



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
- 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



G A L A

Games and Learning Alliance
Network of Excellence for Serious Games



SERIOUS GAMES NETWORK

<http://www.facebook.com/groups/segan/>

eMadrid
www.emadridnet.org



CHERMUG

CONTINUING / HIGHER EDUCATION IN
RESEARCH METHODS USING GAMES



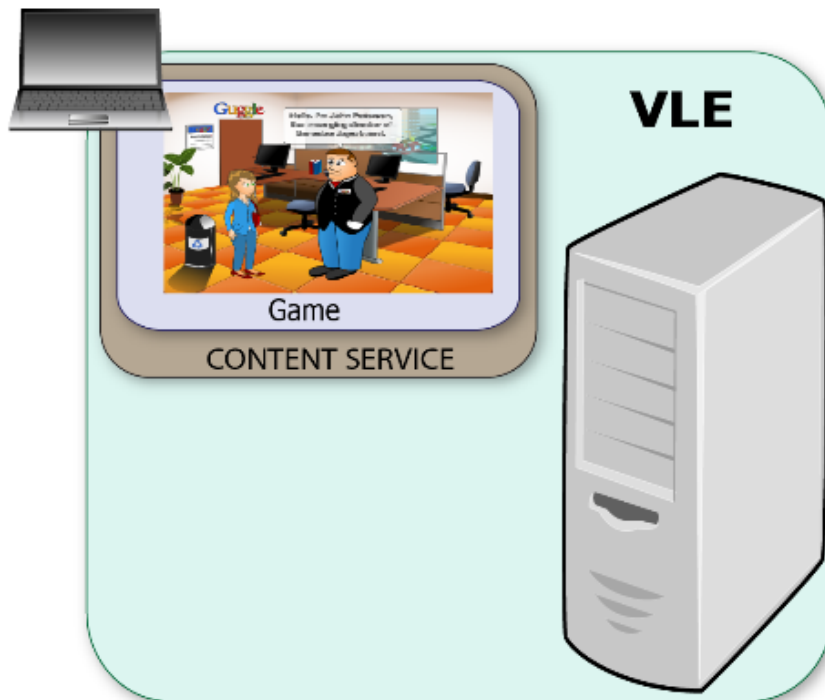
- ▶ **Open content has changed education**
 - Now there is plenty of high quality content available
 - Mainly text, video and low-interactivity multimedia
- ▶ **It is simple to locate, use and adapt open content**
- ▶ **MOOCs**
 - Content is basically video, text and exercises (e.g. edX uses LON-CAPA, <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 heterogeneous devices (mobile, tablets)

- ▶ **Serious Games have proved 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 <http://www.nmc.org/publications/>
 - Time-to-Adoption Horizon: Two to Three Years
- ▶ **But still is a low adoption of Serious Games in mainstream education**

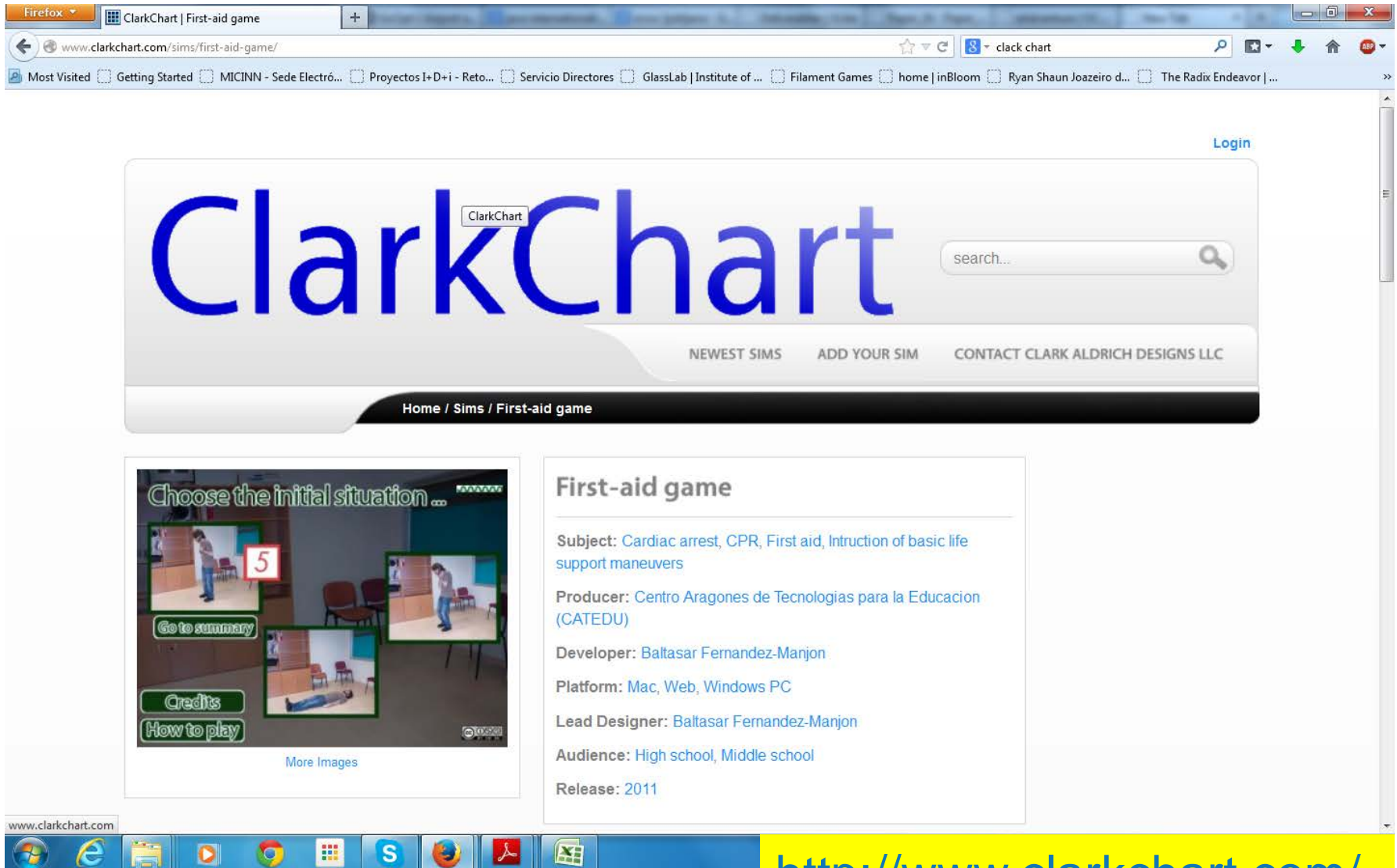
- ▶ **Reducing SG cost development**
- ▶ **Simplify SG deployment**
 - Using preexisting infrastructure
 - Mobile devices
- ▶ **SG scalability and maintainability**
 - Reducing TCO
- ▶ **Actual application of SG in real educational settings**
 - Taking into account current technical infrastructures
 - 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



The screenshot shows a Firefox browser window displaying the ClarkChart website. The page title is "ClarkChart | First-aid game". The URL in the address bar is "www.clarkchart.com/sims/first-aid-game/". The website header features the "ClarkChart" logo in large blue letters, a search bar, and navigation links for "NEWEST SIMS", "ADD YOUR SIM", and "CONTACT CLARK ALDRICH DESIGNS LLC". A "Login" link is also present in the top right. Below the header, the breadcrumb trail reads "Home / Sims / First-aid game".

The main content area is divided into two columns. The left column displays a game preview titled "Choose the initial situation ...". It includes several small images showing a person in a classroom setting, a person lying on the floor, and a person performing CPR. There are buttons for "Go to summary", "Credits", and "How to play", along with a "More Images" link.

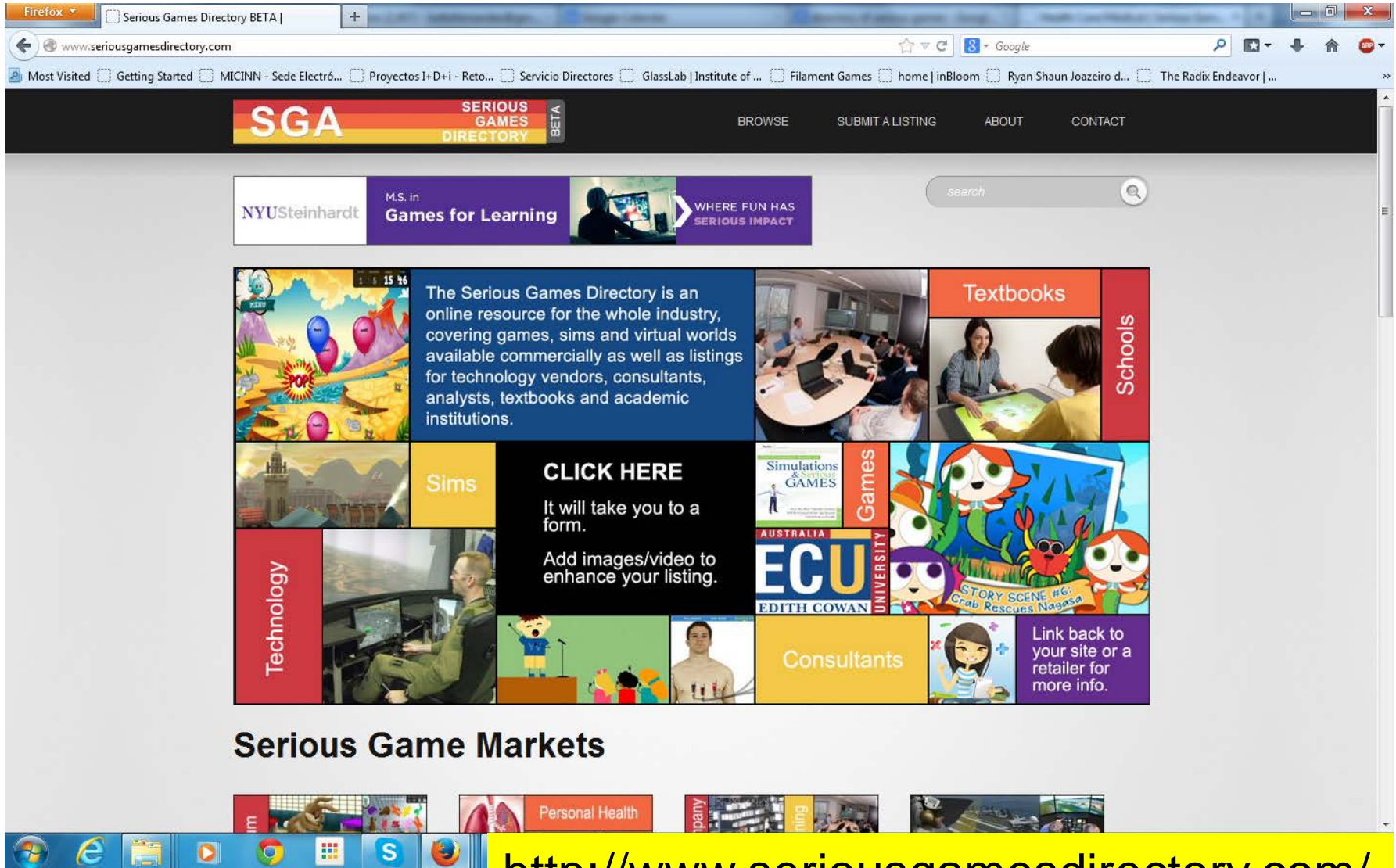
The right column contains the game's metadata:

- First-aid game**
- Subject:** Cardiac arrest, CPR, First aid, Intruction of basic life support maneuvers
- Producer:** Centro Aragonés de Tecnologías para la Educación (CATEDU)
- Developer:** Baltasar Fernandez-Manjon
- Platform:** Mac, Web, Windows PC
- Lead Designer:** Baltasar Fernandez-Manjon
- Audience:** High school, Middle school
- Release:** 2011

The Windows taskbar at the bottom shows various application icons, including Internet Explorer, Firefox, and several utility programs.

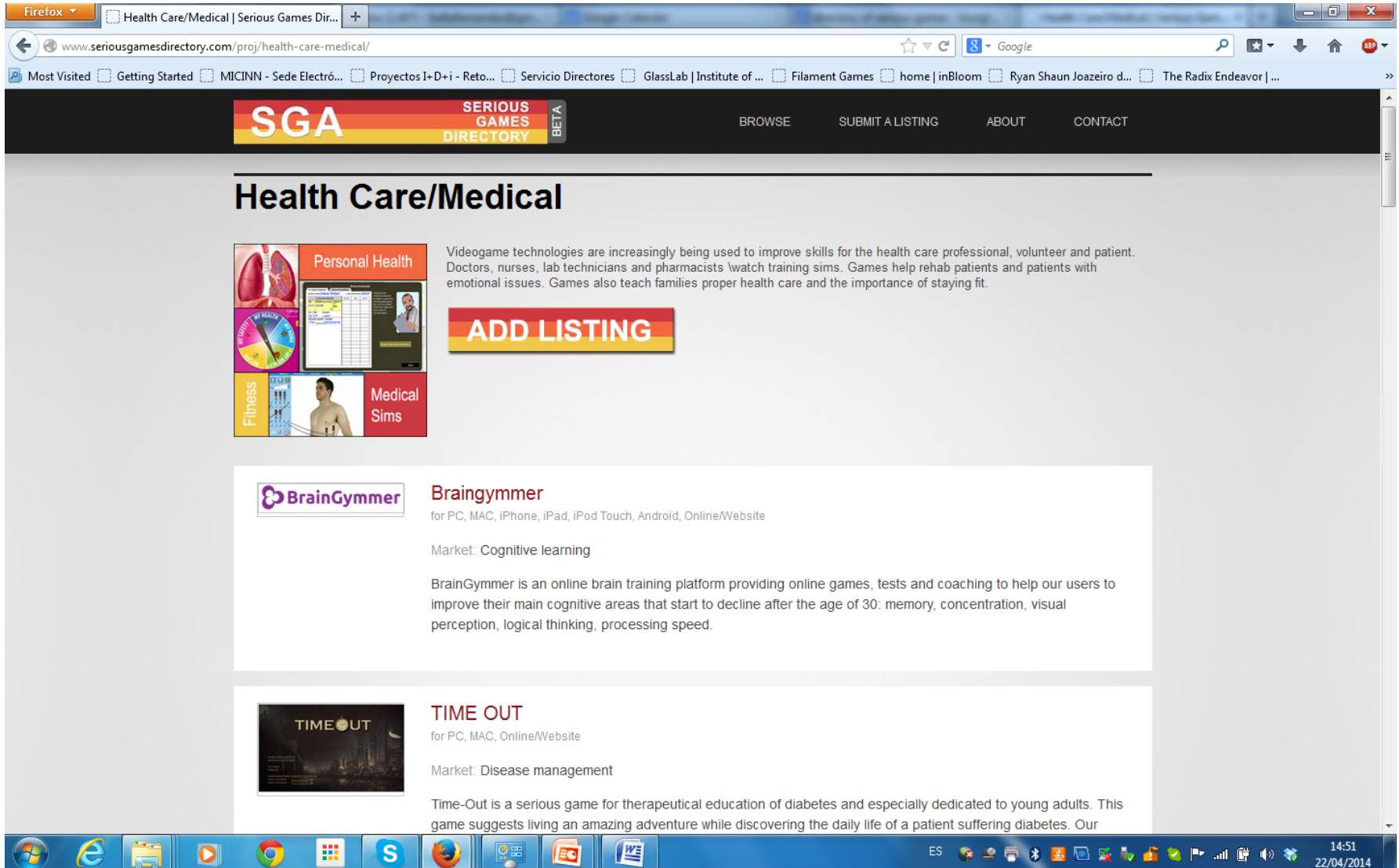
<http://www.clarkchart.com/>

Serious Games repositories



<http://www.seriousgamesdirectory.com/>

Serious Games repositories



The screenshot shows a Firefox browser window displaying the Serious Games Directory website. The address bar shows the URL www.seriousgamesdirectory.com/proj/health-care-medical/. The website header features the SGA logo (Serious Games Directory) and navigation links: BROWSE, SUBMIT A LISTING, ABOUT, and CONTACT. The main content area is titled "Health Care/Medical" and includes a sidebar with categories like Personal Health, Fitness, and Medical Sims. A central text block describes the use of videogame technologies in healthcare. Below this is an "ADD LISTING" button. Two game listings are shown: "Braingymer" (Cognitive learning) and "TIME OUT" (Disease management).

SGA SERIOUS GAMES DIRECTORY BETA

BROWSE SUBMIT A LISTING ABOUT CONTACT

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.

ADD LISTING

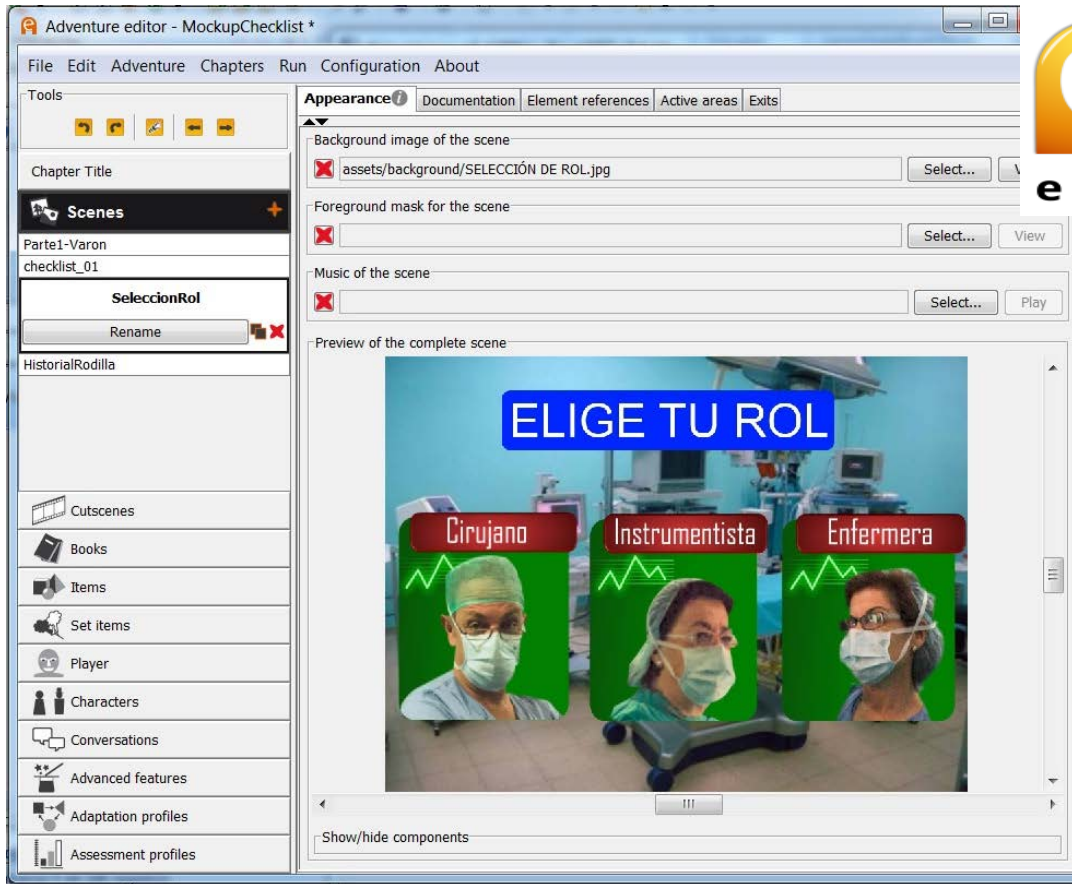
Braingymer
for PC, MAC, iPhone, iPad, iPod Touch, Android, Online/Website
Market: Cognitive learning
Braingymer is an online brain training platform providing online games, tests and coaching to help our users to improve their main cognitive areas that start to decline after the age of 30: memory, concentration, visual perception, logical thinking, processing speed.

TIME OUT
for PC, MAC, Online/Website
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. Our

- ▶ **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

Home (Change File)

Date Range: 2008-11-04 to 2014-04-23



DOWNLOADS

48,709

In the selected date range

TOP COUNTRY *

Spain

25% of downloaders

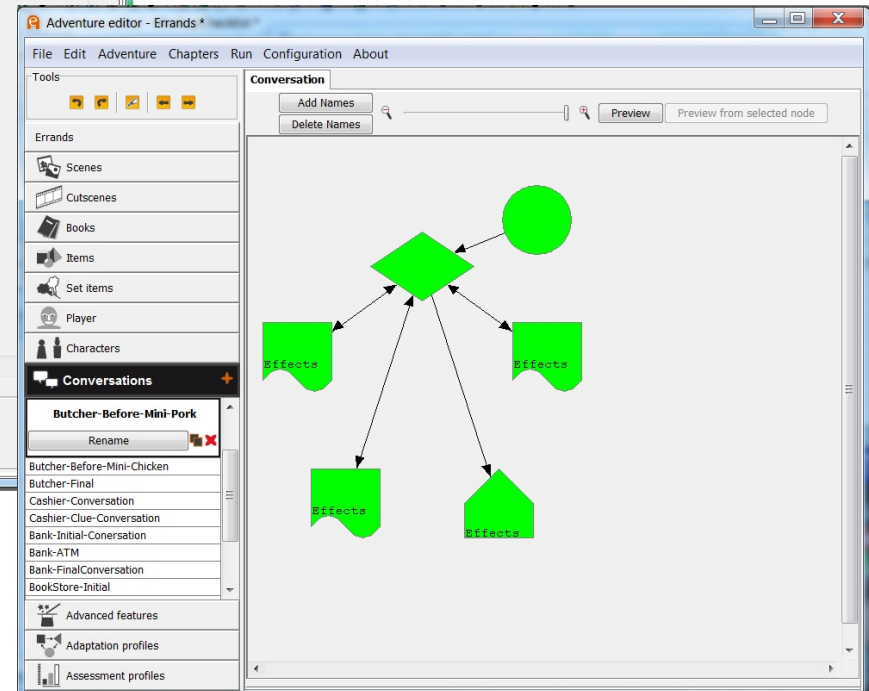
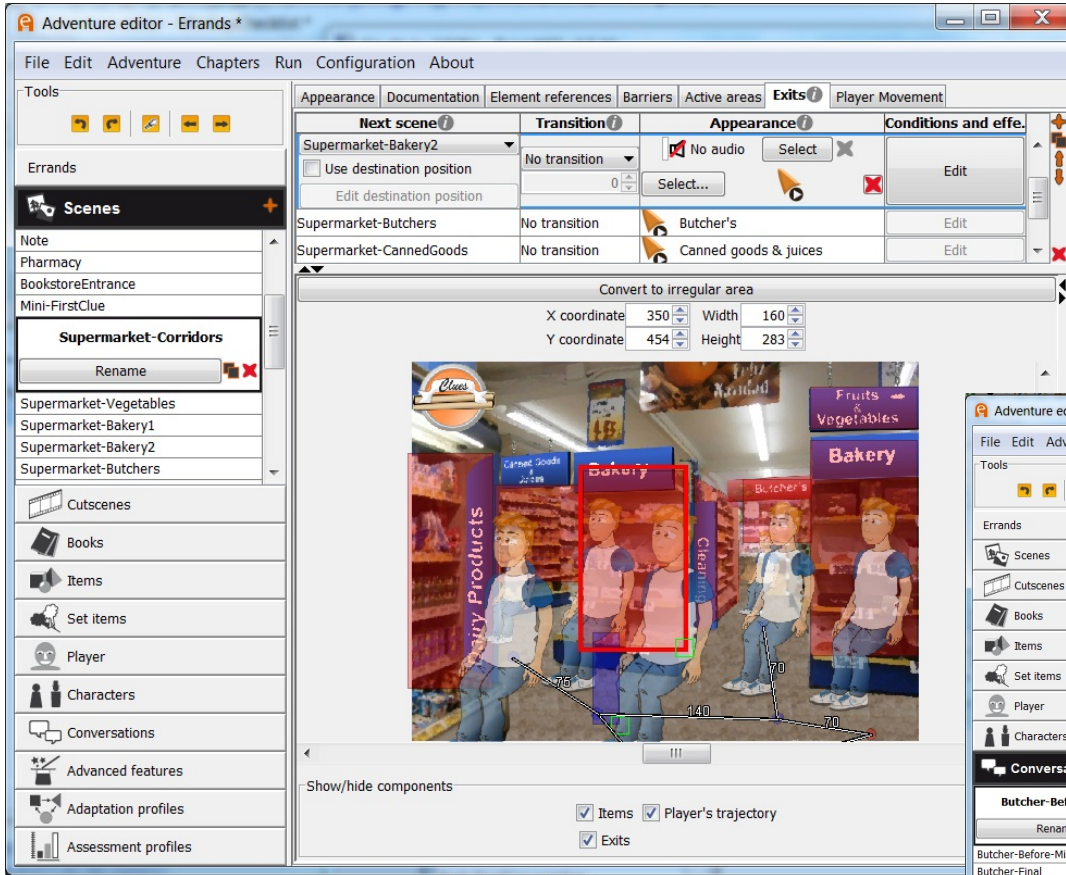
TOP OS *

Windows

83% of downloaders

<http://sourceforge.net/projects/e-adventure>

e-Adventure game platform



- ▶ **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)

- ▶ **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**

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

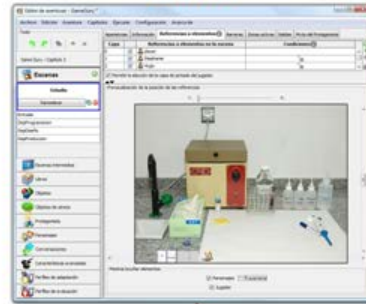
Correctly got to the interview

Got the right answers to the questions

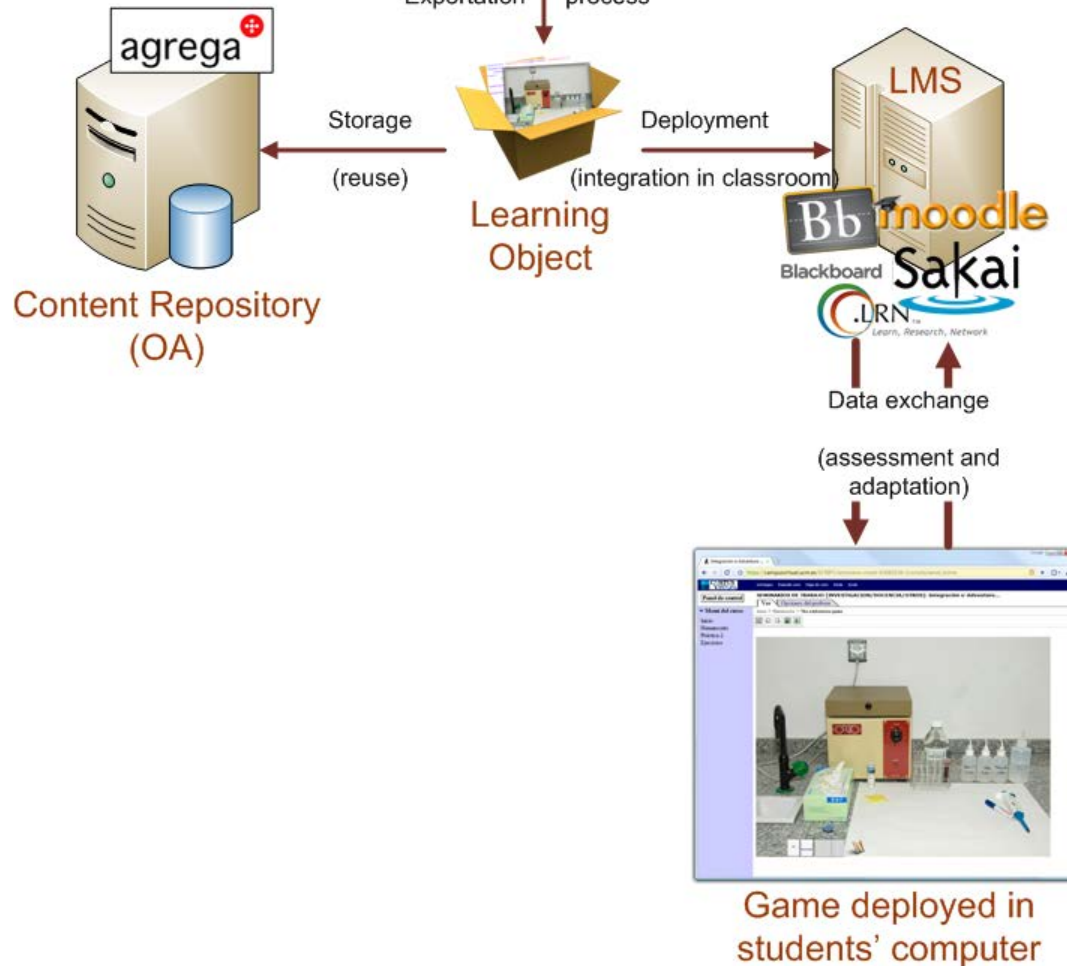


Got the job

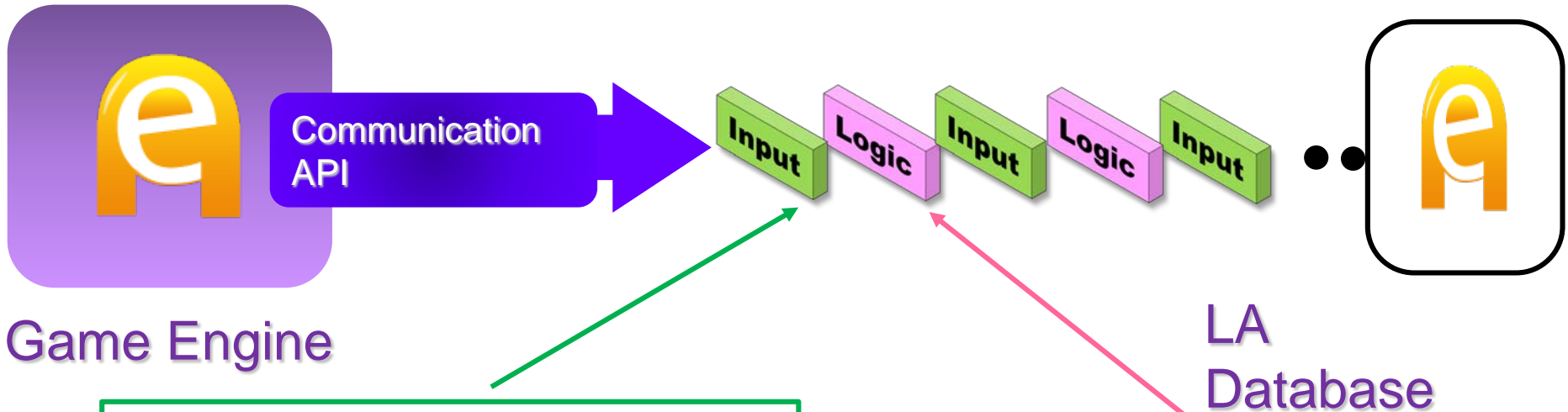
<e-Adventure> Editor



Exportation process

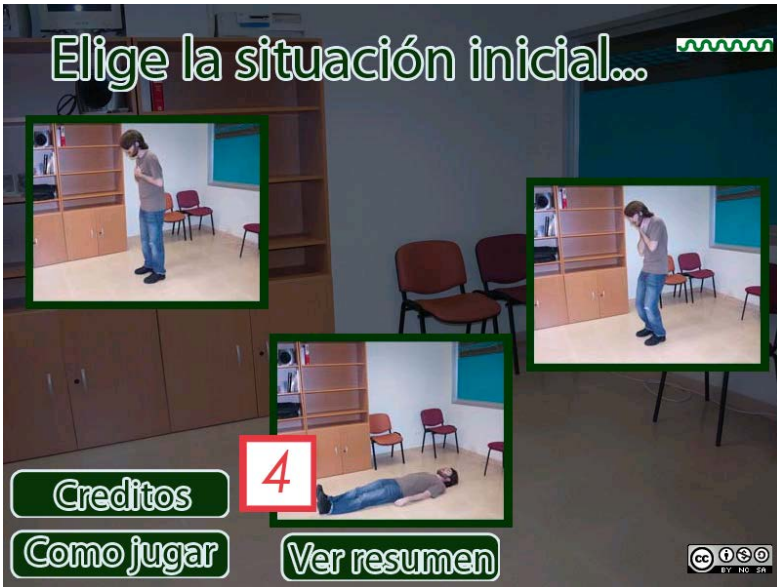


eAdventure + Learning Analytics



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

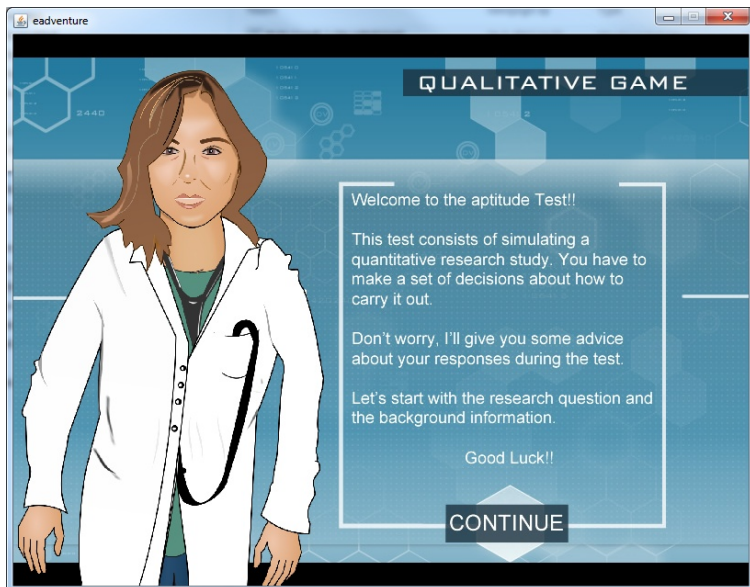
```
{  
  type: 'logic',  
  timeStamp: some_timestamp,  
  event: 'some_event',  
  target: 'some_id',  
  data: { key1: value, ... }  
}
```



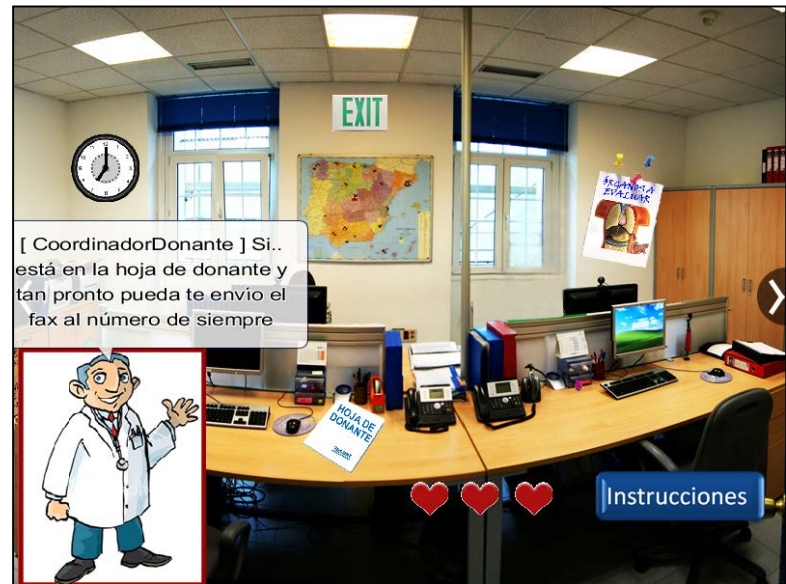
<http://first-aid-game.e-ucm.es>



With MGH-Harvard University



<http://www.chemmug.eu>



With ONT, educ@ONT

Games for English practice

Finding a job



Running Errands



Eating Out



Hospital



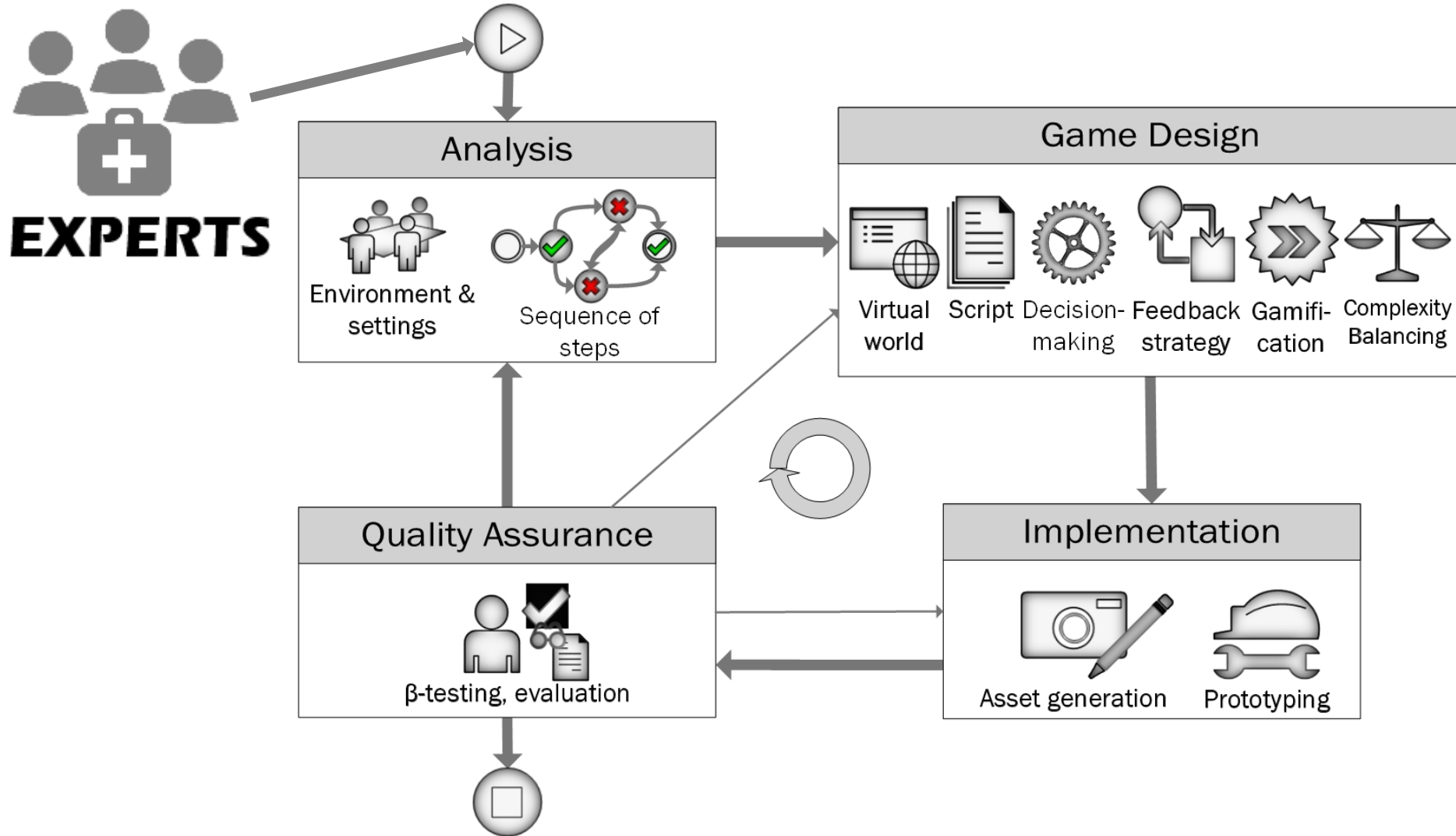
Viaje a Londres



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

- ▶ **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

Implementation



Asset generation



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

Implementation



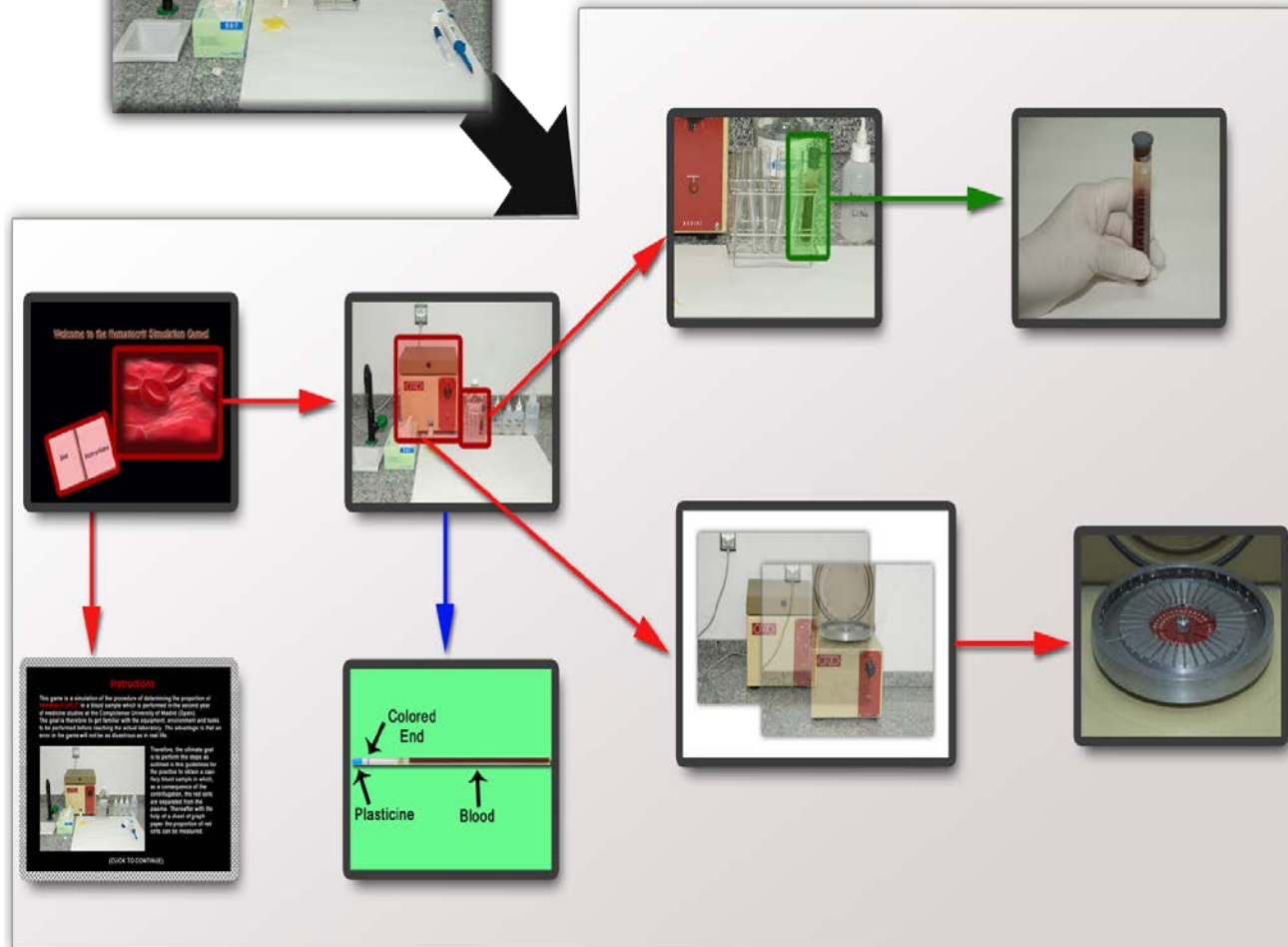
Asset generation



Prototyping



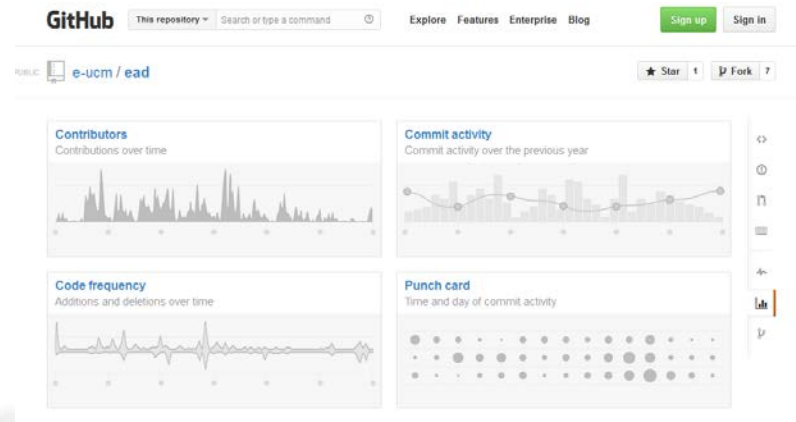
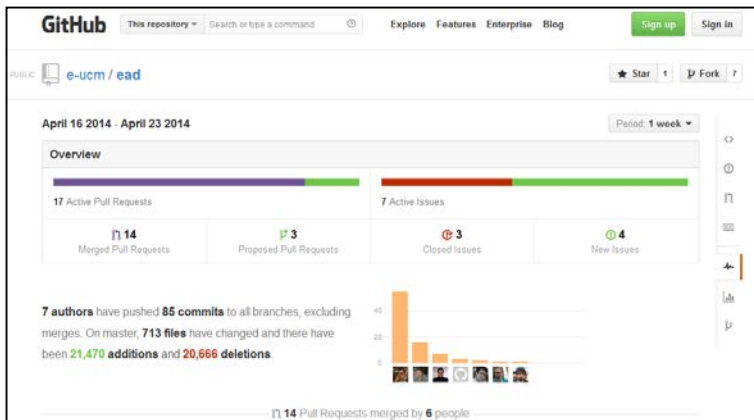
◀ Real workplace ▼ Game scenes map



eAdventure 2.0

<https://github.com/e-ucm/ead/>

<http://www.e-ucm.es/ead2blog/>



Deployment platforms



Communication



*Learning
Analytics*

- Easy **creation and deployment** of state-of-the-art games
 - Interoperability
 - Multiple formats and devices



- Easy **integration of educational features**
 - Easy configuration of gamification features
 - In-Game Assessment
 - Integration with Learning Analytics
 - Communication of results through standards (xAPI)



*Learning
Analytics*



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

- Creating a game resources is expensive
- Top quality requires experience and qualified professionals



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

```
// 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"
      }
    }
  ]
}
```



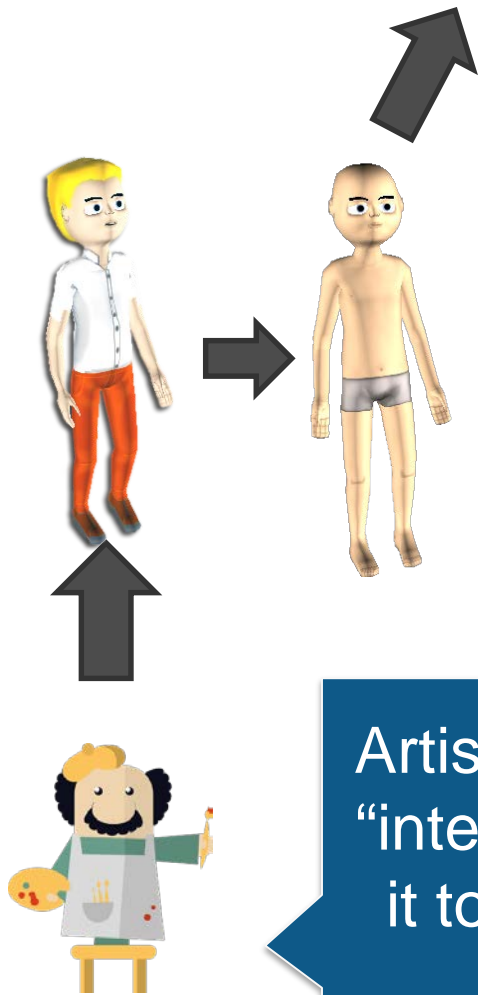
- ▶ **(2) Sharing and reusing PARTS of games**
- ▶ **Art resources**
 - Images
 - Animations
 - Sounds
- ▶ **Libraries that contained reusable components in the game**
 - Buttons
 - Markers (score, lifes)
 - Mini-games
- ▶ **Templates to create slightly different versions of the same component**

Tool for creating animated characters for eAdventure

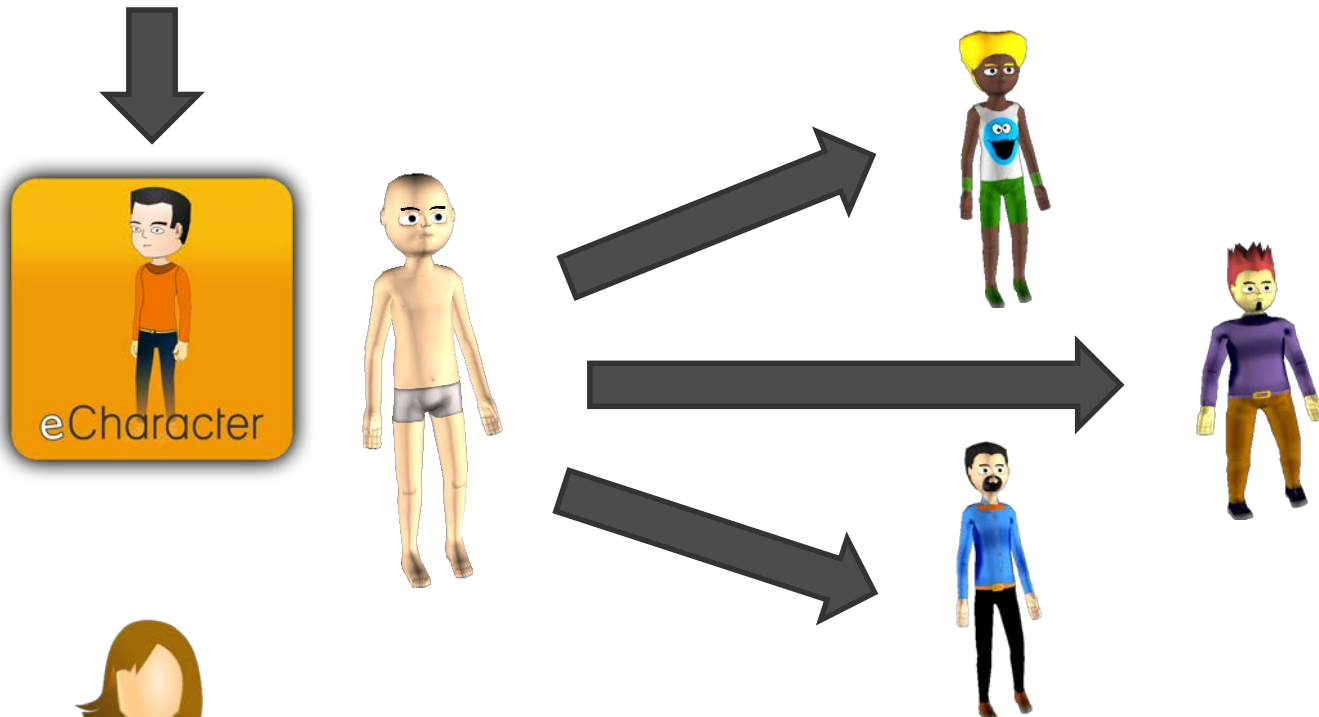
- Base characters can be downloaded from a repository for customization
- Idea: create synergy between young artists who need to showcase their work and educational gaming community



eCharacter
Repository



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

A screenshot of a web browser window displaying the eCharacter website. The browser's title bar shows "eCharacter". The website has a dark grey header with a small eCharacter logo on the left and the text "Selecciona una familia y luego el modelo base para comenzar" in white. Below the header, a light grey banner contains the text "Bienvenido a eCharacter, el configurador de personajes de eAdventure. Para conocer más detalles sobre el proyecto pulse [aquí](#)". The main content area features two selectable options in a white box with a light grey border. The first option is "Cubix Studio", described as "Hombre y mujer adultos de calidad media con estética realista", accompanied by a small image of a woman and a man. The second option is "eAdventure", described as "Un chico, una chica, un niño y una niña de estética simple y tipo cartoon", accompanied by a small image of a girl and a boy. To the right of these options is a large, empty, light grey circular area representing a character selection stage. In the bottom right corner of the browser window, there is a small blue icon with an "i" and the text "Cam".

- ▶ **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/>
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- Blanca Borro Escribano, Ángel del Blanco, Javier Torrente, Itziar Martínez Alpuente, Baltasar Fernández-Manjón (2014): ***Developing game-like simulations to formalize tacit procedural knowledge: The ONT Experience***. Educational Technology Research & Development. Vol 62(2) pp 227-243, Springer. DOI: 10.1007/s11423-013-9321-6. [SCI-JCR:1.155 (2012)].
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- Ángel Serrano-Laguna, Baltasar Fernández-Manjón (2014): ***Applying learning analytics to simplify serious games deployment in the classroom***. Proceedings of the 2014 IEEE Global Engineering Education Conference (EDUCON) Page 872-877 ISBN: 978-1-4799-3190-

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

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- Javier Torrente, Ángel del Blanco, Pablo Moreno-Ger, Iván Martínez-Ortiz, Baltasar Fernández-Manjón (2014): ***Accessible Games and Education: Accessibility Experiences with eAdventure***. In Fun for All: Translation and Accessibility Practices in Video Games, Carmen Mangiron, Pilar Orero, Minako O'Hagan (Eds.), pp. 67-90. Peter Lang AG, International Academic Publishers, Bern (Switzerland). ISBN 978-3-0343-1450-3.
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Our current projects



Education and Culture DG

Lifelong Learning Programme



CHERMUG

CONTINUING / HIGHER EDUCATION IN
RESEARCH METHODS USING GAMES

Increasing patient safety
using games

Modelling/teaching medical procedures at
National Transplant Organization