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!

☐ Choices need to make sense in the context of the story
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
Flow

Getting the balance right is the key to success

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.jenovachchen.com/
Convexity + Flow

- Utilizing both can lead to a great game

Chapter 2.1, Introduction to Game Development

R.W. Lindeman - WPI Dept. of Computer Science
Interactive Media & Game Development
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)
Petrified
Presence: The Sense of Being There

- Immersive technologies can give your senses the feeling of *being there*

- Other things can too
  - The way virtual characters react to you
  - The depth with which you can interact with the environment
  - The invisibility or naturalness of the interface
  - The lack of distractors (e.g., cables)
Measuring Presence

- How could we measure if someone feels “present” in a game or other virtual environment?
- Is this a yes/no measurement?
- How could we discover the depth of presence?
Measuring Presence (cont.)

- **Questionnaires**
  - How could we do this?
  - What kinds of questions could we ask?

- **Behaviors**
  - Duck!

- **Physiological measures**
  - Heart rate
  - Sweat
  - Breathing
Presence Questionnaires

- Slater Usoh Steed (SUS)

- Witmer & Singer

- Problems
  - Questions are very important to get right!
  - Measurement is done after the fact
Behavioral Measures of Presence

- Watch the user, see how they react
  - More realistic reactions mean more presence
- Hard to measure depth of presence...
- ...but easy to know when you see it!
- Could be sound too (e.g., screams)

Problems
- You may have to invent/incorporate “events” to trigger behaviors
Physiological Measures of Presence

- Can instrument the person with sensors
  - Heart rate monitor
  - Galvanic skin response (or skin conductance)
    - Measure amount of sweat
  - Breathing rate/regularity

- Hard to fake

- Problems
  - Some measures take time to settle
  - May need to calibrate a baseline
  - Need to wear stuff (could we use heat map?)
Your Turn!

- Break up into groups of 4-5
- Come up with a scenario where we could measure presence
  - Hardware?
  - Scene?
  - Actions?
- What measures would you use and why?
Gameplay

- From your readings, what do we know about constructing immersive games?
- What should we do to improve chances?
- Can we design “standard” things into games to make them more immersive?