

USING GOOGLE EARTH VISUALISATIONS TO ENHANCE LEARNING

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Abstract

This paper describes the use of Google Earth in supporting Geography students at University of Southampton in two separate instances. The first was a second level undergraduate course where Google Earth was used to develop the skills needed to plan fieldwork, collect and interpret data. It is a course based around a single problem; sedimentation in a river catchment in the New Forest, UK, that has undergone heavy human alteration. The second is an experimental use of multimedia in the field where we are helping students to visualize changes, a dynamic landform associated with the Isle of Wight.

Considering the sedimentation course, Google Earth was installed on the student computers at the University in 2006 allowing its use in the course of the first time. It was used to enhance the course in three ways:

- (a) To introduce students to the factors that control the sediment load of the river. This was done by the author using Google Earth to 'fly' students around the globe using a plasma projector in a lecture. Students were shown a series of sediment controlled rivers including Highland Water, the case study of the course. This use of Google Earth replaced a power point presentation of images. There are some practical considerations of this technique.
- (b) To help students interpret data layers. In the course students interpret satellite data, an Ordnance Survey map and their field data all of the same area as part of the course. Previously this was done with separate monotone paper maps color printing being too costly. Using Google Earth we were able to overlay the data layers in a simple GI style and use color.
- (c) To enable students to share data collected in the field. Students entered soil and vegetation data collected in the New Forest using an online spreadsheet (www.editgrid.org). Students were then able to query the spreadsheet as a KML (Keyhole Markup Language, readable by Google Earth) file which showed the data points as placemarks. Previously, sharing student data was done by collating students Excel spreadsheets of data and plotting them on a paper black and white map with a key. Use of Google Earth enabled the easy use of icons, color and comparison with other data layers. Students could also view the data points attached to the 3D topography and zoom in on points which was especially useful in areas where data points were found close together.

A number of technologies were investigated to perform the functionality described above. (a) and (b) were achieved using simple image enhancement software and the tools for positioning overlays and placemarks within Google Earth. To achieve [c] we produced a

prototype of linking a form based student database in the Open Source software Moodle to KML output via PHP. This approach worked but we finally adopted the EditGrid approach previously mentioned. This used an online spreadsheet which output to KML via XML and an XSLT (extensible style sheet language transformation) sheet. This approach had a superior spreadsheet user interface rather than the Moodle data base interface which used a separate sheet for each data point.

Google Earth worked well and students were positive about its use in their feedback. We aim to use it again in the next presentation of the course and to extend its use so that students also present their final report maps as a Google Earth File. Our plans are also to extend the teaching about cartographic design within the course to cover design within Google Earth itself.

Considering the chine experiment, we are using Google Earth and Sketchup to help students visualize 3D landscape evolution that happened over long periods of time. We are building;

- A simple reconstruction of landscape 10,000 years ago
- Time tagged maps that when played using the time feature Google Earth show a cartoon animation of sea level rise with time.
- A series of 3D block diagrams showing the interaction of cliff retreat and chine development with time.

These resources are currently in construction and will be used in the field to support a student field trip. The results will be analyzed with the help of a cognitive psychologist.