

# Getting in Touch with History

Advanced Seminar: “E-Learning” – Summer term 2008

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# Executive Summary

- ≡ There are a lot of virtual reality applications dealing with history and cultural heritage
- ≡ Technologies like CAVE or HMD enable physical immersion
- ≡ Desktop-based virtual worlds can act as social spaces
- ≡ The educational use of different VR features needs further research
- ≡ There are frameworks and approaches addressing the problem of content creation

# Agenda

- ☰ What is Virtual Reality?
- ☰ There are Different Technologies
- ☰ Educational Potential of VR
- ☰ Cultural Heritage
  - ☰ Dentre Trento
  - ☰ ERATO – Aspendos
  - ☰ LIFEPLUS – Pompeii
  - ☰ Second Life – ROMA
- ☰ VR/AR vs. Desktop-based Virtual Worlds
- ☰ Outlook

# What is Virtual Reality?

## Virtual Reality...

- ≡ Uses **computer graphics systems**
- ≡ in combination with **various displays** and **interface devices**
- ≡ to provide the effect of **immersion** in an **interactive computer-generated environment**
- ≡ is not essentially a technology, but a **human experience**

## Mixed Reality is the superordinate concept of:

- ≡ **Augmented Reality**: real scenes, complemented with virtual objects
- ≡ **Augmented Virtuality**: inclusion of real world objects into a virtual environment

# There are Different Technologies

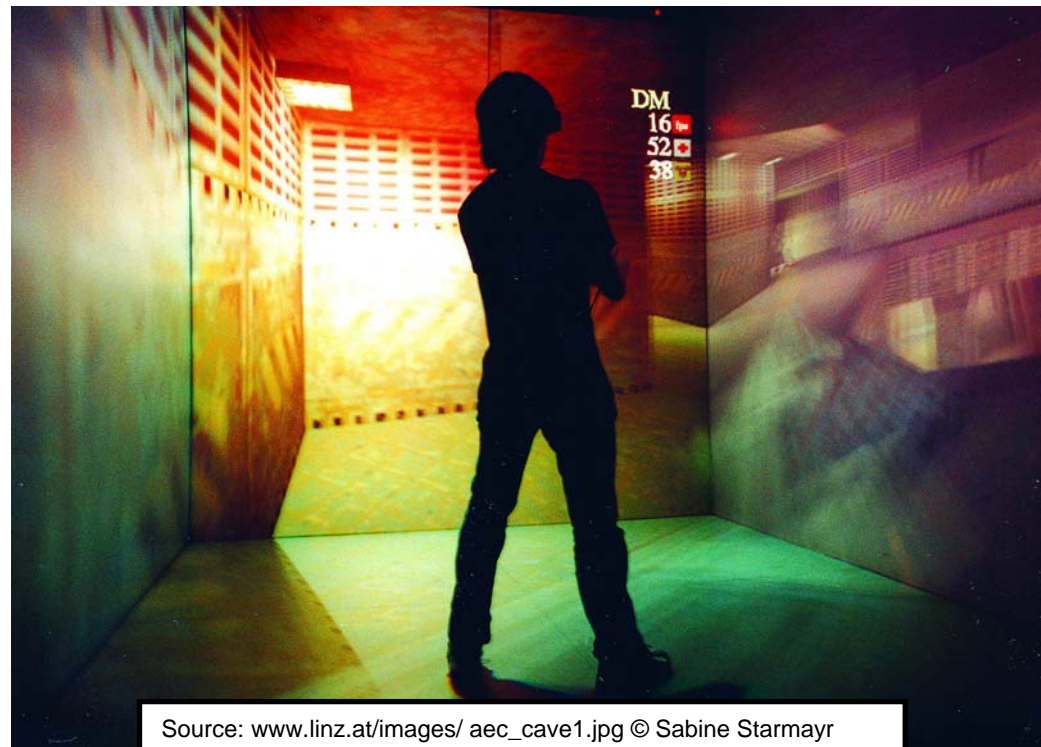
- ≡ CAVE (cave automatic virtual environment)
- ≡ HMD (head-mounted display)
- ≡ Desktop VR
- ≡ Many input devices



Source: [http://www.inition.com/inition/images/product\\_glove\\_immersion\\_cyberglove2.jpg](http://www.inition.com/inition/images/product_glove_immersion_cyberglove2.jpg)



Source: <http://www.biopac.com/ProductImages/hmd1.jpg>



Source: [www.linz.at/images/aec\\_cave1.jpg](http://www.linz.at/images/aec_cave1.jpg) © Sabine Starmayr

# Educational Potential of VR

There is no general theory how to use the concepts of VR in education

≡ **Constructivist theory** as a basis: Interaction and immersion allow first person, non-symbolic experiences

≡ Potential for education:

- ≡ Experimental and active learning
- ≡ Visualization and Reification
- ≡ Learning in contexts impossible or difficult to experience in real life
- ≡ Motivation enhancement
- ≡ Collaboration fostering
- ≡ Adaptability

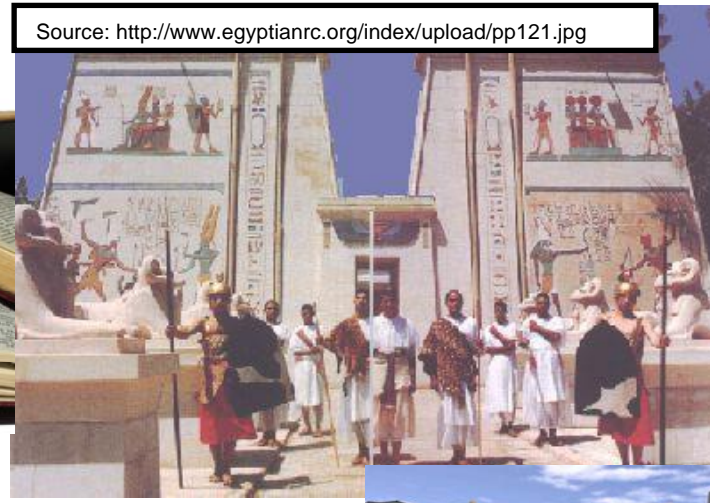
# Cultural Heritage

VR can make the past concrete

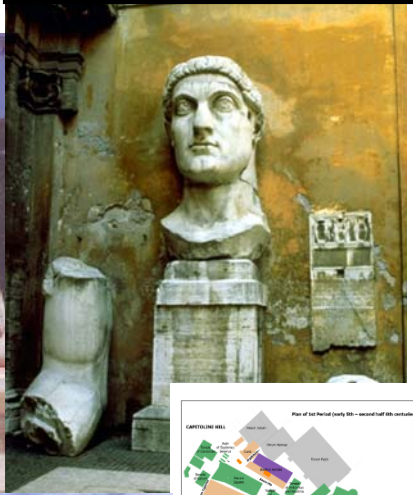
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Source: <http://www.sxc.hu>



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Source: <http://www.romereborn.virginia.edu/>



Source: [http://www.uni-leipzig.de/~uifg/files/D\\_Panele%2011.pdf](http://www.uni-leipzig.de/~uifg/files/D_Panele%2011.pdf)

# Dentro Trento

Added Value through the availability of different time frames



Source: <http://www.graphitech.it/projects/dentrotrento/index.htm>



# ERATO – Aspendos

Focus on acoustic qualities of ancient theatres

- virtual humans are enacting excerpts from greek dramas, such as Antigone of Sophocles

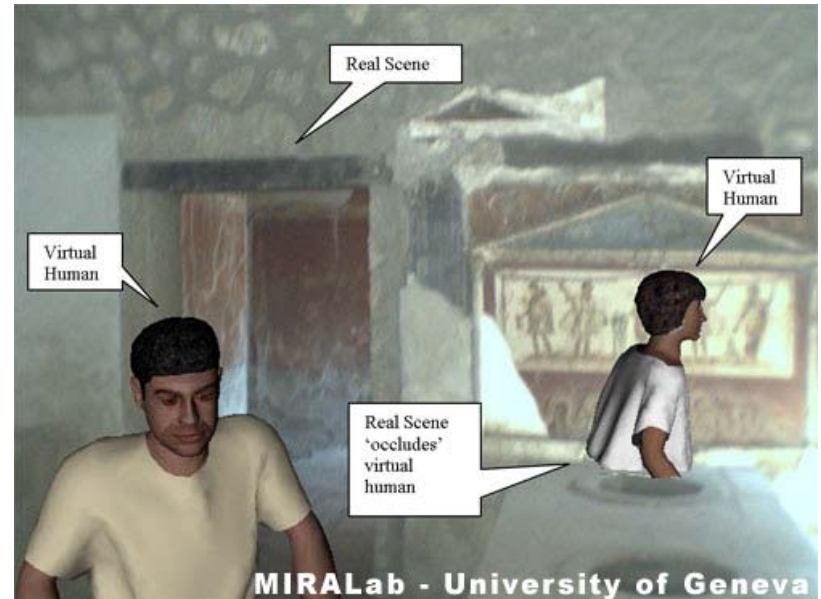
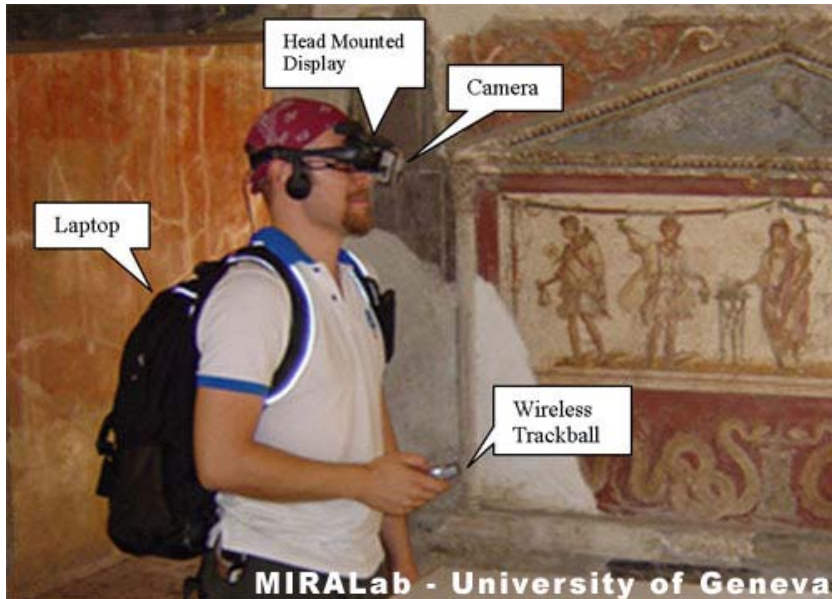


Source:<http://server.oersted.dtu.dk/www/oldat/erato/>

# LIFEPLUS - Pompeii

Wants to push the limits of current AR technologies

- Idea: capture a video of a real scene in real time and add realistic real time rendered 3D simulations of virtual humans, animals and plants to the scene



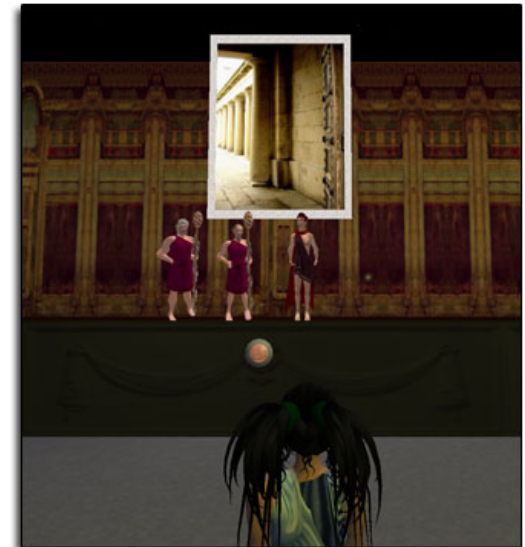
Source: [http://lifeplus.miralab.unige.ch/HTML/results\\_visuals.htm](http://lifeplus.miralab.unige.ch/HTML/results_visuals.htm)

# Second Life – ROMA

≡ No historically coherent reproduction of ancient Rome

≡ A lot of interaction possibilities:

- ≡ Pick a toga and learn some Latin
- ≡ Follow or get involved in gladiator games
- ≡ Take part in role plays and events
- ≡ Follow an ancient play in the theatre
- ≡ Visit exhibitions in the Capitoline Museum



Source:<http://jokay.com.au/2007/02/25/learning-at-virtual-roma/>

# VR/AR vs. Desktop-based Virtual Worlds

Which Features are important for the learning process?

## VR/AR

- Physical immersion
- script-driven virtual humans, who try to react adequately
- Built upon a scenario
- High realism, high quality of the content
- “Expensive”

## Desktop-based

- Subjective immersion
- High level of interactivity
- Users-generated content
- Real and virtual humans
- not necessarily built upon a scenario
- Can create social spaces
- “Cheap”

≡ The point is not to establish whether VR is useful or not

≡ It is important to look at the **concept** being learned

# Trends & Outlook

Improvements can be expected in various fields

## ≡ Artificial intelligence of virtual humans

- ≡ Voice recognition

- ≡ Speech synthesis

## ≡ Improvement of real-time animation and rendering

## ≡ New (cheaper) ways of creating physically immersive applications?

- ≡ Johnny Lee: Head tracking for Desktop VR systems using the Wii remote

## ≡ Can immersive VR technologies exceed the scientific environment in the future?