Mobile learning: towards a cultural ecology

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Introduction

- mobile learning is an emerging, and rapidly expanding field of educational research and practice

- it requires 'bodily engagement'

- the scholarly artefacts emerging are often of a multimodal nature

- the field would benefit from a more traditional scholarly form of communication as a precursor to ensuring transcendence into an established academic discipline

- first theories of mobile learning are emerging

- this presentation is an act of cartography attempting to provide an overview of the field

- insights are drawn from a wide range of sources not necessarily individually acknowledged here – available in

> Pachler, N., Bachmair, B., Cook, J. and Kress, G. (forthcoming) *Mobile learning.* New York: Springer

Growing significance of mobile devices

- Teachers' TV programme School Matters: Mobile Phones, Mobile Minds
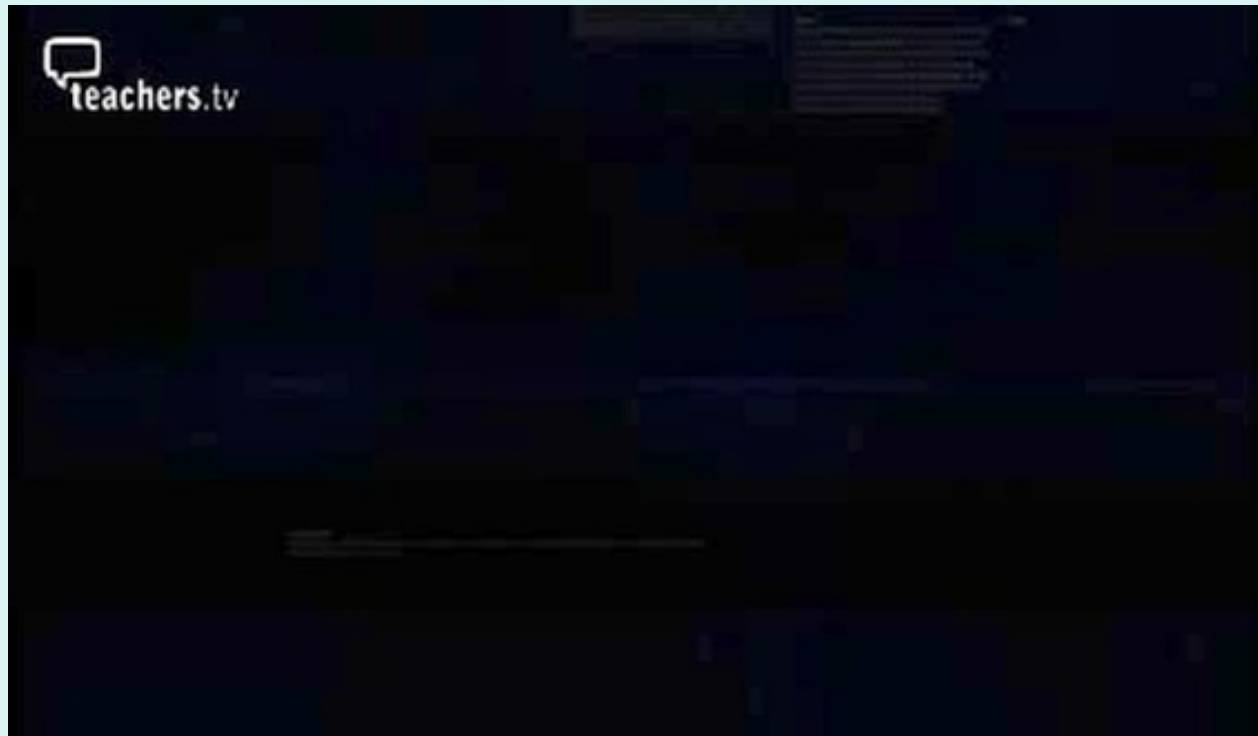
- mobile devices have become increasingly embedded in the life worlds of young people
- there is a danger of
  - a failure of the education system to keep pace with the developments in the life worlds of young people and society more widely
  - potential disconnection between the way young people operate in their daily lives and the way educational institutions interact with them
- there is a trend towards the continued emergence of social networking applications for mobile devices
- a mobile society in flux, in quantitative and qualitative terms

Definitional bases

- the basic principles informing work in mobile learning are by no means new:
    - 'learning' in general, as well as its mediation by and through technology, is a hugely contested and much written about field
    - 'mobility' has been a concern of researchers, scholars and education practitioners for a long time
- what is new is:
    - the capability and the functionality of the technology, in particular the convergence of services and functions into a single device, its ubiquity and abundance, portability and multi-functionality
    - the boundary and context crossing mobile technologies enable in the context of learning
- different definitions foreground the mobility of
    - the technology,
    - the learner,
    - the information

- mobile learning as 'anytime, anywhere', 'just-in-time' rather than 'just-in-case', 'just-enough', 'just-for-me'
- mobile learning as a "process of coming to know through conversations across multiple contexts amongst people and personal interactive technologies"
- we emphasise mobility in relation to the 'habitus of learning': constantly to see the life-world of the individual framed both as challenge and as an environment and a potential resource for learning
- mobile learning – as we understand it – is not about delivering content to mobile devices but, instead, about the processes of coming to know and being able to operate successfully in and across new and ever changing context and learning spaces
- mobile learning is about understanding and knowing how to utilise our everyday life worlds as learning spaces
- paradigm of 'the world in the box' versus 'the box in the world'
- for us, mobile learning is not primarily about technology

Development for education professionals

- most teachers researched perceive a need for professional development in using technology

- notion of educational 'm-maturity': the "integration of technology-based applications and processes into all key aspects of … practice and operation" in relation to the degree of preparedness for pedagogical use

- a lack of personal experience of mobile learning represents a major barrier to its uptake and integration in teaching and learning

- there tends to be a much greater degree of specificity in the technical skills required depending on the particular device being used coupled with the 'dynamic obsolescence' of technology

- teachers value: the opportunity to explore how devices work hands-on prior to considering their application in teaching and learning; the ability to confer with mentors and colleagues; starting small and building up slowly

Knowledge building	• adapting and developing ideas • modelling • representing understanding in multimodal and dynamic ways
Distributed cognition	• accessing resources • finding things out • writing, composing and presenting with mediating artefacts and tools
Community and communication	• exchanging and sharing communication • extending the context of activity • extending the participating community at local and global levels
Engagement	• exploring and playing • acknowledging risk and uncertainty • working with different dimensions of interactivity • responding to immediacy

Table 1: Clusters of purposeful activity with digital technologies

Fisher, Higgins and Loveless 2006, p. 2

Public, personal and intimate spaces and ethical considerations

- growing ubiquity of wireless technologies

- machine-to-machine communication without the knowledge and specific consent of the owner/operator of mobile devices, such as the mining and exploitation of datalogs, or the transmission of location data through RFID tags

- new business models around so-called 'smart services'

- machines, metaphorically speaking, getting eyes, ears and a voice, through interconnectivity by way of ad-hoc mesh networking posing a considerable challenge for current models of privacy protection

- commodification of users and the content they generate using digital technologies

- digital recording as well as sharing of experiences leave multimodal trails of our lives and raise issues around consent, secure storage and use/exploitation by whom and for what purpose

- questions around the extent to which the act of recording and documenting experiences digitally actually interferes with the nature of these experiences for participants
- 'liquid modernity': increasing freedom "to choose our way in the world"

    "For in 'liquid modernity' our lives are fragmented into a 'succession of ill-connected episodes', the narrative for which is no longer some notion of Cartesian transcendence nor the negotiation of conformity within the structured identities of modernity, but a desire and a need to communicate with some sense of who we are at each juncture." (Stone 2008, p. 179)

- questions around what constitutes individual identity: "a work in progress which reflects the dialectic relationship between self-reflexive understandings and externally enforced subjectivities", "multiple, fluid and contingent", but not underpinned by a 'true self' that finds multifaceted articulation according to different contexts

- fluidity of social norms caused by the increasing co-presence of actual (face-to-face) and remote (technologically-mediated) social interaction
- 'simultaneity of place' has led to a constant 'permeability' between public, private and intimate social spaces
- use of media players can be understood as an attempt by users to 'inhabit' and structure the spaces within which they move and to fill the spaces in between acts of communication; "shut off the surroundings and establish a private space where one's psychological presence is transferred to another symbolic place of experience" (Stald 2008, p. 154)
- distinction between 'physical', 'social' and 'absent presence'; social presence as 'a state that varies with medium, knowledge of the other, content of the communication, environment, and social context'; absent presence as being physically present in one space but mentally present in another
- the private "is no longer conceivable as what goes on, discreetly, in the life of the individual away from the public domain" (in Traxler 2007, p. 260)

Learner-generated contexts and augmented reality

- users create their own contexts for learning: users are constantly negotiating their mutual understanding of the situations in which they find themselves
- mobile devices increase the students' ability to bring into fruitful synergy the knowledge distributed across communities of use
- spheres of and for mobility:
    - in physical space,
    - of technology,
    - in conceptual space
    - in social space
    - dispersed in time
- one of the defining characteristics is learning across contexts

- spaces of social media:
  - secret spaces (SMS, MMS, IM)
  - group spaces (Facebook, Myspace, Bebo)
  - publishing spaces (Blogger, Flickr, YouTube)
  - performing spaces (Second Life, World of Warcraft)
  - participation spaces (Meetup, Twitter)
  - watching spaces (mobile tv)
- recognise the limitations of this conceptualisation
- context has both a static and a dynamic dimension; the static elements ('the stuff to be learnt'), process ('ways that stuff can be learnt') and place ('where stuff can be learnt') interact with each other dynamically ('linkages') (Luckin et al 2005)
- importance of authenticity of and across context(s); authenticity of practices

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- context as a representational or as an interactional problem: "how and why, in the course of their interactions, do people achieve and maintain a mutual understanding of the context for their actions?" (Dourish 2004, p. 6)

- "context isn't something that describes a setting; it's something that people do. It is an achievement, rather than an observation; an outcome, rather than a premise" (Dourish 2004, p. 6)

- "Context cannot be a stable, external description of the setting in which activity arises. Instead, it arises from and is sustained by the activity itself." (Dourish 2004, p. 6)

- users expend cognitive, social and physical resources supported by mobile technologies to foster continuity and group identity, to reflect on the self and in relation to the group

- meaning as emergent and not predetermined in events; ubiquitous multimedia can have "an explicitly participative role enhancing, and thus shaping experiences by taking part in the emergence of meaning supporting shared interpretation, or assisting doing and undergoing" (Jacucci, Oulasvirta and Salovaara 2007, p. 5)

- in digital augmentation contextual data is added to objects to enable a deeper understanding of them and richer meaning making
- we recognise the importance of the situatedness of activities carried out with the help of mobile technologies; we consider the spatial framing for learning, be it real or virtual, as less important than the framing it provides for meaning making; very important in this context is the notion of agency, namely the creation by the user/learner together with other relevant parties, such as teachers and peers, of situations conducive to the use of mobile technologies as frames for meaning making; and, we believe in the importance of practice, i.e. people's engagement with particular settings, in which context becomes 'embodied interaction'

Affective and motivational factors

- we note the high levels of ownership with users finding mobile devices particularly engaging as being significant

- he 'unique educational affordances' of mobile devices for us are: portability, social interactivity, context sensitivity, connectivity and individuality

- we view appropriation as central and define it the routine usage for and integration into users' activities but not always necessarily for the purposes and in the ways envisaged by designers and service providers (see Cook, Pachler and Bradley, in preparation)

Interface between formal and informal learning

- only if mobile devices succeed in legitimising informal learning will they realise their potential for learning and merit serious engagement by the educational community

- an effective technological infrastructure is necessary which allows for the seamless transfer of artefacts from one context to the other

- importance of the notion of increasing embeddedness of information, and people, online conceptualised as 'viral' and 'intertwingled': a relationship characterised by a certain lack of hierarchy, categorization and sequentiality

- this leads to epistemological questions about what constitutes knowledge, but also ontological questions around conceptions of reality

- need for interoperable mobile devices with affordable connectivity and a learning object repository which allows for the easy storing, retrieving and re-using of dynamically created digital artefacts; searchability enhanced by appropriate metadata is one key characteristic of an effective repository; others are heterogeneity – the possibility of storing objects from a variety of resources –, automatic and contextual metadata generation, a community portal as well as the ability to synchronise distributed repositories in a network
- importance of meta-level awareness of the learner about the learning processes they engage in across spaces, time and sites of learning; also of purposefully designed learning networks and paths
- interacting domains model:
    - external representations of knowledge,
    - individuals' internal conceptualizations of knowledge, and
    - the social uses made of knowledge and through which it is constructed
- a learner-focussed locus of control and learner agency are key in ensuring the gap between formal and informal learning can be successfully bridged

Mobile learning and design

- usability and accessibility issues
- physical design of the handset as well as the graphical interface of the software
- the design of tools, including the software, is fundamentally predicated on the envisaged types of use
- 20-second interaction principle whereby it needs to be possible to complete all logical steps from start to finish of a task to ensure that the needs of mainstream users are catered for (Jacucci, Oulasvirta and Salovaara 2007)
- simplicity and reliability
- interoperability with teaching and learning processes and curricula
- types of integration: media, process and knowledge
- instant-on/instant-off

- interoperability (*ability of two or more systems to share information*)
- reusability (*ability to reuse or modify existing systems, data or code*)
- manageability (*ability to monitor and maintain systems, data or code*)
- durability (*ability of a system to endure over time*)
- scalability (*ability of a system to handle growing amounts of information and work*) and
- affordability (*ability of systems and data to remain in financial reach of users*) (O'Conell and Smith 2007)

- design for 'new geographies of learning', i.e. "configurations of space, place, and network that respect the social and collaborative nature of learning – while still exploiting the dynamic potential of networked collaboration" (Divitini and Morken 2007); learning is increasingly taking place within and across looser communities which necessitates a focus on the seamless integration of different learning experiences; conditions for 'spatial contiguity' and 'spatial dispersal'

Researching mobile learning

- characterised by (semi)private and social nature around acts of communication
- capturing learners over time and learning across formal and informal contexts
- appropriacy of research methods

Vavoula, G., Pachler, N. and Kukulska-Hulme, A. (in preparation) *Researching mobile learning: frameworks, tools and research designs*. Oxford Peter Lang

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Towards a cultural ecological approach to m-learning

- dynamic interdependence of numerous variables governing the processes of (mobile) learning (Winters 2007):
  - emerging contexts (incl. environment, time, spaces, institutional support, infrastructure),
  - curricula,
  - cultures (of use),
  - ethics,
  - tools and their affordances,
  - learning activities,
  - access to and relationship with information and people,
  - communication,
  - communities,
  - learning histories, and
  - appropriation

Activity Theory

- 'activity systems' as unit of analysis comprising a subject acting on an object (i.e. purpose) with a view to transforming it using mediating artefacts, be they physical or conceptual (symbolic or embodied) and be they enabling or limiting, in order to achieve an outcome; the subject is in turn deemed to be influenced by the rules of the context (explicit and implicit norms, conventions and social relations), the community and division of labour (explicit and implicit organisation of a community in relation to the transformation of the object into an outcome)

Conversational Framework (Diana Laurillard 2002, 2007)

- learning as conversations between different knowledge systems and between the teacher and learners with technology providing support for modelling as well as an environment that enables conversation

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A theory of learning for the mobile age (Sharples et al 2007)

- mobile learning as "the process of coming to know through conversations across multiple contexts among people and personal interactive technologies"

- learning is an internal and external conversation

- argue for "a separation between the semiotics of a learning situation – in terms of knowledge, language and conceptual resources needed for effective learning – and the embodiment of these functionalities in specific devices or constellations of devices"

- learners "know what kind of functionalities (resources for learning) they would like around them to be effective, and will seek these out as and when they need them"

- "people artfully engage with their surroundings to create impromptu sites of learning"

- focus on the communicative interaction between the learning and technology with the aim of achieving an outcome of revised knowledge and skills

- learning and cognition in are distributed and meaning making and knowledge generation, which evolve the state of knowing of the learning system, take place through exchange

- framework "does not give sufficient importance to what it is that makes a learning activity valuable, to the role of teachers in promoting effective learning, to classrooms as well as organized locations for study, and to educational institutions in extending and validating learners' knowledge"

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Framework for analysing mobile learning (Wali, Winters and Oliver 2008)

- critique of Sharples et al 2007

- mobile learning as "learning that occurs as a result of pursuing activities that are directed towards achieving the same objective across multiple contexts (physical and social)"

- focus is on the continuity of learning activities between and across contexts, physical and social settings which they describe as 'context crossing'

- need for a greater focus on learning as practice as well as on context, both in terms of 'that which surrounds us' and 'that which weaves together'

- no need to introduce two layers to represent the semiotic and technological dimensions of activity

- stress the importance of viewing context both in terms of the features of the environment in which learning takes place as well as the social setting of the learning activities

- belittles the importance of the conceptual tools involved in learning, in particular language and other semiotic means

Ecological models

- the metaphorical use of notions of 'ecologies' or 'ecosystems' in relation to the integration of information technologies into educational settings, processes and practices is by no means new, e.g.:
    - Barab et al 1999 'ecologised model' ('relational ontology')
    - Zhao and Frank 2003: 'ecological perspective' ('ecosystem')
    - Luckin et al 2005, Luckin 2008: 'ecology of resources'

Cultural ecology (Pachler, Bachmair, Cook and Kress forthcoming)

- AT as a useful heuristic for trying to understand the complexities of learning with mobile devices

- helpfully signals ontological difference between technology and people with the former mediating human activity, rather than being on an equal footing

- we have a certain scepticism concerning its potential as an analytic frame beyond structural analysis

- we argue for an alternative approach to explaining and analysing mobile learning, namely one based on social semiotics and media pedagogy

- an approach, which is metaphorical in nature and sees learning as meaning-making, as the making of signs and concepts closely linked to the context of the media-rich life-world of learners which we see as representing a new habitus of learning

- metaphoric because metaphors enable "conceptual osmosis between everyday and scientific discourses"

- we are interested in the potential of mobile devices not just to provide, but also to enable the shaping of highly individualised, yet socially and physically connected, culturally differentiated and semiotically rich contexts for learning
- the focus on location and context is important because of its centrality in meaning-making processes
- premised on notions of learner agency, i.e. intent and motivation, which, by-and-large, manifests itself in object-orientated activity systems
- defining characteristics of mobile learning are the moving of "computational power to the site in which the user is engaged" as well as the context-awareness of the devices and augmented physical spaces
- this opens up new possibilities for the relationship between formal and informal learning, between the classroom and other sites of learning

- we agree with the view of school-based activity driven by pedagogic rather than student need as 'content-culture incongruity' (Barab 2002)

- merging of learner and environment into a single system

- we afford great importance to the notion of 'functional significance' of learning goals and activities in terms of 'actualization' of learning and 'potentiating' of learner-facilitator interaction

- need for responsible use of natural resources: we argue for optimum rather than maximum use

- ecology for us is based on a state of 'equilibrium'

- we are interested in:
    - the cultural processes that govern the relationship between learners and the tools they use for the semiotic activity that is learning,
    - the contexts for learning the interaction of the different variables in an ecosystem allow for and generate as well as
    - in the structural relationships embedded in cultural ecologies between informal (life-world) and formal (educational institution) sites for and of learning
- in such a view of learning, meaning-making through signs is situated in, and distributed across learning activities, their content and the contexts in which they occur

Further reading:

Pachler, N. (ed) (2007) *Mobile learning: towards a research agenda*.
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