eAdventure: Serious Games as Open Reusable Content

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e-UCM group and projects

- CS Professor at Complutense U.
  - Director of e-UCM
- e-UCM research group about Learning technologies
  - [www.e-ucm.es](http://www.e-ucm.es)
  - 15 researchers
  - Serious Game technology
    - eAdventure platform
    - GLEANER for SG Learning Analytics
  - Serious games development
    - Application to the medical domain
    - Use and evaluation in formal education
  - Application of e-learning standards to SG
Open content and open education

- Open content has changed education
  - Now there is plenty of high quality content available
  - Mainly text, video and low-interactivity multimedia
- It is simple to locate, use and adapt open content
- MOOCs
  - Content is basically video, text and exercises (e.g. edX uses LON-CAPA, http://www.lon-capa.org/)
  - Also including social interaction and peer review
- Can Serious Games become an Open Reusable Content?
  - Games are very dependant on platform/technology
  - Proprietary technology, no “standard” formats (Flash, Unity3D)
  - New heterogeneus devices (mobile, tablets)
Serious Games as educational content?

- Serious Games have probed to be an effective educational content in several domains
  - Medicine, military, business, corporate training

- The NMC Horizon Report: 2013 Higher Education Edition
  - Games and Gamification
  - Time-to-Adoption Horizon: Two to Three Years

- But still is a low adoption of Serious Games in mainstream education
Educational SG challenges

- Reducing SG cost development
- Simplify SG deployment
  - Using preexisting infrastructure
  - Mobile devices
- SG scalability and maintainability
  - Reducing TCO
- Actual application of SG in real educational settings
  - Taking into account current technical infrastructures
  - Including scientific and formal evaluation
- Include student evaluation into SG
- Take into account curriculum and involve educators
  - Teachers are a key element in games use
SG deployment: Black box model

- Games as “isolated” pieces of content
- No information about what is happening during the in-game play
- Or very simple
  - Completed or not completed
  - Time used

Serious Games repositories

http://www.clarkchart.com/
Serious Games repositories

http://www.seriousgamesdirectory.com/
Serious Games repositories

**Health Care/Medical**

Videogame technologies are increasingly being used to improve skills for the health care professional, volunteer and patient. Doctors, nurses, lab technicians and pharmacists watch training sims. Games help rehab patients and patients with emotional issues. Games also teach families proper health care and the importance of staying fit.

**BrainGymermer**

**Market:** Cognitive learning

BrainGymer is an online brain training platform providing online games, tests and coaching to help our users to improve their main cognitive areas that start to decline after the age of 30: memory, concentration, visual perception, logical thinking, processing speed.

**TIME OUT**

**Market:** Disease management

Time-Out is a serious game for therapeutical education of diabetes and especially dedicated to young adults. This game suggests living an amazing adventure while discovering the daily life of a patient suffering diabetes.
Serious games: our vision

- Wikipedia approach to serious games
  - Reduce the cost of creating games
  - Produce games that can be reused
  - **Provide user with easy to use tools to create the games**
  - Simplify the integration of games in the pre-existing e-learning infrastructure
  - Games should have an open license (e.g. CC, LGPL)
eAdventure game platform

Open code authoring environment for the production of *point-and-click* adventure games & immersive learning simulations

Oriented to educators

No programming required

Multiplatform (windows, linux, mac) , Multilingual (10 languages)
eAdventure use

- sec. education
- healthcare
- accessibility
- language training

http://sourceforge.net/projects/e-adventure
e-Adventure game platform
eAdventure: main characteristics

- **Focus on adventure videogames**
  - Story is more important than action
  - First person and third person games

- **Ease the development of serious games and game-like simulation**
  - Low cost, high reusability
    - Use photos and videos for graphical assets
  - Participation of educators in the development process
    - No programming required

- **Serious games as learning objects**
  - Simple exportation without requiring deep knowledge about e-learning standards (e.g. SCORM)

- **Introducing games into learning flow**
  - Integration with LMS (e.g. Moodle)
eAdventure educational features

- User tracking and assessment
  - Educational relevant situations can be detected and included in a report that can be used for auto evaluation or assessment purposes

- Produced games can be stored in a repository of educational contents
  - AGREGA Spanish Ministry of Education central repository for learning contents

- Teacher as a game producer?
In-game assessment

Eating out report

User doesn’t use “any” (00:00:11)

The user has attempted the “Kinds of Restaurants” mini game (00:01:01)

Attempt: 1

RESULTS:
Bar-Pub: Ok Cafeteria: Ok
Fast Food: Ok Restaurant: Ok
Self Service: Ok Take away: Ok

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**Act 1**
- Prepare résumé
  - Correctly selected items
  - Identified all wrong words
  - Corrected all wrong words

**Act 2**
- Write cover letter
  - Correctly selected items
  - Identified all wrong words
  - Corrected all wrong words

**Act 3**
- Interview for a job
  - Correctly got to the interview
  - Got the right answers to the questions
  - Got the job
Integración con Entornos Virtuales de Enseñanza

‣ Proceso de exportación

• Configurar arquitectura (ambas capas).
• Etiquetar contenido con meta-datos
• Empaquetamiento como Objeto de Aprendizaje (IMS-CP, SCORM, AGREGA)
eAdventure + Learning Analytics

Game Engine

Communication API

Input Logic Input Logic Input

LA Database

```json
{
  type: 'input',
  timeStamp: some_timestamp,
  device: 'some_device',
  action: 'some_action',
  target: 'target_id',
  data: { key1: value, ...}
}
```

```json
{
  type: 'logic',
  timeStamp: some_timestamp,
  event: 'some_event',
  target: 'some_id',
  data: { key1: value, ...}
}
```
Elige la situación inicial...

http://first-aid-game.e-ucm.es

With MGH-Harvard University

http://www.chermug.eu

With ONT, educ@ONT
Games for English practice

Download from www.e-ucm.es or from http://descargaterecursos.wordpress.com/e-adventures/
Game authoring

- Even with easy to use tools game authoring is a complex task
  - more an art than a science
- Generally involves several different experts:
  - Educational expert, domain expert, game programmer
  - Communication problems

- Open questions
  - Maintenance, new versions with required educational changes, etc

- Methodologies to simplify the SG creation
Educational Game Development Approach

Rapid prototyping

- eAdventure allows progressive addition of multimedia resources
- Easy to test concepts before capturing resources
- Reduces changes to resources, which are the costliest part of development
Assets & prototyping

Real workplace

Game scenes map
eAdventure 2.0

https://github.com/e-ucm/ead/
http://www.e-ucm.es/ead2blog/
eAdventure 2.0 - Technologies

### Deployment platforms
- HTML 5
- Android
- Linux
- Windows
- iOS

### Communication
- TIN CAN API
- xAPI

### Learning Analytics
eAdventure 2.0 - Main goals

• Easy **creation and deployment** of state-of-the-art games
  • Interoperability
  • Multiple formats and devices
eAdventure 2.0 - Main goals (2)

• Easy **integration of educational features**
  o Easy configuration of gamification features
  o In-Game Assessment
  o Integration with Learning Analytics
  o Communication of results through standards (xAPI)
Focus on open games and reusability

(1) Build a community of practitioners to share and reuse games

- Creating a game resources is expensive
- Top quality requires experience and qualified professionals
Focus on open games and reusability

eAdventure games = Open games

- Every game created can always be edited back
- Games stored in human readable format
- API and model schema are publicly available

```json
// Bee
{
  "y": 500,
  "x": 100,
  "scaleX": -1,
  "originX": 20,
  "components": [
    {
      "class": "frames",
      "sequence": "linear",
      "frames": [
        {
          "renderer": {
            "class": "image",
            "uri": "images/bee.png"
          },
          "time": "0.1"
        },
        {
          "renderer": {
            "class": "image",
            "uri": "images/bee_fly.png"
          }
        }
      ]
    }
  ]
}```
Focus on open games and reusability

- (2) Sharing and reusing PARTS of games
- Art resources
  - Images
  - Animations
  - Sounds
- Libraries that contained reusable components in the game
  - Buttons
  - Markers (score, lifes)
  - Mini-games
- Templates to create slightly different versions of the same component
Example: eCharacter

Tool for creating animated characters for eAdventure

• Base characters can be downloaded from a repository for customization
• Idea: create synergy between young artists who need to showcase their work and educational gaming community
Artist creates base character and “interchangable pieces”. Uploads it to central repository and gets credits and visibility.
Teacher downloads the base model and uses it to create a bunch of different characters with eCharacter.
Video of eCharacter
Conclusions

➢ To generalize SG we need to create a new ecosystem for open games
  • Tools, repositories, methodologies, open licenses (cc, lgpl)

➢ We need easy to use tools that simplify SG creation, reuse and maintenance
  • Join us in the creation of eAdventure 2.0!!

➢ SG need to be simply to deploy in real settings
  • Interoperability formats and open technologies (e.g. HTML5)

➢ SG need to communicate with other systems (e.g. using standards such as xAPI)
Thank you!

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Slides will be available at
http://slideshare.net/BaltasarFernandezManjon
References

• eAdventure. http://e-adventure.e-ucm.es/
• First Aid Game. http://first-aid-game.e-ucm.es/

Check www.e-ucm.es/publications/ for updated references
References

· Ángel del Blanco, Baltasar Fernández-Manjón, Pedro Ruiz, Manuel Giner (2013): *Using videogames facilitates the first visit to the operating theatre*. Medical Education. Vol 47, Issue 5, pp. 519-520 .
Our current projects

- Increasing patient safety using games
- Modelling/teaching medical procedures at National Transplant Organization