TEN Competence
Building The European Network for Lifelong Competence Development
Smart Indicator Environment

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Case: TeamSpace
The Challenge

How to utilize interaction footprints for learner support in unstructured or emerging environments?
Our Approach

Highlight and unveil interaction footprints (about effort, interest, and concepts) for reflection support to the learner
The underlying Interaction-Model

Actor

Experience Knowledge

Behaviour

Interaction Footprints

Judgement / Reflection

Response

Monitoring / Assessment

System

Process Log

Reflection Support

Butler & Winne, 1995

Dey, 2000
Example: Context Adaptation for Informal Learning

Engage

Motivate

Reflect

actions

performance

interests
The Architecture
A Few Technical Details about the Services

- REST services
- implemented as LAMP
- State-of-the-Art Web2.0 Features
  - Mash-up enabled
  - XML and JSON as output content types
  - XML and JSON as input content types
Actual Implementation

- **Software Plug-ins**
- **Building Learner Profiles**
- **Processing Learner Profiles**
- **Context Adaptation**
- **AJAX Plug-in**
- **HTML Injection**

Diagram:
- **Sensor Layer**
  - Selection Sensor (click-through detection)
  - Tagging Sensor (del.icio.us JSON Interface)
  - Contribution Sensor (RSS/ATOM Feed Reader)
- **Semantic Layer**
  - Activity Aggregator
  - Interest Aggregator
- **Control Layer**
- **Indicator Layer**
  - Interface Widget
  - Interface Widget
- **Process Log**

Aggregator Definition

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Sensor Service

- Simple Sensors Registration
- Collects Interaction Footprints
- Extensible Sensor Events
- Sensor Event Clustering

The sensor layer is **not** a replacement of Log4J or similar debugging systems
Collect Interaction Footprints

• Sources
  – RSS News Feeds
  – Del.icio.us Bookmarks
  – Online Web-interaction

• Sensors submit interaction events
• Interaction events are stored in the learner’s process log
Semantic Aggregation Service

• Analyze the process log
  – Anonymous analysis
  – User centered analysis

• Open framework for sensor analysis
• Named aggregators
• Extension through aggregator scripts
Aggregator Scripts

Operator

Result Data Set

Data Set Collector

Result Set Definition

Limits of the Data Set

Conditions

Data Set Collector

Result Set Definition

Limits of the Data Set

Conditions

Fixed Data Set
Context Adaptation

- **Selection Sensor**: (click-through detection)
- **Tagging Sensor**: (del.icio.us JSON Interface)
- **Contribution Sensor**: (RSS/ATOM Feed Reader)

**Sensor Layer**
- **Activity Aggregator**
- **Interest Aggregator**

**Semantic Layer**
- **Control Layer**
- **Indicator Layer**

**Style Sheets**

**Data Flow**
- **Control**

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Adaptation Strategies

Context Boundary

Resources

Adaptation Strategy
Smart Indicator Contexts

- Sensor Reference
- Context Boundary
- Indicator Reference
- Aggregator Reference
Web Integration
Web-App Integration Architecture

Minimize interference with the business logic of a web-application

• Application independent code injection
  – Sensor Code
  – Indicator Code

• Modular frontend for web-applications
Frontend Architecture Layout

First level Services
(delicious/ blog cache; shoutbox, search)

TeamSpace

User Management and Registration

Sensor Service

Context Detection Service

Aggregator Service

EventManager

Indicator Manager

UserManager

Sensor Manager

User Update

Application Event

Sensor Update

User Update

Indication Details

User Update

Sensor Update

Indication Details
Management of Non-DOM-Events

Non-DOM-events = high level application logic

• Richer meaning of things that happen in the UI
  – Independent from the DOM structure of the UI
  – Connection points for events on code level

• Sub-systems can hook in on high-level functions
  – E.g. “followlink”, “userupdate”, or “sensorupdate”

• Events can be triggered by different sub-systems
Thank you