Introducing User Experience in Games and Virtual Environments

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The Course

- Changes … but builds on a well established course and considerable research in this department.
- The course only has ≤ 8 lectures
  - the most important part is your own work of building a game/VE +
  - make some change and evaluate its effectiveness.
- This means you must have a game for which you can do that
  - or be able to develop one very quickly.

The Course II

- assume you know design techniques
- assume you have a game or can create one yourself
- you may work alone
- Course remains open-ended
  - Had contributions from many expert lecturers
  - Your wishes and suggestions welcome
- Only for those who take part actively:
  - read papers
  - do practical
  - You are responsible for your own learning

Topics

- Introduction
  - What are Games and Virtual Environments?
  - What is meant by User Experience?
- Review of Design
  - Attractors
  - Summary
- Presence and Flow
  - Presence and Perception
  - Immersion and Flow in Games
  - Measurement of Presence and Flow in Games and VEs

Assessment: Practical Work

- Four part practical exercise (done singly or in pairs)
  - Throughout this you will have to read up on the topics presented in lectures by yourself (~12 hours)

1. Treatment and research proposal, 1 page — 10%
   - 6 hrs, due Thu 6/2 11:00, feedback by Thu 13/2
2. Design document for experiment — 20%
   - 8 hrs, due Thu 20/2 11:00, feedback by Mon 24/2
3. Implementation experimental system complete — 20%
   - 8 hrs, due Thu 6/3, demos to be scheduled that day
4. Experimental evaluation
   - 12 hrs, experiments done by Fri 14/3. Evaluated as part of exam.

Assessment: Exam

- A final essay, as an exam, based on the practical work, done **individually**.

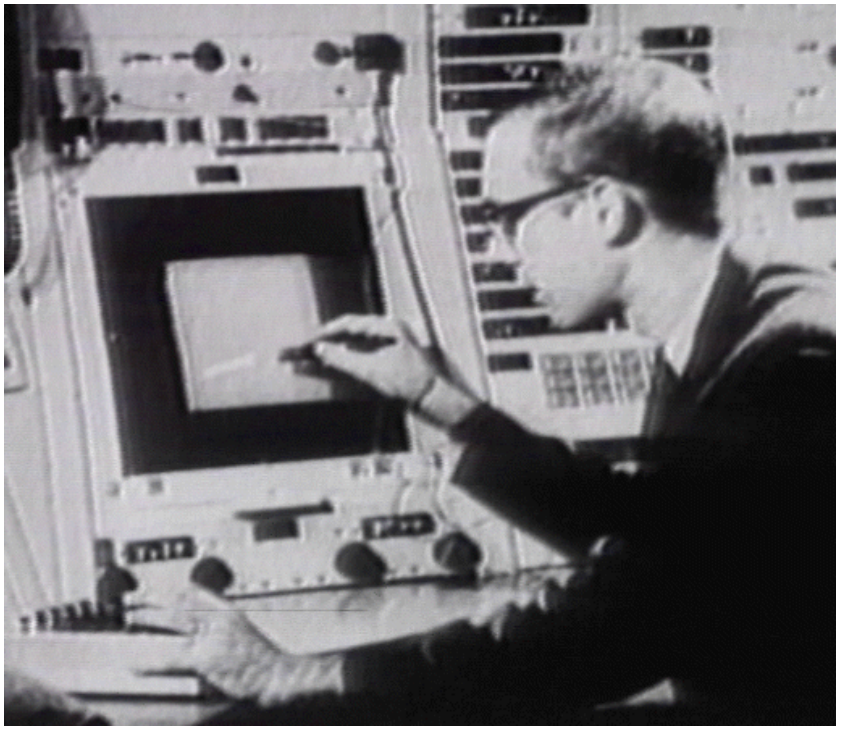
5. Write-up of Experiment (5–7 pages 2800–6000 words + diagrams & tables) — 50%
   - 16 hrs (so-called overnight exam), final hand in on Friday 21/3, 16:00 (**still to be confirmed**).

This Talk

- Overview
  - Intuitive understanding of what is special about VR and sandbox games
  - I assume you know about games …
  - Naming some of the concepts
- Reading
  - The slides (on web)
  - No Text Book: Papers instead.
  - Several Handouts.

The Ultimate Display

- “The ultimate display would ... be a room within which the computer can control the existence of matter. A chair displayed in such room would be good enough to sit in.”
- “With appropriate programming such a display could literally be the Wonderland in which Alice walked.”
- Ivan Sutherland 1965



Ivan Sutherland (1965) “The ultimate display” Proc International Federation of Information Processing, 506–508.

Exercise

- What is Virtual Reality?
  - Extreme Direct Manipulation?
  - Visualization?
    - And the other senses then?
  - Is some kind of simulation essential?
  - Where does emotion come in?
    - Being there?
    - Presence?
    - Willing suspension of disbelief?

Where are you now?

- The Pit Experiment: Two rooms:
  - Training room environment
  - Stressful environment
  - Participants must pick up balls and drop them onto their appropriate targets.
- With passive haptics!

Who are you?

Where are you?

What are Virtual Environments?

- Virtual Environments
  - interactive simulation of three-dimensional animated world in a computer
  - ‘being there’
- Systems
  - Override senses
  - Track movements

Phantom Desktop

Exoskeleton

What are Games?

- Not even going to try to answer this one!
- Particularly interested in Sandbox games:
  - open ended outcome.
  - Aka non-linear games
  - Emergent gameplay
- Examples:
  - Sims,
  - Elder Scrolls,
  - Grand Theft Auto,
  - Far Cry,
  - Assassins Creed,
  - Flower

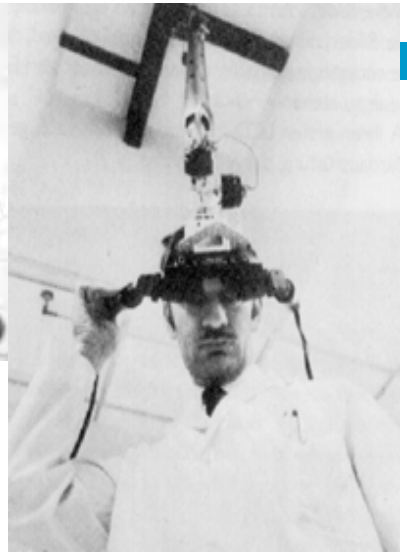
Our Interest: User Experience

- What goes on in the user's or player's mind when they loose themselves in the experience?
- What concepts can we use to understand the phenomena?
  - Presence
  - Flow
- How can we design for it?
- Haw can we implement it?
- How can we measure experience?

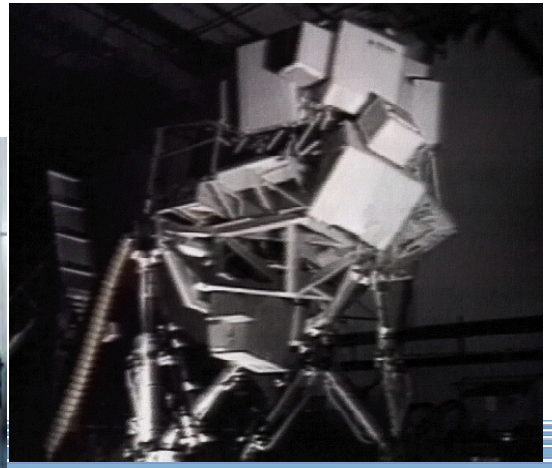
User Experience

- We are interested in how people experience a computer-human interface.
- Traditional HCI
  - Human Factors
  - Classical Cognitivism/Information Processing
  - Question: How well can people perform tasks?
- Third Paradigm (Harrison, Tatar, Sengers, 2007)
  - It focuses on the experiential quality of interaction.
- HCI is finally recognizing the importance of experience!

History



- Head-mounted display—Sutherland 68
- Evans & Sutherland — flight simulators 70's
- Myron Krueger — Artificial Reality, 1973
- Virtual Reality—Lanier 80's
- Aim: legal "trip"?



User Experience in Games

- We'll consider these
  - involvement,
  - engagement,
  - flow,
- And these:
  - immersion,
  - presence,
- But not these
  - fun,
  - play,
  - playability.

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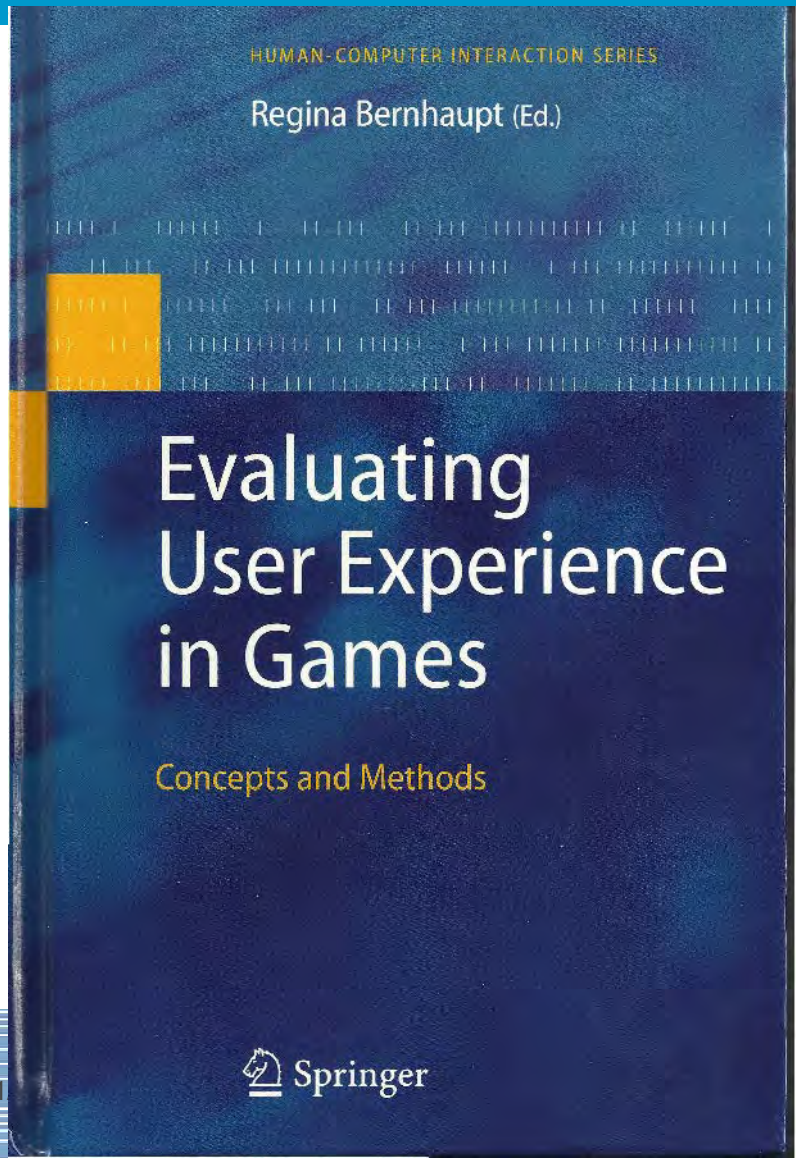
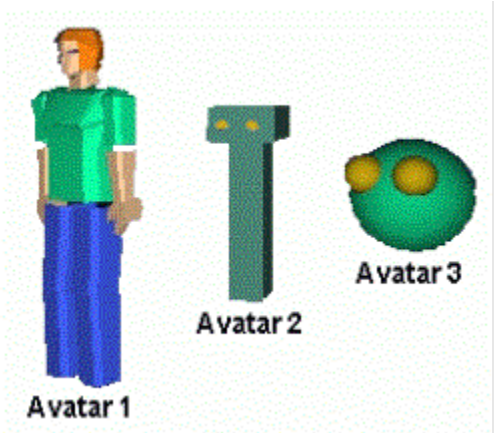


What are Collaborative Virtual Environments?

- Shared spaces
  - (Many) People meet
  - Collaborate on tasks
- Avatar
  - user is an explicit part of the system
  - Hindu Mythology: The descent of a god to earth in incarnate form.
  - An incarnation or embodiment of another person …

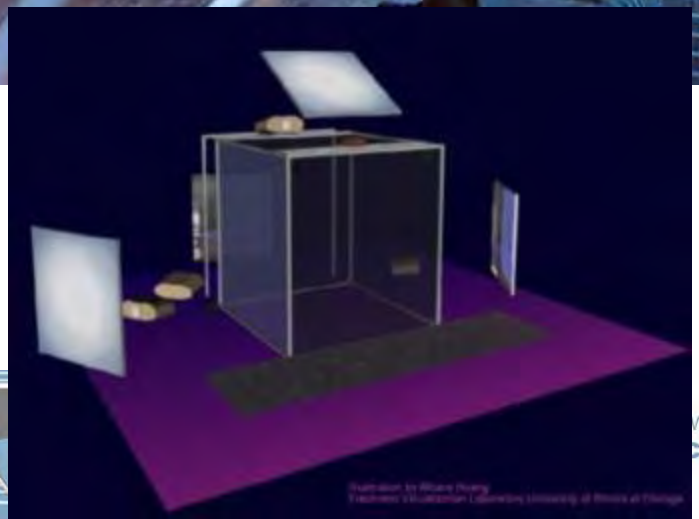


Problems

- Realism
  - Is it needed?
- Latency
  - Networks
  - Systems
  - Nausea (www.cybersickness.org !)
- Authoring
  - Tools
  - Methodology
- Expense
- Hype

Concepts: Hardware and Systems

- Immersion
  - Immersive tendency
- Latency
- Shared spaces
- Caves
- Fish-Tank VR



Concepts: People

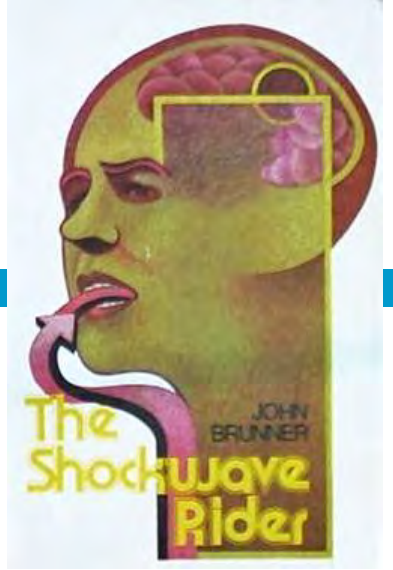
- Suspension of Disbelief
  - realism
  - abstraction
- Presence
  - Tele-presence
  - Personal Presence
  - Co-presence
    - Avatar
  - Environmental Presence
- Flow
  - mental state a person is fully immersed in an activity
    - Csíkszentmihályi

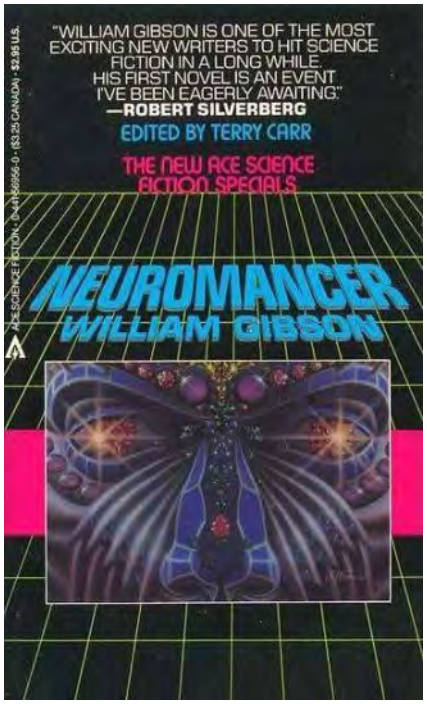
Conclusion: Guiding Questions

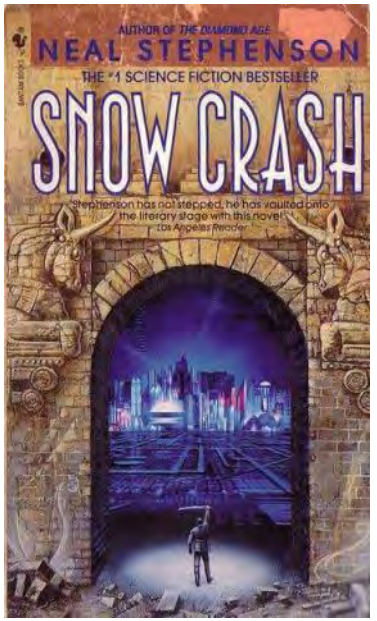
- Is this really different?
  - More than just a 3-D interface to a computer?
- Just what is it the constitutes the differences?
  - The systems?
  - The response of people?
- Does it matter?
  - Is it useful?
    - Does it have to be?
- How do you do it?

Some Necessary Fiction

- The Shockwave Rider (John Brunner – 1975)
- Neuromancer (William Gibson – 1984)
  - Cyberspace — a consensual hallucination
- Snow Crash (Neal Stephenson – 1992)







Movies to See

- Holodeck — Star Trek
- Tron (Steven Lisberger — 1982)
- The Matrix (Wachowski brothers — 1999)
- Avatar (James Camero — 2009)
- Inception (Christopher Nolan — 2010)

Are You Living In a Computer Simulation?

- At least *one* of the following propositions is true:

1. the human species is very likely to go extinct before reaching a “posthuman” stage;
2. any posthuman civilization is extremely unlikely to run a significant number of simulations of their evolutionary history (or variations thereof);
3. we are almost certainly living in a computer simulation.

- So what probability do we assign to each option?
  - Nick Bostrom, Director, Future of Humanity Institute, Oxford.
  - www.simulation-argument.com/

Are there any Fundamental Limits to Virtual Reality?

"Matter, just as it is, carries out outlandishly complex chaotic quantum computations just by sitting around. Matter isn't dumb. Every particle everywhere everywhen is computing at the maximum possible rate."

- Rudy Rucker: www.rudyrucker.com/blog/2008/03/03/fundamental-limits-to-virtual-reality/

- To summarize: It takes the Universe 24 hours to calculate the next 24 hours — where are the extra resources going to come from to simulate it?
- But see also "Holographic principle".

David Deutsch: The Fabric of Reality

1. Perfect VR (universal) image generation is possible
   - need not simulate reality,
   - just need to render all possible sensations
2. Perfect input by intercepting nerve signals from the brain
3. Leaves the computer
   - VR of the future depends on the computer and some “trivial” peripheral devices
   - Solve “time problem” by slowing down user’s brain!

- Turing’s principle becomes:
  It is possible to build a virtual-reality generator, whose repertoire includes every physically possible environment

Effective Games and Virtual Environments

Our Main Interest:

- Measuring User Experience
  - Presence
  - Flow
- Authoring
  - Design Method
  - Design for Presence
  - Design for Flow
- Cost Effective Platforms
- Useful Applications

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Justin	Crause	(UCT)	Practical	
James	Gain	(UCT)	Multi-modality	
Maia	Garau	(UCL)	Avatars and communication	Deview
Zayd	Hendricks	(UCT)	Authoring and scripting	Caves
Cathryn	Johns	(UCT)	Navigation in VEs	NRF
Bertus	Labuschagne	(UCT)	Practical	NRF
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Eric	Savage	(UCT)	Scripting	Caves
Matthew	Slade	(UCT)	Practical and Gaming	NRF
Anthony	Steed	(UCL)	Collaborative VEs and Presence	Deview
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Marion	Walton	(UCT)	Design	Caves
Cara	Winterbottom	(UCT)	Experimental methods	NRF

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