IMGD 5100:
Immersive HCI

Immersion & Game Play

Robert W. Lindeman
Associate Professor
Interactive Media & Game Development
Department of Computer Science
Worcester Polytechnic Institute
gogo@wpi.edu
What *is* Immersion?

- “Being There”
- Being in *Flow*
- Natural interaction that recedes into the background
- Tapping into personal experience
Being There: Remote Physical Environment

- Phone
- Video conference
- Teleoperated robots
Being There: Virtual Environment

- Video game
- Immersive learning environment
  - Immersive chemistry
- Surgical simulation
- MMO
Being There: Real Environment

- Hand-held mobile device
  - iPhone/iPad/Android
  - DS/PSP

- In-vehicle system
  - Navigation
  - Traffic

- Augmented Reality (AR)
Being There:
Described Environment

☐ Books
☐ Movies
☐ Phone sex
What Makes a Good Game?

- "A great game is a **series** of *interesting* and *meaningful choices* made by the player in pursuit of a *clear* and *compelling goal.*" - Sid Meier

- "Natural Funativity"
  - Survival-skill training
  - Need to have player develop a set of skills with increasing levels of difficulty
  - Putting them to the test = mission, quest, level, *etc.*
  - Prize at the end (or in the middle)
Structure of Games

- Movies have linear structure
  - No choice by viewer

- Games must provide "interesting and meaningful choices"
  - Otherwise, user is not in control

- Random death is frustrating!
Being in Flow

- Introduced by Mihály Csíkszentmihályi
  - Heightened sense of perception
  - Highly focused on primary task
  - In the "sweet spot" between frustration and boredom

- Athletes often report this
- Video gamers too
Getting the balance right is the key to success

Flow

M. Csikszentmihalyi, "Flow, The Psychology of Optimal Experience"

Figure 2.1.8 A better flow.

Chapter 2.1, Introduction to Game Development
Convexity of Game Play

- Need to provide choices

FIGURE 2.1.6  *A series of convexities.*
Flow: Sample Game

- flOw
- Game written by Jenova Chen
- Research into adaptive difficulty
  - How can we keep people in flow?
  - Player doing poorly, make it easier
  - Player doing well, make it harder
- Play Demo
- http://www.jenovachen.com/
Convexity + Flow

Utilizing both can lead to a great game

![Ideal Game Difficulty Progression](image)

**FIGURE 2.1.9** Better flowing through convexities.
Characterizing Flow

- A challenge activity that requires skills
- The merging of action and awareness
- Clear goals
- Direct feedback
- Concentration on the task at hand
- The sense of control
- The loss of self-consciousness
- The transformation of time
Natural Interaction

- Recedes into the background
  - Low cognitive load for interaction techniques
  - Visual (and other) feedback can be easily digested
  - Low cumber
The Role of Personal Experience

- We all filter our senses
- Variations in sight, hearing, etc.
- My childhood versus yours
- My mood
- Can we harness this?
Deconstructing **Petrified**

- First-person, multi-player, team-based horror/survival game
- Two teams
  - Humans (*Mortals*):
    - People trapped in the cemetery
    - Need to survive until dawn
  - Statues (*Watchers*):
    - Tombstones
    - Need to convert Humans to Statues
Deconstructing *Petrified* (cont.)

- Main game mechanics
  - Watchers (Statues) can
    - Move when not being looked at by Mortals
    - Occupy another unoccupied statue anytime
    - Swipe at Mortals (short-range attack)
  - Mortals (Humans) can
    - Look at Watchers
    - Move freely
    - Work together
Petrified: Walkthrough (1/6)
Petrified: Walkthrough (2/6)
Petrified: Walkthrough (3/6)
Petrified: Walkthrough (4/6)
Petrified: Walkthrough (5/6)
Petrified:
Walkthrough (6/6)
Petrified: Watcher Movement
Petrified:
Watcher “Swapping”
Question for Discussion:
Is *Petrified* Balanced?

☐ Does one team have an advantage?
☐ If you were a Mortal, how would you play?
☐ If you were a Watcher, how would you play?
☐ What improvements/changes could you make to the game?
**Petrified Modifications:**

Flashsticks
Petrified Modifications: Balancing the Mortals

- Flashstick compensates for weak Mortals
- Skilled Mortal can survive forever
Petrified Modifications: Balancing the Watchers

- Range Attack Balances Watchers
  - Mortals cannot “camp out”

- Provides incentive for Watchers to move about/chase Mortals

- (Show Clip)
Different Level Flow Models

- Linear
- Bottlenecking
- Branching
- Open
- Hubs and Spokes
Level Flow Model: Linear

- Start on one end, end on the other
- Challenge in making a truly interesting experience
  - Often try with graphics, abilities, etc.
  - Ex: *Half-life*, ads great story
- Used to a great extent by many games
Level Flow Model: Bottlenecking

- Various points, path splits, allowing choice
  - Gives feeling of control
  - Ex: Choose stairs or elevator

- At some point, paths converge
  - Designer can manage content explosion
  - Ex: must kill bad guys on roof
Level Flow Model: Branching

- Choices lead to different endings
- User has a lot of control
- Design has burden of making many interesting paths
  - Lots of resources

R.W. Lindeman - WPI Dept. of Computer Science
Interactive Media & Game Development
Level Flow Model: Open

- Player does certain number of tasks
  - Outcome depends upon the tasks.

- Systemic level design
  - Designer creates system, player interacts as sees fit

- Sometimes called “sandbox” level. (Ex: GTA)
Level Flow Model: Hub and Spokes

- Hub is level (or part of a level), other levels branch off
  - Means of grouping levels
- Gives player feeling of control, but can help control level explosion
- Can let player unlock a few spokes at a time
  - Player can see that they will progress that way, but cannot now
Designing a Level: Brainstorming

- An iterative process
  - You did it for the initial design, now do it for levels!
- Create wealth of ideas, on paper, post-it notes, whatever
  - Can be physical sketches
- Can include scripted, timed events (not just gameplay)
- Output
  - Cell-diagram (or tree)
Designing a Level: Cell Diagram

- String out to create the player experience
- Ordered, with lesser physical interactions as connectors (i.e., hallways)
QuakeII-DM1: An Example

- Video (Q2DM1_Layerout.avi)
  - level layout
QuakeII-DM1: Architecture

- Two major rooms
- Connected by three major hallways
- With three major dead-ends
- No place to hide
- Forces player to keep moving
  - Camping is likely to be fatal
QuakeII-DM1: Item Placement

- Cheap weapons are easy to find
- Good weapons are buried in dead ends
- Power-ups require either skill or exposure to acquire
- Sound cues provide clues to location
  - Jumping for power-ups
  - Noise of acquiring armor
- Video (Q2DM1_Weapons.avi)
  - Weapon placement
QuakeII-DM1: Result

- A level that can be played by 2-8 players
- Never gets old
- Open to a variety of strategies