

AM-OER: An Agile Method for the Development of Open Educational Resources

Maurício M. Arimoto
Ellen F. Barbosa

Universidade de São Paulo (USP)
Instituto de Ciências Matemáticas e de Computação (ICMC)

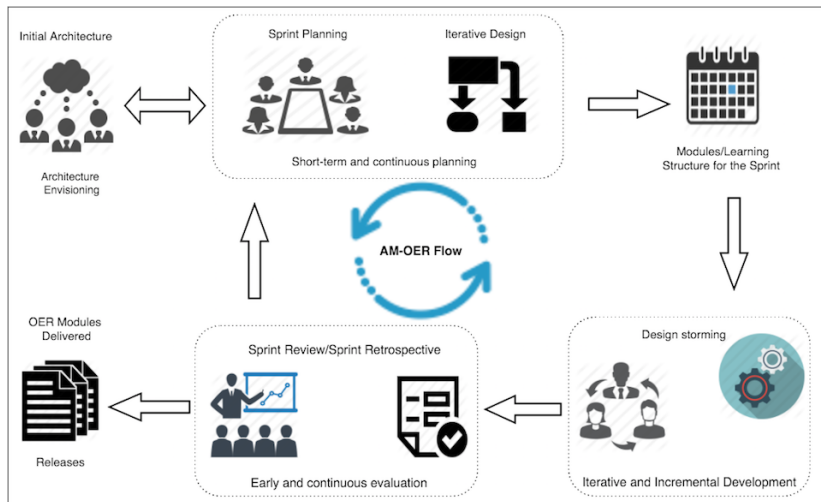
March 17, 2016



Agenda

- 1 AM-OER Overview
- 2 Characteristics and Practices
- 3 Phases

AM-OER Overview



Characteristics and Practices

- Characteristics and practices are derived from Agile Methods and Learning Design

Table: Agile practices

Practices	Description
Small releases	Releases are composed by small set of features prioritized (according to their order of relevance) by the customer
Sprint planning	The team reviews and decides on what will be implemented within a sprint and how the work will be performed
Architecture envisioning	Initial software architecture and requirements are designed at the beginning of a project to identify and think through critical issues
Iterative modelling/design	Functionalities are designed at the beginning of an iteration to identify team's strategy for that iteration
Model/Design Storming	Functionalities are designed on a Just-In-Time (JIT) basis to reflect on specific aspects of team's solution
Simple design	A solution is designed as simple as possible to easily adapt to changes, without demanding much effort
Refactoring	Small changes are performed to improve part of a solution without changing its semantic meaning
Continuous integration	Releases are integrated and tested several times a day, whenever a task is completed
Collaborative development	Team members constantly interact and communicate throughout the development process
Sprint review	Team gets together at the end of a sprint to demonstrate to the customer the work done within the sprint
Sprint retrospective	Team gets together after the sprint review to discuss what working and what is not working well in the project

Characteristics and Practices

Short-term and continuous planning

- The OER project focuses on **short-term** and **continuous** planning in each development cycle
- **Small releases** planned before starting the project (sprint #0)
 - Small modules composed by contents, learning activities, assessment and tools
 - Each release is divided into one or more sprints
 - Sprints are shorter (days to few weeks)
- **Sprint planning** before starting each development sprint
 - What will be delivered at the end of the sprint
 - How the work will be conducted

Characteristics and Practices

Dynamic and incremental design

- The design process is dynamic and involves the whole team
- The design involves design just enough for the current sprint (**simple design**)
- The design is performed **incrementally**
 - Modifications and improvements can be carried out in any part of the process
- **Architecture envisioning** obtains an overall structure of the intended OER
 - **LD** practices help to think about and define the **key components** of the intended OER
 - contents needed, learning assessment activities, learners/educators dialogical and collaboration issues

Characteristics and Practices

Dynamic and incremental design

- **Iterative design** sketches the learning structure of the OER for the **current** sprint
 - **LD** practices help to describe and map the **main components** of such structure
 - learning activities to the intended learning outcomes, the contents, the tools and assessments
- **Design storming** sketches specific aspects of the OER activities flow
 - **LD** practices help to describe and map the flow of **individual** learning activities

Characteristics and Practices

Iterative and Incremental Development

- The development of OERs occurs **incrementally** by short sprints
 - Promotes flexibility, with rapid responses to changes
- Releases are delivered **periodically**
 - Learners have the opportunity to use and evaluate
- New components and enhancement requests are produced as development progresses
- At the end of all planned sprints, a **stable release** is delivered

Characteristics and Practices

Collaborative approach

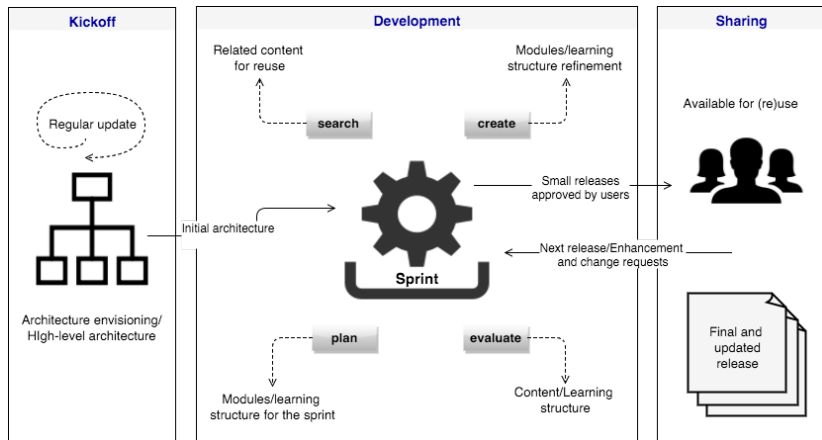
- All those involved should **interact** and **cooperate** constantly throughout the development
 - Problems can be solved more quickly, reducing time and effort
- The **active participation of users** is encouraged during the development
 - Help in the definition of general goals/learning objectives, learning activities, contents, tools and assessments

Characteristics and Practices

Early and continuous evaluation

- Evaluation is carried out **early** and **continuously** throughout the development process
- **Sprint review:**
 - Check whether the OER being created is in agreement with those previously planned
 - Opportunity to identify new perspectives for the OER
 - Possibility to identify changes and improvements
- **Sprint retrospective:**
 - Opportunity think about how the OER development is progressing
 - Identify and analyse the and mistakes
 - Improve next sprints

AM-OER Phases



- Identify and think about **critical issues** and the **main elements** of the intended OER
 - Identify learning needs/problems
 - Establish the overall structure

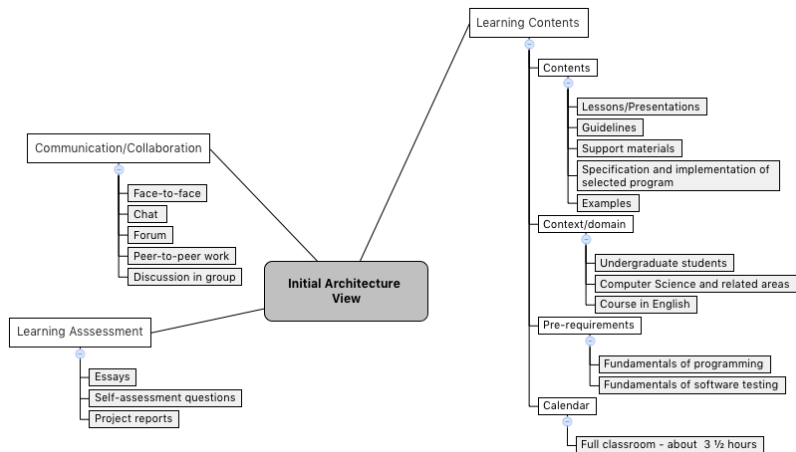
➔ Learning needs

- A common deficiency of many OERs is the **inadequate analysis** of the **learner's needs**
- Many OERs do not have basic elements of **LD** such as **learning objectives**
- The starting point is to focus on the **needs** and **problems** that learners face
 - **General goals**, indicating what the educator intend to cover/present in an OER
 - **Learning objectives**, indicating one of the specific subjects covered by an OER
 - **Context/domain** of use

➔ Overall structure

- Primary **learning contents**
 - * how will OER be delivered to learners (face-to-face, online or hybrid)?
 - * how will learners be supported (face-to-face, online or hybrid)?
 - * how will subjects, topics or concepts be introduced to learners?
 - * what kind of activities learners will need to perform?
- **Learning assessment** activities
 - * how will assessment activities be (online, paper based or both)?
 - * which assessment strategy will be used (diagnostic, formative, summative or which combination of them)?
- **Dialogical** and **collaboration** issues
 - * how will learners communicate and collaborate with their colleagues (online, face-to-face, both)?
 - * how learners will communicate and collaborate with educators (online, face-to-face, both)?
 - * how learners will perform their activities (individually, peer-to-peer work, work in a group)?

Figure: Overall structure of an OER

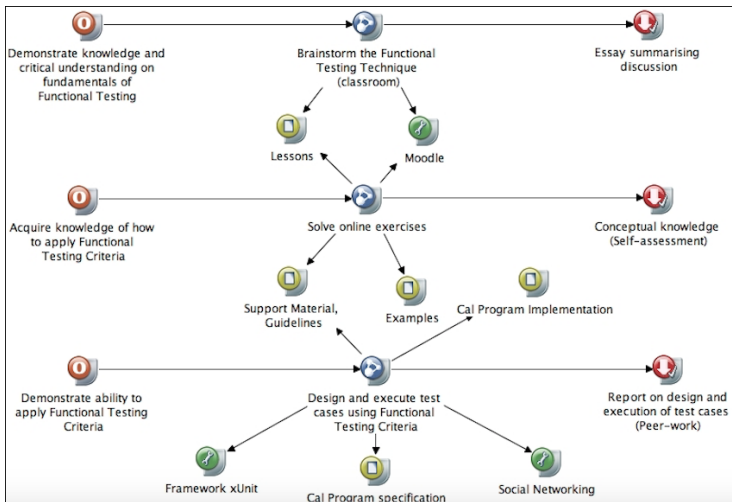


- The whole effort to plan, design, create and evaluate the OER within a sprint
 - Prioritise and select OER modules
 - Design the learning structure
 - Define metadata
 - Search for related learning contents
 - Create OER modules
 - Establish licensing policies
 - Evaluate OER modules
 - Evaluate sprint execution

➔ Learning Structure

- Sketch of a learning structure for the OER
- The OER is designed iteratively in small increments (**iterative design**)
- Learning activities are specified and mapped with the intended learning outcomes, contents, tools and assessment activities (**Learning Outcomes View**)
 - Reflect on the **flow** of the OER activities
 - Obtain a **structured** learning process

Figure: Learning Outcomes View: Mapping learning activities with learning outcomes, content, tools and assessment activities.



➔ Metadata

- Gathering and identification of primary **metadata**
- describe relevant **characteristics** of an OER
- facilitate the reuse and recovery (**discoverability** issue)

Table: Metadata of OERs

Attributes	Description
Author's name	responsible for the development of the OER (person/educational institution/ organisation)
Publisher	responsible for making the OER available for other users
Contributor	responsible for making contributions for the development of the OER (person/ educational institution/organisation)
Identifier	an unambiguous reference to the OER within a specific context or knowledge domain
Title	formal and objective name assigned to the OER
Data	period of time related to the development or availability of the OER
Rights	clear authorship and intellectual property rights (IPR) and conditions of use on the OER
Language	language of the contents associated to the OER
Type	nature or genre of the contents associated to the OER
Format	file format, physical medium, or dimension of the contents associated to the OER
Grade level	target audience, such as primary or secondary school, undergraduate or graduate
Subject	topics related to the context of use of OER, which can be represented by an keywords or key phrases
Description	central idea of the OER and its objectives

➔ Related contents

- Search for related content to be reused to compose the intended OER
 - Contents previously used by educators and colleagues
 - Online contents through:
 - specialised search engines (e.g., Open Education Consortium: oeconsortium.org)
 - institutional repositories (e.g., OpenStax CNX: cnx.org)
 - digital library (e.g., OER Commons: oercommons.org)
 - ...
- Need to check:
 - File format
 - Licensing policies
 - Content sources
 - Appropriateness

➔ OER module creation

- When reusing third-part materials some issues need to be analysed and defined:
 - Whether the contents found fit the **didactic-pedagogical** objectives of the OER
 - What are the **weakness** and **shortcomings** of the contents or whatever needs to be **revised**, **changed** or **improved**
 - What has to be **added** or **mixed** with the contents, and what has to be created from **scratch** to compose the intended OER

➔ OER module creation

- Reusing third-part materials to compose an OER involves different **adaptations**:
 - Make small **fixes** and **improvements**
 - Add new **components** (contents, activities, tools and assessments)
 - Provide different **ways** of learning
 - Recreate **incomplete** and **shortcomings** contents
 - Repurpose contents to meet **specific needs**
 - Contextualise contents to new **context**

















➔ OER module creation

- It can be **difficult** to find third part materials that **fits the purpose**
- Regardless of reuse material or not
 - An OER is designed and created through small sprints
 - Delivery of small releases
- Before starting to develop the OER itself
 - The whole team gets together to discuss and create a JIT design (**design storming**)
 - OER activities are refined and decomposed in simpler activities and atomic (**Learning Tasks View**)
 - reflect on specific design issues
 - help to create an effective OER with embedded pedagogical design practices

➔ Licensing policies

- Establishment of **licensing policies** to share the OER
- OER implies the use of **open licenses** with little or no restriction
- To define licensing policies we should:
 - 1 Verify the authorship and intellectual property rights of third-part materials (when used)
 - 2 Decide how the OER will be available (for instance, if non-commercial use is allowed or not)
 - 3 Choose the appropriate license considering items 1 and 2
- **Creative Commons** licenses are most popular and widely used
- Some licenses are **incompatible**

Table: Creative Commons licenses: Compatibility between licenses.

	 PUBLIC DOMAIN	 PUBLIC DOMAIN	 BY NC ND	 BY NC SA	 BY NC	 BY ND	 BY SA	 BY
 PUBLIC DOMAIN	✓	✓	X	✓	✓	✓	✓	X
 PUBLIC DOMAIN	✓	✓	X	✓	✓	X	✓	X
 BY NC ND	X	X	X	X	X	X	X	X
 BY NC SA	✓	✓	✓	X	✓	X	✓	X
 BY NC	✓	✓	✓	X	✓	X	✓	X
 BY ND	X	X	X	X	X	X	X	X
 BY SA	✓	✓	✓	✓	X	X	X	X
 BY	✓	✓	✓	✓	✓	X	✓	X

➔ OER Evaluation

- OER module produced in the current sprint is approved/dissatisfied (**sprint review**)
- Assessment criteria/issues:
 - ☑ **Didactic-pedagogical**, such as: (1) accuracy of the contents for the learning objectives; (2) relevance of the contents/fits for purpose; and (3) pedagogical design of materials.
 - ☑ **Technical**, such as: (1) interoperability; (2) accessibility; (3) usability; (4) discoverability; and (4) localisation/globalisation capabilities.
 - ☑ **Legal**, such as: (1) intellectual property and rights; and (2) open licenses policies for the contents.

➔ Sprint Evaluation

- Discussion on the general execution of the current sprint (**sprint retrospective**)
- Identification of problems, mistakes and the need for improvements
 - What **worked** well
 - What **did not** work well
 - What needs to **change** and **improve**
- Gathering lessons learned and feedback

- The OER release should be provided to be used in a learning environment
- Effective access to the release should be allowed according to its context
 - ➔ **Deliver to a target audience**
 - critical to identify weaknesses and propose improvements
 - data about learner's experience should be gathered and analysed
 - ➔ **Make available in easily accessible Locations**
 - platforms, repositories, and institutional or stand-alone websites
 - Web 2.0 and social software
 - CD/DVD formats
 - embedded metadata and open licensing
 - ➔ **Gather Feedback and Review**

AM-OER: An Agile Method for the Development of Open Educational Resources

Maurício M. Arimoto
Ellen F. Barbosa

Universidade de São Paulo (USP)
Instituto de Ciências Matemáticas e de Computação (ICMC)

March 17, 2016

