The University of Nottingham

A Theory of Learning for the Mobile Age

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The mobile age

- Mobile telephony is becoming ubiquitous
- Over 50% of the adult population in East Africa (Kenya, Tanzania, Uganda) own mobile phones (TGI, May 2005)
- Young people are developing a mobile culture
  - Organising social life through texting
- Work is increasingly fragmented and mobile
  - Mobile offices in cars, handheld computers
  - Working from home
- Leisure is increasingly fragmented and mobile
  - Short break holidays
  - Mobile gaming

Theories of learning

- No contemporary theory of learning for the mobile age
- Most recent reference to mobile learning in www.infed.org is 1916!

A society which is mobile, which is full of channels for the distribution of a change occurring anywhere, must see to it that its members are educated to personal initiative and adaptability.

Dewey, 1916, “Democracy in Education”

What is distinctive about learning for the mobile age?

- Mobility as the central concern
  - Learners are continually on the move
  - Even learners within a school will move from room to room and shift from topic to topic
  - Need to understand learning as a labile and contextual activity
- Involves a blend of portable and fixed technologies
- Embraces learning both inside and outside the classroom

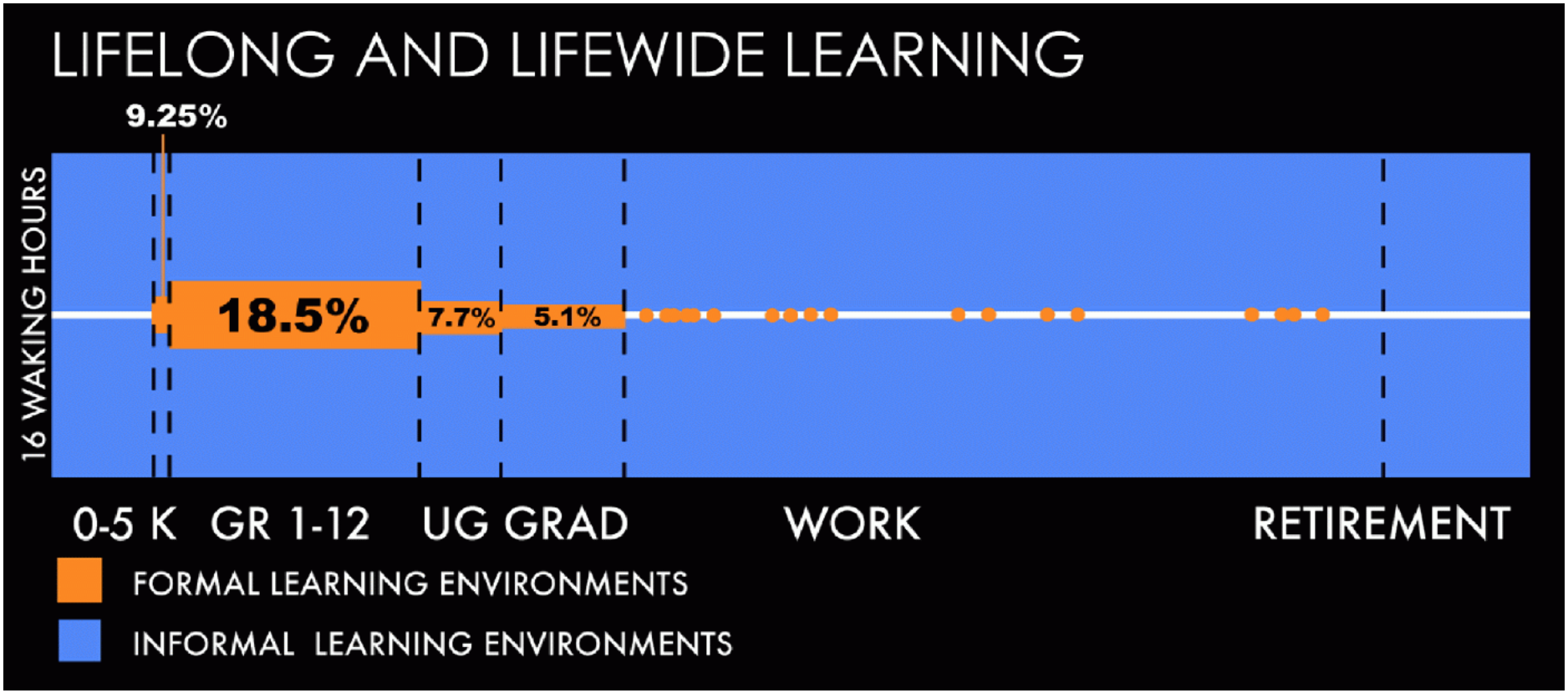


Image from ‘The Learning in Informal and Formal Environments (LIFE) Center’ (http://life-slc.org/)

Vavoula's study of learning and mobility

- March-August 2004
- Diary study
- 44 participants registered
  - 15 kept diary for 2 weeks (161 episodes reported in total)
- Broad definition of 'mobile learning':
  - "Learning away from one's normal learning environment, or learning involving the use of mobile devices"

Results

- 59% of the reported learning episodes were mobile
- 49% were not in home or office
  - 8 outdoors, 34 workplace, 10 place of leisure, 3 friends' house, 1 public transport, 23 other (e.g. places of worship)
- Most learning was to enable activity (40%) and/or solve a problem (15%)
- Only 5% of mobile and 10% of non-mobile learning was related to a curriculum
- Conversation was the main learning method of mobile learning (45% mobile and 21% non-mobile)
- Mobile learning involves more activity and interaction than non-mobile

Definition of mobile learning

“Learning that happens across locations, or that takes advantage of learning opportunities offered by portable technologies”

Wikipedia, ‘M-learning’

The processes of coming to know through explorations and conversations across multiple contexts amongst people and personal interactive technologies

Re-conceptions of learning

- Classroom learning
  - Learning as knowledge transmission and construction
  - Supported by ICT
  - How to design and manage an effective learning environment
- Mobile learning
  - Learning as exploration and conversation across contexts
  - Enabled by continual interaction with personal technologies
  - How people artfully engage with their continually changing surroundings to create transiently stable and effective sites of learning

Sources

- Dewey's Instrumentalism
  - Knowing is activity in the world, involving a combination of thoughts and external artefacts as tools for inquiry
  - Every reflective experience is an instrument for production of meaning
- Pask's Conversation Theory
  - Conversation is the fundamental process of learning
  - Learning is a cybernetic process of "coming to know" through mutual adjustment and negotiation
- Engestrom's Expansive Activity Theory
  - Learning is a cultural-historical activity mediated by tools, including technology and language
  - Activity systems contain the possibility for expansive transformation, as contradictions are internalised and resolved

Dewey and learning through communication

“Not only is social life identical with communication, but all communication (and hence all genuine social life) is educative. To be a recipient of a communication is to have an enlarged and changed experience. One shares in what another has thought and felt and in so far, meagerly or amply, has his own attitude modified. ”

Dewey (1916)

Dewey and communication

- Unclear what he meant by the term ‘communication’.
  - A communication is a token that is sent and received (“to be the recipient of a communication”)
  - Communication is the sharing of experience (“one shares in what another has thought”)

Friere and learning through dialogue

Freire (1996) refers to “co-intentional learning”, where teacher and learner jointly develop understanding through dialogue

> “The teacher is no longer merely the one-who-knows, but one who is himself taught in dialogue with the students, who in turn while being taught also teach. They become jointly responsible for a process in which all grow.”

Conversation Theory
Gordon Pask (1928-1996)

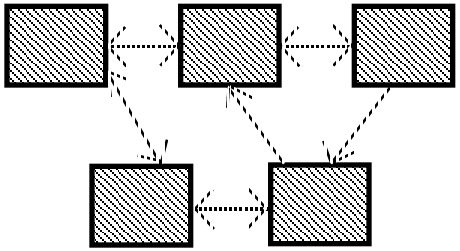
- A theory of the processes of coming to know
- Derived from cybernetics
- A conversation is the minimum necessary structure to enable learning
  - Multiple conversations within one mind
  - One conversation across multiple minds
  - Can involve technology as a conversational partner

Learning conversations

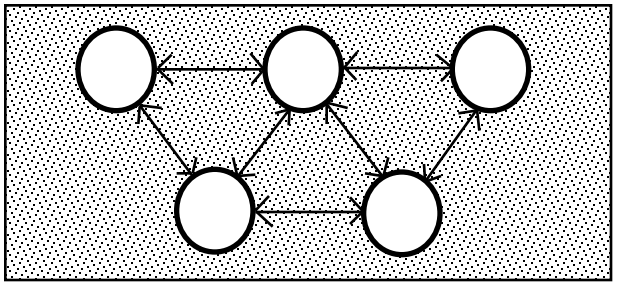
- Conversations about the how and why of a topic
- Conversations about the how of learning (for example discussing study skills and reflecting on experiences as a learner)
- Conversations about purposes, the why of learning, where the emphasis is on encouraging personal autonomy and accepting responsibility for one's own learning

Pask – Mobile Distributed Cognition

"There is no *need* to see minds as neatly encapsulated in brains connected by a network of channels called 'the media' … I am inviting the reader to try out a different point of view; namely the image of a pervasive medium (or media) inhabited by minds in motion. Thus, media are characterized as computing systems, albeit of a peculiar kind." (Pask, 1975)



Organisms ⇢ Media
as channels of communication



Individuals ⟶ Communcation
as program sharing and linguistic interaction between individuals. Medium (M) as shading

Creating shared meaning through conversations: Wikipedia

- *Language*: Natural language, plus Wikipedia rules and conventions
- *Mind*: Wikipedia encyclopedia system
- *Medium*: MediaWiki (system on which Wikipedia is implemented)
- *Individuals*: Wikipedia contributors (one person may be one or more ‘contributors’; more than one person may use a single ‘contributor’ name)

Learning for the mobile age

The processes of coming to know through explorations and conversations across multiple contexts amongst people and personal interactive technologies.

Learning as explorations and conversations across contexts

- Cole (1996) makes an important distinction between context as
  - "that which surrounds us"
  - "that which weaves together"
- Mirrors distinction in HCI between
  - context as a 'shell' that surrounds the human user of technology
  - context as arising out of the constructive interaction between people and technology

A “shell” view of context

User ⇄ Computer

Context

A “shell” view of context

User ⇄ Computer

is immersed in

Context

is represented in

Context through interaction

- Context is a *dynamic* and *historical* process
- to enable appropriate action (learning)
- constructed through interaction between people, technology, objects and activities

Constructing context

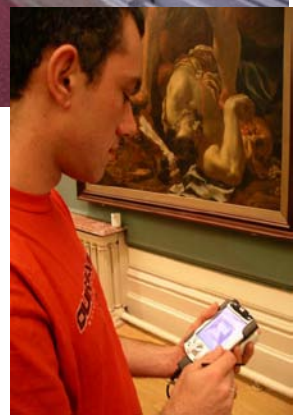
- Traditional classroom learning is founded on an illusion of stability of context
  - Teacher, fixed location, common resources, set curriculum
- If these are removed then creating temporary islands of relatively stable context is a central concern
- We construct ‘micro-classrooms’ through the processes of everyday exploration
- Stability of context enables reflective conversation

Constructing Context

- Current activity can only be fully understood by taking an historical perspective, to understand how it has been shaped and transformed by previous ideas and practices (Engeström, 1996).
- Context can be seen as an ever-playing movie
  - each frame of current context is a progression from earlier ones
  - entire movie is a resource for learning
  - continually being constructed by the cast, from moment to moment, as they share artefacts and create mutual understanding through conversation.

CAGE at Nottingham Castle

- Ultrasound tracking system
- Learning through context to engage the visitor
- Context based on location, time at location, history of interaction
- Highlight links between paintings
- Navigation by physical movement



Expansive mobile learning

Yrjö Engeström's Expansive Activity Theory

- Learning is a cultural-historical activity mediated by tools, including technology and language
- Activity is the focus of analysis
- Activity systems are multi-voiced, with many perspectives, transitions and interests in continual interaction
- Activity systems are shaped over time
- Activity systems contain the possibility for expansive transformation
  - They go though extended periods of qualitative change, as the contradictions are internalised and resolved, leading to the emergence of new structure, tools and activity.

Expansive transformations of mobile learning

- Technology provides a bridge between contexts
  - New conversations and micro-classrooms
- Tensions
  - Between conversations of personal social networking and classroom teaching
  - Between control by learner, teacher, commercial interests
- Contradictions
  - In ownership of the means of learning
- Dangers
  - Disruption of formal education
  - Colonisation of personal learning

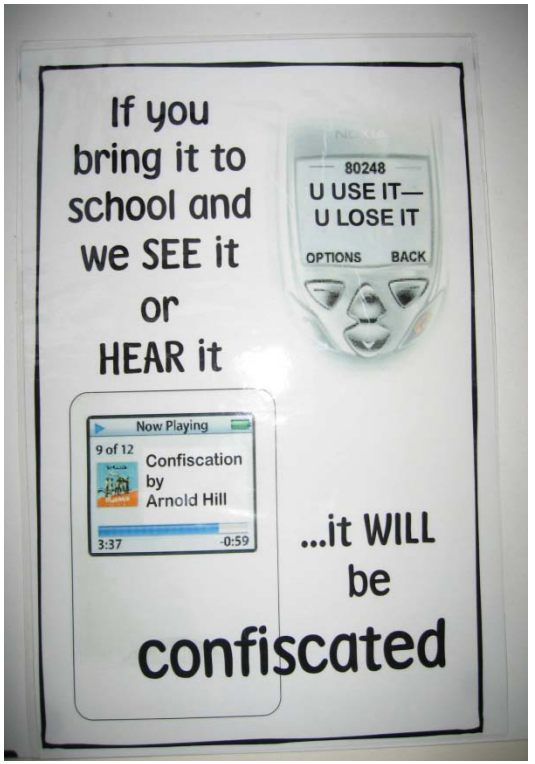
Role of the teacher in learning for the mobile age

- Initial assumptions
  - A learning system that evolves through explorations and conversations that create new meaning
  - Agency lies in the democratic synergy between the different parts of the system
  - A teacher has no ontologically privileged position, but is simply another participant in a cybernetic system
- Tensions
  - The position of the teacher is not given, but must be negotiated
  - Technology is both part of the learning system and an object of it

Tensions

Toronto students banned from using cellphones in schools (CBC News)

Once students walk through the school doors, "it's time to turn it off, put it away and listen to what your teachers say," he said. [He] argued cellphones caused disruptions in class, distracted students and allowed them to cheat by accessing the internet on their phones or receiving answers via text message.



Becta Web 2.0 survey

- Survey of 2611 children in years 9 and 10
- “Have you sent a text message at school (for work)”?
  - 33% replied that they had
- 23% had taken and shared a photo in school
- 36% had accessed the internet from a mobile phone in school
- *Despite mobile phones being banned*

Expansive transformations of mobile learning

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- Contradictions
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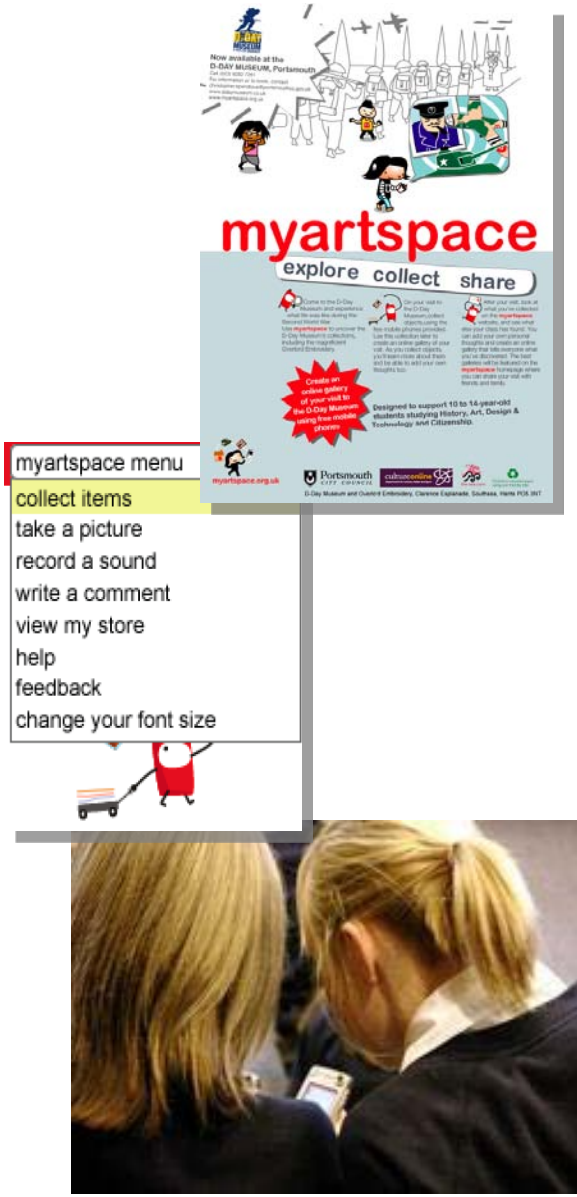
- Dangers
  - Disruption of formal education
  - Colonisation of everyday learning
- Possibilities
  - For ‘co-intentional learning’, where the richness of both formal and everyday learning is valued and supported, through explorations and conversations across contexts

Expansive transformation: School museum visits and field trips

- Museum trips an essential part of the UK National Curriculum
- Should guide students towards development and contrasting of their own ideas (Guisasola et al., 2005)
  - But how to guide students while allowing them to engage with authentic artefacts and discover their own responses to the exhibits?
- Should connect with learning in the classroom (Guisasola et al., 2005)
  - But how to recall and continue the rich experience of the museum visit back in the classroom?

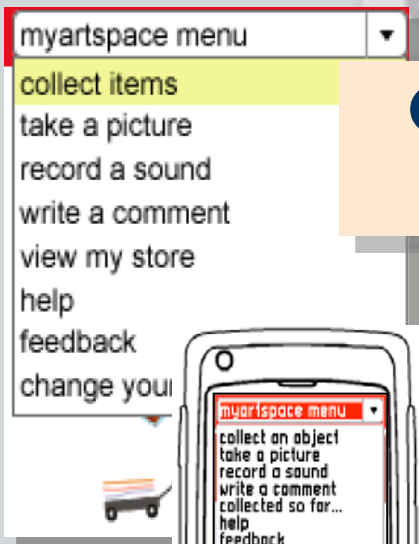
MyArtSpace

- Service on mobile phones for enquiry-led museum learning
- Learning through structured construction and conversation
- Students create their own interpretation of a museum visit which they explore back in the classroom
- 3000 children in three museums



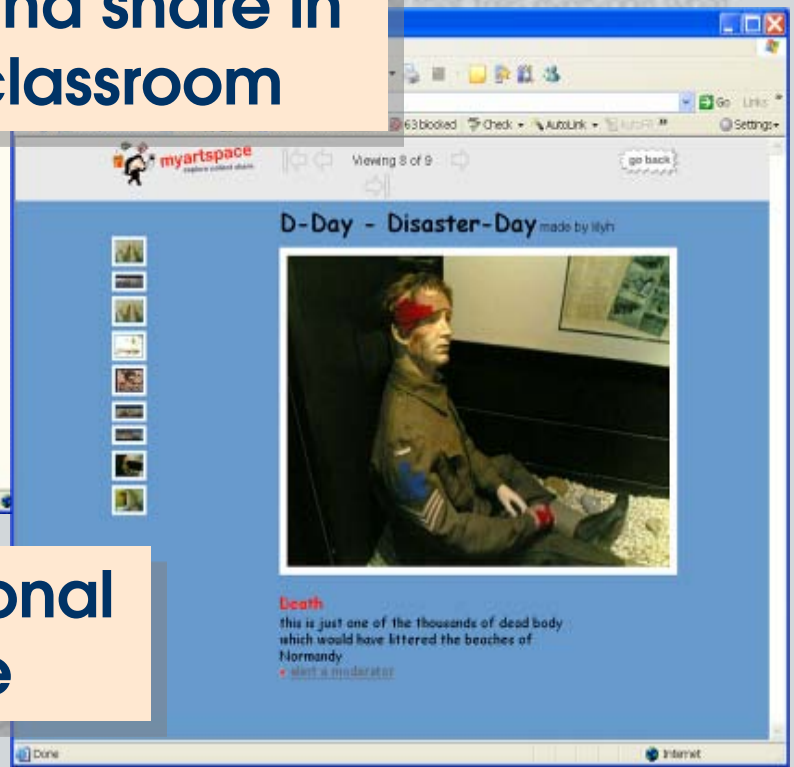
MyArtSpace

Prepare inquiry in the classroom



Create and collect in the museum

View and share in the classroom



Present a personal perspective

myartspace.org.uk

Learning in the mobile age

A cybernetic process of exploring the world and negotiating meaning

Continuity of learning and technology

... supported by valued teachers

... connecting formal and informal learning

... across a lifetime

Sharples, M., Taylor, J., & Vavoula, G. (2005) Towards a Theory of Mobile Learning. In H. van der Merwe & T. Brown, *Mobile Technology: The Future of Learning in Your Hands*, mLearn 2005 Book of Abstracts, 4th World Conference on mLearning, Cape Town, 25-28 October 2005. Cape Town: mLearn 2005, p. 58.

Available at:
http://www.mlearn.org.za/CD/papers/Sharples-%20Theory%20of%20Mobile.pdf

Sharples, M., Taylor, J., & Vavoula, G. (2007) A Theory of Learning for the Mobile Age. In R. Andrews and C. Haythornthwaite (eds.)*The Sage Handbook of Elearning Research*. London: Sage, pp. 221-47.

Preprint at
http://www.lsri.nottingham.ac.uk/msh/Papers/Theory%20of%20Mobile%20Learning.pdf