Virtual Fieldwork in Geology

Roger Suthren (2000)

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A few years ago, a colleague sent me a 'virtual pint of beer'. I compared the difference between this rather unsatisfactory virtual experience and the real thing, and used it as a model to compare virtual fieldwork (VFW) with real fieldwork. There is no substitute for the latter, and there is no doubt that students cannot gain fieldwork skills without going out in the field. However, virtual fieldwork has an important role to play. It can give students an experience of places, environments and times which they cannot visit in person, for reasons of danger, physical disability, geography, inability to travel back or forward in time, for financial reasons, or because of sheer number of students on a course. I would love to give 100 students a first hand experience of the crater of an active volcano, or a trip to the deep ocean or to the moons of Jupiter. A virtual experience via the Web or specialist software such as the Virtual Field Course (VFC)(see *http://www.geog.le.ac.uk/vfc/index.html*) is a great deal better than no experience at all. Some of these experiences are almost live, such as the permanent video cameras set up on volcanoes and geysers, and connected to the web (see *http://vulcan.wr.usgs.gov/LivingWith/volcano_cams.html* and *http://www.nps.gov/yell/oldfaithfulcam.htm*).

Virtual Concerns

I was concerned initially that the main focus of the VFC project was on easily accessible locations in the UK (see previous article by Alan Jenkins). At first sight, this seemed to open the door to the undesirable possibility of replacement of real fieldwork by computer simulation. In fact, VFC and other virtual field course delivery vehicles turn out to be valuable tools to prepare students before real fieldwork, and to provide information, support and feedback afterwards. Perhaps most importantly, VFW can be delivered using portable computers during fieldwork. The technology enables students to see the area they are studying in ways they cannot see on the ground: fly through views from a virtual aeroplane, aerial photographs, satellite infra-red and radar views, or at times in the past or the future. All of this enables the area to be viewed in a broader context, and has the ability to give a much better understanding of the area in 3-D space and in time.

Forms of virtual fieldwork

Virtual fieldwork isn't new, but the technology for delivering it has changed. At Brookes, we have simulated fieldwork for at least 25 years, using a combination of maps, geological samples and posters displaying field photographs. Computer-based virtual fieldwork can take a variety of forms. The student may see images, videos and data from real places, or may experience a truly virtual environment where images of real or imaginary places are generated from digital data. The most sophisticated technology does not necessarily produce the best learning resources. In its simplest form, VFW may present a series of static images with text. There are many good sites of this type, where the design, the science and the pedagogy are good (such as *http://www.maroon.com/bigbend/hike1/index.html*). The next step is to make sites more interactive by the use of clickable image maps, to zoom in on a landscape for example (see *http://www.geo.cornell.edu/geology/GalapagosWWW/GalapagosMap.html*), or to add in computer-assisted assessment (CAA) to give the learner feedback. Video and sound clips are a useful addition

to demonstrate processes in action. The quality of video delivered over the Internet is currently poor (compare the BBC news on the web at *http://news.bbc.co.uk* with what you see on your TV set), but is likely to improve dramatically as bandwidth increases. At a more advanced level, virtual reality can be brought closer using software such as Quicktime VR. Using this, a geology student could pan along a cliff, 'walk' closer to the cliff to see more detail, 'pick up' and 'examine' a rock by clicking on a 'hot spot', and perhaps even look at the rock down a virtual microscope. A good example of multimedia use on the web is at *http://sdcd.gsfc.nasa.gov/GLACIER.BAY/glacierbay.html*

Sharing Good Practice

There are many good VFW resources already available on the web, in a broad range of disciplines: it is not necessary to invent new resources from scratch. By sharing good resources and good practice with colleagues world-wide across the Internet, a great deal can be achieved in using VFW to enhance fieldwork. Future developments at Brookes include:

1) further virtual posters and the introduction of VFC to simulate fieldwork in M08301 Introduction to Geology (see *http://www.brookes.ac.uk/geology/8301/8301welc.html#poster* and *http://www.brookes.ac.uk/geology/manch-97/manch01.html*);

2) virtual fieldwork for physically disabled students by Dr Kevin Jones, as part of a HEFCE-supported project (see Geostudies link from: *http://www.brookes.ac.uk/geology*);

3) creation of virtual field trips by third year geology students next term, part of a continuing project where students have authored web pages which are now used in geology modules (see *http://www.brookes.ac.uk/geology/8361/home.html*).

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