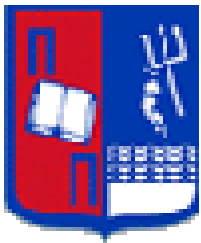# Authoring Learning Board Games for Moodle

Authors: Ioannis Liomas, Symeon Retalis

University of Piraeus
Department of Digital Systems

Computer Supported Learning Engineering Laboratory
http://cosy.ds.unipi.gr

Structure of the Presentation

- Introduction

- BGA Toolkit and Moodle Interoperability

- SCORM Packaging of a game

- Reporting system

- Future work

- Challenges

Why Board Games?

- Structured with clear set of rules

- Endorse turn taking

- Interaction with other players

- Mix of strategy and luck

- Visual and spatial skills

# The Board Game Authoring Toolkit

Game design for learning is Hard

"…just as it is not easy to create a successful video game, creating successful, complex Digital Game-Based Learning is not an easy task."

-Marc Prensky, Digital Game-Based Learning

The BGA Toolkit

A Toolkit for creating multi-level board games with rules

- Designing the Content

- Designing the Game Mechanics

- Designing Game Feedback

- Designing Game Reports
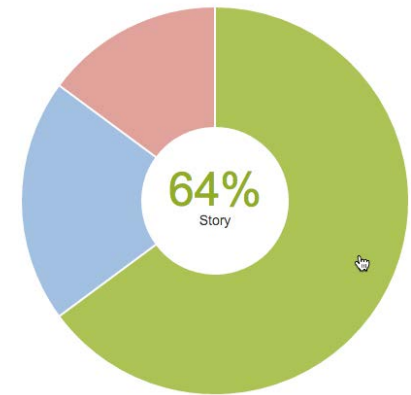
BGA Toolkit Modular Architecture

- Designed in two separate components to enhance reuse and portability

Authoring Component

| Content | Game Mechanics | Feedback | Customizable Reports |

RUNTIME COMPONENT
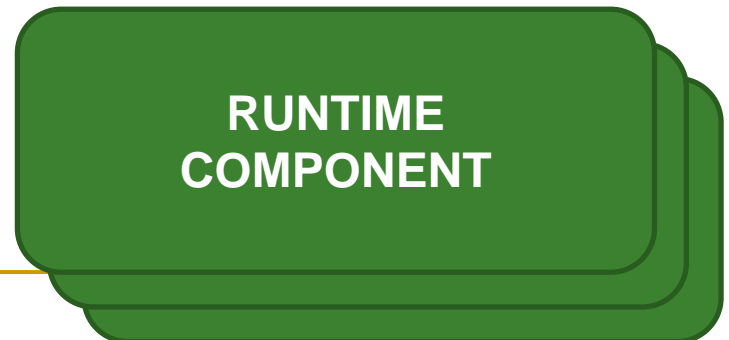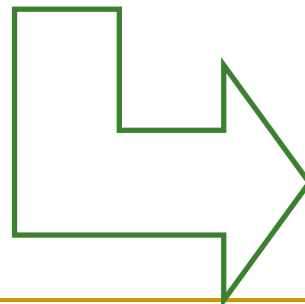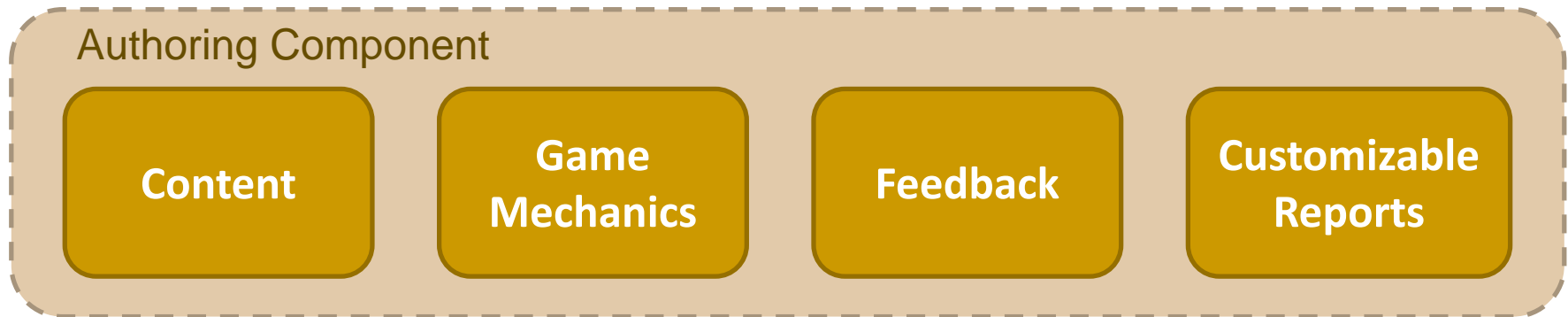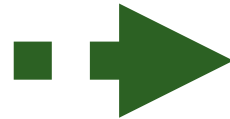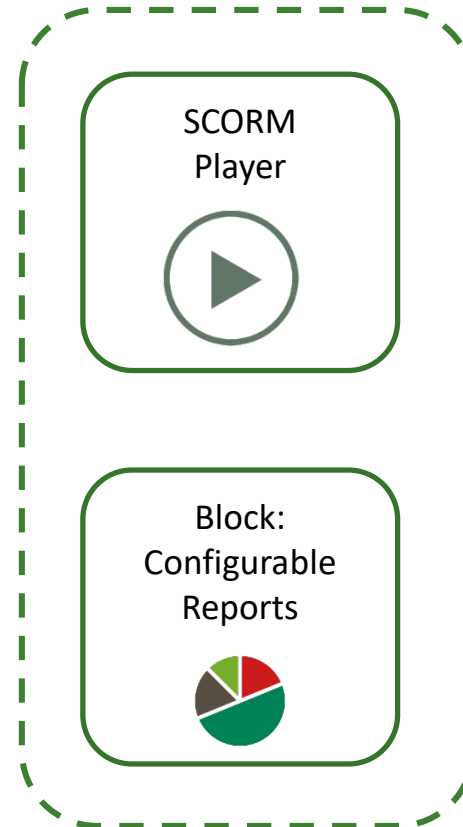
From Design to Deployment

- **Phase A: Design & Production (BGA Toolkit)**
  - ❑ Design
  - ❑ Export (SCORM Packaging)

- **Phase B: Deployment (Moodle)**
  - ❑ Deploy
  - ❑ Reports based on feedback data

Packaging in SCORM Format

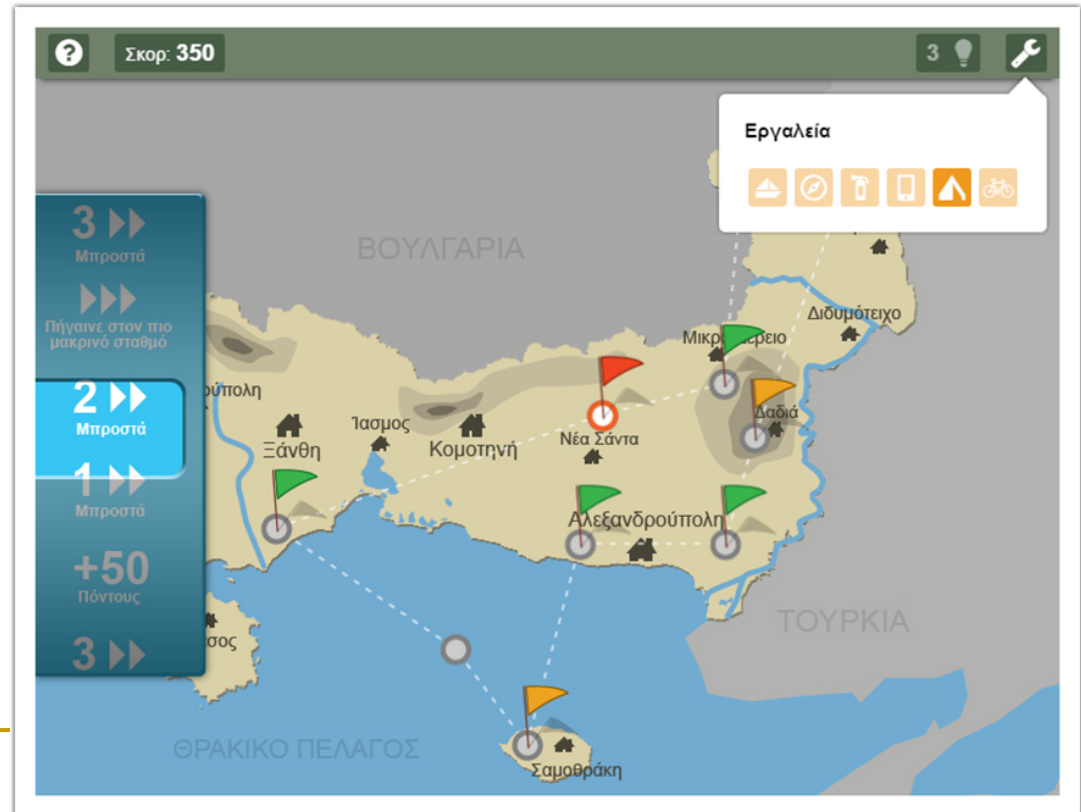**Phase A: Design & Production**
(BGA Toolkit)
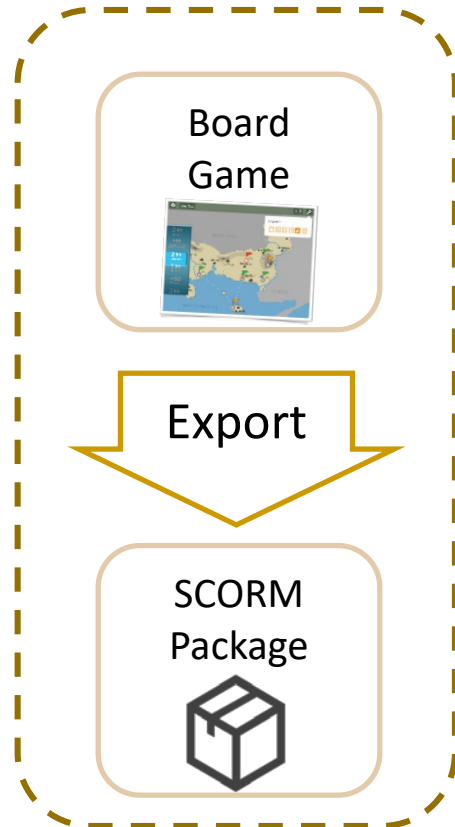
Phase B: Deployment
(Moodle)

Test case

- An Educational game for developing Academic and Cognitive skills

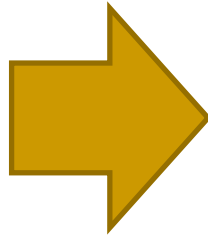**"Around the World in 80 Days"**

wwf-atlas.gr

Packaging the Game

Game files (Json & XML)
- Question
- Rules
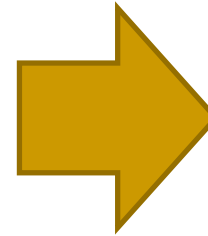- Reporting settings
- Language files
- Game engine

SCORM Driver
- Rustici's Framework

Manifest file

SCORM package

Reporting of the Game

■ Data is recorded using Moodle's native SCORM Reports

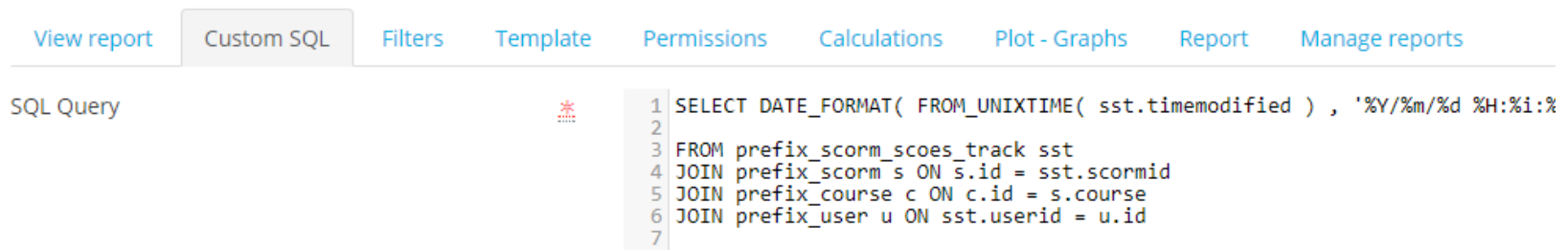## scormdriver-atlasgame-runtimefunctions

Learning objects

Interactions

Attempt 1 - Admin User: Course Title - Track details

| Element	Value
cmi.core.exit	suspend
cmi.core.lesson_status	incomplete
cmi.core.total_time	5 minutes 18.55 seconds
cmi.objectives_0.id ⑦	Level_1_Species
cmi.objectives_0.score.max ⑦	100
cmi.objectives_0.score.min ⑦	0
cmi.objectives_0.score.raw ⑦	3
cmi.objectives_1.id ⑦	Level_1_Habitats
cmi.objectives_1.score.max ⑦	100
cmi.objectives_1.score.min ⑦	0
cmi.objectives_1.score.raw ⑦	0
cmi.objectives_10.id ⑦	Level_2_Land_use
cmi.objectives_10.score.max ⑦	100

Analyzing report data

CONFIGURABLE REPORTS

Atlas completion time per level
Atlas score per question category
Atlas scores per level
Atlas total score vs completion time per player

========

Manage reports

- Data is analyzed using the "Configurable Reports" block
- SQL queries are crafted to retrieve data from Moodle's database

View report	Custom SQL	Filters	Template	Permissions	Calculations	Plot - Graphs	Report	Manage reports

SQL Query

```
1 SELECT DATE_FORMAT( FROM_UNIXTIME( sst.timemodified ) , '%Y/%m/%d %H:%i:%
2
3 FROM prefix_scorm_scoes_track sst
4 JOIN prefix_scorm s ON s.id = sst.scormid
5 JOIN prefix_course c ON c.id = s.course
6 JOIN prefix_user u ON sst.userid = u.id
7
```

CoSyLab

Future Work

- Implementing multiplayer futures in games produced by the BGA Toolkit

- Using a special Moodle plugin
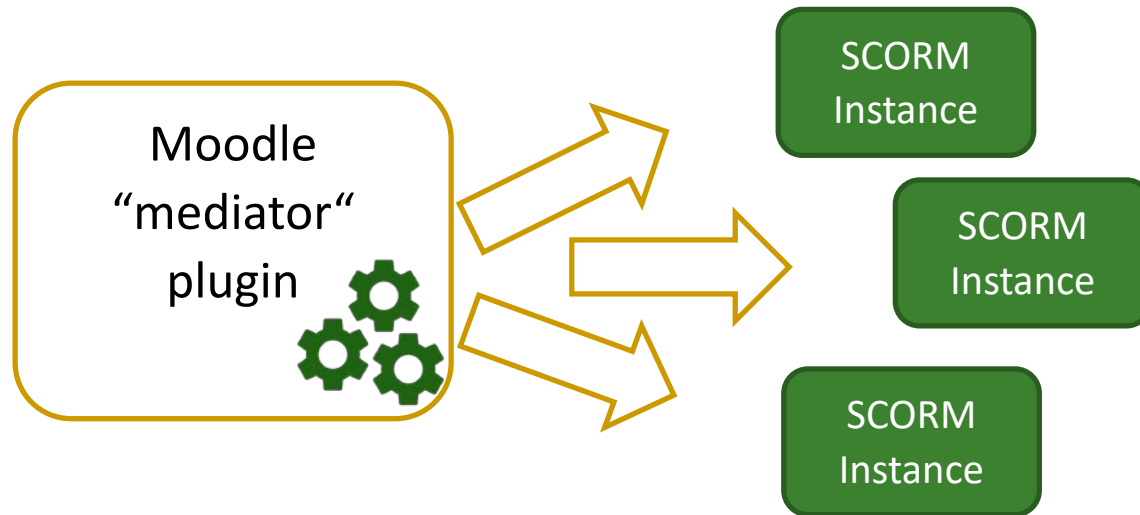
Challenges

- The "mediator" moodle plugin should be able to provide a multi-user interface to:
  - a) Orchestrate unique SCORM instances and
  - b) Manage and store tracking data.

- SCORM specification does not support natively multi-user interactions

- xAPI natively supports such interactions
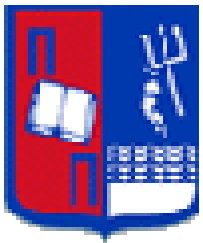 - Does not provide multiplayer infrastructure

QUESTIONS?

Thank you!

Authors: Ioannis Liomas, Symeon Retalis, Giannis Altanis

Presenter: Ioannis Liomas, yanliom@unipi.gr

University of Piraeus
Department of Digital Systems

Computer Supported Learning Engineering Laboratory
http://cosy.ds.unipi.gr