Design Patterns for Recording and Analyzing Usage in Learning Systems

Agathe Merceron
TFH Berlin, De
DPULS JEIRP partners

- **Leader**
  - Christophe Choquet, University Le Mans, FR

- **Steering committee**
  - Christophe Choquet, University Le Mans, FR
  - Agathe Merceron, TFH Berlin, DE (ESILV, FR)
  - Francesca Pozzi, ITD-CNR, IT
  - Feliza Verdejo, Uned, E

- **Consortium**
  - University Le Mans, FR
  - Engineering School ESILV, FR
  - ITD-CNR, IT
  - Distance University Uned, E
  - AIDA - Paris, FR
  - University Grenoble, Fr
  - University Birmingham, UK
  - University Sofia, BU
  - Distance University Quebec, CA
Scope, aims and purpose

- Learning system (dedicated software or LMS or CSCL) for technology mediated activities.
- Emphasis on support for special participants: designers, teachers.
- Emphasis on which interactions to record, and on how to analyse them.
- Capitalize knowledge on tracking problems and solutions.
- Share this knowledge.
Methodology

- Collection and initial structuring of experiences.
- Identification of recurrent tracking problems and solutions.
- Creating, Refining and Validating Design Patterns.
Collection of Experiences
Experiences → Recurrent problems and Solutions

- What do they all share?
Learners' Assessment - Scenario

• Sarah is a teacher who organizes lab work for a group of students. She wants a report on the lab work session to check whether some know-how has been mastered and to get an insight on the kind of strategies the students have used. Her aim is to plan the next session and to adapt her teaching to her students' understanding. She needs an overview on the students' activity during the lab session.
Recurrent problems and solutions

- Definition of a common vocabulary able to describe tracking problems and solutions.
  - Identification of indicators.
  - Allows for search facilities through a Pattern Browser.
- Relationships between problems.
Common Vocabulary - Snapshot

- **Description of the problem**
  - Used to build a patterns’ connectivities map

- **Fields which are used by searching tools (Filter Search)**
  - Explains how the solution can be deployed

- **Design Pattern**
  - 1-General
    - 1-1-DP Name
    - 1-2-DP Abstract
    - 1-3-DP Category
  - 1-4-DP Context
    - 1-4-1-Type of System
    - 1-4-2-Type of Situation
    - 1-4-3-Actors
    - 1-4-4-Context Description
  - 2-Problem
    - 2-1-Statement
    - 2-2-Tracking Focus
    - 2-3-Analysis
  - 3-Set of Solutions
    - 3-1-Solution Name
    - 3-2-Objectives
    - 3-3-Requisites
      - 3-3-1-Indicators
      - 3-3-2-Method Type
    - 3-4-Solution Description
    - 3-5-Discussion
DPs Structure

- Collaboration
- Learners' assessment
- Material Validation
- Tutoring/Regulation of Learning
**DPs: Learners' Assessment**

- **LA1 Multidimensional Analysis of a Learner’s Solution to a single Exercise**
  - LA1.1 Pattern matching to analyze the learner’s solution
  - LA1.2 Specific software to analyze the learner’s solution
  - LA1.3 Human assessor to check the automatic analysis of the learner’s solution

- **LA2 Overview on a learner’s activity across a set of exercises**
  - ....

- **LA3 Overview of the activity of a group of learners on a single exercise**

- **LA4 Overview of the activity of a group of learners on a set of exercises**
Pattern Browser

All Design Patterns ▼

All Relations ▼

All Categories ▼

MV1 Material Improvement
MV2.2 Self-consistency
MV1.1 Course Improvement
MV1.4 Evaluating activity
LA4.2 Relations between e
LA4.1 Automatic clusterin
LA5.1 Browsing Use of a M
LA4.2 Overview of the act
LA4.1 Association rules
LA4 Overview of the act
LA4.1 Automatic clusterin
LA4.2 Relations between e
LA4 Overview of the act
LA1 Multidimensional Anal
LA3 Overview of the act
LA2 Overview on a learner
LA2.2 Learner’s situation
LA1.3 Human assessor to c
LA1.2 Specific software
LA2.1 Learner’s situation
C1 - Effectiveness of Col
DP V1.9 Correlation
Switching to
Evaluating the learner’s
dependence of prac
of use of Help Desk
Browser: Search View
Main Outcomes and Achievements

- Organization and participation to the UALS workshop of AIED Conference 2005.
- Guest editors of a special issue of the French-speaking review STICEF. To be published.
- Indexation of the Browser of design patterns for recording and analysing usage of learning systems in the open archive TeLearn
  - http://telearn.noe-kaleidoscope.org
Design Patterns for Recording and Analyzing Usage in Learning Systems: Prospects

Agathe Merceron
TFH Berlin, De
Prospects

Observe that *IT-Society needs capitalization on experiences and sharing (Web2.0).*

- DPULS DPs are very high-level. Designers and teachers need operational DPs for their concrete problems:
  - What (and how) to store: which trails should be produce.
  - How to analyse trails: what indicators should be used.
  - *Common format, interoperable tools.*
Prospects

- Further need to share experience and build a set of good practices on designing technology mediated activities in such a way (1) that users need to interact and (2) that interesting interactions are recorded without overloading users.
  - IA-aware TEL-platforms.

- Further investigation on interaction analysis needed, and relation with educational data mining.
  - Students making mistake A make also mistake B.