



# Generation of adapted learning scenarios in a serious game: lessons learnt

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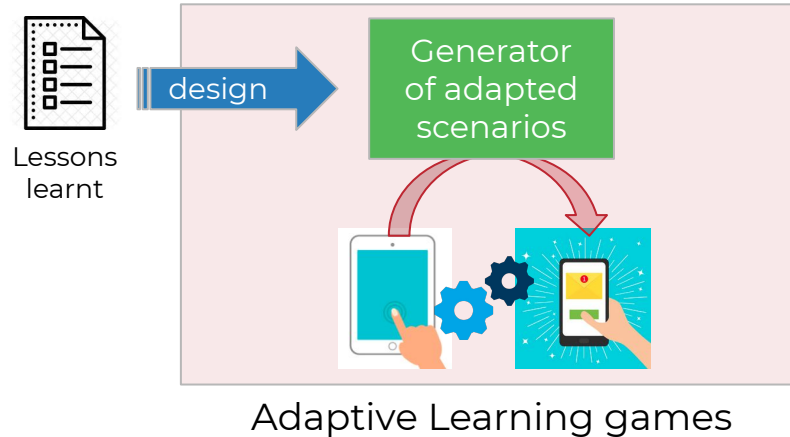


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# Overview

- Research context: **Adaptivity** in Learning Games
- Research object: **Generation** of adapted scenarios / activities
- Research problem: How to **design** the generation / generator?
- This paper focus: The **lessons learnt** with the *Escape It!* case-study



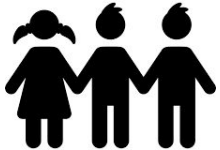
# Outline

- Background and terminology
- The *Escape it!* context
- Overview of the lessons learnt
- Remaining challenges

# Background and Terminology

- **Adaptativity** in Learning Games
  - *Ability to react to the learner-player and prior experiences by offering context-adaptive modifications*
  - Useful for improving learning through **personalization**, motivation, acceptance...
    - Learning side: resources, **activities / scenarios**, recommendations...
    - Game side: difficulties, gameplay components...
  - Various automation techniques
    - Adjustment, selection, **generation**...

# The *Escape it!* case -study



Match object to object

Match object to picture

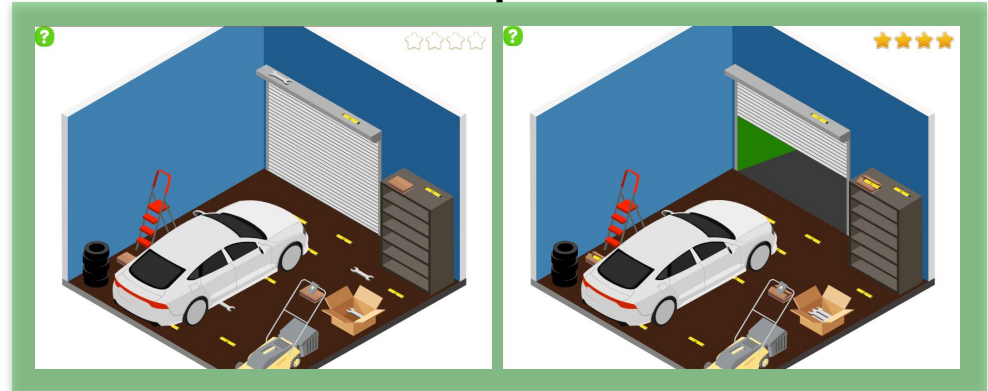
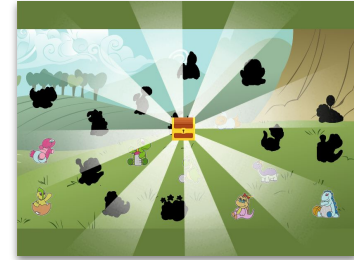
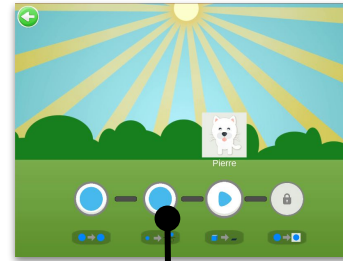
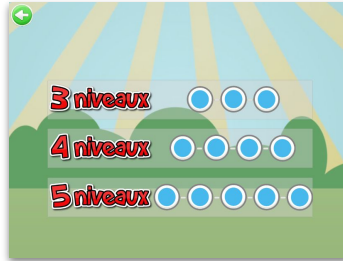
Sort same objects

Match object to shape

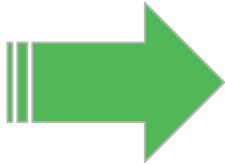
Match/replicate pattern

Sort by class

Complete seriation



# The *Escape it!* case -study



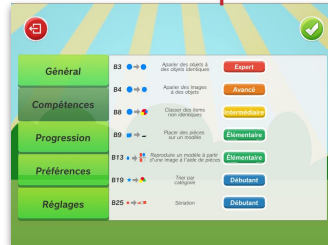
# The *Escape it!* case -study



Information about  
the game elements



Learner's profile

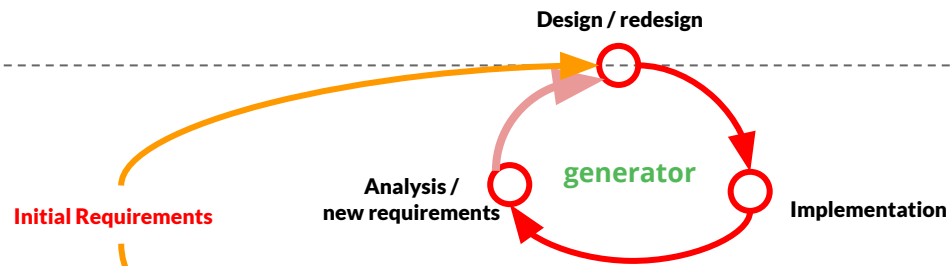


Context

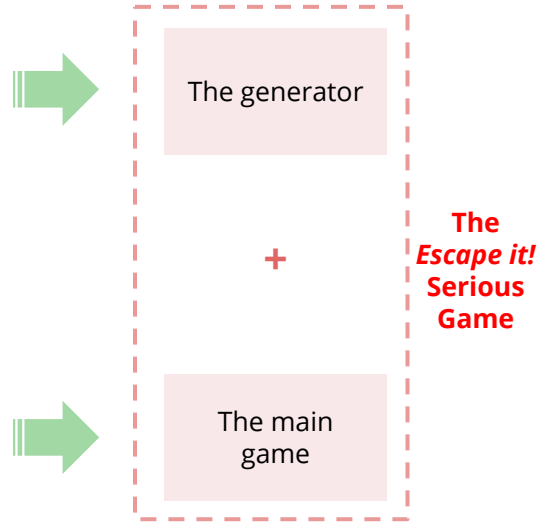
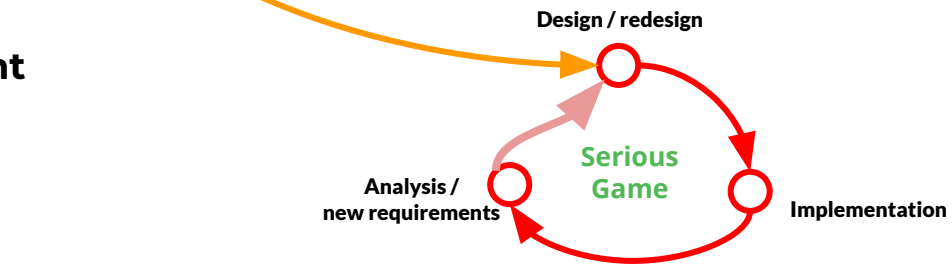


# The *Escape it!* context

Research

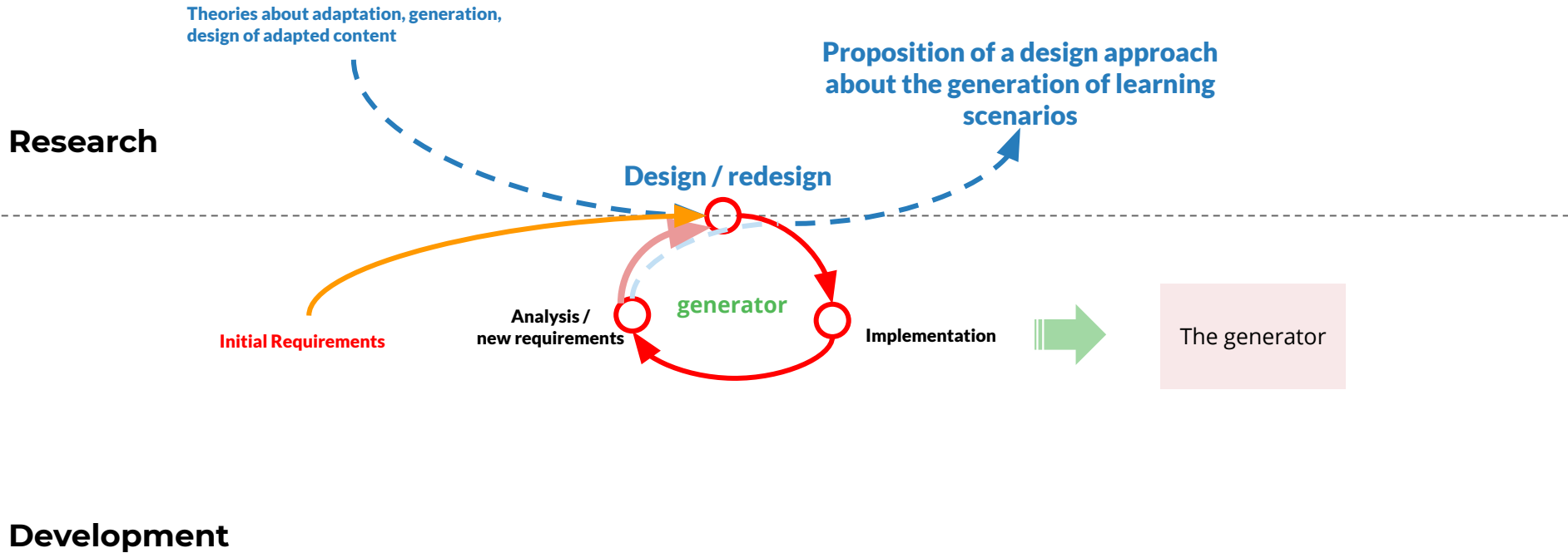


Development





# The *Escape it!* context



# The *Escape it!* context

Theories about adaptation, generation, design of adapted content

Proposition of a design approach about the generation of learning scenarios

Research

Design / redesign

Initial Requirements

Analysis / new requirements

generator

Implementation

co-related processes

Design / redesign

Development

Analysis / new requirements

Serious Game

Implementation

The generator

+

The main game

The *Escape it!* Serious Game

# Overview of the lessons learnt

**Focus** on the design of the generator

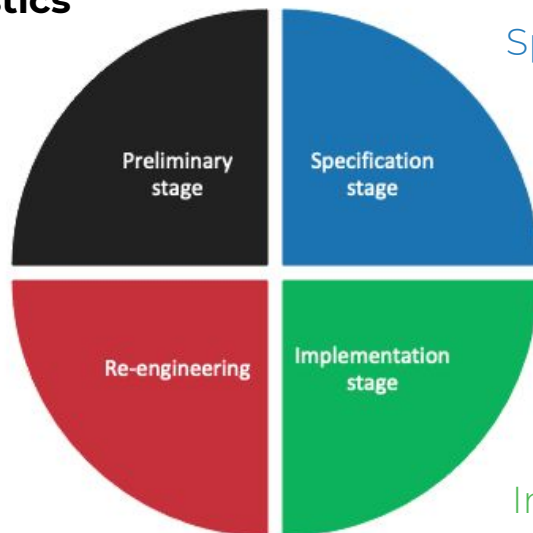
An **iterative** and **incremental** specification  
**centered on the target**

Identify the generation **characteristics**

The generator as a **black-box component**

Experts of the learning game domain are **not** experts in adaptation

**Evolution** of the serious game



Specification into **3 inter-related dimensions**

Consider **generation rules** at a **meta level**

**Machine-readable** specification models

Integration of an **independent** generator

# Preliminary Stage

**L1. Focus** on the design of the generator

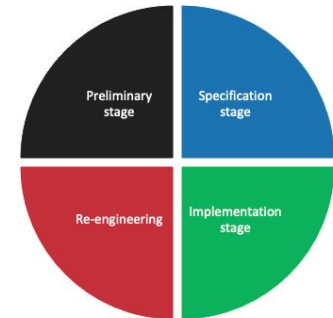
*Differentiate from the overall design of the serious game, distinguish adaptations at design-time or manual adaptations at runtime*

**L2.** Identify the generation **characteristics**

*Intention, Trigger, Target, Sources, Participating elements, Level of automation, Feedback time of the result, Generation approach*

**L3.** The generator as a **black-box component**

*Functional view with inputs/output, identify the final properties for the generator*



# Specification Stage

**L4.** An **iterative** and **incremental** specification **centered on the target**

*3 successive perspectives: Objective / Structural / Feature*

**L5.** Specification into **3 interrelated dimensions**

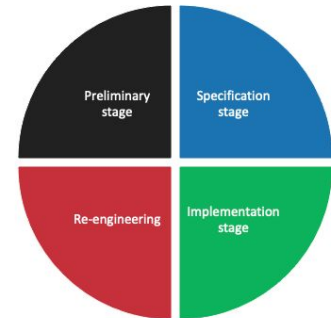
*3 dimensions by perspectives: Scenario description / Game description / Context description*

*Specifications by means of metamodels*

**L6.** Consider **generation rules** at a **meta level**

*Generation rules (or logic) at a meta-level instead of model-level*

*(i.e. domain “generic” rules)*



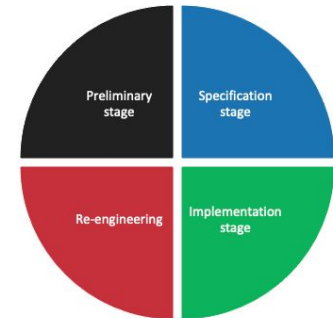
# Implementation stage

## L7. Machine-readable specification models

*Semi-formal specification models can drive the implementation (MDE meaning)*

## L8. Integration of an independent generator

*An independant generator (from the learning game) is helpful to focus on the generation  
But the integration requires engineering actions*



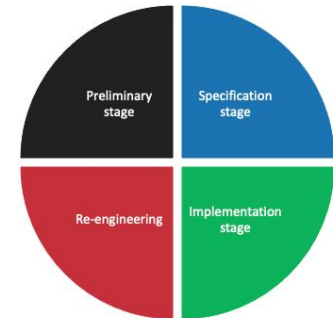
# Re-engineering Stage

**L9.** Experts of the learning game domain are **not** experts in adaptation

*Adaptation elements and logic require feedbacks, adjustments...*

**L10. Evolution** of the serious game

*Evolution of learning/gaming facets on the learning game impact the adaptation  
Models (and meta-models) may be extended*



# Remaining challenges

- **Generation rules** are hard to...
  - **identify** by learning experts
  - **specify** as executable models by computer scientists
  - **validate** by learning experts & computer scientists
- Difficulty to specify a generation that must address **different facets** (learning + gamification + others...)





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<https://projets-lium.univ-lemans.fr/escapeit/>

Partners & funders of the *Escape it!* project



**Le Mans  
Université**



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