

Contextualized Learning with Mobile Devices

Dr. Marcus Specht

Professor Advanced Learning Technologies

Open Universiteit Nederlands

Centre for Learning Sciences and Technologies (CELSTEC.org)

marcus.specht@ou.nl



Some Pedagogical Aspects

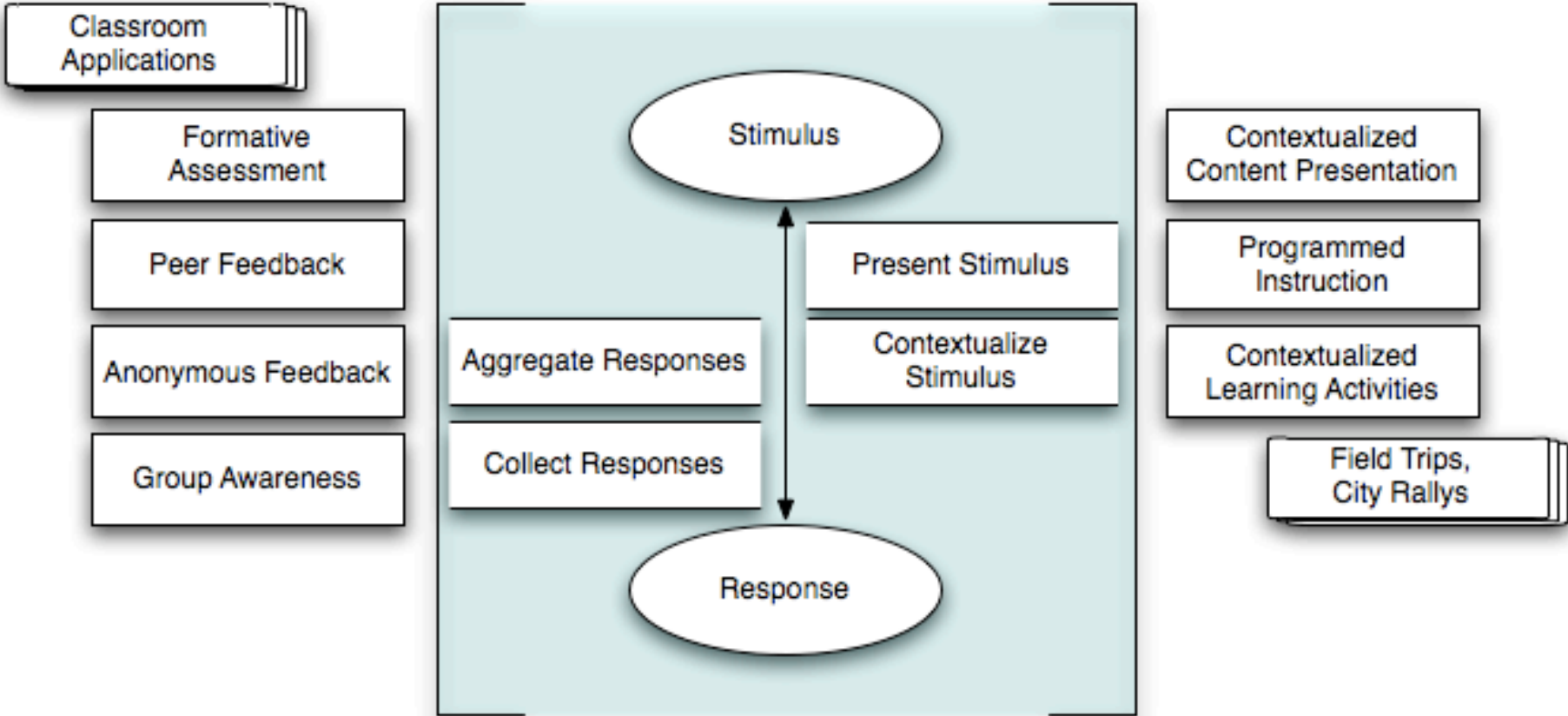


Perspectives: Mobile Technologies for Learning (Nesta Futurelab 2004)

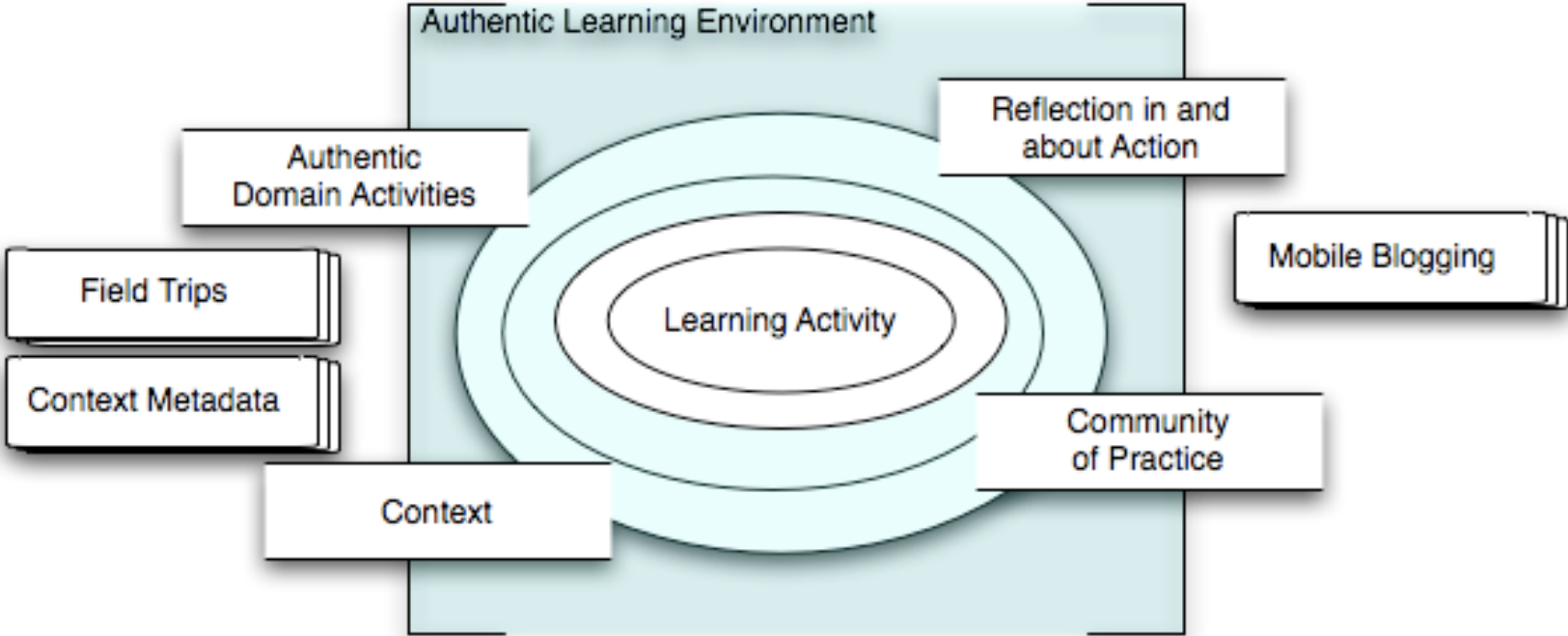
Theme	Key Theorists	Activities
Behaviourist learning	Skinner, Pavlov	<ul style="list-style-type: none"> • drill and feedback • classroom response systems
Constructivist learning	Piaget, Bruner, Papert	<ul style="list-style-type: none"> • participatory simulations
Situated learning	Lave, Brown	<ul style="list-style-type: none"> • problem and case-based learning • context awareness
Collaborative learning	Vygotsky	<ul style="list-style-type: none"> • mobile computer-supported collaborative learning (MCSCCL)
Informal and lifelong learning	Eraut	<ul style="list-style-type: none"> • supporting intentional and accidental learning episodes
Learning and teaching support	n/a	<ul style="list-style-type: none"> • personal organisation • support for administrative duties (eg attendance)

Table 1: An activity-based categorisation of mobile technologies and learning

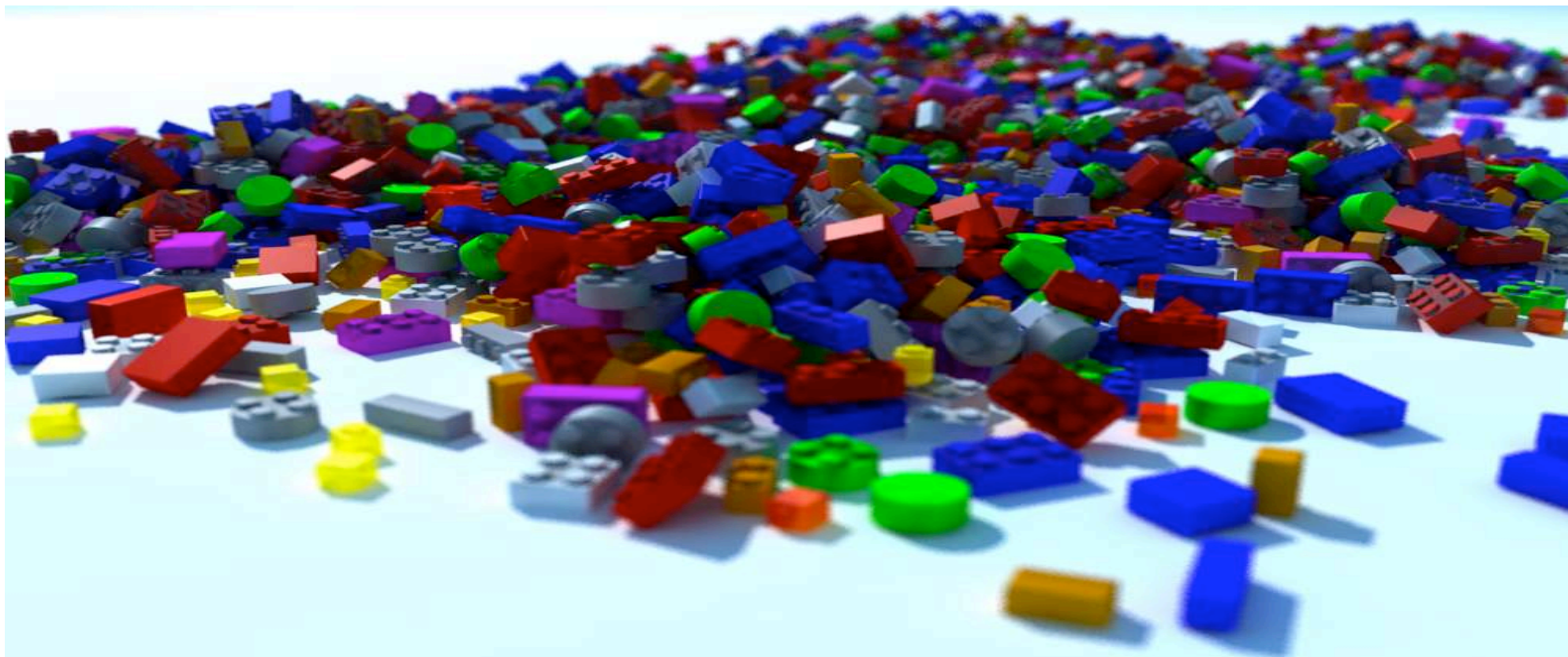
Behaviourist Learning



Situated Learning

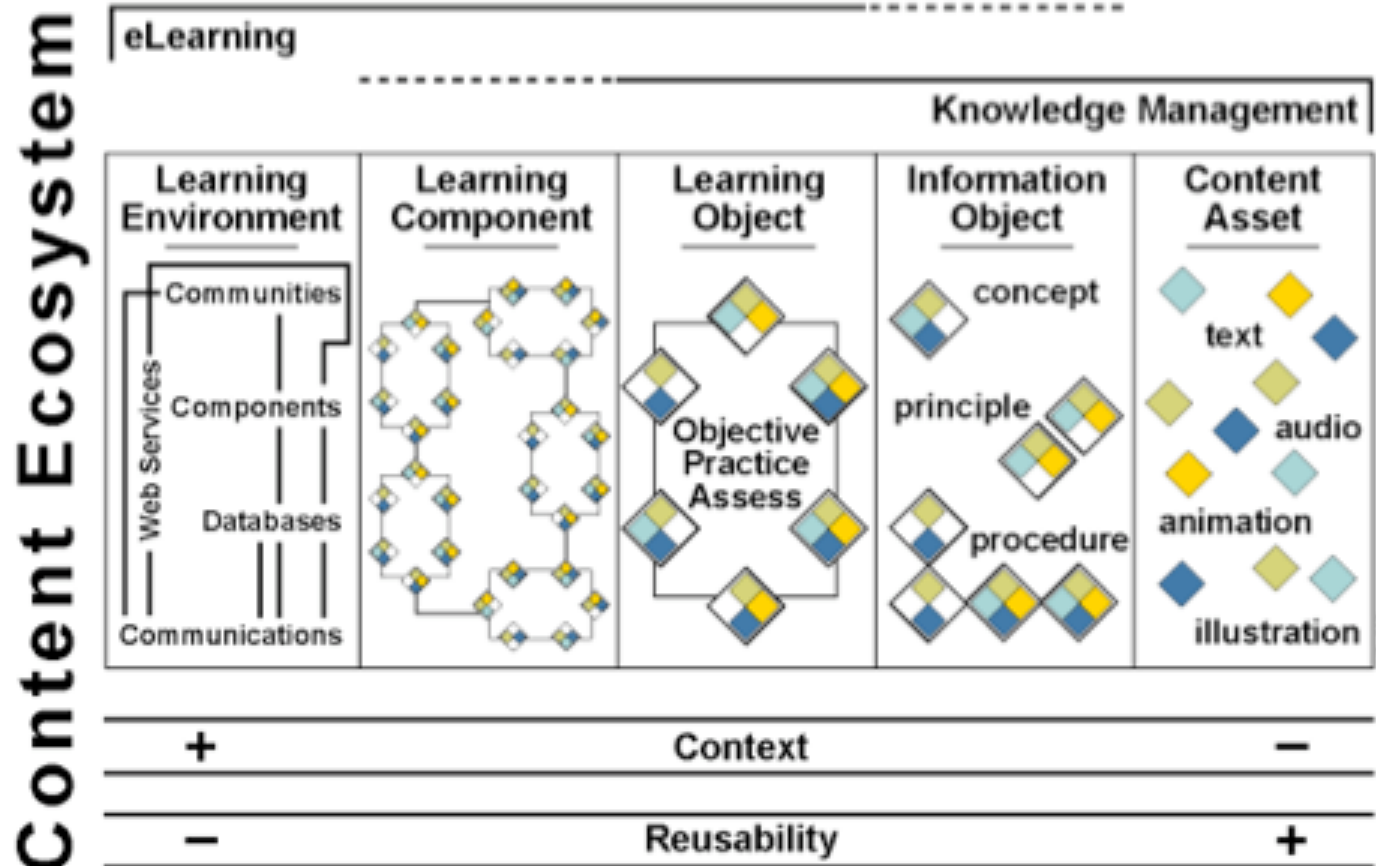


Content and Context



Content and Context

Context and Reuse Relationship (Source: www.learnativity.com, Wayne Hodgins, 2002)



The Trikorder

Content Block Viewer - Microsoft Internet Explorer

Adresse: <http://kobold.fit.fraunhofer.de/Scripts/WebObjects.exe/mediaLibrary.woa/1/wo/WSLmDbLIY5TbYX2yVdn0Ag/2.5.17.27.7.8.0>

Sensors

- PDAnfraredSensor: true
- PDANoiseSensor: 27
- PDAMotionSensor: 1
- TimeSensor: 27.2.2004
- PDAPositionSensor: x: 915 y: 125
- BoardNoiseSensor: 9
- BoardMotionSensor: 18

Current Context

- content_id: 17
- content_type: image/jpeg
- zone: C5-125
- location: (769.45,87.97)
- focused: false
- board_noise: quiet
- board_motion: busy
- weekday: Friday
- daytime: forenoon
- motion: quiet
- noise: quiet


MEDIA LIBRARY

Fraunhofer Institut Angewandte Informationstechnik

Home New Import Export

current position: All Media

View Content Block(s)

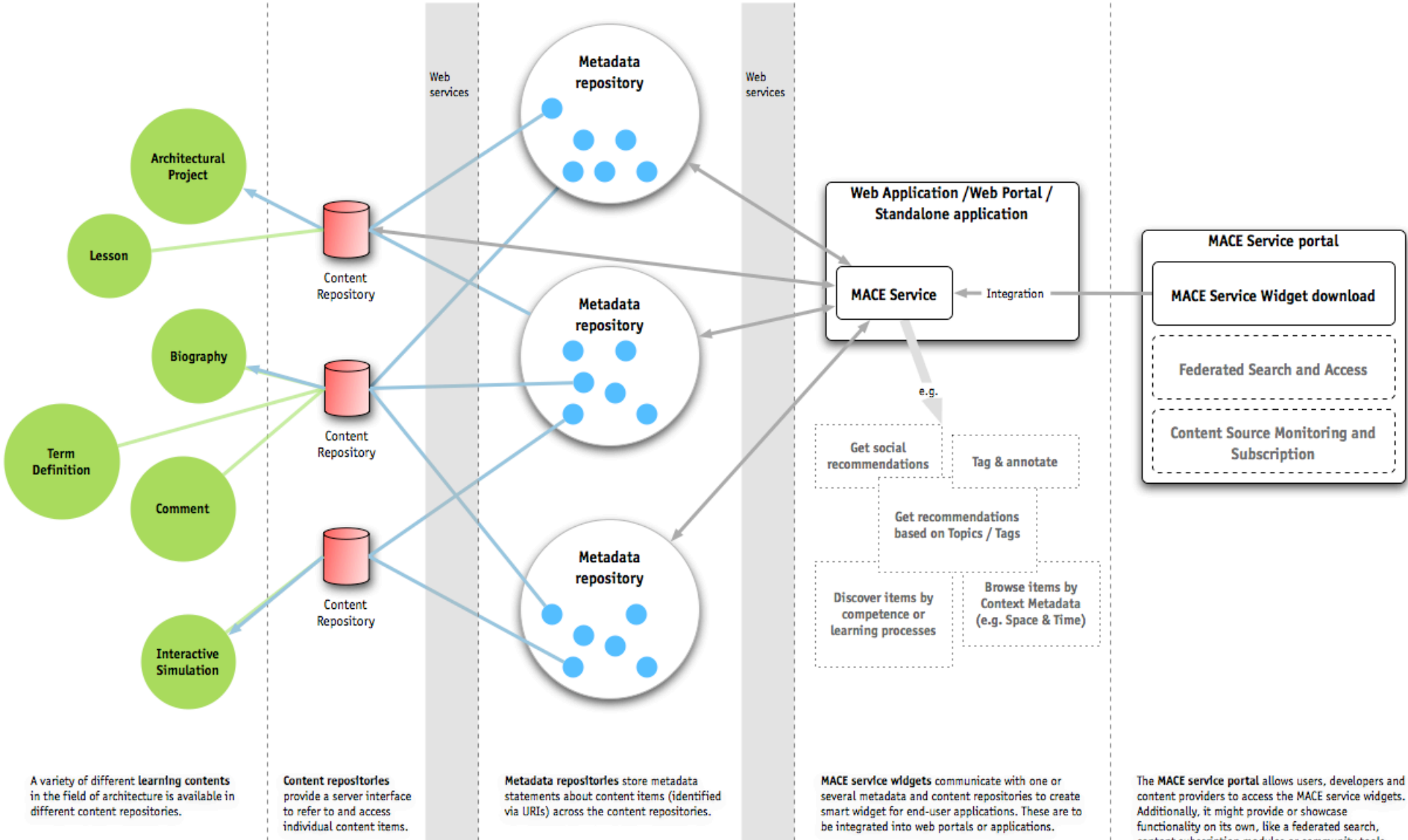


Title: usas1.jpg
Filename: usas1.jpg
MIME Type: image / jpeg
Description:
Content-ID: 17
Course: All Collections
Author: admin
Creation Time: Fr 27 Feb 2004 09:58
Last Modified: Fr 27 Feb 2004 09:58

Edit Preview Add Context

SNAPSHOT
RELEASE
EDIT

MACE Content in Contexts via Metadata



A variety of different learning contents in the field of architecture is available in different content repositories.

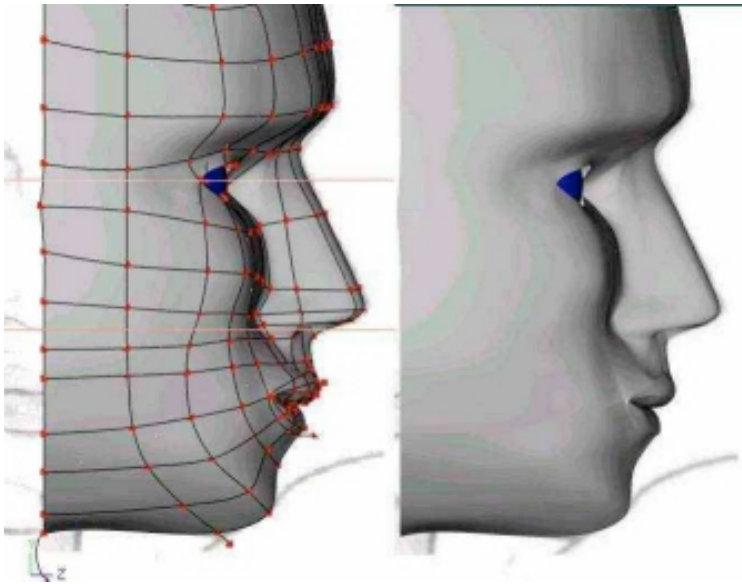
Content repositories provide a server interface to refer to and access individual content items.

Metadata repositories store metadata statements about content items (identified via URIs) 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.

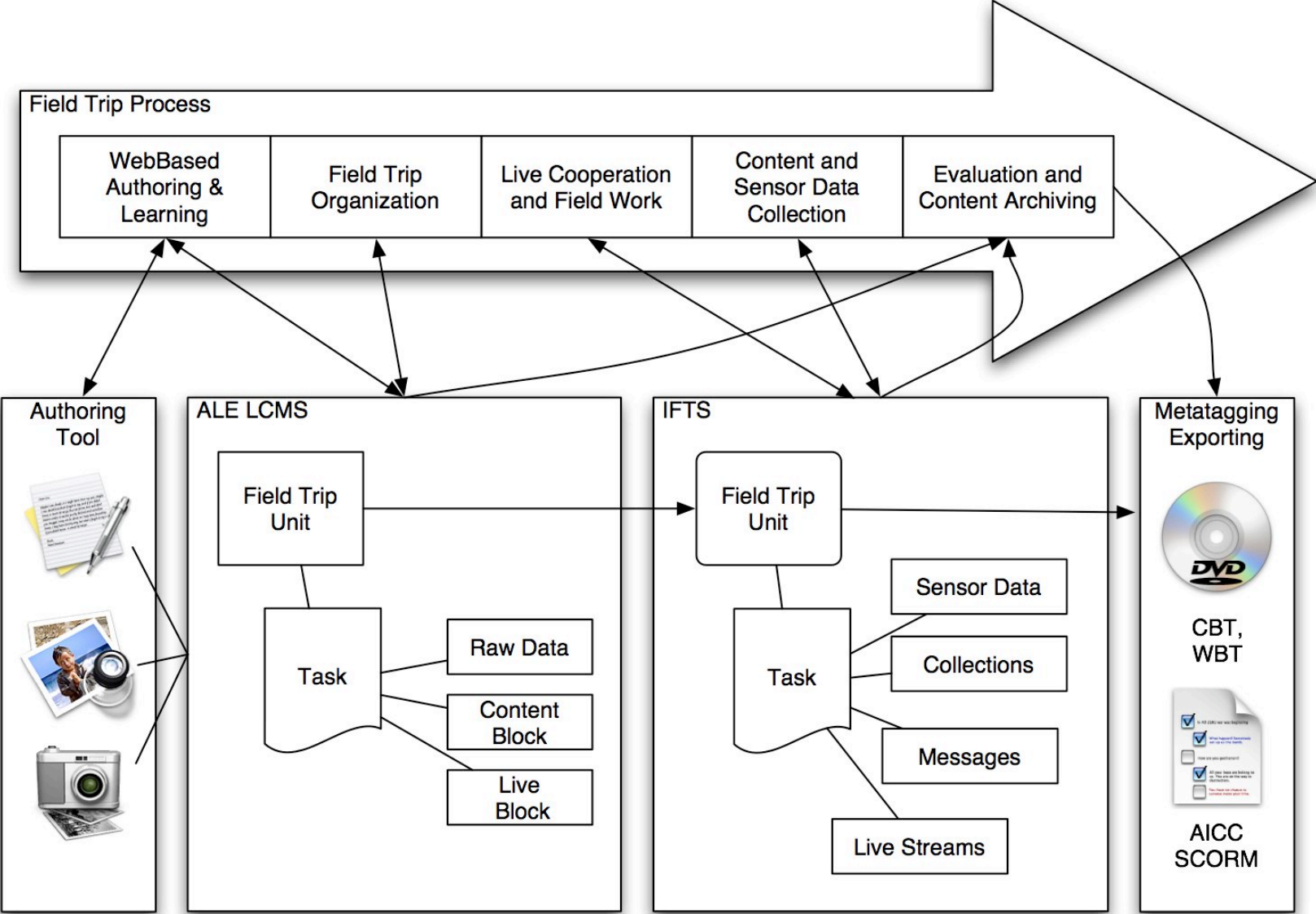
Contextualization and Learning Activities



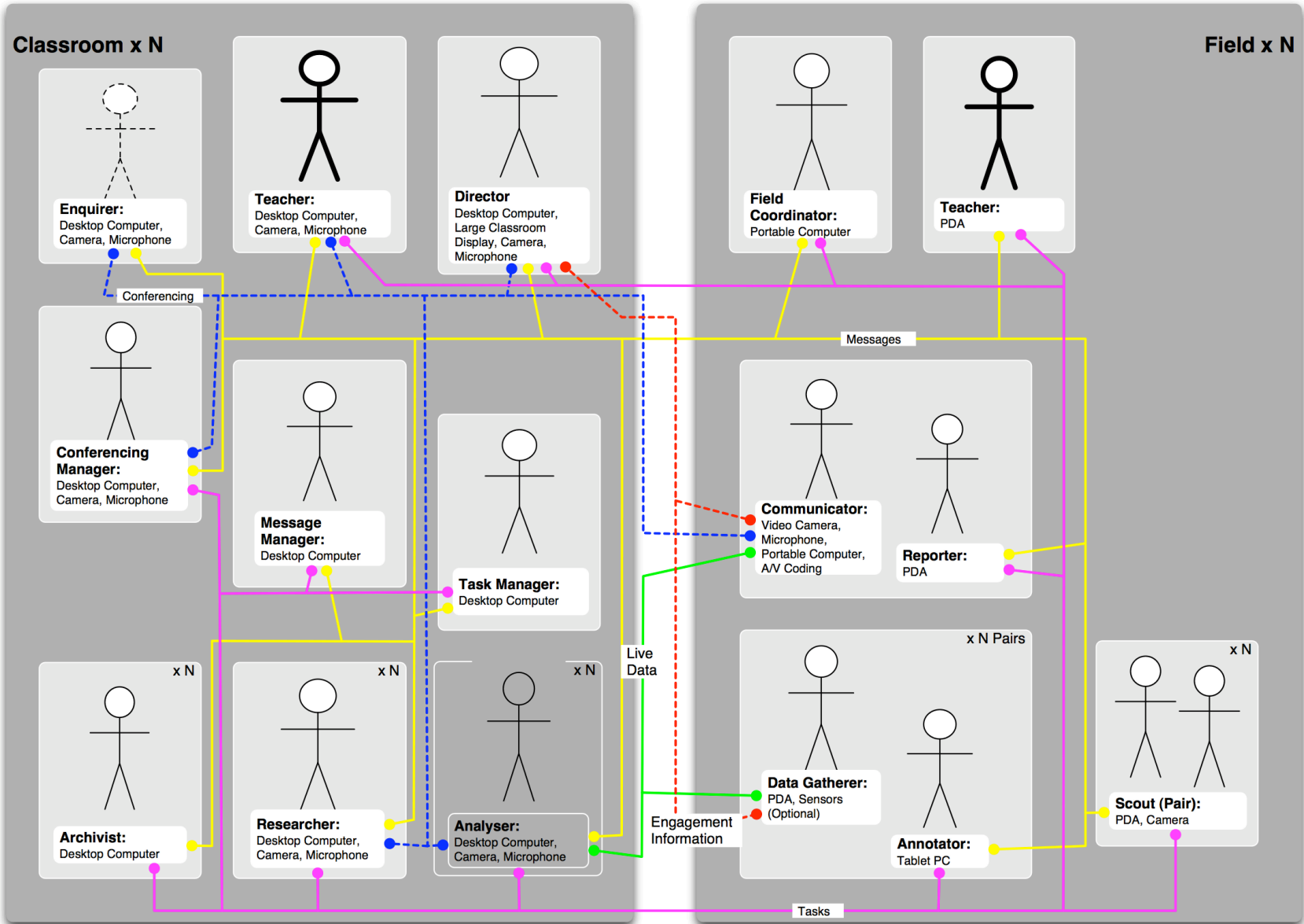
Nomadic Learning Activities and continuous support in ...

- 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 navigation 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.



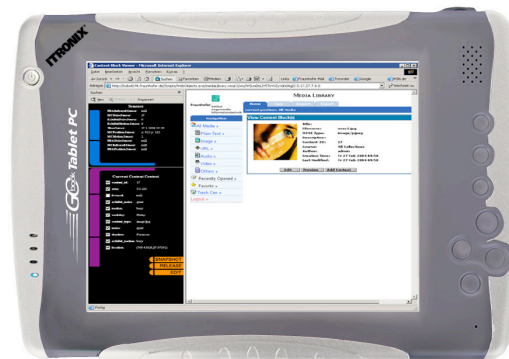
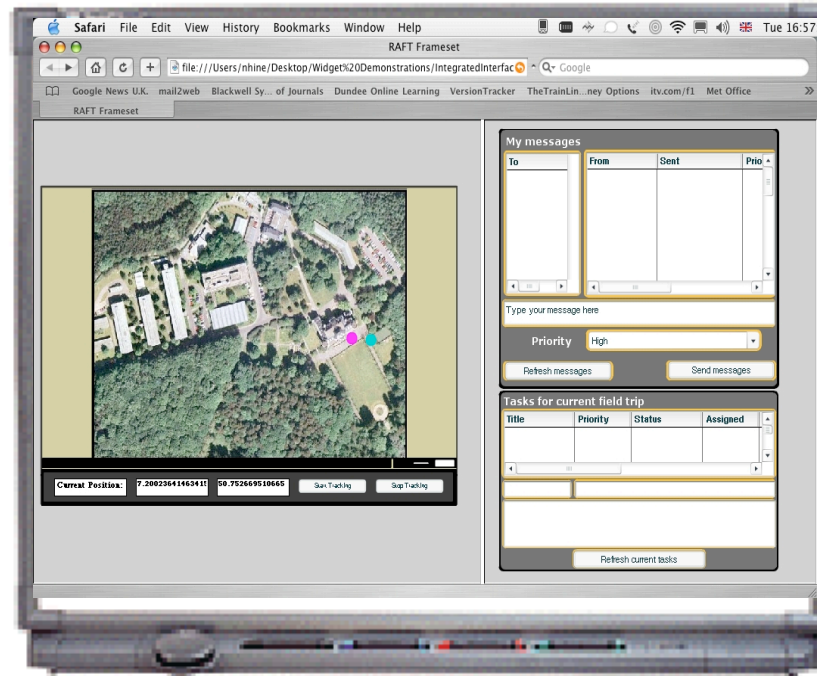
Content Widget allows to view the contents of the LMS and the collect images and data from field trip devices.



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



External Tools Widget



4. Specify role and task specific interfaces

The image displays a web application interface for RAFT (Role and Task Specific Interfaces) and a handheld device showing a map. The web interface is divided into several sections:

- Participants:** A table listing team members and their roles.

Name	Role
Mo	Scout
Marcus	Data Gatherer
Lucia	Annotator
Nick	Researcher
Milos	Analyst
Alex	Reporter
- Task Overview:** A table showing task details, status, participants, and repository.

Task	Subtasks	Status	Participants	Repository
Flower Task	Collect pictures of at least 10 different flowers you can find on the meadows.	finished	Mo (Scout) Marcus (Data Gatherer) Lucia (Annotator)	<input type="checkbox"/>
	Find out at which places they preferably grow and check if that matches your findings.	ongoing	Nick (Researcher) Milos (Analyst)	<input type="checkbox"/>
	Ask the expert which of the flowers is the rarest and which he likes best.	pending	Alex (Reporter) Sian (Comm. Manager)	<input type="checkbox"/>
Tree Task	Collect pictures of at least 10 different flowers you can find on the meadows.	ongoing	Mo (Scout) Marcus (Data Gatherer) Lucia (Annotator)	<input type="checkbox"/>
	Find out at which places they preferably grow and check if that matches your findings.	ongoing	Nick (Researcher) Milos (Analyst)	<input type="checkbox"/>
- Communication:** A list of messages and a detailed view of a message.

From	subject	time
Lucia	A new task for you!	11:35
Nick	Can you please...	11:27
Marcus	Question concerning task 1	11:22
Mo	Hello	11:21
Roderick	What shall we do next?	11:17

Detailed message view:

From	subject	time	to	cc
Mo	Hi, here you are some more flower pictures. Just tell me if you need more or different ones...	11:21	Mo	Mo
- Navigation:** A map showing the current location and task area.
- Annotation:** A detailed view of a discovered flower.

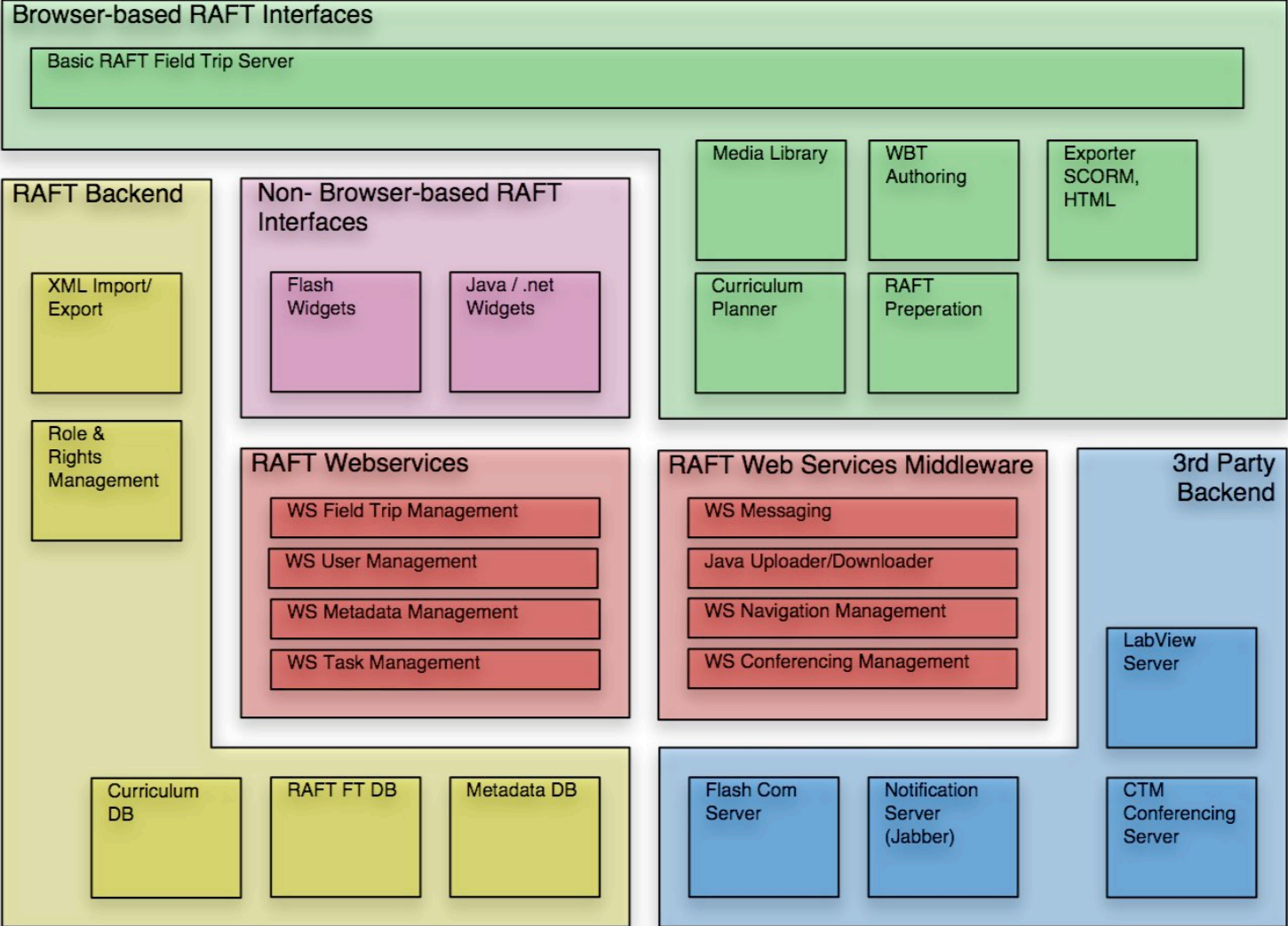
title:	
Thymus praecox flower	
Comment:	
A good one, you've something added to it. I'll be back at 11:00. I'll give a comment and see if we can have a final report. I'll be back at 11:00.	
Related to:	Flower task
Discovered by:	Mo

The handheld device (Gotive) displays a map with a red location pin and a list of nearby points of interest.

5. Select Specialized Hardware



6. Integrate with Standards and Backend Systems



Project Examples



Interface Design, Multimodal Interfaces

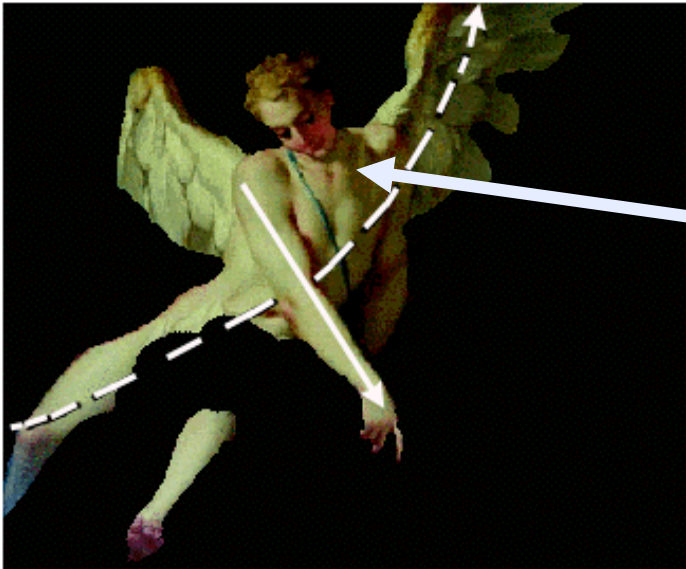
Related projects: HIPPIE – a museum guide

Useful use of multimedia: graphical support

HIPPIE

- [Content](#)
- [Map](#)
- [Tour](#)
- [Search](#)
- [Profile](#)

[Amor und Merkur](#) in [Galerie-Saal](#) in [Schloss Förlinghoven](#)



Amors Körper weist eine Bogenspannung auf. Arm und Körper selbst sind als Pfeil und Bogen gestaltet. Somit ist er vollkommen identifiziert mit dem bewegenden, hinweisenden Prinzip.

Arrow and bow

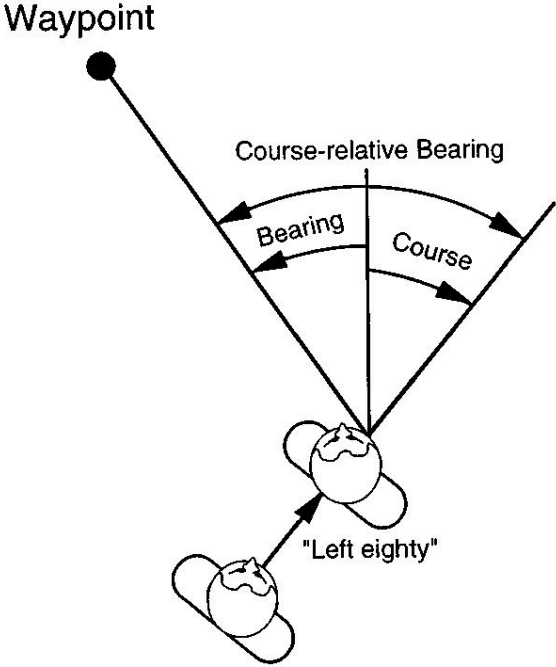
Time: 9 (64) sec.
Title: 2 (6)

[Abstract](#) [Artist](#) [Dateline](#) [Motive](#) [Genre](#) [Material](#) [Technique](#)
[Style](#) [Composition](#) **→ [Form](#)** [Color](#) [Note](#) [View](#) [Way to ...](#)

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)

The screenshot displays the RAFT desktop application interface. At the top, the title bar reads "RAFT desktop: Stefan Apelt". Below it is a menu bar with "File", "Role", and "Skin". The main interface includes a status bar with "Satellites 0/0", "GPS position", and "Map position" fields, along with "Start tracking" and "Connect" buttons. A satellite map shows a location with labels like "AS Bonn-Beul, Ost" and "BECHLINGHOVEN".

The central part of the interface is divided into two panels. The left panel, titled "Einfuehrung in RAFT", contains a list of tasks:

- Dokumentation der Technik-Einfuehrung
- Einfuehrung in das RAFT System
- was ist das?
- Wie sieht euer Schulgebäude aus?

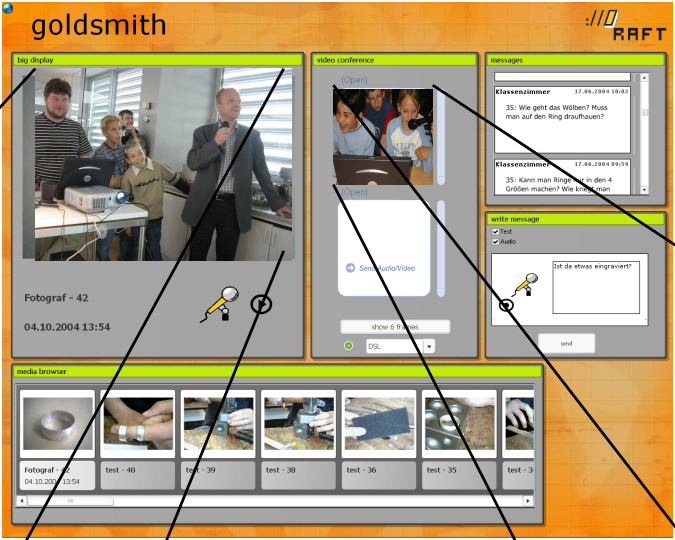
The right panel, titled "Fieldtrip details", contains the following information:

- Fieldtrip: 2434 Einfuehrung in RAFT
- Creator: Jochen Kaul
- Subject: (empty field)
- Description: dieser Kurs dient der Einfuehrung von SchuelerInnen und LehrerInnen in das RAFT System
- Running from: 2004-09-27 07:00:00 to 2005-09-29 22:00:00
- Location: (empty field) Tasks: 4
- Language: deutsch

Below the task list, there is a prompt: "Select a task by clicking on it." At the bottom of the interface, there are buttons for "Collect photos", "Scratch pad", "Local content", and "Context".

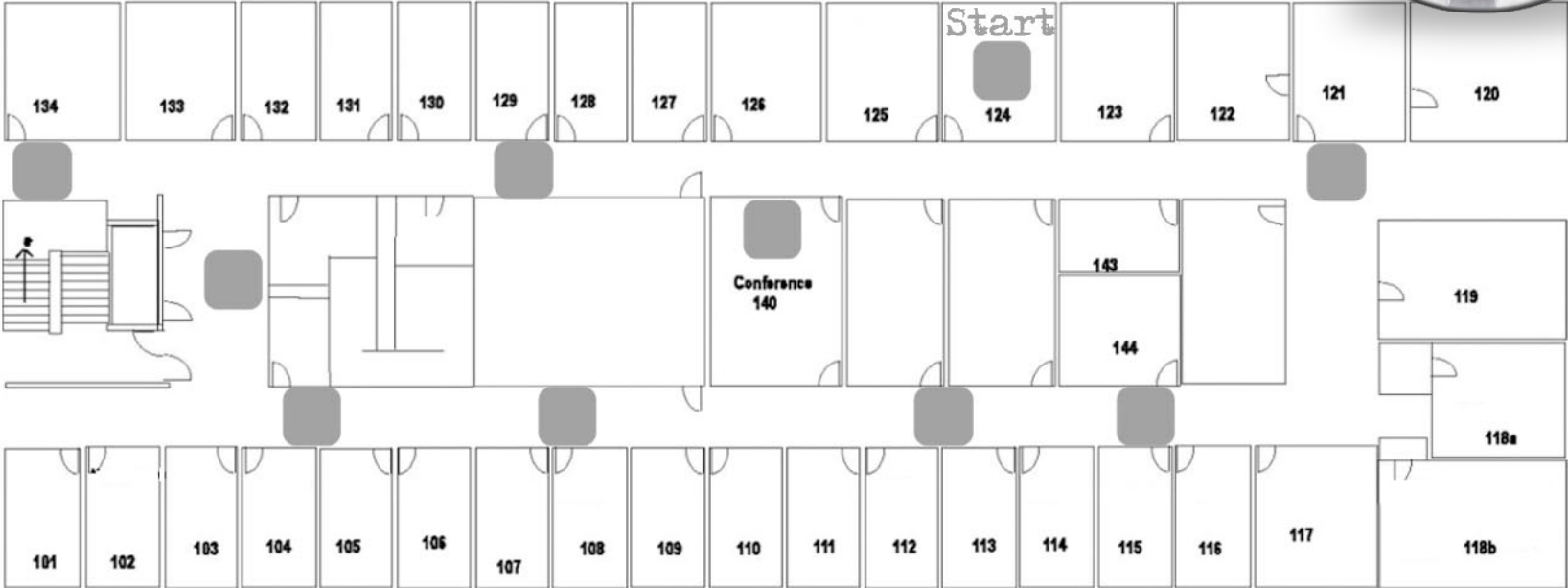
The bottom section features a "Live preview" window showing a man with glasses and a "Captured photo" window showing an office interior. At the very bottom, there is a "Video initialized." status bar and buttons for "Capture" and "Add to task".

Expert Interviews



Mobile Gaming: Locatory

Locatory-Cards



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

sem@code



Google
Base BETA



Thank You.

marcus.speccht@ou.nl

