subject. Moreover, collaborations such as these often lead to the unexpected bonus of a better working relationship and understanding between practitioners and academic environment. In the case of the above example, the student simulation is useful to the practitioners, as they are able to 'dry-run' an operational training tool used for all practitioners involved in contingency planning. This symbiotic relationship has also been seen in other elements of the course where students undertake short projects or fieldwork to the benefit of their own academic development whilst providing useful information/ knowledge to the involved practitioners. Given the competitive nature of the environmental management sector, the building of good working relationships with practitioners develops the opportunities for good student placements and potentially for postgraduate employment.

References

Knight, P.T. (1997) *Masterclass – Learning, Teaching and Curriculum in Taught Masters Degrees*. London: Cassell.

O'Brien, E.M. and Hart, S.J. (1999) Action learning: the link between academia and industry? *Educational Research*, 41 (1) 77-89.

O'Reilly, D. (1996) Becoming a Master in Learning and Teaching in Higher Education: Some issues raised by problematizing 'Mastery' on a learner-led MA programme. *International Journal for Academic Development*, 1 (2) 80-85.

Owen, E. (2001). What key skills do employers need? *Journal of Geography in Higher Education*, 25 (1) 121-126.

SEEC (2003). *Credit Level Descriptors for Further and Higher Education*. March 2003. Available online: http://www.seec-office.org.uk/resources.htm (Accessed 7/7/04).

QAA (2001) *The Framework for Higher Education Qualification in England, Wales and Northern Ireland*. Annex 1. January 2001. Quality Assurance Agency for Higher Education. Available online: http://www.qaa.ac.uk/crntwork/nqf/ewni2001/contents.htm (Accessed 9/7/04)

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A learning resource to support Masters-level training of geologists in professional practice

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Abstract

Postgraduate-level training in 'professional practice' is essential to enable students (a) to understand business management and the role of geologists, civil engineers and environmental scientists in industry, and (b) to advance their skills in report writing, oral presentation, negotiation and financial acumen. This is best achieved through exposure to 'real world' case study material. With GEES Subject Centre support we are developing a multi-media learning resource for students to explore the interactions between environmental legislation, corporate strategy, financial constraints, geotechnical engineering and applied geology. Our case study is an investigation of wastewater treatment by means of sub-surface dispersion within a Chalk aquifer in southern England. We have evaluated the course with groups of students on final year undergraduate and Masters level geology courses. Issues include achieving a suitable balance between individual and group work, between scientific understanding and professional skills development, and between specialist knowledge and transferability to other GEES disciplines.

What is 'professional practice' and why is it important?

Science and engineering degree programmes are primarily designed to develop scientific or technical understanding of the discipline. Unless students were fortunate in securing arelevant work placement or industry-based employment during a vacation, they may have graduated without being exposed to a professional working environment. Many graduates are unfamiliar with the role played by geologists, civil engineers and environmental scientists in industry and in government agencies. The phrase 'professional practice' embodies this experience and skill set. Familiarity with professional practice should increase students' employability and assist their transition from a graduate student to a practising geoscientist or geo-technician.

A case study approach is arguably the best way to bridge the gap between scholarly activity and the work place. Case studies based on 'real' industry projects in a 'virtual learning environment' can recreate the immediacy and complexity of working in industry, where decisions are frequently based on incomplete evidence. Skills in decision making are enhanced by taking on ownership of the project, and being closely involved in the decisions made at all stages of project development. By drafting work briefs, evaluating bids for drilling contracts, and logging borehole core recovered from site investigations, students directly experience issues such as quality assurance that are faced by professional geologists. This approach also provides students with opportunities within their modular work or dissertations to contribute to real scientific projects relevant to their future careers. As noted by Healey et al. (2003) and McQueen (2003), research-informed teaching is probably common in the Earth Sciences but hitherto has not featured extensively in pedagogical journals.

Professional practice in the Applied Geology MSc programme at Brighton

The context to this article is a one-year MSc taught course in Applied Geology at the University of Brighton. Brighton has a long history of geology teaching within civil engineering courses and the module title 'Geoframeworks' is intended to convey the dominant theme of the Masters course, namely the integration of geological science and engineering practice (Moles & Mortimore, 2003). One of us had previously developed a professional practice module within the final year of a BSc Geology course (Moles & Leslie, 2000). Since 2002 we have developed a 'Professional Practice' module that is appropriate to the skill-level of Masters students and builds on the environmental and civil engineering focus of the Applied Geology programme. The module involves students in the evaluation of an industry-based geotechnical / geochemical investigation of wastewater treatment by means of sub-surface dispersion within a Chalk aquifer. The overall aims are to:

- Introduce the roles of and links between scientists and engineers in industry and government
- Highlight the influence of legislation and corporate strategy on site investigations
- Show how technical data are obtained and how its quality is managed
- Encourage decision-making based on incomplete evidence
- Develop presentational, reporting and negotiating skills in an industry context

One problem with the case study approach is the difficulty in retaining supporting material for long-term use. This can be due to the ephemeral nature of telephone conversations and email exchanges, the loss of physical evidence such as drill core, and indeed the loss (or promotion!) of key staff. To combat this problem, and with support from the GEES Subject Centre Small Projects programme in 2003-04, we have created a multi-media 'learning resource' entitled 'Professional practice of Earth scientists in industry'. The idea was to capture onto computer media a range of documents including minutes of meetings, work specifications, reports, drill logs, site maps and images, together with audio files of interviews with personnel involved at various stages of a specific investigation. After an introduction to the case study, courseware users are encouraged to explore the material to answer questions such as the objectives and driving forces of the investigation, the management structure and responsibilities of personnel, and how professional standards such as quality assurance and health and safety are maintained.

Courseware platform

Having researched software options we chose the application Macromedia Flash Professional 2004. This software enables audio and video recordings to be integrated with text and graphics in Powerpoint-style slides. Loops and links can be programmed more readily than in Powerpoint. Flash allows frame-by-frame editing and insertion of subtitles in video clips. It enables interactivity and feedback from formative exercises, and control of access and progression through the courseware. Some problems arose with compatibility, as running the software from disc requires Flash Player 7 which is not universally available on university PCs. Memory overload from the embedded video clips also caused operational problems. These issues have been resolved through use of Sorenson's video compression software and delivery of the courseware using the broadband capabilities of the Blackboard intranet provision (named studentcentral at the University of Brighton).

Wallisdown case study

Our case study is based on recent investigations by Southern Water plc of a number of their aquifer-discharge water treatment works (WwTWs). These investigations aimed to delineate subsurface water flow and water chemistry to ascertain the sustainability of this method of wastewater treatment. A University of Brighton team was contracted by Southern Water to log core, extract pore-water for chemical analyses, and compile reports on several of the WwTWs.

For the purpose of the MSc course, the company asked that we avoid referring to a specific site and we named our imaginary location Wallisdown. This WwTW is located in an open valley a few kilometres from a village. Land uses include farmland, woodland - in part a nature reserve - and a golf course. These points are important to the project, since before the (virtual) intrusive investigations begin, students must consider the topography and hydrogeological regime, plan borehole locations with due regard to environmental impact, and negotiate access to the land (Figure 1). At a mock Public Relations meeting, students role play Wallisdown landowners, residents, business people and action groups, who want to know (in layman's terms) the company's plans and what impact they will have. Those students role-playing the company personnel quickly realise that negotiation skills are vital for the company's success.

Elsewhere in the module, role play is used for summative assessment (Tables 1 and 2). In Phase 2, students adopt the role of contractors and bid competitively for the drilling contract, while tutors role-play the company project team evaluating the

Table 1. Courseware structure and content with links to formative and summative exercises.

Section	Main heading	Sub-headings
Course introduction	Course aims and outcomes Professional codes	Background, course objectives, learning outcomes, methods of assessment Why are codes of conduct needed? Examples
Phase 1: Project context	Introduction to aquifer characteristics and groundwater flow What happens in an aquifer-discharge water treatment works Legislation and controls on groundwater quality Corporate strategy and business management	Aquifer structures, groundwater flow models, chemical and microbial processes in groundwater Virtual tour of an aquifer-discharge WwTW EU and UK water legislation, occurrence and health hazards of listed substances Water industry regulators, business management procedures
Phase 2: Project instigation and contracting	Introduction to Wallisdown WwTW Investigation methods The tender and bid process The Work Brief Bid assessment and contractor selection *Assessed exercise: bid for the Wallisdown drilling contract*	Site history, geographical setting, geology, hydrology and hydrogeology Surface geophysical methods, borehole monitoring, borehole drilling techniques, equipment guidelines Clients and contractors, competitive tendering, selective tendering, nomination Work Brief requirements, layout, good and bad practice, contingencies Criteria, preference weighting, scoring bids Video clips of presentations with commentary on content and style
Phase 3: Construction	Wallisdown geological and hydrological baseline data Borehole configuration and depth *Assessed exercise: optimizing borehole locations at Wallisdown* Construction work good practice Land access and public relations *Formative exercise: PR meeting at Wallisdown Village Hall (role play)*	Stratigraphy, geological structure, monitoring well pieziometric data Ideal borehole configurations, geological constraints, geotechnical constraints, work sequencing Interactive maps, cross sections Preliminaries, health and safety issues, operational logistics, waste disposal, borehole completion Land ownership, interest groups, negotiating compensation, good practice in public relations Managing a public meeting, strategies for success (and failure), legal position
Phase 4: Data acquisition and quality assurance	Core recovery and transportation Core logging *Assessed exercise: geological and geotechnical logging of borehole core* Pore water extraction Data integration and synthesis	QA issues: contamination, sample loss, core damage Video: logging procedures, lithologies, fractures, engineering grade Guidelines for geotechnical logging, TCR, SCR, RQD and grade classification Centrifuge extraction design, optimizing parameters, safety, quality assurance Pore water chemistry data, data quality, integrating core log and water chemistry data
Reporting and evaluation	*Assessed exercise: Project report and oral presentation* Evaluation of learning outcomes	Purpose of the report, scope and division of tasks, length and layout, advice for the oral presentation, assessment criteria Students' (and tutors') reflection and feedback

Table 2. Tasks and mark allocation for summative assessment of the module.

Task (Phase)	Individual or team work	Weighting
3-page report and 5 minute oral presentation for a drilling contract bid (Phase 2)	individual	20%
1-page report proposing and justifying a borehole configuration (Phase 3)	individual	15%
Log of drill core (actual core or photographs) showing stratigraphy and engineering grades (Phase 4)	team	15%
Final report comprising a project completion appraisal and a team-delivered oral presentation of 20-25 minutes duration	compiled by team with individual contributions identified	Report 25% Oral 25%
	Individual total:	60%
	Teamwork total:	40%

bids. Students learn how tendering and contractor selection operates in practice. Preparing the presentations reinforces students' understanding of investigation methods, drilling equipment and costing, and tutor feedback aims to build their skill in oral presentations before they undertake their final report presentation. The scenario for the final report is an end-of-project evaluation by the company team, for which they have to allocate tasks equably. Tutors role-play senior management in assessing the team presentations.

Learning outcomes and assessment

The Professional Practice module specifies the following learning outcomes:

- an awareness of the legislative and corporate forces that drive engineering and environmental geology investigations
- knowledge of project management processes particularly the design of work briefs and contracting
- a sound knowledge of the procedures used in undertaking a geologically-oriented site investigation including a drilling programme
- an understanding of quality assurance and health and safety issues in industry
- skills in preparing business-type reports and delivering oral presentations, which may be based on team investigations

Formative assessment is mostly built into the courseware in the form of interactive exercises that test understanding of topics covered in each phase. The format of the exercises varies; some are true/false or multiple-choice questions, others require diagrams to be appropriately labelled or items to be ranked in an appropriate order. Progression from one phase to the next requires completion of the exercises to obtain a 'password' allowing access to the next phase. Tutor feedback on the individual and group work exercises associated with Phases 2, 3 and 4 (Table 1) also contributes to formative assessment. Summative assessment as applied at the University of Brighton is shown in Table 2.

Student feedback

During 2004 the Professional Practice module was run with two groups of Brighton students, those taking the MSc Applied Geology course and final year undergraduates on the BSc Geology programme. For the MSc students the module was run in the conventional 'long thin' mode with a 1-hour contact session each week for 10 weeks followed by independent study and presentation of reports. The undergraduate students were provided with a 5-day intensive course ('short fat' mode) in the second semester following submission of their final year project dissertations.

Students' responses were generally very positive and showed that the learning objectives had been met. Asked what they had gained from the module, students listed:

- Improved skills in oral presentation
- Ability to work under pressure
- Working effectively as part of a team
- Learning new skills of negotiation and logistics (land ownership issues etc.)
- Understanding the importance of legislation and company structures
- A better understanding of how large site investigations are undertaken

Asked what they regarded as the three best features of the module, students said:

- Group work, spending time with classmates
- Oral presentations (other students listed this as one of the worst features!)
- The core logging exercise (this involved teamwork with a set time constraint)
- Learning how professional practice interfaces with geology
- Feedback from the tutor on presentations and exercises (to help meet the learning objectives, students were given immediate feedback from tutors on their performance)

Offering the same module to students on the BSc and MSc courses is not a sustainable situation, as in future years Brighton-based BSc students will progress onto the MSc course. We are considering the development of a different topic for the BSc 'professional practice' module, or merging it with an existing module on the geology of major civil engineering projects.

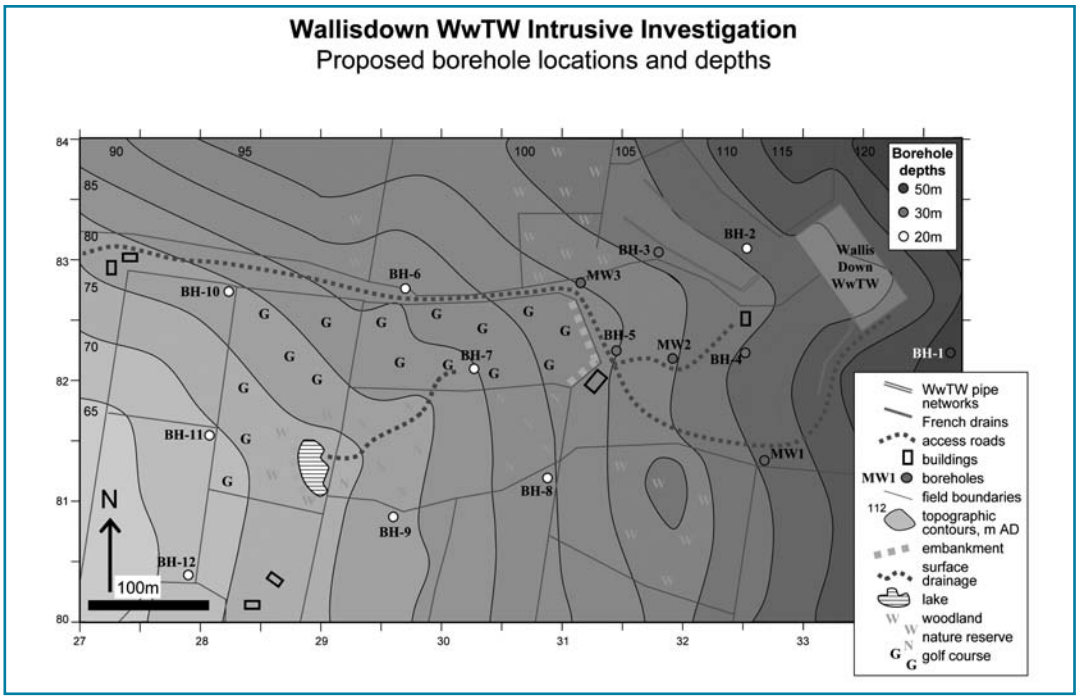

Figure 1. The Wallisdown Wastewater Treatment Works - proposed borehole locations and depths

Issues and lessons learnt

The MSc students were not subjected to the same time constraints and work pressure experienced by the undergraduate cohort. An intensive ('short fat') course format simulates realistic work pressures, encourages effective teamwork and focuses attention, and students gain immense satisfaction from completing the course. Avoiding overlap with concurrent 'long thin' modules can be difficult, particularly where students take optional modules outside the main subject area. Students often have part-time employment or other commitments such as child care which clash with an intensive course schedule. This format is also a greater problem if students are unwell or cannot attend for other reasons. In 2005 we plan to trial the MSc module with a blend of the two formats, i.e. weekly tutorials interspersed with periods of intensive work.

Two aspects of the course approach – teamwork and oral presentations – created student anxiety, as has been noted by others (e.g. Whalley and Favis-Mortlock, 2003). Students commented that they would have been less anxious about giving oral presentations if there had been more of such exercises throughout their course. A recurring issue in PBL-type courses is achieving a suitable balance between individual and group work. We have pitched the assessment balance at 60:40 individual:team work but seek opinions on this choice. In developing the course we were also faced with the issues of balancing scientific and technical content with professional skills development, and with transferability to other GEES disciplines. Geology graduates found the introductory material on aquifer characteristics too simplistic, whereas this material may be challenging for other graduates. Both sets of students asked for more geological data on the case study area. While more has been incorporated in the courseware, we need to explain that an essential feature of the module is to require decision-making based on incomplete data.

Conclusions and recommendations

Developing a CBL resource requires a significant investment of staff time, which in this case, had to be juggled with other academic commitments. However this exercise has encouraged us to expand the content and range of material in the module in addition to creating a courseware product. 'Professional Practice' started as an optional 10-credit module in the MSc Applied Geology course, but is now the main component of a 20-credit core module on 'Geoframeworks'.

From summer 2005 the courseware will be available on-line via a video-streaming server to users at other universities in the GEES network. It may be used either as a stand-alone module contributing 10 to 20 CATS points towards an MSc degree programme, or as a primer for further independent studies of professional practice in industry. Tutor guidelines will be provided in web-page format separately from the student learning resource. The courseware is designed primarily for those who have graduated in the GEES subject area, however most of the content is not technically challenging, and graduates of other disciplines or final year undergraduates should be able to understand the material. In addition to video material, photographs and graphics are included in the courseware and a glossary of terms and references to reading materials are provided.

In due course we hope that readers will review our courseware and provide suggestions for further developments. A demonstration extract will be available on the University of Brighton School of the Environment website. We hope that with GEES support, authors of PBL-type courseware designed for Masters level courses at other universities will also make such courseware available on-line for use outside their home institution.

References

Healey, M., Blumhof, J. & Thomas, N. (2003). The research-teaching nexus in Geography, Earth and Environmental Sciences (GEES). *Planet*, Special Edition, 5: pp. 5-13.

McQueen, K. (2003). Improving team teaching in the Earth Sciences through an action learning approach. *Planet*, 10: pp. 24-28.

Moles, N.R. & Leslie, A.G. (2000). *Professional Practice in Geology - a teamwork course shadowing the minerals industry*. Resource Database: Geography, Earth and Environmental Sciences. http://www.chelt.ac.uk/el/philg/gdn/abstracts/a178.htm Web page created by Phil Gravestock, 5 June 2000.

Mortimore, R.N. & Moles, N.R. (2003). European and cross-disciplinary dimensions to Geology at the University of Brighton. *European Geologist*, 15, pp. 27-28.

Whalley, B. & Favis-Mortlock, D. (2003). 'Research frontiers': Bringing research into teaching via project-based and teamwork approaches. *Planet*, Special Edition, 5: pp. 28-31.

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MSc degrees in Managing Sustainable Mountain/Rural Development at the UHI Millennium Institute

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Abstract

Rural areas in general, and mountain regions in particular, face complex and rapid changes, and are moving up policy agendas. These diverse changes tend to be interlinked, and thus need to be addressed in interdisciplinary and cross-sectoral ways. People living in rural and mountain areas need new approaches to ensure the sustainable development of these areas. Recognising the various potential markets, the UHI Millennium Institute has developed an on-line MSc in Managing Sustainable Mountain/Rural Development. Most of the taught course structure is common to both named degrees; the differences are with regard to initial core courses and assessed work. The first students started in September 2004.

The context: a need for integrated approaches

There is growing national and international recognition of the value of rural areas in general, and mountain regions in particular. In the UK and other countries, and within the European Union as a whole, issues relating to these regions are moving up policy agendas. Recognition of the escalating importance of rural issues has been affirmed by the Council of Ministers of the European Union in allocating a new budget heading for Rural Development from 1995, and subsequently in the formulation of 'Agenda 2000', the reform of the Common Agricultural Policy, and proposals in July 2004 for more integrated rural development from 2007. Similarly, the importance of mountain regions, both to their inhabitants and to the people of Europe as a whole, has been increasingly recognised since the Rio Earth Summit, where 'Agenda 21'included a specific chapter on mountains, and especially during and since 2002, the International Year of Mountains. During this year, many events took place in Scotland and more widely across the UK; initiatives supported by a number of Directorates-General of the European Commission have provided a new focus on mountain regions , in the context of both sustainable development and Community cohesion policy (e.g., European Commission, 2004).

These trends reflect the fact that rural and mountain regions are facing continued rapid change: to their natural environments, their economies, and their societies. The complex and linked changes affecting these regions bring new problems and demand more sophisticated and responsive solutions. Over the past few decades, growing realisation of the complexities of achieving real improvements in the quality of life for people living in rural and mountain areas has led to demands for more integrated approaches to assure their sustainable development. This typically means that economic issues, social initiatives, environmental activities, and matters of social equity need to be considered as inter-related, rather than addressed by isolated disciplines as they have been in the past. It has slowly come to be recognised that, when these main disciplines are applied individually, they provide only partial solutions to needs and opportunities in rural and mountain areas; applied collectively, they provide powerful tools for change and improvement. In the policy arena, there is a clear need for integrated, rather than sectoral, policies; this implies integration at all levels and at all stages in the cyclical process from evaluation of options, through implementation, to analysis of outcomes and the development of new policies.

The declining importance of agricultural production and other primary industries, coupled with increases in leisure time, disposable incomes, and the availability of technological innovations, has meant that future participants in change in rural and mountain areas will be able to take advantage of a far wider range of development options than has hitherto been possible. Central to the desire to provide secure livelihoods and stable communities is the need to stem population drift, especially of young and professionally skilled people. This can be achieved in various ways, but generally involves securing a range of alternative employment opportunities, and encouraging the ability to maintain a quality of life which is perceived as at least as good as in urban and suburban locations. At the same time, it must be recognised that a key basis for the long-term future of rural and mountain communities is the sustainable management of the environmental resources on which they depend; and that increasing numbers of people are coming to these communities as 'amenity migrants', for whom earning a living may no longer be a primary concern.

A key element of the UHI is the use of ICT for the delivery of teaching and research tuition

The UHI Millennium Institute

The Highlands and Islands of Scotland are predominantly both rural and mountainous. In 2000, the UHI Millennium Institute (UHI) was created as the only Higher Education Institution based in the region. It provides university-level education and research through a partnership of 14 colleges and research institutions linked to about 100 learning centres across the region (www.uhi.ac.uk). A key element of the UHI is the use of ICT for the delivery of teaching and research tuition, as well as for networked administrative tasks such as committee meetings (Bryden et al., 1996; Rennie, 2000).

Two interdisciplinary undergraduate courses in the field of sustainable development have been running within the UHI for some time: a BSc in Rural Development Studies, offered by Lews Castle College since 1994 and now across the UHI network (Rennie, 2003); and a BSc in Sustainable Development and Environmental Management, offered by Orkney College since 2000, drawing on collaboration with Heriot-Watt University's International Centre for Island Technology in Stromness. Experience with these degrees led to the establishment of an on-line part-time MSc in Managing Sustainable Mountain/Rural Development.

Designing a new MSc degree

The MSc degree came about through the collaboration of Frank Rennie, the original course leader of the BSc in Rural Development Studies, and Martin Price, who established the Centre for Mountain Studies at Perth College in 2000. The

former had recognised the potential for progression from this course and others within the UHI, and had commissioned an independent study in 1998 which indicated substantial interest in a taught postgraduate qualification in sustainable rural development. The latter had been active in issues relating to sustainable development in mountain areas both in Europe and globally, and saw the opportunities of using the UHI network as a basis for postgraduate training, especially in the context of an expanding European Union, as many of the accession states have significant mountain areas and populations.

While they came from different perspectives, discussion between the two proponents led to a recognition that issues relating to sustainable development in rural and mountain areas are generally similar, and consequently that much of the taught content of an eventual degree should be in common. At the same time, there are certain differences between the two types of areas (e.g., mountain areas are not necessarily wholly rural; and there are specific policies for these areas), and there seemed likely to be different markets for two named courses. Thus, a course with a rural emphasis was expected to draw mainly people working in rural development, particularly for continuing professional development (CPD), as there is a gap in educational provision because many, if not most, individuals employed by local authorities and development and environmentally-focused organisations have 'drifted' into the field of their employment from other specialist, but not directly relevant, areas of expertise. While in no way wishing to detract from the valuable experience of many of these professionals, the growing appreciation of the close inter-linking of economic, environmental, and social issues in development has created the need for individuals with a new type of education and training.

the growing appreciation of the close inter-linking of economic, environmental, and social issues in development has created the need for individuals with a new type of education and training

While many of these statements are also true for people already working on various aspects of the sustainable development of mountain areas, the potential market for an MSc course with a mountain emphasis appeared to be more diverse. It would include not only people working on various issues related to sustainable development in mountain areas, and thus seeking CPD in the context of their current position, but also those wishing to move into work with a mountain focus, and also people who might take the course because of their interest in mountain areas per se, rather than as a setting for work (e.g., retirees, mountaineers).

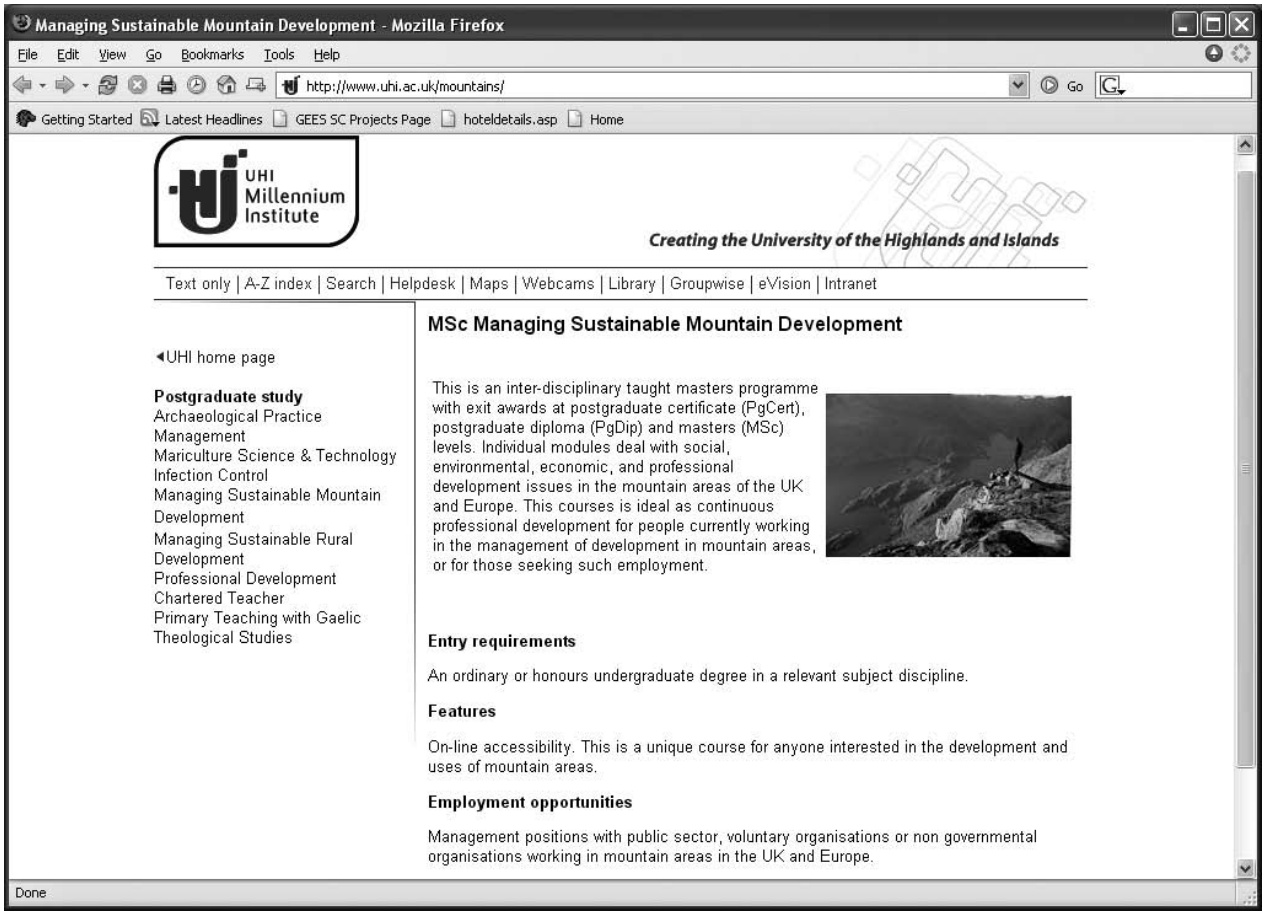
Given the differentiation of markets, it was decided that the course structure would be as follows. Students would start with a core module either with a specifically rural focus, for the 'rural' course; or with a specifically mountain focus, for the 'mountain' course. The other core modules would address key themes providing a foundation for managing sustainable development: developing communities; policy frameworks and analysis; sustainable development. However, in these modules and throughout the remainder of the degree, while taught content would be common to both courses, all assessed work would have to be on the theme of the course for which a particular student was registered: i.e., either mountain or rural. Following completion of the core modules, students would have a choice of a range of optional modules, allowing them to construct their own programmes of study and develop more in-depth knowledge and skills in specific areas. New optional modules to be developed for the course include: biodiversity management; environmental impact assessment, geographical information systems, the information society and rural development, sustainable tourism and interpretation, and water management. A further three optional modules – developing potential through placement, developing research capability, ICT and professional development – could also be chosen from those already being offered in UHI's MA in Professional Development. Students would have the option of leaving the course after the four core modules with a Postgraduate Certificate or, after also taking four optional modules, with a Postgraduate Diploma. However, it was hoped that most would complete a dissertation to gain the MSc.

Delivering the degree

The degree went through its validation process with Open University Validation Services (OUVS), which validates all UHI degrees, in 2003. It was validated for delivery from September 2004, but only to residents of the UK. This was primarily because of concerns relating to student support; it is hoped that, when it is revalidated in 2006, this will be for delivery at least across Europe – though this will bring new challenges! During 2004, despite a relatively low level of formal marketing activity, a good first cohort of students signed up. Many of those applying for the mountain course did so after reading about it in the press, after coverage in various Scottish local and national papers, and also UK dailies. The experience and interests of the 27 students starting in September 2004 spanned the entire spectrum of the anticipated market; and four of those accepted on to the 'mountain' course were from England and Wales.

The student experience is not entirely on-line: the course starts with a weekend induction during which the students are registered, have time to get to know each other – which greatly helps in subsequent interactions, mainly online – and to practise how to use both the Blackboard™ Virtual Learning Environment (VLE), on which all modules are hosted, and online search software (McAlister et al., 2001). The modules are delivered using a variety of technologies. Blackboard™ is password-protected and provides a continuously available, consistently structured site that offers familiarity for the learner. Easily identifiable signposts indicate learning resources labelled 'Course Information' 'Course Documents' 'Discussion Board' etc. and are consistent for modules across the programme of study. The VLE can host documents (with internal and external links), graphics, photographs (still and moving - including full webcasts) as well as discussion 'threads' for computer conferencing, and a space for course announcements. In addition, for nine of the 12 weeks of the initial core module for the mountain course, lectures using Microsoft Producer, which allows Powerpoint slides to be spliced together with a video of the lecturer, were provided to students on CD. This software will probably also be used for other modules where visual images are essential elements of the learning experience (Mason and Rennie, 2004).

The staff involved in developing the course, from five of UHI's colleges, have significant experience in delivering online learning, and recognise its significant attraction for students who are part-time, have family and/or work obligations, are based in locations remote from the tutor, and/or are spread across a wide geographical area (Rennie and Mason, 2004). Equally, though students do not have access to a physical university library, they can use UHI's well-developed electronic library system, which can be used to access resources 24 hours a day, seven days a week (MacKay, 2001); and key references are provided as pdfs through Blackboard and, sometimes, on CD. The students can work at their own pace – except for delivering assignments! – and also develop new skills and competence in a variety of ICT



applications, which may be useful either at work or at home. This is a new venture, and we have yet to see how it will fare. The students have now completed their first core modules and are now into the second semester. Feedback has been positive, and applications are coming in for next year.

We have learned four key lessons in the process of preparing and delivering these courses. First, start early, with a clear, concise module descriptor; this avoids hurried deadlines or disconnected learning activities, and may save considerable costs in terms of both time and resources. Second, the realisation that context is frequently more important than content has allowed us to write shorter, more focussed, pieces of academic orientation on the VLE, but to link these in a 'layered' style to other deeper and wider learning resources for different learner needs. Third, constant attention to the need for diversity – in types of resources, assessments, communication tools, and learning activities – not only creates greater flexibility for learners to customise their learning, but provides a self-reinforcing learning environment of creativity and innovation. Finally, with on-line access, and at least given the current small numbers of students, they are able to ask tutors for advice or feedback on a one-to-one basis, and we can provide this rapidly – and from anywhere in the world with internet access! Together, these lessons demonstrate a considerable 'learning advantage' over more traditional, less flexible courses. We believe that not only will this pair of courses be sustainable, but that they will contribute to the sustainable development of rural and mountain areas both in the UK and across Europe.

References

Bryden, J., Fuller, T., & Rennie, F. (1996) *Implications of the Information Highway for Rural Development and Education*. Report of the Arkleton Trust Seminar, Douneside, Aberdeenshire, Scotland, February 1995. Enstone: The Arkleton Trust.. ISBN: 0-906724-43-0

European Commission (2004) *Mountain Areas in Europe: Analysis of Mountain Areas in EU Member States, Acceding and Other European Countries*. Brussels: European Commission.

McAlister, M. K., Rivera, J. C., & Hallam, S. F. (2001) Twelve important questions to answer before you offer a web based curriculum, *Online Journal of Distance Learning Administration*. 4(2). URL: http://www.westga.edu/~distance/ojdla/summer42/mcalister42.html (Accessed November 08, 2001)

Mackay, M. (2001). Collaboration and liaison: the importance of developing working partnerships in the provision of networked hybrid services to lifelong learners in rural areas, *Library Management*, 22(8/9), 411-5.

Mason, R, and Rennie, F. (2004) Broadband: A Solution for rural e-learning? *International Review of Research in Open and Distance Learning* 5 (1). URL:

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Taking the distance out of distance learning

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Abstract

Staffordshire University offers a range of web-based distance learning (DL) environment/sustainability taught postgraduate awards with well over 200 enrolled students around the world. This article explores how the awards have been received over the last five years, both from the learners' and from the tutors' viewpoint, and also discusses the importance of student-tutor interaction in determining the quality of delivery and ensuring learner retention. The article also addresses ways in which the award provider's institutional policies and regulations need to adapt to accommodating off-campus distance learning students and when developing delivery partnership arrangements.

Introduction

This is the fifth year of biannual recruitment to Staffordshire University's off-campus taught postgraduate environment/sustainability distance learning awards (http://www.staffs.ac.uk/courses/distlearn/). These awards range from the MA in Sustainable Development, through MSc programmes in Sustainability and Environmental Management and Water and Environmental Management to MSc in Pollution Management, with the more recent addition of MAs in NGOs and Sustainable Development, and in Governance and Sustainable Development. Our particular model of distance learning involves web-based, off-campus delivery of most of the learning and teaching content (combined with continuous formative/summative assessments against learning outcomes), together with two biannual face-to-face weekend workshops that are held on-campus.

At present, the introductory workshop and the pre-dissertation workshop (for those students on the masters programmes) are compulsory. Whilst accepting that 'appropriate induction and ongoing support are essential for effective learning to happen' (Ruis-Riu, 2002), there can be obvious disadvantages in having only this relatively short (but intensive) amount of face-to-face contact time - particularly for non-UK based students who have to travel a long distance to attend. The disadvantage here is offset by the very real social and pedagogic benefits that flow from the personal interactions of students and tutors and between students themselves. Post workshop questionnaires regularly cite 'meeting students and tutors' as one of the workshops' principal benefits.

Generally, students seem not to have a strong view about the timing of these workshops, with a survey in 2004 [19 responses] suggesting that opinion about whether it is preferable to attend over a weekend or during the working week being fairly evenly split. In part, this may be a reflection of the particular market for these DL awards - many learners work in organisations that support them financially and also by giving them some time in which to study.

Students are attracted to e-learning courses for a variety of reasons (HEFCE, 2003; Pettenati et al, 2000; O'Leary, 2002; Ruis-Riu, 2002); feedback at Staffordshire University suggests an almost unanimous view that the accessibility and flexibility (in being able to combine domestic and professional commitments with further postgraduate study or continuing professional development) of our courses makes them preferable to alternatives that require on-campus attendance. During the last five years, we have seen enrolled numbers grow to over 200 across the environment/sustainability DL awards, and we have been fortunate in recent years in gaining support from the Commonwealth Scholarship Commission in the UK to provide tuition funding for learners at our two partner institutions - the University of Madras and Jadavpur University in India. These Indian partner institutions provide local venues for our induction and continuing learner two-day workshops - as well as important local cultural, political and market sensitivity that enables us to advertise and deliver our courses more effectively. Staff at Jadavpur and Madras also have the opportunity to learn more about (and ultimately participate in) e-learning delivery and assessment itself. This last factor is an important aspect of our capacity building activities, although increasing involvement of partners in offering Staffordshire University awards brings increasing complexity in delivery and quality assurance arrangements. Our own internal audit procedures, coupled with external scrutiny from QAA, drive us, quite correctly, towards increased vigilance and higher standards of course delivery and operation.

many learners work in organisations that support them financially and also by giving them some time in which to study

Building capacity with colleagues at partner institutions by providing timely and relevant staff development provides direct benefits to all parties. Colleagues in partner institutions are able to increase their own skill sets to a level commensurate with the needs of the award(s) and the expectations of Staffordshire University and our learners, and they then become more confident and innovative when developing their own e-learning material and associated assessments. In addition to the pedagogic developmental aspects of such partnerships, another important facet involves increasing the partner's understanding of Staffordshire University's institutional policy and regulatory requirements (see Box 1). The effort required in this development process should not be underestimated, but it is a vital component in building a secure and self-sustaining future for delivery partnerships.

Box 1: Areas for staff development at partner institutions

E-learning authoring, assessment and moderating/tutoring

Anonymous marking and second marking policies and procedures

Main provider's referencing and plagiarism policies and procedures

Effective personal tutoring, student mentoring and pastoral support for students

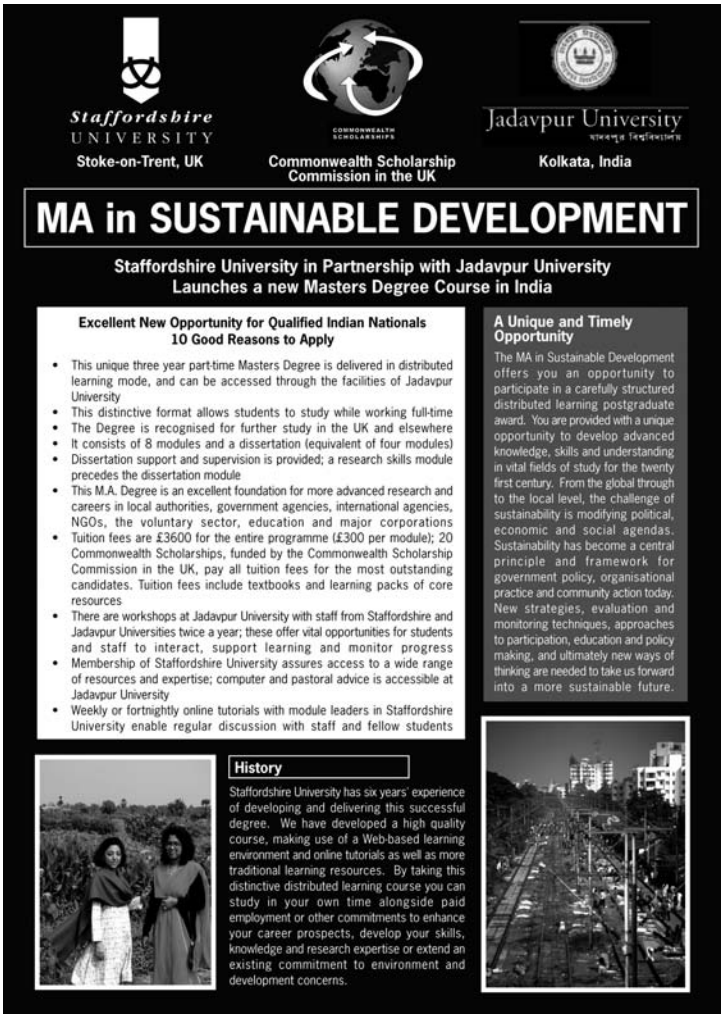
Personal development planning and employability issues

Main provider's extenuating circumstances procedures and student complaint/grievance procedures

Peer observation of teaching

Methods for soliciting student feedback – acquiring, reviewing and feeding back outputs into course delivery and development processes, and also student/staff liaison policies

Data/information collection systems and compilation for main provider's award annual monitoring procedures



Learners' and tutors' perceptions

Wegner et al (1999) commented that 'distance learning systems, especially internet-based systems, obviously cannot compete with face-to-face communication opportunities'. I suppose the accuracy of this statement rather depends upon what the authors mean by their use of the word 'compete' - and whilst it is undoubtedly true that e-learning programmes tend to be more reliant on written communication than face-to-face courses, tutors and learners are able to employ different skills and use varying emphases in order to enable (the same) learning outcomes to be achieved simply by navigating a different route to that which would apply to students attending an on-campus programme.

Although there is plenty of evidence to suggest that a significant degree of collaboration between learners on distance learning programmes enhances the learning experience (Eastwood, 2002; Hughes et al, 2002; Ruis-Riu, 2002; Salmon, 2000), our experience is that appropriate tutor-learner interaction coupled with attractively organised and presented learning and teaching content and combined with imaginative assessments can provide a very supportive and enriching learning environment. Williams (2004) recognises the importance of this, whilst McPherson and Nunes (2004) and Landis (2001 - and references cited therein) acknowledge the importance of the tutor-student interaction. It is not just we, as tutors, who believe this; our student feedback through the post-module questionnaires generate consistent satisfaction ratings in excess of 80% in response to specific questions about feedback and support from university personnel, the speed of response to queries and the overall format and content of modules and their delivery.

The extent to which success in an e-learning course might depend upon the level and speed of development of independent learning skills by the student is also of interest. To an extent, the constituency to which a DL course most appeals will be self-selecting, in that it will more naturally lend itself to those individuals who have an enthusiasm, a curiosity and an appetite for such an e-course, combined with a latent confidence in their ability to tackle such a programme at a distance. This tends to be borne out by the responses of a sample of the students who attend our induction workshops. When questioned, 96% (of a sample of 26) agreed or strongly agreed that a capacity for independent learning should be one of the most highly valued goals in higher education. Opinions were more mixed about whether independent learning mainly involved being able to work 'on one's own', with only 68% either agreeing or strongly agreeing with this proposition. Reassuringly (for tutors), 88% disagreed with the suggestion that lecturers had little/no role to play with independent learners.

Retention rates in e-learning courses can also be a matter of concern. West Texas A&M University have reported that online courses tend to enrol more students than comparable campus-based courses but that they also suffer from higher attrition rates (Willging & Johnson, 2004). Box 2 lists the principal factors that influence students in their decision to leave an e-learning course, as reported by Willging & Johnson (2004), Landis (2001) and Murray (2001). In our own case, the vast majority of students who withdraw have clear personal or professional issues that have interfered with their studies, and many of these choose to intermit and return at a later date to continue with their awards. Increasing flexibility in the approach to study through DL makes it difficult to generate definitive short-term retention data, but our information suggests that the attrition rates on these DL awards are no higher than for those of our on-campus activities.

Institutional issues

Often, many of a higher education institution's (HEI's) policies, regulations and procedures are designed to cater for 'traditional' on-campus undergraduate students. If the HEI decides to validate and deliver off-campus distance learning programmes then there are a number of important areas that urgently need to be addressed so that DL tutors and students genuinely feel as though they are a valued part of the University's core activity. If these structural changes are not made then distance learners and

Box 2: Principal factors that can reduce student retention on e-learning courses

Isolation
Disconnectedness
Technological problems
Financial and/or family circumstances
Job-related time constraints
Dissatisfaction with the learning environment
Low confidence levels in distance learning as a means of acquiring new knowledge and information
Feelings of inadequacy in using the virtual learning environment as an effective learning tool
Feeling overwhelmed by the amount of new knowledge needed and suffering from information overload
Insufficient support from tutors and administrators
A depersonalised learning environment
Lack of tutor-student and student-student interaction

Box 3: Some of the institutional factors that need to be addressed if distance/distributed learning programmes are to be successful

- Generic institutional support – how embedded is the e-learning activity within the pedagogic philosophy of the institution? What support is available for tutors, administrators and learners?
- Quality assurance issues – what particular areas need to be addressed when validating a distance learning award and what on-going quality assurance/control regime is appropriate for this form of delivery and assessment.
- Security and audit trail for applicants' credentials and bona fides.
- Procedures for effectively enrolling and tracking e-learners, including receipt, distribution, marking and archiving of submitted assessments/assignments, preparation of marks and archiving of submitted work [and its availability for external examiners and accreditation assessors].
- Staff-student liaison policies and procedures.
- Assessment deadlines, plagiarism and extenuating circumstances policies and procedures - submission requirements and appeals procedures
- What are considered to be acceptable and/or appropriate retention/non-completion rates for distance learning courses?
- Decisions about the flexibility of access to learning and teaching material; enrolment and registration formalities and procedures, timetabling of learning, phasing of modules, start and end dates for modules etc.
- The balance of on-campus and face-to-face attendance.
- Costing/pricing models for modules/awards – fees structure. There risks being little correlation between the cost of development and delivery of the programme and the fees charges.
- Marketing the programmes – who is best placed to investigate the sensitivity, targeting and costs?
- Accreditation/partnerships - is it cost effective to gain accreditation of the course(s) or parts of a course by institutes and/or institutions in order to help attract students; is it appropriate to develop partnership arrangements with other institutions to

e-tutors risk feeling disenfranchised or embarrassed through exclusion. Box 3 lists some of the important areas that have to be tackled; the importance of institutions recognising and dealing with these should not be underestimated. The timeliness with which the HEI moves to incorporate e-learning into its mainstream activities may be the one factor above all others that dictates the extent to which the whole enterprise will be successful.

References

Eastwood, D. (2002) Education for Sustainable Development by Web-based Distance Learning: Postgraduate Teaching of Virtual PgDip/MSc Courses. *Planet* Special Edition 4 pp. 18-19 Available from: http://www.gees.ac.uk/planet/index.htm [Accessed 13/02/05].

HEFCE Strategy 2003-2008, *The Association for Learning Technology's [ALT] response* [Internet] UK Available from: http://www.alt.ac.uk/docs/HEFCE_2003_2008_strategy_final.doc [Accessed 22/01/05].

Hughes, S.C., Wickersham, L., Ryan-Jones, D.L., Smith, S.A., (2002) Overcoming Social and Psychological Barriers to Effective On-line Collaboration. *Educational Technology & Society* [Internet] 5 (1), pp. 86-92 Available from: http://www.ifets.info/others/journals/5_1/hughes.pdf [Accessed 24/01/05].

Landis, M., (2001) A Comparison of Interaction in AV-Based and Internet based Distance Learning Courses. *Educational Technology & Society* [Internet] 4 (2), Available from: http://www.ifets.info/others/journals/4_2/landis.pdf [Accessed 24/01/05].

McPherson, M., Nunes, M.B., (2004) *The Role of Tutors as a Integral Part of Online Learning Support* [Internet] UK, Available from http://www.eurodl.org/materials/contrib/2004/Maggie_MsP.html [Accessed 05/07/04].

Murray, B., (2001) What Makes Students Stay? *eLearn Magazine* [Internet] October, Available from: http://www.elearnmag.org/subpage/sub_page.cfm?article_pk=1301&page_number_nb=1&title=FEATURE%20STORY [Accessed 24/01/05].

O'Leary, R., (2002) *Virtual Learning Environments* [Internet] UK, Available from: http://www.alt.ac.uk/docs/eln002.pdf [Accessed 22/01/05].

Ruis-Riu, M., (2002) *Using the WWW in Learning and Teaching* [Internet] UK, Available from: http://www.alt.ac.uk/docs/eln001.pdf [Accessed 22/01/05].

Salmon, G (2000) *E-Moderating; The Key to Teaching and Learning OnLine* Kogan Page.

Wegner, S.B., Holloway, K,C., Wegner, S.K., (1999) The Effects of a Computer-Based Instructional Management System on Student Communication in a Distance Learning Environment. *Educational Technology & Society* [Internet] 2 (4), pp. 146-153 Available from: http://www.ifets.info/others/journals/2_4/wegner.pdf [Accessed 24/01/05].

Williams, B., (2004) Participation in On-line Courses – How Essential is it? *Educational Technology & Society* 7 (2), pp. 1-8.

Willging, P.A., Johnson, S.D., (2004) Factors that Influence Students Decision to Drop Out of Online Courses, *Journal of Asynchronous Learning Networks* 8 (4), December, pp. 105–118.

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GIS teaching via distance learning experiences and lessons learned

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Abstract

This paper draws on seven-years' experience of postgraduate teaching GIS via distance learning mode. Experience has shown that in setting-up, maintaining and developing the GIS course via distance learning, particular consideration has to be given towards the cultural and geographical diversity of students. Moreover, the dynamic nature of GIS and the Internet itself require the constant revision of curriculum and teaching methods.

GIS and e-Learning

The rise of the Geoinformation Industry in the past decade has generated a high demand for suitably educated graduates worldwide. This demand has only been partly met by the higher education sector (GIS Educator, 2004). Gaudet et al. (2003) estimate that the worldwide market for geospatial technologies will reach a revenue of £15 billion by 2004 and predict a significant shortage of suitably trained, GI-literate employees. Phoenix (2000) estimated a shortfall of professionals with advanced GIS education of 3000 to 4000 in the US alone, with an even greater shortfall in the rest of the world.

Most GIS degree programmes that were established in the past ten years are taught in the traditional full-time, face-to-face setting (Wikle and Finchum, 2003). An alternative approach is to deliver the course in a distance-learning mode, including the option of studying part-time. This has a number of advantages: students can attend the course without the need to be physically present at the university, and they can study parallel to professional work. Moreover, overseas students can attend the course without having to apply for a visa. These factors make it possible for students to pursue a postgraduate GIS education that otherwise would be difficult to attain.

There are currently around a dozen programmes world-wide that offer postgraduate distance-learning GIS courses (Wright et al., 2002). One example of such a programme is the MSc in Geographical Information Science (GIScOnline) at the Birkbeck College School of Geography. The course was established in 1998 and is amongst the oldest postgraduate GIS distance-learning courses. This paper will report on the experience of the programme, with special reference to three aspects: first, the characteristics of the students; second, GIS as a dynamically changing teaching subject and the consequences for curriculum development; and third, course delivery and online teaching methods.

The characteristics of distance-learning students

Students on a postgraduate-distance learning course differ significantly from the standard 18-21 year old undergraduate population of a traditional face-to-face programme. DiBiase (2000) argues that in fact this is the key distinction between distance learning and traditional residential programmes. Within the GIScOnline programme we found life-stage and parallel work commitments of particular importance: students are mature (our average student age is 32), often having family and many years of professional work experience. Moreover, most students are likely to remain in full-time employment throughout the course, thus having to cope with an extensive workload.

The mature age of students means that many of them have left formal university education ten or more years ago. Moreover, due to the interdisciplinary nature of GIS, the academic background of our GIScOnline students is very diverse, ranging from geosciences, archaeology, military, civil engineering, to business administration.

GIScOnline students have a wide cultural background. Due to the nature of an Internet-based distance-learning programme, graduates can enrol and study literally from any place in the world. In our program, two, approximately equally sized, sub-cohorts can be identified: the first is UK-based, with many students living and working in the greater London area and having a first degree from an UK university. The second group is based overseas and usually obtained their first degree at a university in their home country. Current student locations include North America, Colombia, Barbados, Kenya, Saudi Arabia, Tajikistan, Afghanistan, and Hong Kong. Many overseas students are not familiar with the UK university system and its customs (for a more detailed discussion of this issue, see Labour et al., 2001).

The considerable variety in academic and cultural experiences poses a particular challenge for teaching and curriculum design.

The considerable variety in academic and cultural experiences poses a particular challenge for teaching and curriculum design. Particular care has to be taken that students who are not familiar with the teaching style and assessment procedure of a UK university are able to adjust.

GIS curriculum

Considerable effort has been undertaken towards a mutually agreed curriculum for GIS teaching. Of central importance was the pioneering development of the NCGIA Core Curriculum in Geographic Information Sciences (Unwin, 1997) in the 1990s. More recently, the University Consortium for Geographic Information Science (UCGIS) is co-ordinating an ambitious project to define a modern GIS curriculum with particular reference to undergraduate education (Kemp, 2003; UCGIS 2003).

Wikle and Finchum (2003) identify two general types of postgraduate GIS programmes: one is the Geographic Information Systems degree which focuses on skills that enable graduates to utilise GIS as a tool. The other type of degree is Geographic Information Science which emphasises the integration of spatial disciplines and associated research.

The Birkbeck GIScOnline programme belongs to the latter group. Its curriculum is specifically designed for a part-time study mode which can be completed within two years. Although it is also possible to study it in one year full-time mode, this is generally not recommend to students who have competing work commitments.

The course is structured into five modules. Module 1 (Fundamentals of Geographic Information Science) covers general theoretical aspects, including data models, compression techniques and computer architecture. Module 2 (Advanced Spatial Analysis) addresses quantitative aspects of spatial data analysis and modelling. Module 3 (GIS and Society) focuses on organisational and institutional issues of the GIS and related markets, including legal and social aspects. Module 4 (GIS Analysis) introduces advanced GIS techniques and applications, including Risk Modelling and Spatial Decision Support. Module 5, lastly, is a self-directed research phase devoted to the production of the MSc Thesis

The dynamic development of GIS makes it necessary to constantly adjust and update the curriculum to reflect advances in software and applications. Consequently, the current curriculum has little resemblance to the original curriculum when the program started in 1998. Topics that have been added to the curriculum include Global Positioning Systems, Object-Oriented Programming, and Location-based Services.

Course delivery and teaching methods

Teaching in distance learning mode is hardly an intervention of the internet age. In fact, the University of London External Programme offered its first specifically designed correspondence courses back in 1858. Yet, modern Internet-based teaching is more than course delivery via softcopy instead of hardcopy. Instead, computer-based e-learning offers the opportunity for students to engage interactively with the teaching material on a variety of levels.

Moreover, a number of communication tools have improved communication between student and teacher and also between students. Methods used within GIScOnline are

- one-to-one realtime synchronous communication using messenger technology,
- one-to-one asynchronous communication via standard email, and
- group asynchronous communication using customised message board facilities.

Real-time group discussion ('chat rooms') is not in use because of the wide range of time zones students are living in. It is our experience that the message board is more appropriate and effective in developing and maintaining an online learning community. Its main function is that of a 'digital classroom' where tutors and teacher discuss questions posed in the teaching material. It is a valuable tool to gauge how well students understand the material and follow the curriculum. The message board has social functions as well, enabling students to communicate about topics that are not directly curriculum related, including job listings, career advice, and personal hobbies.

The first GIScOnline Course Proposal Form in 1997 specified an additional 10 MB of disk space on the College web server as the main computing requirement. Since then, the internet has undergone a stormy technical development, with significant impact on the choice of teaching methods. Recently, a number of tools have become available that are of potential use for e-teaching. These include animations, voice-supported powerpoint presentations, and video-conferencing.

However, a significant constraint in online teaching via the world wide web is the fact that many students do not have a high-speed Internet connection but still connect to the internet using slow dial-up modems, making it time consuming and costly to download large data sets. Hence, for practical e-teaching, many new tools are not (yet) suitable because of their high bandwidth demand. As a result, large data sets, software and other teaching material are distributed to the student via CD-Rom. This includes the GIS packages ArcGIS and IDRISI Kilimanjaro. Both programmes are the basis for a number of practical exercises with which theoretical concepts are reinforced. Special licence agreements have been negotiated with the vendors so that students can acquire these packages at heavily discounted prices.

The future

The importance of GIS teaching via distance learning is expected to grow. It is particularly well suited to serve the needs of many GIS practitioners who were 'trained on the job' but lack technical and theoretical background knowledge. Feedback from students has been very positive. Many of them emphasized that they were only able to take part in the program because it is delivered in distance-learning mode. More than two-thirds of the alumni feel that the programme has helped them to advance their career.

The Birkbeck School of Geography has recently complemented its distance-learning GIS activities with a Postgraduate Diploma course in 'Applied Geographic Information Systems'. It is offered via the London External Program (http://www.londonexternal.ac.uk/postgraduate/birkbeck/agis/index.shtml) and started in September 2004.

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References

DiBiase, D (2000) Is Distance Education a Faustian Bargain? *Journal of Geography in Higher Education*, 1: pp. 130-136.

DiBiase, D (2004) Engaging Stakeholders in Program Planning for an Online Master of GIS Degree Program. in: *Proceedings of the American Congress on Surveying and Mapping Annual Conference*. http://www.acsm.net/DiBiaseGISCert41904.pdf

Gaudet, C., Annulis, H.M., and Carr, J.C. (2003) Building the Geospatial Workforce. *URISA Journal* 15(1): pp.31-30.

GIS Educator (2004) *Curriculum Development and the Workforce*. ESRI Higher Education Solutions Group: pp. 2-3. http://www.esri.com/industries/university/news-community/giseducator.html

Kemp, K. (2003) Update on the UCGIS Model Curricula Project. *Urban and Regional Information Systems Association (URISA) Journal* 15(1): pp.47-49.

Labour, M., Juwah, C., White, N., and Tolley, S. (2001). Culture and Ethics: Facilitating Online Learning. in: C. Higgisdon (ed) *Online Tutoring e-Book*, Edinburgh: Institute for Computer Based Learning. Heriot-Watt University. http://otis.scotcit.ac.uk/onlinebook

Phoenix, M. (2000) Geography and the Demand for GIS education. *Association of American Geographers Newsletter*, 6: pp 13.

Unwin, D. (1997). *Teaching Geographical Information Systems*. NCGIA Core Curriculum in Geographic Information Science. http://www.ncgia.ucsb.edu/education/curricula/giscc/units/u158/u158_f.html

Wikle, T.A. and Finchum, G.A (2003) The emerging GIS degree landscape. Computers, *Environment, and Urban Systems*, 27: pp. 107-122.

Wright, D.J., DiBiase, D., Pancake, C, Wright, R., and Foote, K.E. (2002) *Challenges and Opportunities in Distance Education for Geographic Information Science*. UCGIS White Paper. http://dusk.geo.orst.edu/disted/

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21st century research training on the Internet: let's get serious about an e-PhD?

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Abstract

Technological advances and marketplace changes suggest that unexploited opportunities exist to develop research training mechanisms that could support new blended learning and new internet-based distance learning degrees such as e-MRes, e-MPhil and e-PhD.

Introduction

Most academic institutions have experienced substantial changes over the last decade which have included a proliferation in the number of Taught Masters Degree (TMD) programmes i.e. MAs and MScs. Technological educational innovations have also involved the subsequent conversion of established TMD courses, or/and the development of new TMD programmes, to offer blended or internet-based distance learning equivalent e-TMDs i.e. e-MAs and e-MScs.

This latest switch towards the development of on- and off-campus internet based e-learning degrees is doubtless intended to build on earlier expansions and past successes. It is intended to address the challenges of shifting market demands, together with the need for higher educational institutions to take a more proactive stance, in which fresh business opportunities are sought, both at home and abroad, and within a wider market context. Numerous e-TMD programmes and courses, nevertheless, are often restricted to the use of past teaching formats that are applied in a similar manner to those which prevailed in their non-internet based predecessors. The older processes and procedures were designed to suit a 'single facilitator - multiple student' model; that functioned in a cost-efficient manner, where teaching and learning was based on coursework-centred or exam-centred methodologies, and which placed a strong reliance on content-rich mechanisms and resources.

Some e-TMD programmes might go beyond the traditional model, and offer what is called a virtual learning environment that can support both on- or off-campus activities: e.g. internet-based learning support tools in the manner of a 'course management package' such as WebCT or Blackboard. This software provides excellent opportunities for the secure organisation of course material and a dedicated platform for text-based communication protocols that extend from the provision of email, chat room and discussion board facilities, to the construction of gradebooks and quizzes. The level of associated interactive communication that can be supported in these more advanced teaching environments is richer than that achieved by the simple translation of traditional materials into an e-based format. However, the level of interaction that can occur still falls a long way short of the experience that students gain through face-to-face contact. Such interactions are necessary both for checking understanding and for cementing the social relationship between student and teacher. These issues become particularly acute as we try to promote more critical and reflective approaches to learning, such that the design and effective use of internet tools which can support the curriculum in these key areas represents one of the main challenges for e-leaning in the higher education sector.

Moving from e-learning to e-training

There are significant differences between a Taught Masters Degree (MA; MSc) and a Post-Graduate Research Degree (MRes; MPhil; PhD) both in terms of process and content, and in terms of operational matters related to research supervision and research training procedures. As a result, few, if any, e-MRes or e-MPhil or e-PhD Post-Graduate Research Degrees have so far been created. This is largely due to a lack of suitable software environments that can handle or/and resolve the important 'social' aspects of student-teacher interaction(s). However, the 'e-learning toolbox' is changing, and it may now be possible to move e-learning functionalities into the e-based research training environment. Several 'social software' tools have, for example, been developed in this respect and continue to be investigated in terms of their overall effectiveness for research training purposes: e.g. Hexagon; BuddySpace; FlashMeeting; AliceStreet Conference Center. (See Table 1.)

Table 1: List of software web sites

WebCT	http://www.webct.com/
Blackboard	http://www.blackboard.com/
Hexagon	http://cnm.open.ac.uk/projects/hexagon/
BuddySpace	http://kmi.open.ac.uk/projects/buddyspace/
FlashMeeting	http://cnm.open.ac.uk/projects/flashmeeting/
Alice Street Conference Centre	http://www.alicestreet.com/
Compendium	http://www.compendiuminstitute.org/
D3E	http://d3e.sourceforge.net/
Mind Manager	http://www.mindjet.com/uk/
Mind Genius	http://www.mindgenius.com/

These technological developments are timely, because the mission of the research trainer is also changing. The traditional difference between a Taught Masters Degree and a Post-Graduate Research Degree was often expressed in terms of objectives and deliverables: a research degree was intended to be about conducting 'original research'. It was focused on the production of a substantial thesis which was, in turn, expected to make a 'contribution to knowledge' and to present a position that could be 'defended'. This emphasis has, however, shifted in recent times such that research degree programmes are now expected to have a stronger focus on the more generic aspects of research training and to encompass the development of individual personal qualities and professional research skills for the workplace

Metcalfe et al. (2002) report that training in research skills and techniques is now the key element in the development of a research student, although the provision of wider employment-related skills should not detract from the core objective, which is that research students are expected to make a substantial and original contribution to our existing knowledge in their specialist subject area and that such findings would, in most cases, lead to published work. Their list of suggested skills is provided in Table 2.

Table 2: Key Components of Post-Graduate Research Training Programmes (after Metcalfe et al., 2002)

A) Research skills and techniques - to be able to demonstrate:

- the ability to recognise and validate problems
- original, independent and critical thinking, and the ability to develop theoretical concepts
- a knowledge of recent advances within one's field and in related areas
- an understanding of relevant research methodologies and techniques and their appropriate application within one's research field
- the ability to critically analyse and evaluate one's findings and those of others
- an ability to summarise, document, report and reflect on progress

B) Research environment - to be able to:

- show a broad understanding of the context, at the national and international level, in which research takes place
- demonstrate awareness of issues relating to the rights of other researchers, of research subjects, and of others who may be affected by the research, e.g. confidentiality, ethical issues, attribution, copyright, malpractice, ownership of data and the requirements of the Data Protection Act
- demonstrate appreciation of standards of good research practice in their institution and/or discipline
- understand relevant health and safety issues and demonstrate responsible working practices
- understand the processes for funding and evaluation of research
- justify the principles and experimental techniques used in one's own research
- understand the process of academic or commercial exploitation of research results

C) Research management - to be able to:

- apply effective project management through the setting of research goals, intermediate milestones and prioritisation of activities
- design and execute systems for the acquisition and collation of information through the effective use of appropriate resources and equipment
- identify and access appropriate bibliographical resources, archives, and other sources of relevant information
- use information technology appropriately for database management, recording and presenting information

D) Personal effectiveness - to be able to:

- demonstrate a willingness and ability to learn and acquire knowledge
- be creative, innovative and original in one's approach to research
- demonstrate flexibility and open-mindedness
- demonstrate self-awareness and the ability to identify one's own training needs
- demonstrate self-discipline, motivation, and thoroughness
- recognise boundaries and draw upon/use sources of support as appropriate
- show initiative, work independently and be self-reliant

E) Communication skills - to be able to:

- write clearly and in a style appropriate to purpose, e.g. progress reports, published documents, thesis
- construct coherent arguments and articulate ideas clearly to a range of audiences, formally and informally through a variety of techniques
- constructively defend research outcomes at seminars and viva examination
- contribute to promoting the public understanding of one's research field
- effectively support the learning of others when involved in teaching, mentoring or demonstrating activities

F) Networking and teamworking - to be able to:

- develop and maintain co-operative networks and working relationships with supervisors, colleagues and peers, within the institution and the wider research community
- understand one's behaviours and impact on others when working in and contributing to the success of formal and informal teams
- listen, give and receive feedback and respond perceptively to others

G) Career management - to be able to:

- appreciate the need for and show commitment to continued professional development
- take ownership for and manage one's career progression, set realistic and achievable career goals, and identify and develop ways to improve employability
- demonstrate an insight into the transferable nature of research skills to other work environments and the range of career opportunities within and outside academia
- present one's skills, personal attributes and experiences through effective CVs, applications and interviews

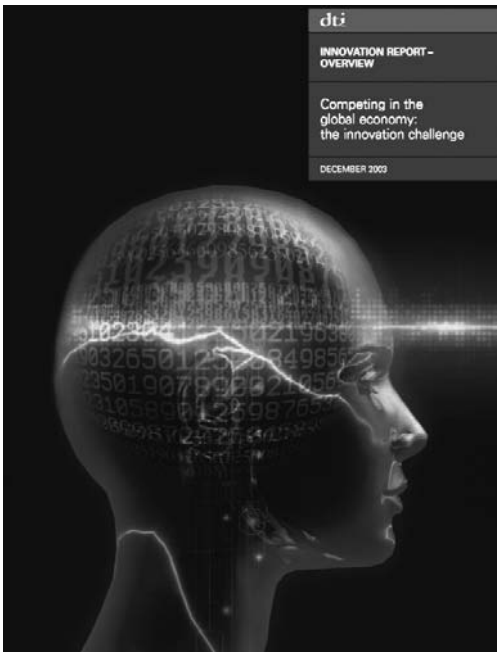
These skills might be present on commencement, could be explicitly taught, or could be developed during the course of their research, and it is expected that different mechanisms will be used to support effective training, as appropriate, including self-direction, supervisor support and mentoring, departmental support, workshops, conferences, elective courses, assessed courses and informal opportunities. This change of focus will create excellent opportunities in which to develop a strong e-learning and content-based component that could be delivered over the internet on a regular basis and be used to supplement the traditional post-graduate research supervision process. Several skill-based tools have been developed in this respect and continue to be investigated in terms of their overall effectiveness for research training purposes: e.g. Compendium [a semantic hypertext concept mapping tool]; D3E [a digital document discourse environment that binds a document to a discussion for individual or collective reviewing], as well as other 'mind-mapping' tools such as Mind Manager and Mind Genius. [Table 1]

Trends and developments in the marketplace

The marketplace for research training is neither static nor stagnant. Recent changes suggest that the development of e-based research training is now essential. In the UK, for example, the national agenda for post-graduate research training continues to evolve and the number of research students has doubled in the last decade (Grad, 2003). However, further increased throughput is required, to meet our current demands and to account for demographic and economic expansion (Roberts, 2002). Further increases are indeed considered to be essential, since future economic and social development and international competitiveness, is dependent upon the level and quality of investment in basic research and research training operations (DTI, 2003; HM Treasury, 1996). Newby (2003) has also noted that massive changes are occurring in the 'marketplace' and that a major part of the recent expansion in post-graduate numbers in the UK has been in terms of part-time students. The same trend is occurring elsewhere in the world. This suggests that the traditional, full-time studentship, taken soon after graduation from a first degree, would no longer be the appropriate answer and that the development of alternative models must be considered.

The post-graduate research agenda is also being shaped by such factors as:

- The financial unattractiveness even of the traditional PhD which is now a major barrier to uptake amongst high quality candidates (Roberts, 2002, Ch. 4).



- The need for the mix of skills that is provided in research training programmes to be broadened to take account of both the long-term career needs of students and the requirements of employers in the academic, industrial and public sectors (HM Treasury, 1996; Roberts, 2002).
- The increasing need to promote mobility of researchers even at the early stages of their careers, both geographically (to take account of the increasing internationalisation of research) and between universities, industry and public sector organisations (to ensure the relevance of research and to fully realise its social and economic benefits) (DTI, 2003; European Commission, 2003)
- The need for life-long learning and continuing career development at all levels in a 'knowledge-based society' (DTI, 2003; STRATA-ETAN, 2003).

In these contexts, the development of e-based approaches to research training would clearly be of relevance in the case of students who had difficulties in attending standard courses, sessions and events (e.g. live at a distance), who do not do their research on campus (e.g. workplace learning, fieldwork, etc.), or who need greater flexibilities in scheduling (e.g. part-time students, mature students with children, etc.). In looking to the future, Fell (2003) has also emphasised the potential importance of developing distance learning and e-based models for the post-graduate sector and has suggested that such developments may be particularly significant given the need for closer collaboration between universities and the business sector - as highlighted by recent Government policy statements (DTI, 2003).

Conclusions

Putting the various arguments together [toolbox; mission; market] it would seem that it is time to extend our pedagogic aspirations and horizons into the educational aspects of skill-focused, e-based research training, as opposed to traditional, content rich, e-based subject-specific teaching and learning undertakings. We need to consider what is taught, how teaching occurs, and how our teaching is assimilated. We also need to develop a coherent plan of action, together with a set of best working practices, for the widespread dissemination of higher degree research training activities over a virtual and distributed international environment such as the internet. The time of the e-based research training programme has arrived.

References

DTI (2003) *Competing in the Global Economy: The Innovation Challenge*. Dec. 2003

European Commission (2003) http://fp6.cordis.lu/fp6/home.cfm

Fell, T. (2003) *Challenges for Research SSpervision*. National Forum on Implementing the Roberts' Review Recommendations, p18.

Grad (2003) *Beyond the White Paper*. Conference held in London, 16.09.03.

HM Treasury (1996) *The relationship between publicly funded basic research and economic performance*. SPRU.

Metcalfe, J., Thompson, Q. and Green, H. (2002) *Improving standards in post-graduate research degree programmes: A report to the Higher Education Funding Councils of England, Scotland and Wales*. HEFCE Publication No: 2003/01.

Newby, H. (2003) *The UK Vision for Research Training*. National Forum on Implementing the Roberts' Review Recommendations, p6.

Roberts (2002) *The Supply of People with Science, Technology, Engineering and Mathematical Skills*. The Report of Sir Gareth Roberts' Review. April 2002.

STRATA-ETAN (2003) http://europa.eu.int/comm/research/science-society/women/wir/pdf/tor.pdf

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Linking teaching and learning: a Masters level programme for primary and secondary classroom teachers

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Abstract

This article describes the development and structure of a Masters programme designed for practising primary and secondary school classroom teachers in the United States. Designed in collaboration between the Wright State University Colleges of Science and Mathematics and Education and Human Services, this hybrid postgraduate programme offers long term professional development in Earth/Space and Environmental science and includes coursework designed to increase their understandings of science content knowledge, inquiry based science teaching, the use of technology in the classroom and content specific pedagogy and assessment strategies. Courses are taught in the field during the summer months and on-line and in traditional classroom settings during the academic year. The Masters of Science in Teaching (Earth Science) programme has attracted a growing number of participants in response to legislation mandating an increased emphasis on Earth/Space/Environmental science and a newly mandated program of state-wide high stakes testing.[1] The Masters of Science in Teaching (Earth Science) programme has positively impacted departmental enrolment figures while the interactions with primary and secondary teachers have brought a renewed sense of the importance of teaching, learning and assessment to the Department of Geological Sciences faculty.

Introduction

Science teaching reform efforts in the United States are cyclical. In 1957 after the launch of Sputnik by the former Soviet Union the American educational establishment responded with efforts to increase the quantity and quality of science courses that American students were taking. The focus of the reform efforts at that time was to produce more scientists. Science education for the student not headed for a science career was given scant attention. The latest round of reform began with the publication of *A Nation at Risk* (AAAS 1983) which suggested that the economic future of America hinged on all students gaining a measure of scientific and technological literacy. In response to this call for the reform and the development of the National Science Education Standards (NRC 1996) many states developed their own science standards that tracked the national science standards in content and suggested pedagogy. Ohio is one such state.

In 1994 the Ohio Department of Education published Science: Ohio's Model Competency-based Program (Ohio Department of Education 1994) and developed a programme of high stakes testing of students in the fourth, sixth, ninth and twelfth grades. Students in these grade levels are approximately nine, eleven, fourteen and seventeen years of age. These proficiency tests were aligned with the content and inquiry based pedagogy suggested in the National Science Education Standards. The results of the state wide tests are used to determine the effectiveness of local education agencies, individual schools and as measures of teacher success in their classrooms. Because the new Ohio science programme was aligned with the National Science Education Standards subjects such as Earth/Space and Environmental science suddenly became mandatory topics for the science curriculum at all twelve grade levels. Recently passed legislation mandates that starting in 2007 all tenth grade students must pass an Ohio Graduation Test in order to receive their diploma of graduation from high school. Passing the science portion of this high-stakes examination is difficult without a good working content knowledge of Earth/Space science, Environmental science and the ability to apply their content understandings in new circumstances.

The focus of the reform efforts at that time was to produce more scientists.

This mandate was a serious challenge because many primary and secondary school educators have had little Earth/Space/Environmental (ESE) science in their own academic backgrounds. They find themselves in the position of having to teach topics in the curriculum for which they themselves have had limited academic preparation. Short in-service workshops provide classroom teachers with much needed exposure to content and pedagogical best practices in teaching ESE science, but experience has shown that there are limitations on the amount of material that can be covered in a short workshop.

Post-workshop assessments indicate that although participants report that workshop topics have been folded into their science teaching, they perceive that without repeated, long term exposure to inquiry based science activities, they do not have the means to fundamentally change the way that they teach science. In order to meet the needs of classroom educators for long term professional development, and to reach as many teachers as possible, the Department of Geological Sciences has restructured its Master of Science in Teaching (Earth Science) degree programme. This restructuring has taken the form of the development of several inquiry-based summer field experiences, the development of several asynchronous on-line courses, and the refinement of existing courses to reflect the content and process suggested by the National Science Education Standards.

The Masters of Science in Teaching (Earth Science) programme

The Master of Science in Teaching (Earth Science) degree programme (MST) is a hybrid programme blending ESE science content courses provided by the College of Science and Mathematics and pedagogy courses offered by the College of Education and Human Services. It is housed in the Department of Geological Sciences within the College of Science and

1. High stakes testing: standardized tests that are used to reward or sanction schools for their academic performance in the US.

Mathematics. The program requires participants to complete a total of 45 quarter hours of graduate credit. Under the United States system, course credits are based on the number of classroom contact hours each week. For example, a course carrying three hours of credit would meet for three hours each week during the ten week term. It is expected that three additional hours of work per week will be done outside the classroom by students for each hour of credit a course carries. Participants in the MST program earn up to 12 graduate credits for coursework taken in the College of Education and Human Services, and the remaining 33 quarter hours in the Department of Geological Sciences. As in most graduate programmes in the United States, up to 12 quarter hours of graduate credit may be transferred in upon approval of the participants' graduate committee made up of faculty from both colleges. The Department of Geological Sciences offers the Master of Science in Teaching (Earth Science) degree to applicants possessing a Bachelor of Arts or a Bachelor of Science degree from a recognized institution.

The MST programme is available to teachers of all primary and secondary grade levels. Extensive undergraduate preparation in Earth/Space/Environmental science is not an admission requirement. Because MST classroom teachers enter the degree programme with widely different backgrounds and academic preparation in the sciences, programs of study are tailored to individual needs, and consider prior coursework and career plans and goals. Available courses are aligned with the National Science Teachers Association guidelines for the preparation of classroom teachers, and include courses in Physical and Historical Geology, Natural Resources, Earth Systems, and Oceanography.

Although the MST programme is non-thesis, a capstone independent study project is required. This project is conceived and developed with the support of a faculty advisement committee, and the project usually takes the form of an independent assignment combining Earth and Space science content, pedagogy, and assessment of student learning. Participants are encouraged to take education courses (e.g. in authentic assessment strategies) that support their project. A two quarter hour course taken in the first quarter of the academic year assists programme participants in developing ideas for their projects, and writing project proposals that include a project synopsis, literature search, timeline, and assessment plan. Examples of recent Master of Science in Teaching (Earth Science) projects include the development of a stream monitoring programme for middle school students, assessing the impact of technology on elementary school students' Earth and Space science learning, and a classroom action research project to assess the efficacy of Earth and Space science laboratories in a high school classroom. The goal of the independent capstone projects in all cases is the development of reflective teaching practices by classroom teachers. In addition to a written report, MST programme participants are required to orally present the results of their project to faculty and peers. See Figure 1 for a typical 45 quarter hour programme of study.

Discussion

Courses in the MST programme are designed to meet the content requirements of national and state science educational standards, help teachers to be independent science learners themselves and to build their confidence to teach Earth/Space and Environmental science to their students. Courses fall into three broad categories. Field courses are offered in the summer, while on-line courses and traditional classroom experiences are offered in the academic year. The number of credit hours awarded for field based courses varies from institution to institution in the United States. Wright State University's Department of Geological Sciences policy awards the same number of credits for field courses as it does for lecture courses. Therefore, a course that runs for four days with eight contact hours per day yields 32 contact hours, while the out of class hour requirement is satisfied by pre and post meetings, independent reports and the development of lesson plans built on the field experience. Courses take MST participants to the New Jersey

Figure 1. Typical program of study for a Master of Science in Teaching (Earth Science) programme.

Academic Department granting credit	Course	Number of Credits	Course Delivery Method
Fall Quarter			
Education	MST Project Development	2.0	Face-to-face and Distance learning
Education	Instructional Design & Development	4.0	Face-to-face
Geology	Global Change	4.5	Distance learning
Winter Quarter			
Geology	Plate Tectonics	4.0	Distance learning
Geology	Teaching Earth Science by Inquiry	4.5	Face-to-face
Spring Quarter			
Geology	Geologic Hazards and Environmental Quality	4.0	Face-to-face
Geology	Water and the Environment	4.0	Distance learning
Geology	MST Project	4.0	Independent research project
Summer Quarter			
Geology	Field and Lab Studies of Coastal Processes	4.0	Field-based experience
Geology	Glacial Landforms	3.0	Field-based experience
Geology	Field Trip to Central Appalachian Region	3.0	Field-based experience
Education	Using Instructional Technology	4.0	Face-to-face

Figure 2. Students on the New Jersey coast

coast to study Coastal Processes (Figure 2), to the Appalachian Mountains of West Virginia and Pennsylvania to study stratigraphy and paleontology and to New York State to study glacial landforms first-hand.

Most participants in the Master of Science in Teaching (Earth Science) programme teach full time, so an array of on-line courses and classroom courses are offered each quarter during the academic year to minimize time spent on campus. On-line courses are delivered in Plate Tectonics, Water and the Environment, and Earth Systems science. The course in Earth Systems Science was developed in collaboration with NASA and uses remote sensing images and NASA mission websites to enable classroom educators to build their own content knowledge of Earth systems and to develop Earth Systems Science lessons for their own classrooms (Slattery *et al* 2004).

Evening classes each quarter are provided at convenient times for teachers to come to campus and provide integrated lecture/laboratory settings for the study of such varied subjects as using GIS in the classroom, remote sensing and near Earth astronomy. Taking several different field based courses for each of two summers, with an on-line and one classroom course during each of the three intervening academic year quarters, it is possible to complete the entire program of 45 quarter hours in two summers and an intervening academic year.

The Master of Science in Teaching (Earth Science) programme has proven to be a classic "win-win" situation for the Department of Geological Sciences, for the teachers involved and for their students. There has been a downturn in the number of traditional Master's level geoscience students in recent years. Many geoscience departments in the United States have been downsized, merged with other science departments, or eliminated altogether. In contrast, over the past five years over 150 primary and secondary teachers have graduated with their MST degree from the Department of Geological Sciences. These post-graduate students have positively impacted the enrolment figures of the department. In addition, because of their interactions with the faculty, they have brought a new interest in teaching, learning and assessment to the department as well.

Classroom teachers well prepared in ESE content, pedagogy and technology are able to provide their students with enriching age-appropriate science activities aligned with the science education standards. Indeed, because they have had the experience of attempting to make sense from data they themselves have collected, have used the internet and library resources to research questions they themselves have asked and have built a personal model of what science is and how it works, they are more likely to deliver science learning of that kind to their students.

References

American Association for the Advancement of Science (1983) *A Nation at Risk: The Imperative for Educational Reform*. A Report to the Nation and the Secretary of Education. The National Commission on Excellence in Education, United States Department of Education.

National Research Council (1996) *National Science Education Standards*, National Academy Press, Washington, D.C.

Ohio State Board of Education (1994) *Ohio's Model Competency-Based Science Program*. Ohio State Board of Education, Columbus, Ohio.

Slattery, William; Myers, Robert J.; Kunk, Kelly (2004) Ripples of Learning: A Middle School Teachers Application of Content and Pedagogy Learned in the ESSEA On-line Earth Systems Science Course. *The Journal of Earth Systems Science Education* http://jesse.usra.edu/archive/jesse04-400-06

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Graduate-level professional development opportunities for in-service teachers: helping to meet No Child Left Behind (NCLB) mandates

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Abstract

Teachers living in sparsely populated rural areas have difficulties in complying with continuing education mandates. Using state funding support, partnerships between K-12 and post-secondary institutions have been developed in Wisconsin and serve as models for professional development. These could be mirrored in other settings to enable meeting the No Child Left Behind mandates.

Introduction

An in-service school teacher in the United States may never disregard his or her own continuing education. Although requirements vary from state to state, in most states a set number of approved continuing education credits must be earned each time the practising teacher applies for renewal of an existing teaching licence. In the state of Wisconsin in the U.S.A., for example, practising K-12 teachers must accrue six academic credits each five years. Called "professional growth requirement," all teachers seeking a five-year renewal licence must earn credits that are, "directly and substantively related to one or more of the licences held by the applicant or to the applicant's professional competency." (www.dpi.state.wi.us)

Credits may be earned from any accredited baccalaureate or graduate degree-granting college or university recognized by the Department of Education. Original transcripts, documenting the appropriate work, must be submitted with the application at the time of license renewal. Coursework may include independent study, correspondence, or internet courses and at the present time may be in any academic discipline.

Obstacles for teachers

Teachers living in rural areas understandably have a relatively difficult time complying with continuing education mandates. Wisconsin, with a population of approximately 5.5 million, has a very low overall number of persons per square mile, at 98.8. Comparing this to the state of California, which has a population of 35.5 million and 217 persons per square mile, one can see that Wisconsin is a much less densely populated state with far fewer people per square mile. Another spatial comparison may be made with the state of New York, which has a population of 19 million people and a density of 401 persons per square mile. (www.census.gov./qfd.states)

This brief comparison of three states in the United States is intended to demonstrate that Wisconsin has a very low overall number of persons per square mile and therefore, as expected, contains large areas that are rural and geographically isolated. This spatial aspect creates many obstacles for in-service teachers in their quest to meet their professional growth requirement in order to renew their teaching licences. In addition, teachers have reported that they often take the easiest route, both in terms of course delivery and academic discipline of earned credit. Simply completing the required credits becomes the goal, rather than a great deal of thought being put in to how it will better qualify them in the classroom.

Simply completing the required credits becomes the goal

While it is true that Internet and other correspondence-based courses will satisfy the basic requirements to renew a licence, are they necessarily the best courses and methods of delivery to meet the No Child Left Behind (NCLB) requirements in place in the United States today? According to the Department of Education homepage, The No Child Left Behind Act of 2001 is a landmark in education reform designed to improve student achievement and change the culture of America's schools. President George W. Bush describes this law as the "cornerstone of my administration." Clearly, our children are our future, and, as President Bush has expressed,

> "Too many of our neediest children are being left behind. With the passage of No Child Left Behind, Congress reauthorized the Elementary and Secondary Education Act (ESEA) - the principal federal law affecting education from kindergarten through high school. In amending ESEA, the new law represents a sweeping overhaul of federal efforts to support elementary and secondary education in the United States. It is built on four common-sense pillars: accountability for results; an emphasis on doing what works based on scientific research; expanded parental options; and expanded local control and flexibility."

The website goes on to explain that,

> "Of course, this Act is intended to ensure a quality education to all students in the United States, but in this new era of education, children will no longer be trapped in the dead end of low-performing schools. Under No Child Left Behind, such schools must use their federal funds to make needed improvements. In the event of a school's continued poor performance, parents have options to ensure that their children receive the high-quality education to which they are entitled. That might mean that children can transfer to higher-performing schools in the area or receive supplemental educational services in the community, such as tutoring, after-school programs or remedial classes."

School, teacher, and student performance is measured by quantified test scores although the validity of such testing has been met with criticism. According to the National Education Association (ESEA) Homepage, this accountability serves to "punish" schools who cannot meet the standards. They go on to say that, "The National Education Association has consistently sought to guarantee every child an equal opportunity to succeed in our nation's public schools. The Elementary and Secondary Education Act (ESEA) was enacted in 1965 to provide guidance and funds to K-12 schools. The No Child Left Behind (NCLB) Act of 2001 (the latest revision of ESEA) presents real obstacles to helping students and strengthening public schools because it focuses on:

Teachers involved in the University of Wisconsin workshops

- punishments rather than assistance
- mandates rather than support for effective programs
- privatization rather than teacher-led, family-oriented solutions.

As one commentator notes:

> "States are working hard to place certified teachers in as many classrooms as possible in accord with the federal No Child Left Behind Act of 2001. But according to a new report, not enough of these efforts have benefited schools with high concentrations of impoverished students. Many states now have programs that offer signing bonuses, retention bonuses, scholarships, loans, and tuition assistance to attract new teachers. But few of these programs are targeted at high-poverty or low-achieving schools, the survey says. A noticeable gap in teacher quality continues to exist between high-poverty and more affluent schools. One measure is the percentage of students who take at least one class from a teacher who did not major or minor in the subject. For secondary schools overall, it's about 22 percent, but in high-poverty secondary schools, it rises to 32 percent. Students in high-poverty high schools are also twice as likely as those in low-poverty schools to have a teacher who is not certified in the subject he or she teaches." (Coeyman 2004)

The Bayfield School District is one such example of a rural, isolated school district in Wisconsin where practising teachers have a difficult time meeting their professional development obligations. Wisconsin Information Network for Successful Schools (WINSS) teacher quality data indicate that while 100% of the Bayfield School District Middle and Secondary teachers are fully licensed (as compared to 95% statewide) the teachers in this District fall far behind state averages for advanced degrees in their field. While 43% of teachers statewide hold a Master's Degree, only 8% of Bayfield teachers have received an advanced degree. This data support teachers' claims that they have a very difficult time, because of geographic isolation, completing even their continuing education requirements for licensure, and often turn to correspondnace course that are not even in their academic discipline. From *Education Week* (September 8, 2004) Teachers of Ambition, states that "Broadening the instructor's own intellectual horizons does much to improve the quality of teaching," thus supporting the importance of pertinent continuing education for quality teaching.

Opportunities available

Most states offer funding support designed to assist in-service K-12 teachers in meeting their professional development requirements. Utilization of this funding often requires a partnership and commitment between the K-12 and post-secondary institutions. Two such partnerships have been developed in Wisconsin, and serve as models for professional development, that can be mirrored in other settings.

The University of Wisconsin System currently supports financially a partnership agreement, initiated by the University of Wisconsin in Superior. This smallest of the University of Wisconsin System schools is located in the most northerly portion of Wisconsin, right on the westernmost tip of Lake Superior – a largely rural and isolated part of the state with the city of Superior having a population of less than 30,000 persons. The University has partnered with two nearby K-12 schools with the goal to provide professional development in the areas of Geographic Information Systems (GIS), Global Positioning Systems (GPS) and Image Processing (IP.) Teachers attend an intensive one-week technology training workshop, followed by curriculum support designed to enable teachers to integrate the technology into existing curriculum. The teachers are then required to develop lessons and share those lessons with a colleague, thus disseminating the newfound knowledge to additional practising teachers. Information on this program can be found at the homepage maintained for the project at: http://www2.uwsuper.edu/personal/facstaff/rgabr

Teachers involved in the University of Wisconsin workshops

Twelve teachers participated in this three-year, three-tier project. Each earns two graduate credits per year and receives a $500 stipend to pay for the credits. Participation in this professional development project, therefore, earned teachers the necessary credits required to renew his/her teaching licence. Each teacher's school was also provided with all of the necessary software and financial support to implement the lessons in the classroom. Survey assessment data strongly supported the theory that this workshop-based, hands-on professional development met the needs of the practising teachers much better than the other limited options for professional development teachers often have at their disposal.

Because of the success of this project - entitled Superior Technology for Awesome Teachers (STAT) - another grant request is pending with the University of Wisconsin System to partner once again with the local Superior School District, to introduce this technology to additional teachers as well as include pre-service teachers in the process. The new project, mirrored after the pilot STAT, is titled Technology Connections (TC). After both in-service teachers from Superior and Bayfield and pre-service teachers from the University of Wisconsin in Superior learn the technology, pre-service teachers will have the opportunity to visit the in-service classroom to observe and assist the in-service teachers. The very isolated school, Bayfield, which is 160 miles roundtrip from the city of Superior, and located on the south shore of Lake Superior, will also be included in this new project.

Most classroom or workshop based professional development opportunities for in-service teachers most often requires that the teachers travel to the site of instruction. In order to ease the barriers for these isolated teachers in Bayfield, the workshop instructors will also travel to Bayfield. Early indications show that this attempt to assist teachers with graduate degree level work will be very popular - although funding is not yet secured, many more teachers than can be accommodated have applied to be part of the project.

Conclusion

Although the projects used as examples do not lead directly to a Master's Degree in Geography, the courses are at the graduate-level and could be transferred into an accredited geography program. Unfortunately, in the spatial region of northern Wisconsin, virtually no opportunities exist for in-service teachers to earn an advanced degree in geography or a related field at a distance or in a non-traditional setting. Although Master's degree programs are emerging online, such as the Master's Degree in Geography Education at the University of Texas, San Marcos, this program does still require time be spent in Texas, something that is beyond the financial means of many practising teachers in geographically distanced states.

Still, the changes that are needed to address the NCLB mandates are also evident in the non-traditional degree that may be earned from Western Governor's University in the United States. Carnivale (2003) reports that the U.S. Secretary of Education, Roderick R. Paige, has said that the new Teachers College would help school districts meet a requirement of the No Child Left Behind Act, which mandates that elementary and secondary schools have instructors with teaching credentials in all classrooms by 2006. The Education Department helped finance the Teachers College with a $10-million grant that was awarded in September 2001. The college will offer Associate, Bachelor's, and Master's degrees in education; some of the degree programs will focus on using technology in the classroom. Western Governor's is a virtual university that does not offer any courses itself. It awards degrees based on evaluations of students' competencies in various subjects. Students can gain that competence through experience or by taking online courses through institutions that have formed partnerships with WGU.

Although northern Wisconsin has not presented opportunities such as this for in-service teachers to earn an advanced degree in geography, Wisconsin University System funding has enabled many teachers to be exposed to GIS, GPS and Image Processing, and to earn much needed graduate credits in geography that serve two purposes, (1) to renew teaching licences by earning genuinely useful credits, and (2) earn credits toward a possible graduate degree in geography. Because these technologies can be applied to many disciplines, including physical and human sciences and mathematics, they serve to assist teachers in creating more innovative and interesting lessons that meet the NCLB mandates and serve as a model to assist schools and teachers in the United States.

References

Banner, James. M., (2003) teachers of ambition, *Education Week* Vol. 24, Issue 2, pp. 45-52.

Carnivale, Dan, Western Governors U. Opens a New Online College for Teachers, *The Chronicle of Higher Education*. March 11, http://chronicle.com/free/2003/03/2003031101t.htm; retrieved 1/7/05

Coeyman, Marjorie, (2004) Teacher quality lags in poorer schools, *Christian Science Monitor*, January 7, http://www.csmonitor.com/2003/0107/p18s01-lepr.html; retrieved 1/5/05

www.dpi.state.wi.us/sig *Wisconsin Successful School Guide*; retrieved 11/03/04

www.dpi.state.wi.us. Wisconsin Department of Public Instruction Homepage; retrieved 12/17/04.

www.census.gov./qfd.states *Wisconsin Quick Facts*; retrieved 12/18/04

http://www.ed.gov/nclb/landing.jhtml *No Child Left Behind* Official Webpage; retrieved 1/4/05

http://www.nea.org/esea/ National Education Association Homepage; retrieved 1/4/05

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M.Phil. in the Earth Sciences at the University of the West Indies, Jamaica

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Abstract

The degree of M.Phil. in geology has been offered at the University of the West Indies, Kingston, Jamaica (UWI), since 1966. Since 1970 it has awarded 20 Master of Philosophy (M.Phil.) degrees in Earth Science, mainly to graduates of UWI. The majority of research projects undertaken are on an aspect of Jamaican geology, that continues to provide numerous opportunities for research in a wide range of geological areas. Graduate students may sit in on relevant undergraduate courses should there be a need to fill a deficiency. About twice as many males as females have been awarded the M.Phil. degree. Relatively few students upgrade from M.Phil. to Ph.D. Thus, the M.Phil. has a higher profile in Caribbean society than might be true where there is a large production of Ph.D. students.

Introduction

Geology was first taught as a subject at the University of the West Indies (UWI) in the 1961/1962 academic year on the Mona campus in Kingston, Jamaica. In that same year the University opened a second campus, at St Augustine in Trinidad and Tobago, and two years later another was established at Cave Hill in Barbados. Despite the expansion of UWI to three campuses on as many islands, the centre for teaching the Earth Sciences has remained at the Mona campus. Currently, UWI is financed by 16 English-speaking countries of the Caribbean region and has an enrolment of just under 20,000 undergraduate students.

In 1966 the Department of Geology registered its first set of graduate research students and graduated its first Masters students in 1970, since which time it has awarded 20 Master of Philosophy (M.Phil.) degrees in geology. Eighty percent of these persons are graduates of the UWI, the remaining 20% coming with first degrees from universities in Canada and the United Kingdom. Entry into the M.Phil. programme requires a good first degree in geology, either at the First or Upper Second Class honours level. Candidates with a Lower Second degree can prepare through a qualifying examination(s). All students in the graduate programme must first register for the M.Phil. degree, but can be upgraded in the course of their studies to the Ph.D. programme.

Research students in geology are generally financed by the University, commonly by scholarships or departmental awards, which cover the cost of tuition fees and provide a living allowance for the students. Funding for research projects to help support field and analytical work comes from three sources, namely the UWI, international funding agencies and the private sector.

Because geology at the postgraduate level is taught at only one of the three main campuses, the majority of the research projects undertaken by M.Phil. students are on an aspect of the geology of Jamaica. Only two of the 20 M.Phil. degrees have been on areas outside of Jamaica, one on the petroleum geology of Trinidad and the other on the volcanic petrology of the Grenadines, Lesser Antilles. Despite this spatial bias, and although the geology of Jamaica has been studied since the 1820s (De la Beche, 1827; Donovan et al., 2002), there are still many aspects that require detailed examination and Jamaica continues to provide numerous opportunities for research in a wide range of geological areas. Degrees of M.Phil. on Jamaican geology have included studies on natural hazards, oceanography, sedimentology, stratigraphy, palaeontology, geochemistry and structural geology. The students undertaking these projects do not necessarily come from Jamaica. Of the 18 M.Phil. theses on Jamaica, nine were written by Jamaicans, seven by nationals of Trinidad & Tobago, and two were by British nationals. Those from outside of Jamaica often return to the country of their citizenship where they are employed in their field of specialization. Males dominate over females by approximately 2:1 at the M.Phil. award level and become even more dominant at the Ph.D. level, suggesting that there is a preference among the women to study for the masters (Jackson, 1996a, b). However, based on current registration in the Ph.D. programme, this male dominance is likely to be reduced.

An M.Phil. at UWI

Because of the relatively few students who major in geology at UWI, compared both with larger schools of geology elsewhere and bigger departments at UWI, the M.Phil. is truly a research degree, although interested students may sit in on undergraduate courses that may be considered relevant and which they did not take as part of their first degree. As an example, it would be considered mandatory for a candidate from overseas to sit, and pass, the final year undergraduate course on Caribbean geology.

Prominence of the M.Phil. in Caribbean society

There are relatively few students who convert from an M.Phil. programme to Ph.D. at UWI. Thus, the M.Phil. has a higher profile in Caribbean and Jamaican society than would be true where there is a large production of Ph.D. students. Further, it may also be true to say that merely to be registered for a higher degree carries with it a kudos that is considered worthy of attainment. Although this should favour a faster production of individuals with higher degrees, the average completion times of degrees of M.Phil. and Ph.D. are similar, between five and six years. The School for Graduate Studies & Research is trying to identify the reasons for the throughput problems among the MPhil students There is certainly an unhealthy tendency for MPhil students to ask for extensions of time to the very limits that the system permits, without any guarantee that a thesis will ever be produced.

References

Beche, H. T. De la (1827) Remarks on the geology of Jamaica. *Transactions of the Geological Society*, London (series 2), 2: 143-194.

Donovan, S. K., Jackson, T. A. and Miller, D. J. (2002) Fieldwork: a key component in teaching geology and geomorphology at the University of the West Indies, Jamaica. In Jackson, T. A. (ed.), *Caribbean Geology: Into the 3rd Millennium: Transactions of the 15th Caribbean Geological Conference*, 29th June - 2nd July, 1998, Kingston, Jamaica. The Press, University of the West Indies, Mona: 269-279.

Jackson, T. A. (1996a) Geology education in the Anglophone Caribbean. In Stow, D. A. V. and McCall, G. J. H. (eds), *Geoscience Education and Training*. Balkema, Rotterdam: 417-424.

Jackson, T. A. (1996b) Women in geology: a University of the West Indies case study. In Stow, D. A. V. and McCall, G. J. H. (eds), *Geoscience Education and Training*. Balkema, Rotterdam: 765-773.

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UKGRAD: What's it all about?

Confession time. My name is Dr. Steve Hutchinson and UKGRAD changed my life.

In 1998 I was a NERC-funded research student and right in the depths of the "second year slump". Partly to get away from work for a week I signed up to go on a UKGRAD residential school. At that school I had (don't tell my wife) one of the best weeks of my life. It was the epiphany for me. That course was the point which made me realise that actually life could be very different for me and when I started to take some real control of my ailing research and my career. Before you tire of my autobiographical rantings, here are a couple of quotes from recent participants on UKGRAD activities:
"If someone tells you that you can't afford the time to go on a gradschool, don't listen to them. This is the most useful training I've ever done. Thank you."

"I came here quite depressed, but this course has shown me that I can achieve anything."
So what is UKGRAD and why do people get so much from it?

UKGRAD is an organisation funded by the Research Councils to promote and support training and development for researchers. It aims for all postgraduate researchers to be fully equipped and encouraged to complete their studies and then to make the successful transition from their PhD studies to their future careers.

UKGRAD runs a national programme of residential schools for second and third year PhD students. These range between three and five days and have a variety of themes, from "Career Development" to "Teamworking" and are now expanding into more specific areas, such as "the Environmental Sector". Researchers work in small teams on a variety of tasks and case studies which are designed to test and develop a range of skills that are integral to research and building a career. So you might find yourself negotiating an international treaty, or managing an environmental crisis or launching a charity or working through a blindfold maze or any other of a huge variety of activities that challenge and test everything that you think you know about yourself and your abilities.

Courses are interactive, highly participatory, require real reflection, extremely knackering, very challenging but, above everything, fun. Of course, this is regardless of the sector in which you see your future laying. It is certainly NOT about "teaching people to be accountants…".

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These courses are free to Research Council Funded students. In addition, UKGRAD is divided into a number of regional "hubs" many of whom help to support and run local "UKGRAD equivalent" courses which are often free to any research student. The hubs engage in helping institutions to run shorter activities for their own students, and so more and more students are having a UKGRAD experience.

If you are vaguely interested (and you should be) in getting involved with a GRADSchool, take a look at www.grad.ac.uk/gradschool

In addition to all this the UKGRAD website (www.grad.ac.uk) has a wealth of resources for all Postgrads (top tips and materials on Time & Project Management, Writing, Working with Your Supervisor, Building Your Career etc.) - and it also has materials for supervisors to download.

UKGRAD has a range of publications which are often launched at national and regional events (the most recent being 'What Do PhDs Do?'; an analysis of career destinations of research students). These events are in addition to the annual conference and policy forum that UKGRAD organise. So if you're a supervisor, do have a look at the UKGRAD website – it might be the most useful thing you've read in ages.

And finally, if you are a postgraduate student, DO find out about UKGRAD. It saved my PhD, changed my life - and it could do the same for you.

Dr. Steve Hutchinson
University of Leeds and Coordinator of Yorkshire and Northeast Hub UKGRAD Programme