

# Using 3D worlds in an educational network

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## WIE 2009



## 3D Virtual Environments (3DVE's)



- Increasing use due to:
  - Broadband Internet
  - Improvements in 3D graphics acceleration
- Innovative applications in education:
  - Distant & synchronous communication
  - Common sense of presence
  - Active participation in collaborative activities
  - The tutor can be present and act as presenter, advisor or facilitator or can be absent, thus allowing students to act freely
  - Learning in classroom cannot be replaced but can be supplemented or enhanced by student-oriented collaborative activities in the virtual world





# The evolution of Virtual Worlds



## Online Games

e.g. Quake, Half-Life,...



## MMORPGs (Massively multiplayer online role-playing games)

e.g. Everquest, Project Entropia, World of Warcraft,...



## Virtual Worlds (Massively multiplayer, BUT NOT ONLY role-playing games)

e.g. Big World, Second Life, There,...

- The content is created by users.
- This is not a game, there is no specific aim.
- A place for meetings, creation, exploration, cooperation, marketing and of course education.



# Choosing the appropriate 3DVE



- ❑ The 3DVE platform must be free and open source so that it can be adapted to the community needs



- ❑ Content creation should be easy for non-experts



- ❑ The ability to import content from external libraries is desirable



- ❑ The platform should allow web browsing, text and voice communication and file sharing capabilities

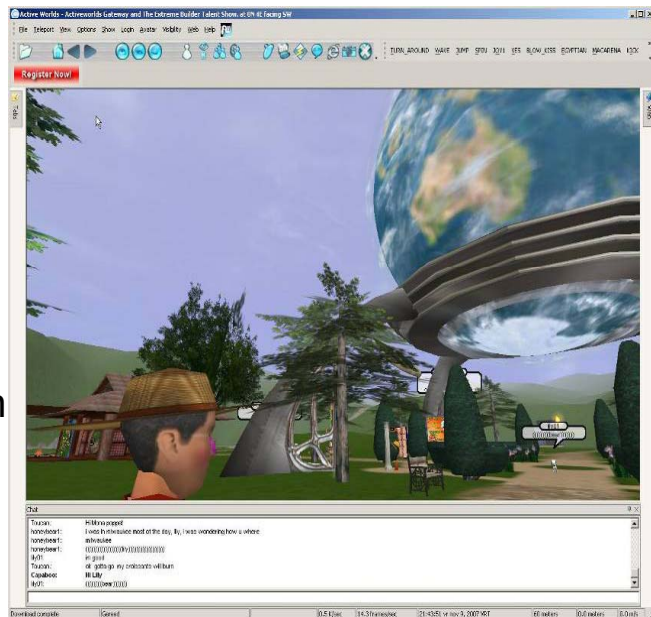
- ❑ Can operate in a distributed environment



## Active Worlds

([www.activeworlds.com](http://www.activeworlds.com))

- specialized educational community (AWEDU)
- object creation and composition
- file exchange
- synchronous and asynchronous text and voice based communication
- registration fee



## Second Life

([www.secondlife.com](http://www.secondlife.com))

- Extensively used by universities (e.g. MIT, Harvard, Edinburgh University etc.)
- Easily design & implement online courses
- Synchronous & asynchronous audio or text communication
- Restrictive policy for non-adult members
- TeenSecondLife solution for students requires a costly and complex registration process

# Harvard Law School in SecondLife



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7



## Project Wonderland

<https://lg3d-wonderland.dev.java.net>

- Sun's open source software
- The main technology for the production of 3D graphics is Java3D
- Cooperates with well known programs for building 3D graphic objects such as Blender and Maya
- Demanding when creating content
- Difficult configuration and customization (server & client)



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8



## Croquet

<http://www.croquetconsortium.org>

- Open source
- Is used for the creation of collaborative, interconnected, multiple-user environments
- Small data transfer without using a central server
- Runs in its on virtual machine thus it can be easily transferred to any common operating system
- Croquet is still rarely used despite its usefulness for Virtual Reality .



## OpenSim

- Open source software (server & client)
- Easy installation on a lab computer that worked as the server without special characteristics (AMD x2 2,3 Ghz processor, 2 GB RAM)
- 500 GB Hard disc space, onboard graphics card and was running Windows XP SP3)
- Identical with SecondLife environment
- In world building tools (WYSIWYG)
- Ability to import objects from Second Life
- **Standalone mode** through a VPN or LAN and **grid mode** through the internet
- It can be customized and fully operating in a school computer lab (**standalone mode**) or through the school network (**grid mode**)
- It is already used formally by educational organisations and companies such as IBM, Microsoft, Nokia and Intel



# OpenSim

<http://opensimulator.org>



**A team meeting in one of IBM's Sametime 3D virtual meeting rooms**

## COURSE DESIGN

- The course was an introduction to computer architecture, using:
  - a) classroom teaching supported by a multimedia presentation (in class session)
  - b) educational activities and informational content inside the 3DVE (online session)

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## In class session

- We used a rich media presentation in order to attract students' attention. We used photos of computer parts and animations in order to achieve a vivid result
- We provided students with details and asked several questions in order to get their feedback
- However, in the absence of real computer parts we didn't perform any group tasks

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## Online session

- The students were enabled to watch the same slide presentation, with the in class students, in the 3D environment
- Objects from previous courses in SecondLife have been imported and re-used
- Additional 3D objects were created
- The students had the ability to interact with the 3D objects and read information about their role and function by clicking with their mouse on each object

## Displaying the presentation in OpenSim



## On line session

- Students learned the function of computer parts by constructing a working computer with the help of their classmates
- The teacher provided clear instructions on how to complete the activities and supported students to solve any technical difficulties
- The online lesson was more learner-centred, active and collaborative than the real-class lesson



## Students completing their tasks in OpenSim



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17

## Evaluation of OpenSim 3DVE

The evaluation questions aimed to:

- Depict the interest of students for the online course
  - They found the course interesting, understandable, collaborative and constructive
- Collect their complaints
  - They needed time to familiarize with the interface, they feel unconfident inside the virtual environment
- Uncover their difficulties in using the platform
  - Lack of expertise in using computers, no previous experience in 3DVE

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18

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# Conclusions

Our evaluation verifies our intuition that

3DVEs may increase students' interest and support interactivity and cooperation

OpenSim 3DVE:

- has a user friendly interface which enables the effective and easy design and application of learning activities that can have a positive impact on students' performance
- improves the ability of students to construct objects, to learn and share their knowledge
- allows collaborative tasks to be assigned to student groups and educators to co-ordinate and support students' activities
- enables virtual worlds to interconnect creating a wider educational grid on the Greek school network

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# Future work

- Develop a database of educational activities that can support one or more courses
  - Run virtual courses, without the physical presence of the teacher and evaluate results
  - Deploy the same course across more than one schools thus allowing students from different backgrounds to interact in the same virtual environment
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Thank you!

Questions ?

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