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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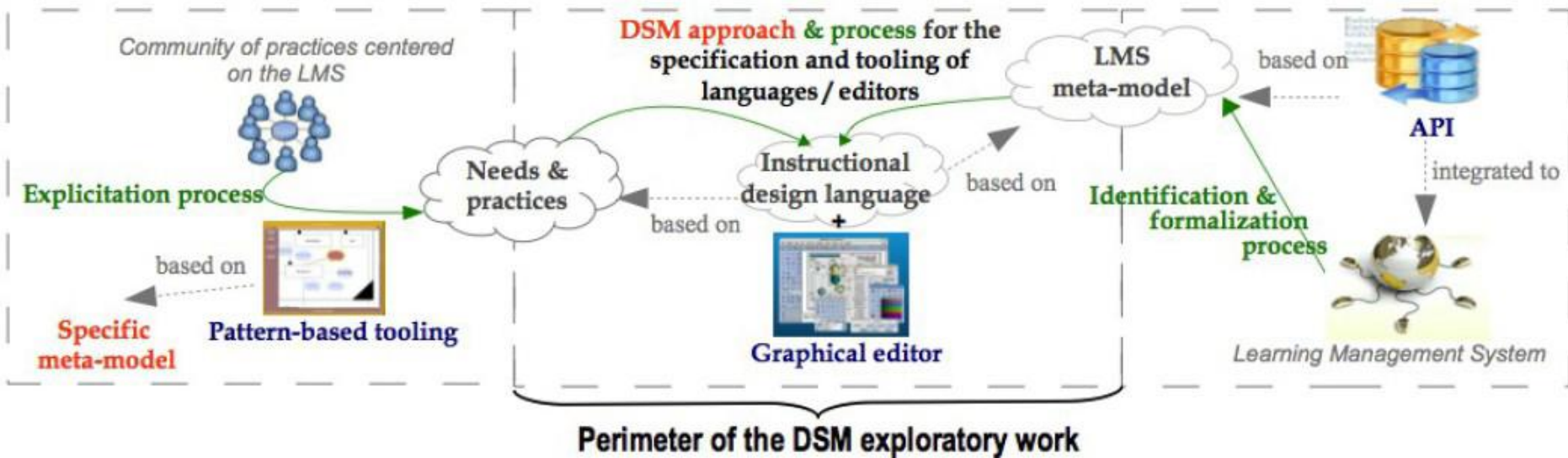LIUM (Laboratoire d'Informatique de l'Université du Maine) Lab

TEL (Technology-Enhanced Learning)Team

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 mecanisms to popular LMS

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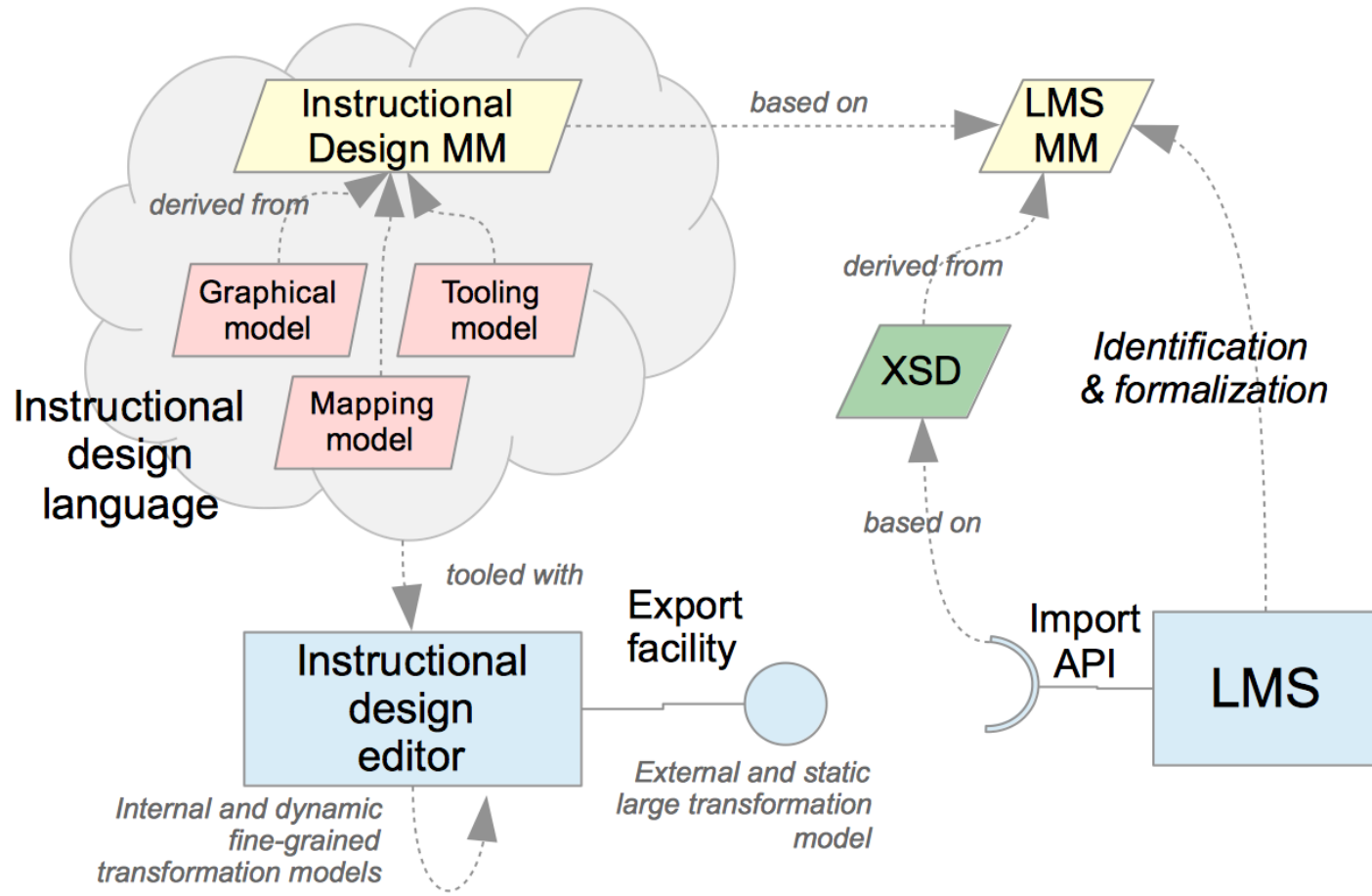
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Issues

- 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

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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

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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

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
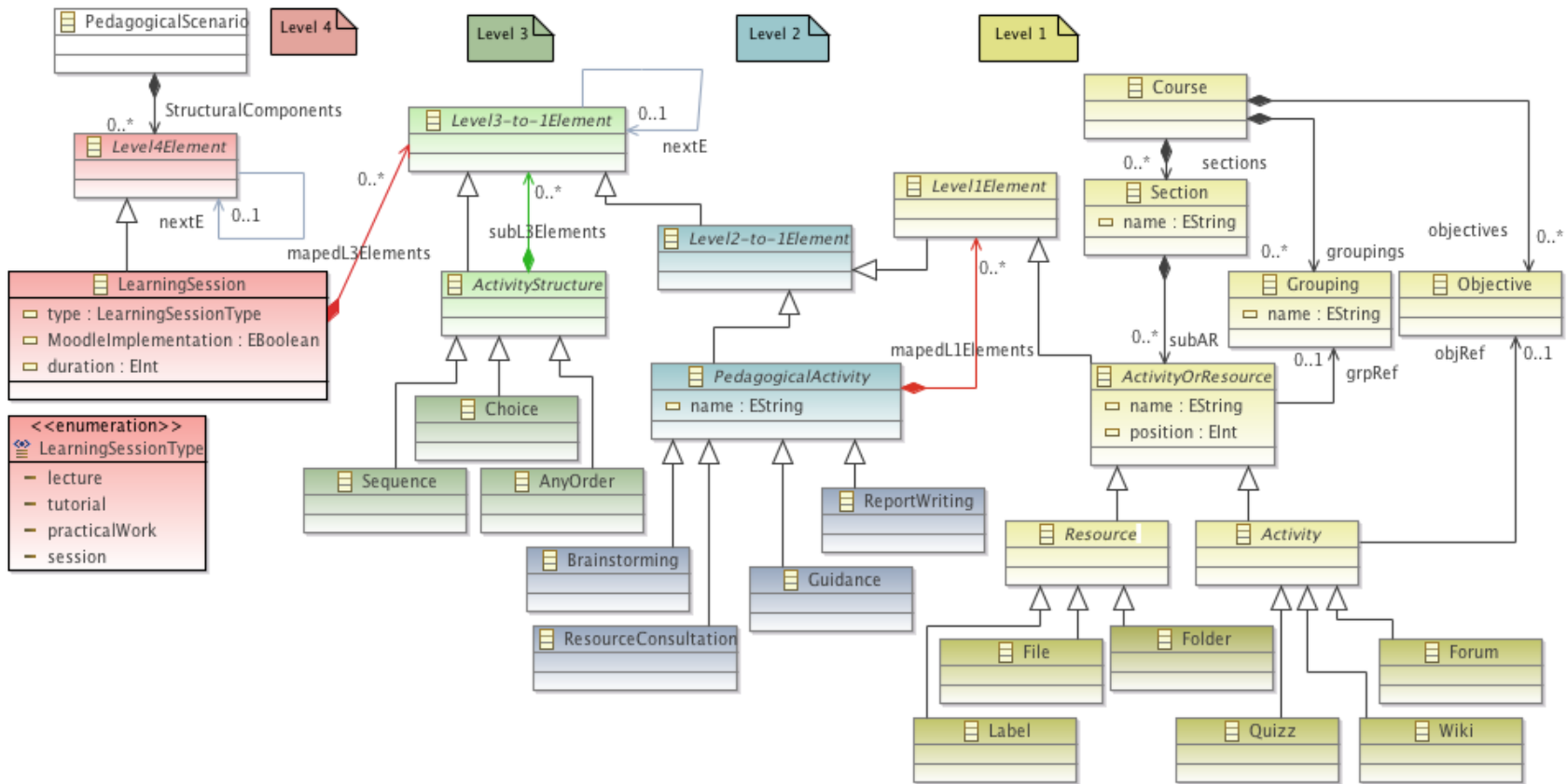
Identification method

1. Analysis of reccurent 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

Answer a poll	Quiz	Choice	Feedback	Survey
2+ questions ?	Yes/No	No	Yes/No	Yes
Multiple choices ?	Yes/No	No	Yes/No	Yes
Pre-populated	No	No	No	Yes
Time-limit	Yes/No	No	No	No
Anonymous	No	No	Yes/No	No
Graded	Yes	No	No	No
Feedback after submission	Yes	No	Yes	No

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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)
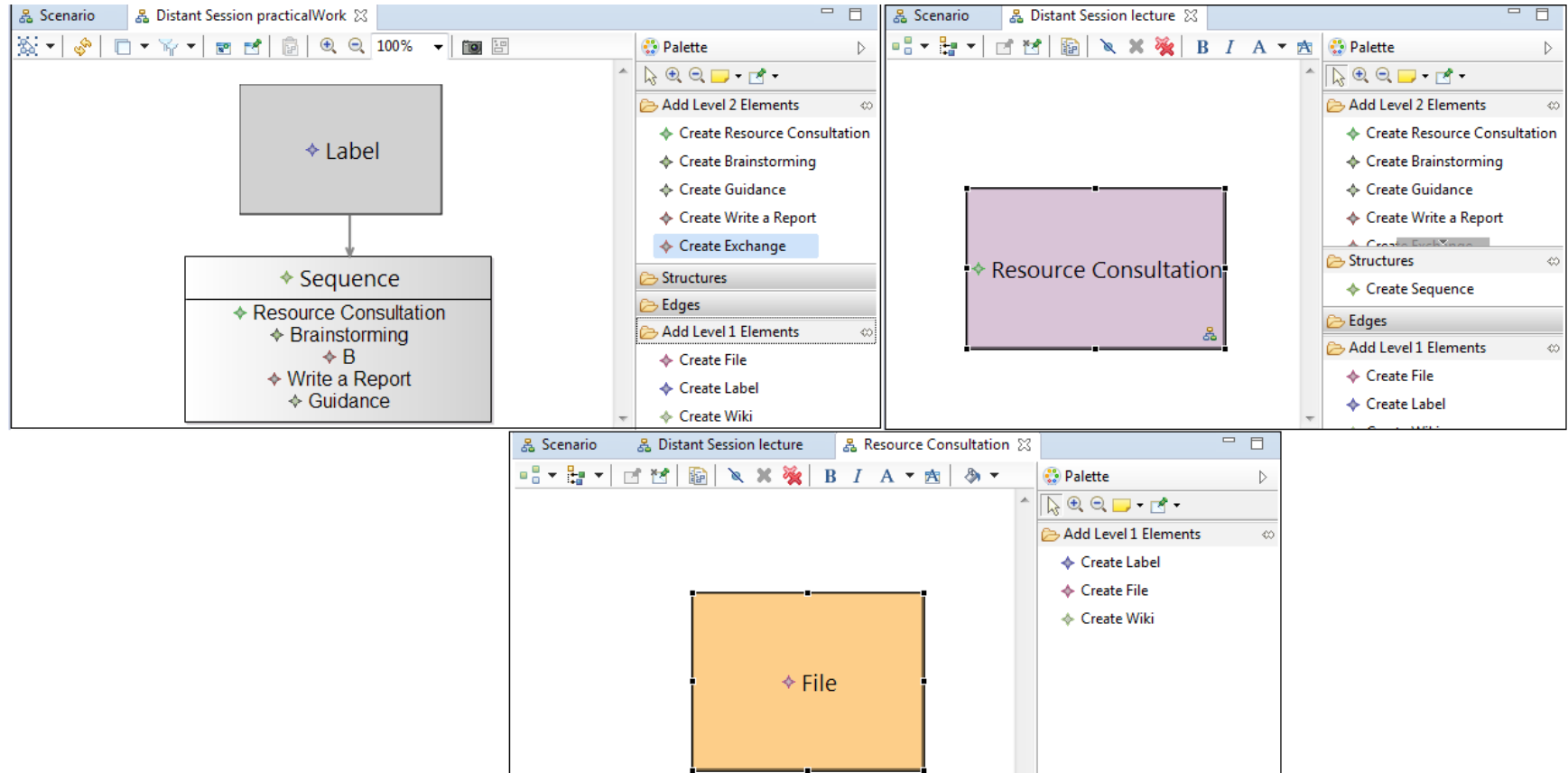
Conclusion & Perspectives

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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