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GeoHCI for learning in the wild

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ABSTRACT
This position paper gives exemplars of location-based ‘in the wild’ learning and their relationship to GeoHCI, and also describes the challenges and research questions inherent in doing so. We present several projects that encompass both formal and informal learning experiences. We discuss the issues arising from the use of outdoor in the wild ‘blended spaces’ to change geoscience practices, together with a suggestion that we should also be considering a more responsible and scalable approach when designing these interventions.

Author Keywords
Location-based learning; mobile media; mobile learning; GeoHCI; responsible design; research challenges.

ACM Classification Keywords
H.5.1 Multimedia Information Systems (Artificial, augmented, and virtual realities; audio input/output); H.5.3 Group and Organization Interfaces (asynchronous interaction; asynchronous interaction; computer-supported cooperative work).

INTRODUCTION
Formally-managed field trips ‘in the wild’ are a popular way of providing students and school opportunities to carry out environmental fieldwork or to visit sites of historical or cultural interest. Likewise, visiting ruined castles, nature reserves or just wandering around a new city are popular leisure activities that can provide opportunities for informal learning by members of the general public. However, designing effective educational experiences can be a challenge that technology can overcome. We need to know what resources are available and how they can be used appropriately to help learners achieve their tasks and goals in a timely manner. This paper gives examples of learning in outdoor settings and considers what the main research questions and issues are, in relation to educational GeoHCI.

BACKGROUND
The authors of this paper have extensive involvement in designing both formal and informal learning experiences in outdoor settings. Some of these are documented here:

Distributed Fieldwork
The Out There In Here (OTIH) project [1] looked at distributed technology support for collaborative geoscience fieldwork experiences. One group in a laboratory worked together with an outdoor field group, in real time. The project explored requirements of designing for distributed and co-located technologies (tabletops, large screen displays, tablets, mobile phones), issues of spatial coherence and deictic communication. The project also identified how technology enhanced distributed collaboration increased field-based reflections.

Geolocated Media and Augmented Reality (AR)
Building on earlier work into placement and activation of geolocated media (e.g. mScape [9]), we developed further the overlaying of digital information on maps, often integrated with journeys through a physical environment.

Augmenting the Visitor Experience (AVE)
The AVE project investigated different hardware and software for effective place-based information provided to tourists visiting a National Park, carried out as part of a university geography field trip [8]. The study used printed acetates, Personal Digital Assistants (PDAs), a head-mounted display (HMD) and laptop, tablet computers and mobile phones and a range of software (Google Earth, mScape, AR apps such as Layar, and customized mapping apps). Innovative ‘high-tech’ solutions, such as the HMD, were less suitable for tourists, due to the weight and low robustness of the kit, high purchase cost and technical overheads in setting it up and maintaining it. However, simpler solutions (e.g. printed acetates and mobile phone apps) ranked highly, due to usability and relatively low costs.

Place-based Audio
The AVE project found that audio was often more compelling for learning in the outdoor environment than visual displays, due to issues such as screen glare and the difficulties for users in trying to shift cognitive focus between a large visually-stimulating landscape and the graphics seen on the small screens of handheld devices.

Further work therefore examined the design of effective audio guides [6] and also compared a ‘person-led’ historical walk with a ‘technology-led’ equivalent, where handheld devices provided the same audio at the same
loca
tional points in both studies. Audio narratives, on the
1831 Reform Riot, were delivered by members of a local
community history group [7]. Each walk offered different
affordances but the use of authentic locations was a key
feature for providing an immersive and engaging way of
learning about local history. One important question arose
from the work, questioning the issue of granularity in terms
of what constitutes ‘local’ when considering historical data,
events and sources and how this affects the learners’
experience.

Situ8
Situ8 is work in progress that examines how we capture
and deliver geolocated media on-the-fly, authored by the
general public, to promote and enhance engagement with
our outdoor surroundings. Such engagement could result in
ad hoc learning [5], location-based games or simply a way of
recording and reflecting on our experiences with our
physical environments (a possible ‘next step’ from holiday
photos – facilitating a rich multimedia scrapbook of
memories). Initial development led to the creation of an
Android app (see Figure 1); follow-on funding has enabled
further development to create a related web portal. User
trials planned for Summer 2013 will utilise citizen science
and gathering field data as key scenarios for Situ8, and the
results of this work will be published in due course.

Relationship Between Place and Space
The OTIH project asked what kinds of interaction turn an
in-the-wild physical ‘place’ into a culturally and socially
constructed ‘space’ [4]? How do the affordances of these
differ and how are these differences important when
designing for technology-enhanced collaboration and
learning experiences?

Affordances of Blended Spaces
‘Blended spaces’, where physical and digital spaces come
together [3], can provide rich environments for learning
and were considered carefully into our work into place-
based audio. How can we design these spaces effectively so
that interactions successfully combine these two
components – either seamlessly or seamfully?

Contextually-relevant Information
In attempting to bring together location and digital content
for learning, there is a danger that the quantity of information
or the mode of its presentation becomes overwhelming for the learner. These were issues in both the
place-based audio and the AVE projects. How can we (or
should we?) adapt – or personalize – this information so as
to reduce cognitive load and potential cognitive dissonance
for learners whilst also enabling a stimulating experience?

DESIGNING RESPONSIBLY
Lastly, this research ties in with a recurring theme from our
research: the notion of responsible scalable innovation. Much of our work has involved non-academic partners and
one of the tensions we encounter is between technical
innovation – what we have termed “catwalk technology” –
and the way in which more “ready-to-wear” solutions can
be used [2]. It could be argued that we have an ethical
responsibility to consider impacts when a project finishes
and the legacy we leave behind, or how the work might be
sustained by partners.

CONCLUSION
This paper has presented recent educational projects where
an ‘in the wild’ physical location has been a central aspect
of both the work itself and the way in which we design for
collaboration. Whilst some important findings have
emerged, it is clear that we still have many unanswered
questions around providing effective and usable location-
based technologies for learning. With the growth in
ubiquitous computing, place and location are becoming
more important than ever; what we now need is to
understand how to utilize this for compelling technology
enhanced learning experiences.

ACKNOWLEDGMENTS
We are grateful to all those who participated in the projects
documented in this paper (end users, community groups
and colleagues). Projects were funded by EPSRC (OTIH
and ‘To The Castle’), HEFCE (AVE), The Open
University/Ordnance Survey (Situ8 app) and the Wolfson
Foundation (Situ8 web portal).

WIDER QUESTIONS AROUND EDUCATIONAL GEOHCFI
Some intriguing questions have emerged from our work in
location-based learning. These can be broadly considered
under the following headings:

Technology Promoting Environmental Engagement
Situ8 is investigating how technology can facilitate use of
the physical environment as a personally-meaningful
resource so that we feel a deeper connection to our
surroundings. But what are the benefits in doing so? Can it
affect our health and well-being – or is it a way in which
we can return to the pre-industrial days where we might
have had a more symbiotic connection to our local
environment?
REFERENCES