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Open University of the Netherlands - OTEC

- Started in 1984; national institute;
- Two missions:
  1. provide open distance education
     - 7 faculties, 24000 students, 24 study centres in Netherlands and Belgium
  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)
Trends and current research at OUNL

- Learning Networks for Lifelong Competence Development
  - Informal and Formal Learning in Competence Development (TENCompetence)
  - Innovation in Learning Networks, Language Technologies for LLL (LTFLL)
- Cognitive Instructional Design, Performance Assessment, Orchestration of Learning Services
- **Pervasive Media for Learning (<=)**
  - **Contextualized Learning Support**
    - A Reference Model for Contextualized Learning (PHD)
    - Context Indicators for Learning (PHD)
    - Context Metadata for Learning Support (MACE)
Contextualized Learning
Why Contextualized Learning?

- Knowledge acquisition in a cultural context and the integration in a community of practice (Wenger & Lave, 1991)
- Learning is always situated within its application and the community of practice (Mandl, Gruber, & Renkl, 1995)
- Reflection in action and reflection about action (D. A. Schön, 1983; D.A. Schön, 1987)
- Context in Knowledge Management (Nonaka & Takeuchi 95)
- ContextBlogger (Dejong, Specht, Koper (2007))
A References Model for Contextualized Learning
### Dimensions of Analysis

<table>
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<tr>
<th>Content</th>
<th>Context</th>
<th>Information flow</th>
<th>Purpose</th>
<th>Pedagogical model</th>
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<tbody>
<tr>
<td>Annotations</td>
<td>Individuality Context</td>
<td>One-to-one</td>
<td>sharing content and knowledge</td>
<td>behaviourist</td>
</tr>
<tr>
<td>Documents</td>
<td>Time Context</td>
<td>One-to-many</td>
<td>facilitate discussion and brainstorming</td>
<td>cognitive</td>
</tr>
<tr>
<td>Messages</td>
<td>Locations Context</td>
<td>Many-to-one</td>
<td>social awareness</td>
<td>constructivist</td>
</tr>
<tr>
<td>Notifications</td>
<td>Environment or Activity Context</td>
<td>Many-to-many</td>
<td>guide communication</td>
<td>social constructivist</td>
</tr>
<tr>
<td></td>
<td>Relations context</td>
<td></td>
<td>engagement and immersion</td>
<td></td>
</tr>
</tbody>
</table>
Example: Shared Documents with Notification
Content ...
Different forms of Content

- The MOBI Learner project combined multimedia content creation, content delivery and stores context metadata about that content.
- KLIV project (Eva Brandt & Hillgren, 2003) delivered video content to PDAs used by nurses.
- xTask adds the collaborative editing of content and instant messaging for discussing the content.
- Environmental Detectives (Klopfer, Squire, & Jenkins, 2002) is an example that along with content creation stores location metadata.
- RAFT project, which demonstrated effects on classroom engagement and participation with the integration of authentic learning materials from remote field trips (Bergin et al., 2007).
Context...

Context, describes applications based on the context parameters taken into account for learning support.
Context taken into Account (Zimmermann et al. 2007)

- Individuality Context, includes information about objects and users in the real world as also information about groups and the attributes or properties the members have in common.

- Time Context, basically this dimension ranges from simple points in time to ranges, intervals and a complete history of entities.

- Locations Context, are divided into quantitative and qualitative location models, which allow to work with absolute and relative positions.

- Activity Context, reflects the entities goals, tasks, and actions.

- Relations Context, captures the relation an entity has establish to other entities, and describes social, functional, and compositional relationships.
Context Examples

- Mobile Language Learning, Ogata and Yano (2004b) CLUE use Learner Profile and RWO (Real World Objects)
- AwarePhone (Bardram and Hansen, 2004) uses location to locate fellow employees within the hospital, a calendar artefact to capture and share time context and indicates the activity of a user at a certain moment.
- TANGO system (Ogata and Yano, 2004a) and the Musex system (Yatani et al., 2004) detect objects in the vicinity by using RFID tags. Moop (Mattila and Fordel, 2005) couples (GPS) location to observations/information gathered in the field.
- Wallop (Farnham et al., 2004) allows its users to discover social relationships and provides social awareness by storing and analysing social context information.
Purpose ...

Purpose, describes applications according to the goals and methods of the system for enabling learning.
Purpose Examples

- Social Software in General: **Identity management, information sharing, relationship management** (Richter & Koch, 2007)
- **Sharing Content** and Knowledge: iLogbook (Bull et al., 2004)
- Facilitate discussion and brainstorming: Mobile notes.
- **Mobile recommender** systems like MovieLens Unplugged
- Location **awareness**, group awareness, NearMe
- HANDLer project offers conversation between mobile learners to support **knowledge exchange** (Sharples, Corlett, & Westmancott, 2002)
- Creating **Authentic Learning Materials** and Conversations (RAFT 2005)
Information Flow

Information Flow classifies applications according to the number of entities in the systems information flow.
Context Blogging in different Information Flow Designs
Pedagogical Models

Pedagogical paradigms and instructional models
# Study Mobile Technologies for Learning (Nesta Futurelab 2004)

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

Table 1: An activity-based categorisation of mobile technologies and learning
Behaviourist Learning - Content in Context

Classroom Applications

Formative Assessment

Peer Feedback

Anonymous Feedback

Group Awareness

Stimulus

Present Stimulus

Aggregate Responses

Contextualize Stimulus

Collect Responses

Response

Contextualized Content Presentation

Programmed Instruction

Contextualized Learning Activities

Field Trips, City Rallies
Mobile Situated Learning

Authentic Learning Environment
- Authentic Domain Activities
- Field Trips
- Context Metadata
- Context
- Reflection in and about Action
- Mobile Blogging
- Community of Practice

Learning Activity
Examples

- **Behaviourist approaches** on learning are the foundation of most *notifications systems* (SMSCoach). Moreover, the more standard form of notification systems want the user to react on or learn about some peer activity being performed.

- **Constructivist approaches** like MediaBoard (Colley & Stead, 2004) create a *mobile accessible working space* aimed at fostering interaction in a community of practice.

- **Annotation tools** like Mobile Notes, used in brainstorming sessions are also often designed from a constructivist point of view.

- An example of *situated learning* support is the RAFT project that aims “to provide a cooperative learning environment spanning field trip and the classroom”.

Building Contextualized Learning Support


Connecting RWO

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Location Tags
Amor und Merkur

Abstract: Das Bild stellt zwei Göterfiguren aus der antiken Mythologie dar, nämlich den Liebesgott Amor mit Pfeil und Bogen zusammen mit Merkur, dem Göterboten, dessen Utensilien, Flöte, Buch, Pinsel und Zirkel, auf vier menschliche Künste hinweisen: Musik, Literatur, Malerei und Geometrie.

Artist: Der Maler ist unbekannt.

Location Areas

Locatory Cards

Start

Conference 140

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118a 118b 119 110 121 122 123 124 125 126 127 128 129 130 131 132 133 134

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High Precision Tracking
Direction and Relative Location
Task Structures for Connecting RWO - LO
ContextBlogger: 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
Context Metadata for Learning Objects
Combining Context and Competence Metadata

- OAI-PMH
- HARVESTED
- LOM
- CAM
- ATTENTION
- Domain Metadata
- Competence
- Context Metadata
- Improved Access

- ENRICHED METADATA
- AUTOMATIC METHODS
- EXPERT INDEXERS
- ARCHITECTURAL COMMUNITY
- MACE PORTA
- FACETED SEARCH
- INTEGRATED

- 3RD PARTY CONTENT
- DESCRIBITIONS
- MAPS
- 3D MODELS
- DYNAMO
- IRB
- WINDS
- REGULATIONS
Context Enrichment Services

```java
String assignContentToPosition(String positionId, String contentId)
String[] getAllPositions()
Position[] getPositionsInArea(double nwLat, double nwLon, double seLat, double seLon)
Position getPositionOfContent(String contentId)
String removeAllContentsFromPosition(String PositionId)
Position[] getPositionsInRange(double lat, double lon, double radius)
StringArray[] getContentsOfMultiplePositions(Position[] position)
Position[] getPositionsOfMultipleContents(String[] contentId)
createPosition(String positionId, double latitude, double longitude)
String removeContentFromPosition(String positionId, String contentId)
String removePosition(String positionId)
String getContentShortInfo(String positionId)
String[] getContentsOfPosition(String positionId)
```
Combining Services with Context Metadata

EXAMPLE: MAP WIDGET
Smart Context Indicators
Context Indicators for Learning Support

Indicator
- Visualization Widget 1
- Visualization Widget 2
- Graphical Feedback Engine
- Actuator/Indicator Layer
- Mobile Client
- Ubiquitous Display
- Audio Client

Process
- Feedback Strategy Editor
- Feedback Modelling Service
- Notification Modelling Service
- Notification Strategy Editor

Aggregator
- Action Aggregator Service

Sensor
- Learning Network Actions and Interfaces
- Knowledge Resource Tracking Service
- UoL Tracking Service
- Positioning Service
- Collaboration and Recommender Service
- IMS-LIP
- QTI
- TENC
- Ubiquitous Tracking and Interfaces
- Timer, Schedules
- Location Tracking

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Smart Indicators

(a) after accessing three items

(b) after accessing ten items

(c) after accessing 60 items

(a) learner is less active than the community and less active than last week

(b) Most active community member
Team Space

**Blog Entries**

- **Workshop on Contextualized Attention Metadata**
  *posted by Marcus Specht, on 2007-05-27 17:30:43*
  
  I am in the Program Committee for the CAMA workshop on Contextualized Attention Metadata: personalized access to digital resources see webpage at: http://aradi.ne.cs.kul.euvene.be/cama2007/ it will be at ACM IEEE Joint Conference on Digital Libraries in Vancouver. Organized by Erik Duval, JeNad Najar, and Martin Wölpers context, research.

- **New MACe Project Website Online**
  *posted by Marcus Specht, on 2007-03-18 22:14:42*
  
  The new MACe project website is online. I use Joomla for the page and I plan to be a MACe partner. Check out the project and its ideas. architecture and design, architecture metadata, MACE Project W...[

- **gaming in the london subway**
  *posted by Marcus Specht, on 2007-03-12 16:34:41*
  
  My friend Huntington (Andy has a list of his website at http://www.etc... The OY Project! Participants can tag bus and have to answer questions we see some places on the...[

- **Mobile Social Software**
  *posted by Marcus Specht, on 2007-02-26 21:23:08*
  
  There is a nice list of mobile social software maintained by Timo Arnall http://www.elasticspace.com/... Also Nicolas Nova maintains http://tecfa.unige.ch/personal/nicolas/software some recent works about context, applications, context, cool, learning, social media, social software...[

**del.icio.us Links**

- **Examples 1 GeoRSS : Geographically Encoded Objects for RSS feeds**
  *posted by Marcus Specht, on 2007-11-05 23:12:08*

- **International Workshop on Representation models and Techniques for Improving e-Learning**
  *posted by Marcus Specht, on 2007-08-14 16:34:41*
Thank You.

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