Turning recurrent uses of e-learning tools into reusable pedagogical activities

a Meta-Modeling approach applied to a Moodle case-study

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Research context

• LIUM : Computer Science Lab (Le Mans, France)
  – TEL systems engineering team

• GraphiT project
  – Funded by the French research agency (ANR)
The GraphiT Project
Visual Instructional Design Language

- A modeling language
- To design learning scenarios
- Define a visual representation of pedagogical concepts
- Support creative thinking and human communication
- Do not systematically provide binding mechanisms to popular LMS
Issues

• Institutions impose a specific LMS to teachers
• Teachers are (sometimes) trained on how to use it
  – Not how to design learning situations on the LMS
• -of-the-
  and LMS
  – -the-
  – Depending on the teacher skills about the LMS
Objectives

• Provide teachers with graphical learning design language
  – with LMS

• Help to focus on the pedagogical aspect of the scenario
  – Instead of setting-up complex tools

• Foster individual reflection about learning design

• Improve uses of the existent LMS
Overall architecture
Survey & Interviews

- Open and spread through French-speaking higher education institutions
- Up to 21 questions
  - Learning design skills
  - LMS skills
  - LMS user experience
- 208 complete answers
- Interviews conducted with 20 selected people who answered the survey

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Results

• Settings screens too complex
  – Mixing pedagogical and technical parameters

• Time consuming when elaborating complex learning situations

• Teachers have a common set of design practices

• But all use a mix of LMS tools and pedagogical concepts
Requirements

- Graphical notation
- High level pedagogical blocks
- Mixing LMS and abstracted semantics
- Editable default implementation (mapping)
- Non-visible information
- Activity structures
Abstractions

• Moodle-specific
• Pedagogical activity
  – Tool or resource based
  – Focus on one pedagogical use
  – Hide implementation parameters
  – Has specific properties
• Activity structure
  – To implement structural strategies
  – Common in VIDLs
MetaModel
Identification method

1. Analysis of reccurent uses of a specific Moodle tool
2. Identification of tools offering common uses
3. Specification of discriminating criteria
Identification method

• The pedagogical activity name is only from a teacher perspective if no students are concerned

• Tools participating to the realization of the activity are the elements A12...A1n.

• Discriminating criteria are the elements A21...Am1.

• Discriminating criteria are expressed as much as possible as a pedagogical question designers have to answer by Yes or No.

• Cells intersecting a discriminating criterion and a tool must embed all answers that can implied to choose this tool (Yes/No are both possible if the tool can support both pedagogical cases).

• A valid discriminating criterion must cause at least one different answers for one tool.

• The matrix is terminated if there is no similar combination of answers for two tools.
## Identification method

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Mapping Implementation

• Using model transformations at run-time
  – Generated through High Order Transformation
• Modifiable through generic weaving model editor
Learning scenario editor

• Sirius based diagram editor

• 3 levels of diagram
  – Learning sessions
  – Pedagogical activities and structures
  – Moodle tools and resources

• Sequencing elements through node connections
Learning scenario editor (wip)
Conclusion & Perspectives

Contributions:

• Platform specific VIDL
• Abstraction of LMS tools based on specific usage and parameters
• Automatic mapping through model weaving
• Diagram based editor

Perspectives:

• More complete visual notation
• Adding groups and pedagogical objective
• More user-friendly editors
• Final model transformation for export feature
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Thank you!

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