



Exploring ancient wonders –  
using computer game technology to  
create virtual learning environments

# Motivations for the Project



- challenge of helping students appreciate the significance of ancient architectural wonders using virtual learning environments (VLEs)
- power of 'modding' tools from 'first-person shooter' games
- ubiquity of computer games and computers powerful enough to run them in schools

# Aims



- investigate the capacity of computer game-based VLEs to enhance students' knowledge
- identify the influence of VLEs on engagement
- identify student perceptions of using game-based VLEs

# What does the literature say?



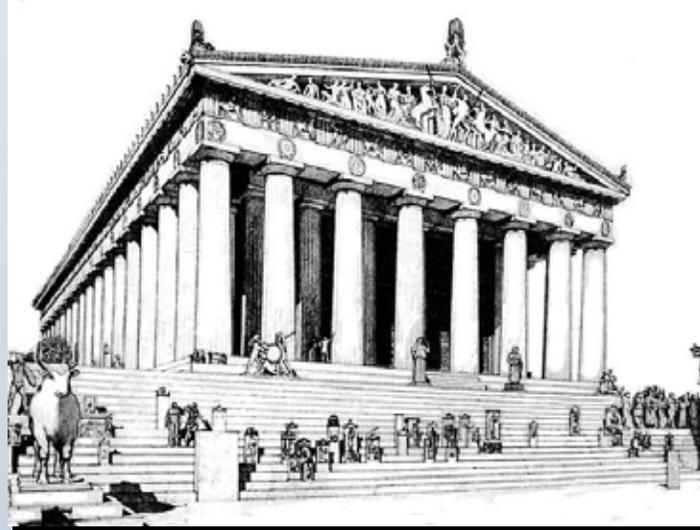
## VR technologies:

- have been identified as functional and effective educational tools (Dickey, 2005; Foreman, 2004; Moreno, 2002; Winn, 2002)
- effective in promoting learning through engagement and experiential participation – embodied learning (Jeffs & Whitelock, 2000; Winn, 2003)
- engage the user in a multi-sensory fashion – visual, auditory and kinaesthetic – that leads to the development of experiential intuitions which are retained by the user (Dede, Salzman, Loftin & Sprague, 1999)



- computer game technologies have been identified as viable alternatives to traditional forms of VR (Champion, 2006; Foreman, 2004; Jacobson & Holden, 2005)
- in order to be successful, VLEs must:
  - facilitate immersion; user must feel ‘presence’ (Champion, 2006; Jeffs & Whitelock, 2000; Winn 2003) and
  - have an effective pedagogical foundation (Chen, Toh, & Ismail 2005; Moreno, 2002).

# Designing the VLE - location



<http://www.mlahanas.de/Greeks/Arts/Parthenon/Parthenon2.jpg>

## Why the Parthenon?

- iconic architectural structure, the scale of which is difficult to appreciate from images
- architectural elements are comparatively simple, facilitating effective representation using game technology

# Designing the VLE - immersion



- realism
- scale
- ‘presence’ created via environmental effects
- focusing the user’s attention – information markers

# Designing the VLE - pedagogy



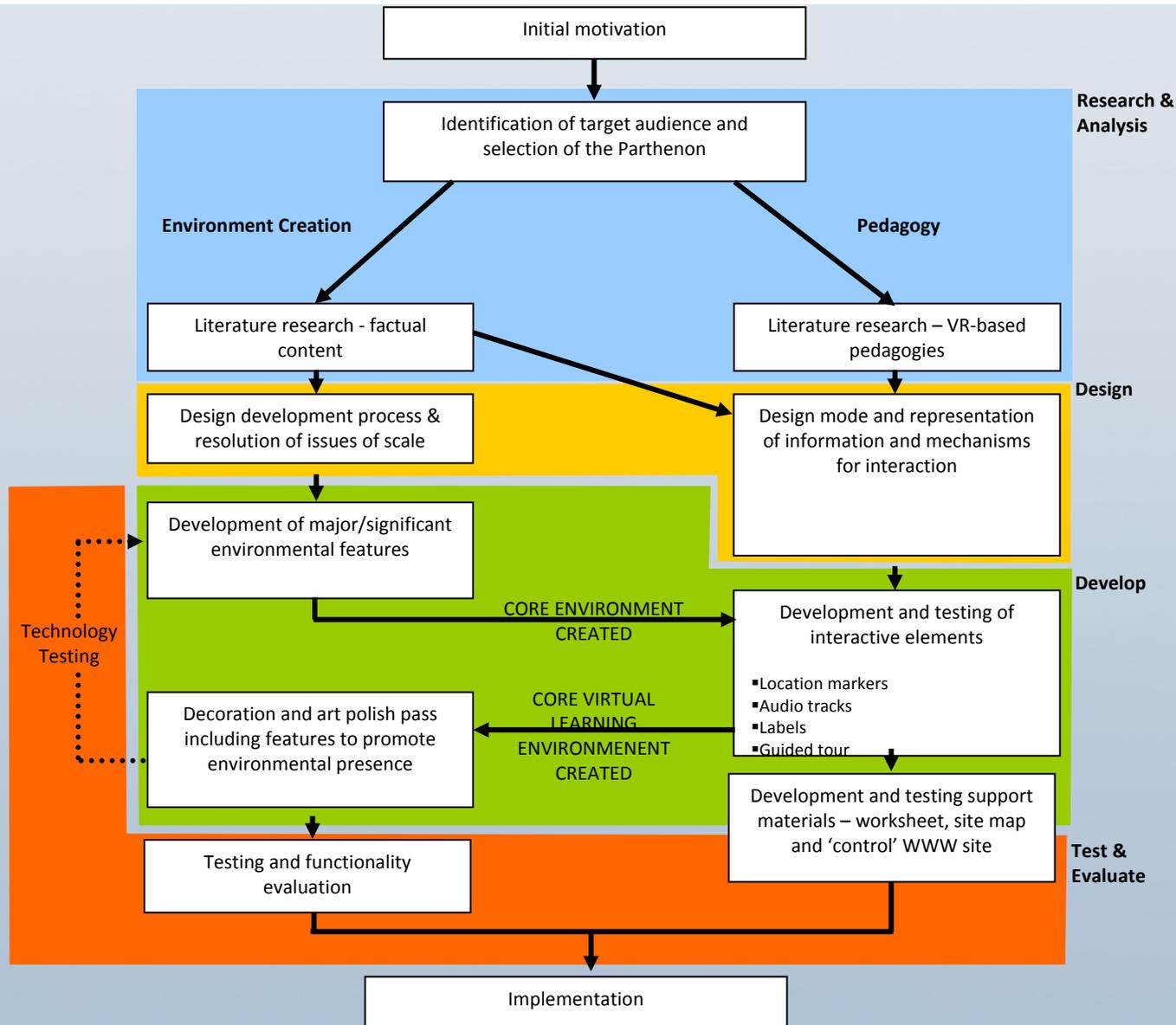
- mechanism to promote meaningful exploration
- epistemic activity – exploring, observing and recording – based on constructivist pedagogy
- museum activity and worksheet

Exploring Ancient Worlds  
**THE PARTHENON**

The following are images of artefacts from the Parthenon. They will be included in a new museum display. Explore the site to gather the information required for the catalogue.

	<p>What is it?</p> <p>Where in the Parthenon is it from?</p> <p>More information</p>	<p>What is it?</p> <p>Where in the Parthenon is it from?</p> <p>More information</p>	
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# Design Process





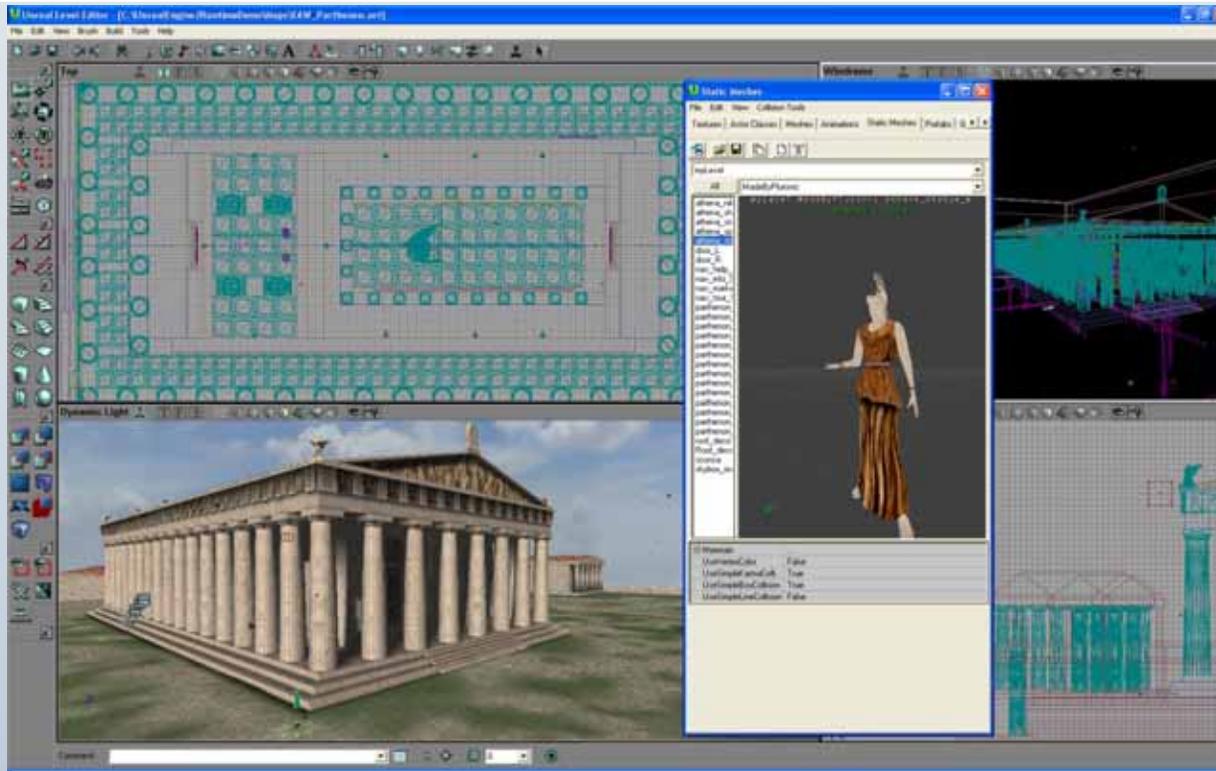
# Creating the VLE



## Unreal Engine 2 runtime

- fully-featured computer game engine
- free to use in the education context
- content created with it can be openly distributed as long as it is not sold

# Creating the VLE



## UnrealEd

- CAD style interface
- Easy to use
- No programming required, though tools are included

# Research Methodology



As part of the project, the short term effectiveness of the VLE was measured using a treatment-control methodology:

- 29 Year 8 history students (mixed gender)
- half used the VLE, half used a control WWW site
- pre- and post-test – knowledge, engagement , and confidence with VLEs



## Students' Knowledge

- VLE was more effective in the development and retention of short-term knowledge than the WWW site
- males using the VLE demonstrated:
  - significantly greater improvement in and level of knowledge
  - greater confidence in their knowledge
- VLE and the WWW site had a similar level of benefit for females
- VLE demonstrated a similar level of effect for visual and multi-sensory learners



## Engagement

- self-guided, non-sequential nature of the constructivist learning experience promoted high levels of engagement for treatment and control groups
- students using the VLE demonstrated higher levels of appreciation for and engagement in the activity.



## Students' perceptions of using VLEs

- 87% of using the VLE indicated a preference to learn more about historic places via a VLE
- *"It is not something that you would normally do at school. It makes it more fun and interesting to learn."*
- factors that increased enjoyment:
  - realistic representation
  - ability to freely explore the site
  - opportunity to examine the important features carefully and in a self-directed manner

# Conclusions



- computer game-based VLEs are effective educational tools
- FPS engines and 'mod' tools can be used to make effective VLEs
- Unreal Engine 2 runtime is an ideal tool for teachers

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