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)
  – http://www-lium.univ-lemans.fr/~laforcad/graphit/
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
• No “out-of-the-box” Binding between LD standard and LMS
  – Direct “on-the-fly” design on the LMS
  – Depending on the teacher skills about the LMS
Objectives

• Provide teachers with graphical learning design language
  – “compatible” 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 educations 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

24/05/2015
Results

• Settings screens too complex
  – Mixing pedagogical and technical parameters
• Time consuming when elaborating complex learning situations
• Teachers don’t 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 recurrent uses of a specific Moodle tool
2. Identification of tools offering common uses
3. Specification of discriminating criteria
Identification method

- **R1** The pedagogical activity name is only from a teacher perspective if no students are concerned.
- **R2** Tools participating to the realization of the activity are the elements A12...A1n.
- **R3** Discriminating criteria are the elements A21...Am1.
- **R4** Discriminating criteria are expressed as much as possible as a pedagogical question designers have to answer by Yes or No.
- **R5** 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).
- **R6** A valid discriminating criterion must cause at least one different answers for one tool.
- **R7** The matrix is terminated if there is no similar combination of answers for two tools.
# Identification method

<table>
<thead>
<tr>
<th>Answer a poll</th>
<th>Quiz</th>
<th>Choice</th>
<th>Feedback</th>
<th>Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>2+ questions ?</td>
<td>Yes/No</td>
<td>No</td>
<td>Yes/No</td>
<td>Yes</td>
</tr>
<tr>
<td>Multiple choices ?</td>
<td>Yes/No</td>
<td>No</td>
<td>Yes/No</td>
<td>Yes</td>
</tr>
<tr>
<td>Pre-populated</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Time-limit</td>
<td>Yes/No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Anonymous</td>
<td>No</td>
<td>No</td>
<td>Yes/No</td>
<td>No</td>
</tr>
<tr>
<td>Graded</td>
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<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Feedback after submission</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
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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