Contextualized Learning with Mobile Devices

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- Started in 1984; national institute;
- Two missions:
  1. provide open distance education
     - 7 faculties, 24000 students
     - 24 study centres in Netherlands and Belgium
     - Develop education in multidisciplinary teams
     - Deliver education through a variety of technologies (print, cd-rom, telephone, internet, face to face contact sessions, practical rooms, etc.)
- 2. innovate education
- The Educational Technology Expertise Centre (OTEC) of the Open University of the Netherlands carries out R&D into Learning Technologies.
- The current technology development programme is investigating Self-Organized Learning Networks. (Ca. 80 Staff)
Some Pedagogical Aspects
### Perspectives: Mobile Technologies for Learning (Nesta Futurelab 2004)

<table>
<thead>
<tr>
<th>Theme</th>
<th>Key Theorists</th>
<th>Activities</th>
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<tbody>
<tr>
<td>Behaviourist learning</td>
<td>Skinner, Pavlov</td>
<td>• drill and feedback</td>
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<td></td>
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<td>• classroom response systems</td>
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<td>Constructivist learning</td>
<td>Piaget, Bruner, Papert</td>
<td>• participatory simulations</td>
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<td>Situated learning</td>
<td>Lave, Brown</td>
<td>• problem and case-based learning</td>
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<td>• context awareness</td>
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<td>Collaborative learning</td>
<td>Vygotsky</td>
<td>• mobile computer-supported collaborative learning (MCSSL)</td>
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<td>Informal and lifelong learning</td>
<td>Eraut</td>
<td>• supporting intentional and accidental learning episodes</td>
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<td>Learning and teaching support</td>
<td>n/a</td>
<td>• personal organisation</td>
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<td>• support for administrative duties (eg attendance)</td>
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Table 1: An activity-based categorisation of mobile technologies and learning
Behaviourist Learning

Classroom Applications
- Formative Assessment
- Peer Feedback
- Anonymous Feedback
- Group Awareness

Stimulus
- Present Stimulus
- Contextualize Stimulus

Aggregate Responses
Collect Responses

Response

Contextualized Content Presentation
Programmed Instruction
Contextualized Learning Activities
Field Trips, City Rallys
Situated Learning
Content and Context
Content and Context

Context and Reuse Relationship (Source: www.learnativity.com, Wayne Hodgins, 2002)
The Trikorder
MACE Content in Contexts via Metadata

A variety of different learning contents are available in different content repositories.

Content repositories provide a server interface to refer to and access individual content items.

Metadata repositories store metadata statements about content items (identified via UIDs) across the content repositories.

MACE service widgets communicate with one or several metadata and content repositories to create smart widget for end-user applications. These are to be integrated into web portals or applications.

The MACE service portal allows users, developers, and content providers to access the MACE service widgets. Additionally, it might provide or showcase functionality on its own, like a federated search, content subscription modules, or community tools.
Contextualization and Learning Activities
Nomadic Learning Activities and continuous support in ...

- time
  ... full information access at any time and information retrieval specific for a given activity phase

- place
  ... multiple device information access at any place and position aware (contextualised) information retrieval.

- communities
  ..technology needs to support access to communication tools at any time and place and social constellation aware
Contextualization Example: Field Trips
Roles and Different Contexts -> IMS LD
Designing Mobile Learning Technology
1. Analyse added values of Mobile Devices (Klopfer et. al. 2002)

- Portability,
- Social Interactivity,
- Context Sensitivity,
- Connectivity,
- Individuality
2. Prototype with End Users analyse activities and stakeholders
3. Design a flexible widget set

- **Task Widget** allows to see all tasks and contents of a currently running field trip.

- **Navigation Widget** allows to view a map of a field trip and to navigate tasks.

- **Messaging Widget** gives all participants of a field trip an instant messaging tool.

- **Sensing Widget** allows to capture sensor data (GPS, other Sensors,..) and connect it to contents.

- **Conference Widget** allows to video conference from field and classroom.

- **Content Widget** allows to view the contents of the LMS and the collect images and data from field trip devices.

- **Metadata Widget** allows to edit and add context data to the field trip data.

- **External Tools Widget**
4. Specify role and task specific interfaces
5. Select Specialized Hardware
6. Integrate with Standards and Backend Systems
Project Examples
Interface Design, Multimodal Interfaces
Related projects: HIPPIE – a museum guide
Useful use of multimedia: graphical support

Amor und Medusa in Chodzer-Nacht in Schlager-Erlaubtjenst

Arrow and bow

Amor Körper weist eine Begrenzung auf Arm und Körper selbst sind als Pfeil und Pfeil gestaltet. Somit ist er vollkommen identifiziert mit dem bewegenden, hinweisenden Prinzip.
LISTEN: 3D Audio Augmented Environments for Art Exhibitions
Auditory Displays: Melodious Walkabout
Mobile Interaction and Data Collection
Mobile Data Collection Indoor
Mobile Data Collection (Outdoor)
Expert Interviews
Mobile Gaming: Locatory

Locatory-Cards
ContextBlogg: Campus Memories

- Tagging and Location Sensors
  - Semacode, Barcode, RFID
  - WLAN Ekahau, GPS
- Blogging Systems and APIs
- Goal: enable mobile content injection and delivery
- Evaluations on Language Learning
- Health Care Pilot
Thank You.

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