Enhancing field-based learning: GIS & GPS approaches

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The SPLINT (Spatial Literacy) CETL project provides the backdrop for this work, which concerns the enhancement of spatial literacy skills when teaching across a wide range of contexts and disciplines. This paper addresses four applications of GIS and GPS technologies designed to support the field-related learning of geography Undergraduate students at a variety of levels. These examples include: GeoJournal tool; Elevation Profiler tool; pre field work training plus field data collection with ArcPad™; Geovisionary.

The **GeoJournal tool** provides access to readings in a spatially referenced context, such that students are further encouraged to engage with journal literature and are better enabled to make connections both between different papers and also aspects of the underlying geographical landscape when they do so. This tool draws on increased interest in seeing photographs co-located in virtual geographical environments (e.g. Google Earth), an approach known generically as geotagging, GeoJournal is a novel new system that involves combining background data with up to date readings, images and animations taken directly from the field. The first prototype has been designed in ArcMap™ GIS.

The **Elevation Profiler tool** updates an elevation profile in real time according to a GPS track log location and elevation database query, showing students an overall trend in terrain throughout the course of a field visit. This tool was developed to assist students awareness of changing processes and landforms with elevation in the course of coach journeys between field sites.

Our Undergraduate and Postgraduate students have also been trained in **digital field data collection** using a combination of GPS-enabled PDAs and field tablet computers running Arcpad™ and Excel. This work has a two-fold objectives: Firstly, in our increasingly digitally-connected, GPS-enabled world, we see it as important that students recognise and gain a practical understanding of how GIS technology works and impacts on society and the workplace. Secondly, the practicals provide an experiential outworking of prior theoretical training in matters such as GPS error, applications of mobile GIS and sampling design.

Finally, we report on progress developing **GeoVisionary** software in conjunction with Virtalis and BGS. Our role in this 3D visualisation software has been both in the specification of wider GIS format and visual functionality and also to provide GPS interfaces to the visualisation engine that, in conjunction with head tracking, will facilitate geo-contextualised views of past and potential future environments. In a teaching context, when carefully integrated with more traditional approaches, we this ability to represent complex space-time change to assist students in synthesising considerable volumes of unfamiliar, advanced and locally specific information within the time-limited context of a field trip.