ERA: On-the-fly networking for collaborative geology fieldwork

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BACKGROUND
Field-based activities are regarded as essential to the development of a range of professional and personal skills for undergraduate students within geography, earth and environmental sciences. Students are taught investigative skills to enable them to interpret features within the landscape, establish technical skills such as sketching and the use of field equipment, and learn to collaborate with peers. Students enjoy field activities, and these improve deeper learning and understanding. However, due to issues such as cost and access some have little opportunity to participate in field-based studies. The ERA (Enabling Remote Activity) project is investigating how mobile and communication technologies might enhance field learning experiences for all participants. We identify two ways in which supporting technologies can enable greater participation and add value to existing fieldwork: remote access and collaborative groupwork.

METHODS
In 2006 we enabled a single mobility impaired student to direct a remote geologist in the field, supporting remote access. A rapidly deployable, lightweight, battery powered wireless network was built (which we refer to as an 'on-the fly network') to enable the transmission of video, audio, and high resolution still images from the field to the student. In 2007 we supported three groups of volunteers undertaking remote collaboration, with half the participants in a university laboratory and the others in the field location. Each group was carrying out a separate specific geological investigation; graphic logging, paleontology, or mineralogy and paleocurrents. A network infrastructure supported communication and data transmission between the groups. Field and laboratory participants had their own distinct, significant roles and the trials explored how technology enhanced collaboration may be used to improve student learning.

CONTRIBUTION
ERA has tested highly mobile, easily configurable low cost network tools to explore how on-the-fly networking can support geology field studies at undergraduate level in remote locations. We have explored two differing configurations, developed through a collaborative design process undertaken between technology developers and course managers.

EVALUATION AND REFLECTION
A range of evaluation tools were used to enable analysis of the trials. Field journals were kept by all participants, which found ready acceptance with the geologists as an extension of their standard practice of keeping field notes. A wiki was used by the technical team to capture lessons learnt during the development and trial periods. Participants were gathered together for post-trial debrief sessions. In the second trial, participants' responses were collected through written questionnaires and focus group discussions (audio recorded). Participants' activities were also captured on video camera and this was analysed to capture critical incidents. Key findings underline the importance of co-designing technology and pedagogy, orchestration of multiple groups, on-site testing, and planning for graceful degradation of technologies and learning activities.

In 2008 we will be looking to move the system from a development prototype to a production model that could be could be replicated by geology departments across the UK without intensive technical support, and the proving of specific technical enhancements including VOIP (Voice Over Internet Protocol) communication and the use of wireless digital cameras.