Operationalization of Learning Scenarios on Open and Distance Learning platforms: the case of the Moodle Platform

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Outline

- Introduction
- General Problematic
- Related approaches
- Focusing on the platform language
- Case of study: Moodle
- DSM approach
- Conclusions & Future Works
Introduction

❖ Context

➢ Instructional design
  ▪ Learning scenarios
  ▪ EML (Educational Modeling Language)
  ▪ VIDL (Visual Instructional Design Language)
  ▪ Standards

➢ Platforms/LMS
  ▪ Learning Scenarios
  ▪ Specific platforms Language
  ▪ Dedicated editors
  ▪ Infrastructure
Introduction

Findings

- Many EMLs, VIDLs
- Few standards and authoring tools
- EML are generally not compatible with platforms
- Many difficulties to appropriate platforms by teachers designers
- Practitioners are not familiar with this implicit instructional design domain
- Each platform embeds a specific instructional design paradigm
Introduction

Process of design and re-engineering of a learning scenario

1. Design
   - Learning scenario, didactic intention, course, etc.

2. Operationalization
   - Platforms, scenario, specific infrastructure, etc.

3. Execution
   - Tutors, learners, platforms, etc.

4. Analysis
   - Observations, traces, etc.

Facilitate the instructional design and the operationalization of learning scenarios on specific platforms
1. How to improve the specific design of learning scenarios on an existing platform?

2. How to ensure the operationalization of learning scenarios?
Related approaches

- Editorial chain dedicated to PF
- Use of external tools
  - whiteboard
- Use of practitioners centred tools
  - Collage, CPM
- Internal Design to PF
- Standards
  - SCORM, IMS-LD
- Transcription + implementation
- Choice of specific course + import
- Scenarlii

Didactic intention

Teacher designer

PF

Moodle Ganesha ...

Standards

Comp. PFs?
[yes] [no]

Comp. Standards?
[yes] [no]

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Focusing on the platform language

1. Identifying and formalizing of the implicit learning design language
2. Exposing the identified language to specify new authoring tools
3. Adding a specific API to the LMS for realizing the import/export facilities
Case of study: Moodle learning design language

The identification of Moodle language

**Goal**: identify concepts, attributes and relationships composing the abstract syntax of the implicit MOODLE language

**Method**: platform analysis
- Analyzing user interfaces (HMI)
- Analyzing data persistence in MOODLE database
- Analyzing the platform functionalities
  - Backup functionality
  - Restore functionality
Case of study: Moodle learning design language

- **The explicitation of the Moodle language**
  - Choice of a concrete syntax for the representation of the language vocabulary and grammar
  - Choice of the XML notation
    - Its widely use in interoperability standards
    - Its use by the backup and the restore functionalities of MOODLE
  - **Method**
    - develop an instance of an XML document representing a complete course,
    - specify an XML schema,
    - complete and refine the xml schema in order to clarify all possible semantics that was not explicit in the previous XML instance
  - The XML schema represents the Moodle business language we propose as a communication format between external tools and the LMS
Case of study: Moodle learning design language
Case of study: Moodle learning design language

- Import/Export communication module for Moodle
  - An API between the external design tools and MOODLE
  - Ensuring the operationalization and the export of learning scenarios
  - Two processes:
    - The first one deals with the course export and its formalization in the specified platform language
      - The backup functionality in MOODLE
      - An XSLT transformation to generate an XML document instance conformed to our XML schema and handleable by the design tools
Case of study: Moodle learning design language

- The second one concerns the importation of scenarios in the platform
  - Based on the existing restore function of MOODLE
  - Developing an XSLT transformation complete and to transform the scenario into the expected format by the restore functionality
Case of study: Moodle learning design language

JAVA PROGRAMMATION

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Topic outline

1. JAVA: Variables and Types
   - Variables and Types

2. JAVA: Methods
   - Classes and Methods
   - Programs with Multiple Methods
   - Methods with Results
   - Samples

3. JAVA: Arrays
   - Creating and Using Arrays
   - Programming With Arrays
   - Arrays samples
   - Exercise
   - Programming problems
   - Programming help

4. The Way of the Program
   - What is a Programming Language?
   - What is a Program?
   - What is Debugging?
   - The First Program

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DSM approach

“DSM (Domain Specific Modeling) is a software engineering methodology for systems design and development which involves the systematic use of graphical languages to represent different system facets” [Laforcade and al., 2008]

Apply the DSM tools
- Specification of VIDL on top of the LMS metamodel
- Generation of a dedicated graphical editor

Our aim is to provide practitioners with some external learning design editors based on the platforms languages

We hope helping them in improving and facilitating their self-reflection and communication about the learning design of their courses
Conclusion

- Our objective is
  - to improve the design task on existent platforms
  - to automate the operationalization process of a course on a given platform

- Our proposal is
  - to externalize the design of a learning scenario by the mean of an editor, reifying a VIDL based on the Domain Specific Language of the targeted platform
  - to develop a bridge between this editor and the platform for ensuring the operationalization and the export of the scenario
  - to explore the potential of Domain Specific Modeling

- Our originality
  - Centering the design of the platform abilities
Current and future Works

- We actually work on two directions:
  - Defining an other DSL for Moodle
  - Study at least an other LMS (Ganesha) and repeat the same approach

- Study the interoperability between platforms through the models created by these dedicated editors

- Finalize the development of the graphical editor dedicated to Moodle, according to the DSM approach thanks to GMF (Graphical Modeling Framework) tooling
Thank you

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