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A series of 10-minute presentations demonstrated the use of technology with fieldwork and discussed some of the educational implications. Participants in the workshop then convened as an expert group to discuss key pedagogical issues relating to C&IT and fieldwork. The main purpose of this short paper is intended to disseminate examples of good practice from the presentations at the workshop.

Workshop abstracts and reviews

The 12 presentations at the May workshop detailed below, clearly reflect the fact that technological developments in computer hardware, software and networks combined with increasing pressures on staff and students, have led to the rise of the use of C&IT within learning and teaching environments in general. Use of IT to deliver course notes and computer-aided learning packages has proliferated considerably over the last few years. Computer-based assessment is now a regular mode of examination in many institutions. Computer technology is able to provide more than just passive teaching and its strengths lie in the ability of students to benefit from interactive and dynamic virtual environments. The workshop presentations demonstrated, in particular, the use of multimedia and the WWW as a successful teaching, learning and assessment tool in association with fieldcourses.

Abstracts of the presentations, together with copies of the accompanying PowerPoint slides for almost all of the papers, can be found at: <http://www.gees.ac.uk/pedresfw/pedresfw.htm#C&IT>.

Here, we simply summarise the various C&IT uses in fieldwork that these presentations exemplify, with the WWW featuring in 11 of the 12. Each of the papers are now briefly discussed in turn.

So-called 'virtual fieldcourses' (VFCs) appeared in several presentations. **Cromarty in the classroom - a virtual fieldcourse**, by Steve Fletcher of Southampton Institute (steve.fletcher@solent.ac.uk) provided an example of a fieldwork project developed around a virtual learning environment, *Learnwise*. This software enabled the development of a resource-base about Cromarty and coastal management to be used together with collaborative tools in a problem-based fieldwork exercise. Students are required to adopt an enquiry-based and exploratory methodology, as in the 'real' world, and the approach demonstrated the importance of ensuring that the use of C&IT in fieldwork is aligned with the desired outcome of the teaching process.

Barbara Rumsby at the University of Hull (b.t.rumsby@hull.ac.uk) presented a paper co-authored with Richard Middleton, **C&IT Support Package for an Undergraduate Field Study Module on Tenerife** (<http://www.hull.ac.uk/geogmods>). This reported on the use of a website both pre- and post-fieldwork in Tenerife. The website consists of a comprehensive information base and was unique amongst the projects described on the day, in that formative assessment related to the fieldwork was also incorporated into the site.

Kate Moore (mek@leicester.ac.uk) described some of the visualisation software developed in the University of Leicester's **Virtual Field Course Project** (<http://www.geog.le.ac.uk/vfc>). This can incorporate maps, spatially referenced multimedia and panoramic imagery to enhance student learning. The software is designed to be generic and a variety of projects have been successfully designed and run using the VFC software as a focus for project preparation, data collection, analysis and presentation.

Another virtual fieldcourse package, illustrating the higher-order user interfaces now available, was demonstrated by Damion Young of the Open University (m.d.b.young@open.ac.uk). **DVD-based virtual field trips for Environmental Science** is a highly interactive package, which guides students through a series of learning experiences whilst visualising both the fieldwork site and the process of measurement.

A virtual field trip based on the Teign Valley region of Devon provides a training module for working in the field and subsequent analytical procedures. As training software and as an introduction to the region it scores highly. However, the software appears dedicated to the one region and is sold as a commercial package that is not customisable to any other area. Nevertheless, some of the Computer Assisted Learning

Fieldwork Education and Technology: A GEES Perspective

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Abstract

This report summarises an LTSN-GEES funded and supported "Fieldwork Education and Technology" workshop held at the University of Leicester in May 2002. Reviews of the presentations outline a variety of ways that C&IT is currently used in fieldcourses. The WWW features in 11 of the 12 presentations. Salient points from expert group discussions at the event provide insights into the driving forces, hindrances and future directions of C&IT with fieldcourses. The article will hopefully be of interest to all those involved in fieldwork teaching in the GEES disciplines.

Introduction

LTSN-GEES is undertaking a national project on "Enhancing Fieldwork Quality through Pedagogic Research" (see: <http://www.gees.ac.uk/pedresfw/pedresfw.htm>). As part of this, the "Fieldwork, Education and Technology (FEET)" sub-group is investigating the relationship between C&IT and fieldwork as used in the undergraduate curriculum in geography, earth and environmental science (GEES).

Prior to the May workshop discussed below, as a basic data gathering exercise, all GEES departments in Higher Education institutions were surveyed on their usage of C&IT in fieldwork, using LTSN-GEES departmental representatives. The objective of the FEET Workshop in May therefore was to provide a forum at which participants could display, exchange and develop ideas on the pedagogical use of C&IT with fieldwork.

P L A N E T

elements are refreshingly different for the average student user to maintain interest and involvement in the activity.

A second element of the Open University package, focussed on Seville in New Mexico, is the basis for a tutor-marked assessment, and student assessment is indeed another common use of the WWW in enhancing the educational value of fieldcourses. For example, **Development of Web-based Field Classes for the Teaching of Earth Science in the North of Ireland** by Alastair Ruffell (a.ruffell@qub.ac.uk) and Brian Whalley (Queen's University, Belfast) (b.whalley@qub.ac.uk), showed the use of Web-based materials by staff for development of a resource base and by students for assessment. In this case, the emphasis was the use students made of digital photography and the web for presentation of their fieldwork. The annotation of digital images is replacing the use of field sketching, which perhaps indicated that observation is performed less on site and more in the classroom during the analysis phase of the fieldwork. Examples of 'flash' movies, created by a former student, were shown and possibly indicate the next step in uptake of computer presentations as students become more familiar with the technology.

In **Integrating C & IT and Fieldwork: Using Web Sites for Assessment**, Chris Ribchester (c.ribchester@chester.ac.uk) and Derek France (d.france@chester.ac.uk) of Chester College of Higher Education, again reported the dual use of the web for delivery of course information and for student feedback and assessment. The educational impact is clearly one of developing skills and generating a sense of achievement in students from the use of C&IT. The key innovation was to use the production of a website as the means to assess work undertaken during a field visit. However, one noteworthy pitfall was a tendency of some students to trivialise the presentation of scientific reports, sacrificing content to web design.

Clare Milsom of Liverpool John Moores University (c.milsom@livjm.ac.uk) presented **Maximising the student field experience: virtual fieldwork as a formative assessment tool**, co-authored with Chris Settle, Mike Carr and Keith Crompton. Virtual fieldtrips have been developed in the School of Biological and Earth Sciences to help narrow the resource gap in fieldwork budgets and prepare students for field-related assessments. The use of C&IT in this example was driven by the need to relieve students of the pressure, felt by many of them, to get field-based assessment 'right-first-time'. A website simulates field assessment in order that students are prepared better for the field. The use of panoramic imagery provides an interactive view of reality, students being able to zoom in on features of interest in the scene. In addition to the primary aim of maximising the effectiveness of time spent in the field by pre-training, a second objective was the provision of a replacement option for students with special needs.

Web-based support for field mapping in the earth sciences featured in two presentations. In **Web-based support for fieldwork - Mapping in NW Scotland**, Rob Butler (r.w.h.butler@earth.leeds.ac.uk), of the University of Leeds, reported an open-access Internet resource created to support a two-week residential field class. The challenges were to provide interactive support materials to take pressure off staff on the field class (allowing them to concentrate on other forms of student feedback), to provide revision material to allow students to prepare better for the field class and to provide context for the field activities themselves. The structured resource that resulted includes materials available on-site and progressively back in the University (<http://earth.leeds.ac.uk/assynt>) <http://earth.leeds.ac.uk/assynttrip>).

In the second presentation concerning support for field mapping, Ken McCaffrey (k.j.w.mccaffrey@durham.ac.uk) described his new project **Introduction of 3-D computer visualization models in an Earth Science undergraduate Mapping training class** at the University of Durham. Again focussing on the Assynt region, this project will use the new digital mapping technologies (combining GPS, Laser RangerTM, GIS data management systems and visualisation software) to construct a 3-D computer model to be introduced in an undergraduate field mapping class. During the field class, the model will be progressively revealed to students in step with their own mapping of the area.

'Visualisation' and the use of Geographical Information Science (GIS) also came together in **Integrating GIS and fieldwork for geoscience undergraduates** by Anne-Marie Nuttall (a.nuttall@livjm.ac.uk) of Liverpool John Moore's University. This project demonstrated a well-integrated approach to using GIS during all phases of fieldwork: pre, during and post. (Data sets for satellite images and elevation maps of many parts of Britain are freely available through (<http://www.landmap.ac.uk>)). The integration of GIS into fieldwork provides both a tool for familiarisation and appreciation of fieldwork observations and also a preliminary introduction to GIS software and concepts.

The way students use websites was the subject of a presentation **Website analysis and redesign using HCI techniques** by Ian Stimpson (i.g.stimpson@esci.keele.ac.uk) of Keele University. He outlined the analysis and redesign of an academic website using human-computer interaction (HCI) techniques. Data mining of access logs, identifying user habits, designing and videoing tasks for test users, and analysing by expert users are all employed in the design and redesign processes. The project was presented as moving to a solution for technical problems. The methodology could, of course, be applied in pedagogical research on the use of websites.

The remaining report was also based on a pedagogical research project. Bob Moore (rmoore@glos.ac.uk) of the University of Gloucestershire, presented **Video in site and social survey**. The objective of the project is for students to develop their skills in observing places over a period of time, the only example in the set of presentations of the substantial use of digital video footage to gain a sense of place. This is to be achieved by way of a more professional and technical competence in the filming, editing, interaction and analysis of digital video images, initially in the field of landscape architecture. The presentation was a work-in-progress evaluation and covered current video usage, the ease of digital video production, and a demonstration of the application of the technology. Particularly interesting was the suggestion that by encouraging students to make a film about a place, they have to consider in greater depth what goes on there and the meanings for the users of that space. An intended result of this approach was that students spent more time in the field than would otherwise have been the case!

Expert Group Summary

An expert group discussion led by Alan Jenkins (Oxford Brookes University) aimed to provide a distillation of thoughts about the major impacts of C&IT on fieldwork teaching at the end of the May workshop. A series of questions were posed and answered individually in an initial round. Small groups then formed to discuss the ideas generated about the key impacts. The following day the group findings were further discussed at a meeting of the FEET team members, acting as a tighter focus group to refine the summary points from the workshop.

What are the central trends in the use of C&IT in fieldwork?

There is an expanding use of C&IT with fieldwork. The web features most prominently. The employment of web-based resources as a precursor to fieldwork features strongly, but the web is also used in other areas such as assessment and student presentations. The resources are becoming increasingly interactive rather than passive information providers. A wider range of multimedia and virtual environments are also being used, together with GIS and other visualization tools.

Data is used in the field to a greater extent. Integration of primary (e.g. student collected) and secondary data (e.g. satellite imagery or geological maps) is done at the fieldwork base. Field mapping projects are good examples of this. In the field, the use of mobile phones and GPS can be clearly identified.

What central factors are driving the integration of C&IT in fieldwork?

This was answered by the response "because we can!" The availability of the technology is a key motivating force. Cheaper hardware, software and data are now readily available and there is a desire to use them to effect with a variety of educational aims, such as improving training in the

field. Care has to be taken that the driving force is not totally technology led, but that the use of IT has definite pedagogic benefits. This technology drive can be linked with a wish to make more effective use of student time, particularly time spent in the field. Motivating staff to gain skills training and to ensure that IT skills are integrated into fieldwork training for the students is another perceived need. Accessibility, on several levels, is a key factor: Legislation requiring provision of opportunities for people with special needs, and accessibility to dangerous, inaccessible or distant sites were all seen as factors supporting the use of IT with fieldwork.

Readers might like to refer to the special edition of PLANET on special education needs and disabilities (PLANET, Special Edition Three, April 2002). Available free from info@gees.ac.uk

What central factors are hindering the integration of C&IT in fieldwork?

All of the positive factors in support of C&IT could also be viewed in a different light as hindrances. Costs of hardware and data for use in the field can still be prohibitive to some institutions and use of cutting-edge technologies to many more. Transport of computer hardware to fieldwork areas may also be a problem. It was interesting to note that no institutions either represented at the meeting or in the survey were yet using palmtop computers. Additional time is needed for staff development and skills uptake to implement the use of new technologies. Time is also needed particularly in the initial phase, to develop learning and teaching materials for use on-line. The combined cost issues and lack of relevant skills may cause a widening breach between institutions with funds and skills and those without them.

First reflections on the general trend of the expert discussion suggest that many of the responses were still very technology biased. The technology is leading the use of C&IT rather than new pedagogic thoughts generating novel ways of teaching fieldwork.

What are the central educational impacts for how staff teach and students learn from the use of C&IT in fieldwork?

The educational impacts of C&IT for staff and students seemed less easy to identify than the ergonomic impacts. The skills gap and skills development by staff were mentioned. The expectation of gains in time is illusory in the initial phases, as it takes considerable time to develop skills and resources. However, the goals and learning outcomes of fieldwork have not changed significantly; what have changed are the skills to be developed, for example, using GIS/GPS instead of maps and compass. Students are more aware of the fieldwork topic or region through more structured preliminary training. As C&IT becomes more embedded in the curriculum, the use of the technology becomes more transparent (that is, it becomes just another tool). However, there is a danger that fieldcourse venues will become 'fossilised' over time, as teaching material becomes dated. There is more emphasis, however, on self-learning and problem-based learning than formal lectures and 'Cook's Tours'. Students therefore become more responsible for their own learning.

What is a realistic expectation over the next 5 years for the use of C&IT in fieldwork?

C&IT will become further embedded in the curriculum in general. There will be increasing resources available via the web. Ideally, technology will be more fully integrated in the whole experience of fieldwork and at all stages: pre-, during and post-fieldwork. If implemented well, C&IT can generate a greater feeling of engagement with, and understanding of, the topic or region.

However, major changes over the next five-year period are dependent on a combination of lowering the cost of technology and increased funding. Unless this happens, the use of C&IT may become institutionally divisive: richer institutions will benefit from more and better technology.

Possibly a major breakthrough may come if students are required to purchase their own hardware, particularly in the form of palmtop computers or mobile phones with effective internet access. At this point, true integration of IT with fieldwork becomes possible.

Following the FEET workshop in May, and a subsequent one-day data analysis training workshop for the project team at Coventry University, the survey responses, expert-group summaries and a focus-group

transcription are undergoing further analysis. A future publication is planned for a peer-reviewed scholarly journal and a shorter final paper will also be submitted to PLANET.

Any PLANET readers interested in disseminating their own use of C&IT in fieldcourses can submit their website to be linked to the online C&IT-in-fieldwork resource base (<http://www.gees.ac.uk/pedresfw/pedresfw.htm#C&IT>), by contacting the Subject Centre (info@gees.ac.uk).

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HAVE YOU SEEN THIS?

Disability Update SENDA 2002: Are you Ready?

With September 2002 fast approaching, many lecturers, departments and institutions will now (hopefully!) be working hard to implement their accessibility policy. Most GEES colleagues will be aware that September is the month in which the Special Educational Needs and Disabilities Act (SENDA) (2001) comes into effect with regard to learning and teaching (see for example the article by Skill, PLANET Special Edition 3, April 2002 - copies available from info@gees.ac.uk).

The summer of 2002 will therefore be one of much activity in all GEES disciplines in preparation for September. There are many materials available to assist in the preparation for SENDA, including a book recently published jointly by the LTSN Generic Centre, TechDis and the University of Wales Institute Cardiff, entitled "**Accessible Curricula: Good Practice For All**". This book is a great reference guide for making each aspect of teaching (lectures, laboratory work, field-trips, assessments etc.) as accessible as possible. It can be downloaded free from the TechDis website (www.techdis.ac.uk/pdf/curricula.pdf) and copies have been sent to every institution's Disability Office, Staff Development Office, and Pro-VC for Learning and Teaching. Further hard copies are available from UWIC Press (details can be found at the end of the above pdf file).

To undertake a more thorough review of your teaching materials, the Scottish Higher Education Funding Council Teachability project is an excellent guide through what is a thought-provoking procedure (see article by Simpson, A., PLANET Special Edition 3, April 2002). It can be a relief to a lecturer to discover that disabled students do not necessarily have to receive an identical experience to non-disabled students in absolutely every instance. In certain cases, once you have undertaken the Teachability review and determined what is 'core' to your module or course, it may transpire that there are several alternative experiences and pathways students can take to achieve the core course objectives and develop the required skills and knowledge.

If you have questions regarding technology and disabilities, then please contact TechDis (details below).

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