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Just in time, just in place:

Exploring the role of handheld computing in geographical education

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Introduction

Recent developments in handheld telephony have given rise to 'the mobile internet' - a range of technologies, from multimedia-messaging to the access of the internet on handheld devices. These trends have been accompanied by the increasing consumerisation of the mobile phone. Many pupils today have in their pockets a tool which allows them to connect to potentially anyone else, regardless of spatial co-location - if ever a consumer tool epitomised the shrinking world, the mobile phone would be it.

The pace of technological change has resulted in a dearth of research on the potential contributions of the mobile internet to education as a whole, and to geographical education in particular. Indeed, in some quarters it has been regarded more as a bane than as an arrow in the geographer's quiver. Yet it does not take much contemplation for one to realize that the new generation of multimedia handheld phones present us with some unique affordances of particular interest to geographical education. For example, the ability to capture pictures of remote locations for synchronous collaborative viewing and discussion, in non-spatially-contiguous sites, has tremendous potential on the conduct of geographical fieldwork, which we would be remiss to ignore.

This chapter therefore seeks to explore how these very affordances present opportunities to geographical education for inquiry and collaborative learning, in ways

which have not been technologically possible before. In doing so, it is hoped that we, as geography educators, will reach a better understanding of how our pupils make sense of their shrinking world.

Inquiry, Collaborative Learning and Social Software

One of the primary theoretical constructs underpinning collaborative learning would be 'distributed intelligence', first described by Perkins in 1992, in which he wrote,

people think and remember with the help of all sorts of physical aids, and we commonly construct new physical aids to help ourselves yet more. People think and remember socially, through interaction with other people, sharing information and perspectives and developing ideas ... People sustain thinking through socially shared symbol systems – speech, writing, the technical argot of specialties, diagrams, scientific notations, and so on.

He elaborated on three ways in which intelligence can be distributed; namely physically (student output such as the completion of traditional problem sets, journals and portfolios, simple programming and desktop publishing), socially (co-operative learning), and symbolically (for example, through diagrams & charts, mental maps, and role-play). These insights have their roots in Vygotsky's cultural-historical theory of activity, first formulated in the 1920s, in which the relationships between human agents and objects in their environment are mediated by culture, tools and symbols.

Putnam (1993) brings to the present discussion the term 'social capital'. This refers to social networks which go beyond traditional familial ties and connect friends and strangers for mutual benefit. Social capital is therefore the basis of collaborative behaviour. The basic unit of social capital is information, defined by Boeck (in press) as

“material which is selected by individuals to be transformed by them into knowledge to solve a problem in the specific social domains to which they belong”. Such ‘problems’ in which pupils find themselves can be described through what Johnson and Johnson (1979) term ‘Structured Academic Controversies’.

Defined as the “deliberate stimulation of intellectual conflict by creating a highly structured situation wherein one student’s ideas, information, conclusions, theories, and opinions are incompatible with those of another, and the two seek to reach an agreement by engaging in Aristotlean ‘deliberate discourse’” (Johnson, Johnson and Smith (1997)), Academic Controversies permit investigations of the social distribution of intelligence, by building on traditional models of debate and encouraging participants to reach shared consensual values.

Recently, various authors (eg, Palloff and Pratt, 1999; Russell and Ginsburg, 1999) have made explicit reference to the formation and sustenance of learning communities in conjunction with online learning. In these latter studies, the focus has been less on individual learning, and more on the social nature of cognition and the making of meaning; as Zukas and Malcolm (2000) succinctly express it, “students and teachers are considered to be social and cultural actors with identities emerging from their wider social experiences”.

Finally, synthesizing these various strands is a term which has gained currency only in the past twelve months or so. ‘Social software’ has been defined as “any software which enables groups of people to communicate and to collaborate, and which exists for the benefit of the everyday non-specialist user...[it] supports and improves mainstream social practices, both offline and online” (Davies, 2003). To this, Coates (2003) has

added that social software augments collaborative activities by facilitating creative processes in groups, structuring the processes so as to have a distinct and productive end result. In the context of this chapter, therefore, examples of social software are the text- and multimedia-messaging technologies, and multi-player games, of the mobile phone.

Some Using Handheld Computing in Educational Contexts

The relative novelty of the mobile internet, combined with the fact that K-12 education tends not to be an early-adoptive industry with regards to technology, has meant that there is a dearth of literature dedicated to the study of how the mobile internet and its related technologies can be used in educational contexts.

Two initiatives are worthy of mention. Both pertain to early investigations on the social use of handhelds in education. First, Soloway (2003) has written a program ‘Cooties’, billed as a virus-transfer simulation. In this program, pupils work collaboratively to deduce the origin of a ‘virus’ from handheld to handheld, based on an investigation of factors such as incubation time, dissemination pattern, immunity levels and so on.

‘Cooties’ distinguishes itself from the few other programs written specifically for handheld use in K-12 education, by taking advantage of particular affordances of the technology – in this case the simulation of the unobtrusive and unmediated transfer of bits of data within an existing social group, based on predefined parameters of interaction, over space and time.

The second intervention is the Ambient Wood Project, first conducted by the University of Sussex in 2002. In this project, primary school pupils use handhelds and walkie-talkies to learn more about the natural ecological systems in the local woodland.

Pairs of pupils explore the nearby woods, and describe specimens of interest to their peers through their walkie-talkies. Background information on the specimen is subsequently transmitted to their handheld by the teacher. In this way, pupils are given opportunities to consolidate and reflect upon their explorations.

Beyond the immediate application in schools, Moed's (2002) innovative use of the limited internet capabilities of more recent handhelds to explore the nexus of 'real' urban environments with the socially-annotated virtual world, embodies the very nature of 'just-in-time, just-in-place' social interaction recent developments in mobile telephony now made possible.

Moed's project, known as 'Annotate Space: an interpretation and storytelling on location', is at its most basic a contemporary take on traditional walking tours (such as the HandHeld History service which has started in London's Covent Garden), with the very important exception that the commentaries *en route* are not solely those of a faceless authority on the locale, but are instead the combined contributions from fellow tourists and residents. The story which is told is therefore an evolutionary palimpsest of all who have gone before, and one to which the visitor himself is invited to add. Storytelling is arguably mankind's oldest artform, and the Annotate Space project embodies many of the defining characteristics of social software.

In Wales, picture messaging has been used both by enterprising real estate companies as well as by doctors at the Royal Glamorgan Hospital. The former use it to enable their busy clients to learn more about their prospective purchases via virtual tours on-demand. The system has been so well received that plans are afoot to extend the service to the entire United Kingdom (BBC, 2003).

The latter use picture messaging as a collaborative diagnosis tool, enabling colleagues who are in relatively remote locations to stay in frequent and regular communication with each other, while constructing a pool of corporately-shared knowledge. Picture messaging is used in a similar way by firefighters in Fife, Scotland (BBC, 2003).

Schools in Singapore are showing an interest in educational use of mobile phones. A collaborative project between two primary schools, “Trailblazer” won a Gold Award in the annual Hewlett Packard Innovation in Information Technology (HPINIT) Competition. Handphones and SMS technology were used to make learning fun and engaging for primary six students (twelve year olds) as they moved in teams from station to station along a trail in Fort Canning Park, acquiring information and responding to questions sent by their teachers via SMS.

Potential of Handheld Computing in Geographical Education

Thirty years ago, Tuan wrote:

in our mobile society, the fleeting impressions of people passing through cannot be neglected. Generally speaking, we may say that only the visitor (and particularly the tourist) has a viewpoint; his perception is often a matter of *using his eyes to compose pictures* [emphasis added].

Present-day messaging technologies have enabled these once personal perceptions to be analysed in ways that have not formerly been possible. In Singapore, for example, a study will be carried out throughout 2004 among geography students in secondary schools, with the following objectives:

- To investigate how pupils help each other explore and navigate unfamiliar environments, through an examination of their synchronous discourse, as well as of pictorial clues with which they provide and request of each other;
- To investigate the nature and quality of non-mediated real-time text-based debate between pupils, and how they might use multimedia recorded *in situ* to augment their views;
- To investigate how pupils transpose their conceptions of actual locations into two-dimensional representations of space, and the extent to which these transpositions can be successfully communicated to their peers.

The study explores how mobile phones can be used as tools for collaborative learning around two geographical tasks designed to give insights into how teens perceive their local environment.

The first task requires pairs of pupils to help their peers navigate unfamiliar environments, using only text- and picture-messaging. Through an analysis of which aspects of these environments pupils find meaningful, teachers would be in a better position to translate geographical concepts from the textbooks into terms and metaphors to which teens can more easily relate.

In the second task, teams of pupils explore a bounded area, looking for pieces of evidence which they could use to support non-congruent points-of-view. They record these pieces of evidence pictorially, using the phones, and exchange these pictures in real time while still in the field, physically separated from each other. This kind of task is only feasible given the affordances of the new generation of camera phones. Pupils use the evidence to explore given geographical issues regarding the bounded area, in the

format of a Structured Academic Controversy. By analyzing the pictorial exchange, teachers will better understand which particular aspects of their local environments teens perceive to be relevant to the given geographic themes.

Concluding Remarks and Future Directions

The Singapore study employs, as its primary pedagogical foundation, the experiential framework known as the Structured Academic Controversy. Traditionally, Academic Controversies are structured such that participants engage in face-to-face debates. This forum of interaction is somewhat contrived and cannot accurately mirror modes of teen discussion and negotiation outside of the formal learning environment.

By taking direct advantage of the affordances of the mobile internet, the study makes the following contributions to the yet nascent body of research on pedagogical applications of social software. Specifically, the requirement that the pupils engage in real-time collaborative interaction while still onsite in multiple remote locations can only be properly realized with the mobile internet. No longer should pupils have to wait till they return to school before sharing their thoughts with their peers:

The study thus permits direct comparison between how pupils working in teams navigate in a traditional way and using the technologies of the mobile internet. Because pupils have to ask their peers for directions, and because their peers have to try to direct them precisely (using only text and photos), this study will give insight into how teens perceive issues of space and place in an urban environment. Further, the study encourages pupils to empathise with, and defend, different points-of-view. Through this debate, pupils will gain an appreciation of the issues pertaining to the geography of their local environments. The quality of the debate will be a function of their powers of

observation, and this again will give the investigator an insight into what teens perceive as meaningful in their environment.

By marrying the use of social software to the collaborative learning framework of the Structured Academic Controversy, the study represents an attempt to redefine the traditional parameters of the Structured Academic Controversy against the more contemporary context of the hyper-connected, 'always-on', world of the teenager. The latter is characterized by digital convergence. Two technologies which figure large in the teenager's life are the mobile phone and the gaming platform.

This study will have the distinction of being one of the earliest to explore the potential pedagogical applications of this new kind of social software in promoting collaborative learning. By focusing on how the social software of the mobile internet is used by teenagers in the process of constructing negotiated and shared understandings of unfamiliar environments in which they may find themselves, the Singapore study addresses Kress's (in press) contention that, whereas speech happens in time, "image, by contrast, is organized by the logic of space. That which I wish to represent has to be depicted in space, and the relations of the elements that I wish to depict have to be displayed through the semiotic means of space ... the shift from the dominance of the book and the page to the new dominance of the screen is paralleled by a change in canonical modes of representation, away from the dominance of writing to an increasing use of image".

As educators, we should make the choice to learn more about (if not embrace) the technologies from which our charges derive so much interest, to investigate how we might best channel these sources of motivation towards improving the learning process.

To quote Rheingold (2003): “the emphasis on social software today ought to be a reminder that the real capabilities of augmentation lie in the thinking and communication practices these tools enable.”

References

Boeck, M. (in press). Information, Wissen und medialer Wandel. In *Medien Journal*

British Broadcasting Corporation (2003). *Picture phones save doctors time*. Retrieved December 31, 2003, from http://news.bbc.co.uk/2/hi/uk_news/wales/2995518.stm

_____. *Photo message plan to save lives*. Retrieved December 32, 2003, from http://news.bbc.co.uk/2/hi/uk_news/scotland/3142945.stm

Coates, T. (2003). *My working definition of social software*. Retrieved December 31, 2003, from http://www.plasticbag.org/archives/2003/05/my_working_definition_of_social_software.shtml

Davies, W. (2003). *You don't know me, but...: Social capital & social software*. London: The Work Foundation.

Johnson, D. W. & Johnson, R. T. (1979). Conflict in the classroom: Controversy and learning. *Review of Educational Research*, 49, 51-61.

Moed, A. (2002). *Annotate space: Interpretation and storytelling on location*. Interactive telecommunications program, New York University.

Perkins, D. (1992). *Smart schools: Better thinking and learning for every child*. New York: The Free Press.

Putnam, R. D. (1993). The prosperous community: Social capital and public life. *The American Prospect*, 4(13), 35 – 42.

Rheingold, H. (2003). *Historical roots of social software*. Retrieved December 31, 2003, from <http://www.smartmobs.com/archives/001023.html>

Tuan, Y.-F. (1974). *Topophilia: A study of environmental perception, attitudes and values*. New York: Columbia University Press.

Zukas, M. & Malcolm, J. (2000). *Pedagogies for lifelong learning: Building bridges or building walls?* Working Papers of the Global Colloquium on Supporting Lifelong Learning . Retrieved December 31, 2003, from <http://www.open.ac.uk/lifelong-learning>