Comparative Analysis of Realtime Game Engines to Traditional Methods of Design Communication

Advanced Interdisciplinary Design Studio
Spring 2009
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It started with...
Dead Masterplans and Digital Creativity
Dead Masterplans and Digital Creativity

1. Abolish 2-dimensional master-planning
2. Make 3-dimensional design the norm
3. Encourage 4-dimensional design, by simulating changes through time
4. Supply designers with a wealth of factual information
5. Incorporate a full range of values into the design process
6. Impart post-modern structures to the design process, employing intellectual structures from natural science, social science, the arts and the humanities
7. Facilitate the environmental assessment of projects from many points of view, including the motorist, the cyclist, the pedestrian, the local resident, the frog, the hedgehog and the buttercup.
Kythryn Gustafson
“words, diagrams, then models”
Johan Huitzinga (1872-1945) "Let my playing be my learning, and my learning be my playing."
What is a Real Time Game Engine?

- A system of software intended for the creation and development of video games or other real-time content
- Most popular use is the video game industry
- Remarkable ability to render and to respond to input instantaneously
- Ability to incorporate sound, light, physics, and user input
Why Explore Game Engines?

- Plans, sections, and elevations are abstractions and inadequate to fully communicate designs to stakeholders.
- Animations are cumbersome and predetermined and do not allow freedom to explore design.
- A paradigm shift in how landscape architects design and communicate design is essential for the progression of the profession.
- Greater transparency enabling participants to have greater input in the design process.
# Comparison

<table>
<thead>
<tr>
<th></th>
<th>Plans, Sections, Elevations</th>
<th>Perspectives</th>
<th>Scale Models</th>
<th>Animations</th>
<th>Realtime Game</th>
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</thead>
<tbody>
<tr>
<td><strong>Immersion</strong></td>
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<tr>
<td><strong>Accuracy</strong></td>
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<tr>
<td><strong>Realism</strong></td>
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<td>+++</td>
<td>++1/2</td>
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<td><strong>Comprehension of space</strong></td>
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<td>++</td>
<td>+1/2</td>
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<tr>
<td><strong>Dimensions</strong></td>
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<td>2 1/2</td>
<td>3</td>
<td>4</td>
<td>5 1/2</td>
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<td><strong>Interaction</strong></td>
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Why Explore Game Engines?

- A very malleable technology
- Enormous research and development initiative by game engine developers to create photo-realistic, immersive environments.
- Media familiarity: game industry has surpassed the motion picture and music industries
- Easily accessible technology
- Provides superior spacial understanding of the landscape and urban fabric
- Dynamic interaction
- Active engagement versus passive observance
Why Explore Game Engines?
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Why Explore Game Engines?
Workflow

3D Models

Imagery/Textures

GIS

Scripts

Concepts

Participant Input

Audio/Vide o

Game Engine

Standalone Webplayer iPhone
• Project strongly suited to test game engine because it incorporates many different facets of urban design, landscape architecture, transportation planning, architecture, ecology

• Major redesign of interstates I-26 and I-240 and Patton Ave. threaten to diminish fabric of Asheville and West Asheville with more bridges and NCDOT right of way acquisition

• 4 design alternatives: B2,B3,B4,B4-B

• For every alternative additional acquired land is imperative to accommodate expanding highway infrastructure
Project Site
Asheville, NC

- Project site is over 500 acres
- Projected cost: $400-$600 million
- Planning going for over 5 years
- Grassroots effort led by Asheville Design Center to minimize landscape and urban disturbance
- Asheville Design Center created ALT B4-B to minimize land acquisition
- This project is being decided solely on drawings
3 Land Acquisition Analysis

ACQUIRED LAND

HIGHWAY

ALT B4

ALT B3

ALT B5

ALT B2

ALT B4-B

86 Acres

73 Acres

65 Acres

63 Acres

35 Acres
Applications

- Instantaneously test design alternatives
- Provide information dialogues at key places
- Explore the landscape
- Stir greater community interest
- Test scenarios
- Provide a better framework to test future designs
Now to the Demo...
Strengths

- Democratizes the design process by allowing greater transparency between designer and participants
- Quick testing of alternatives provides ability to make better decisions
- Encourages curiosity and play
- Promotes spatial literacy in design
- Useful for interacting and creating dialogue with and between the public, government officials, professional experts, and developers
- Minimize errors in the design phase
- Help young design students
Weaknesses

- Can be technically demanding to learn for some, especially when scripting code
- 3D modeling of scenes could slow process
- Level of detail for large spaces constrained by programmer skill and/or computer resources
- Further work needed in vegetation
Special Thanks

• My wife
• Asheville Design Center
• Zachariah Inks
• Case Brown
• Dr. Jan Holmevik
• Unity Technologies
• Unity3D Forum
• Unify Community
• Ennanzus Interactive
• URS Creative Imaging
• NCDOT
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