Animation

Presented by Sancho McCann
Animation

• Is animation useful?
• Why?
• Principles of animation
• Principles applied
Animation: can it facilitate?

• Does animation help the understanding of changes over time?
• A picture is worth 1000 words; is a 100 frame animation even worth 100 stills?
• “Yes?” - the congruence principle
• “No?” - the apprehension principle
Congruence Principle

• A useful graphic is congruent to the structure and content of the internal representation.

• Either match a users internal representation or,

• Force a useful internal representation.
Hedy Ellis Leiter, age 7, draws the world.

Congruence Principle Violated

- 3D does not improve congruence;
- 3D does not improve performance, speed, accuracy, or memory.
Congruence Principle Applied

- Afterglow Light Pattern 400,000 yrs.
- Dark Ages
- Development of Galaxies, Planets, etc.
- Dark Energy Accelerated Expansion
- Inflation
- Quantum Fluctuations
- 1st Stars about 400 million yrs.
- WMAP
- Big Bang Expansion 13.7 billion years
Congruence in Static Graphics

- Using space to portray space has been widely successful for millennia.

http://www.math.ubc.ca/~cass/Euclid/papyrus/papyrus.html

US Patent 223898

http://www.classicmaps.com
Congruence in Animations
Does Animation Facilitate?

• How could we compare the effectiveness of an animated presentation against a static presentation?
Rieber’s Animated Graphic

- Block and ball moved at different speeds

Rieber’s Static Graphic

• No information about speeds of the objects was presented, only arrows to indicate direction of motion.

Rieber’s Post Test

Imagine a race in outer space between a ball and a concrete block.

If both are given kicks of the same strength at the start, which of the following is true?

1. It’s impossible to know which would win.
2. The race will end in a tie.
3. The block will win the race.
4. The ball will win the race.
5. Both will stop before the finish line.

Does Animation Facilitate?

• Many of the studies have confounding variables on the results of the test:
  – The animation was interactive
  – The animation showed more information

• Comparison on equal ground:
  – Tutorials based on animation are actually not remembered well
Why Not?

• The **apprehension** principle states that the external representation must be readily and accurately perceived and comprehended.

• Animation violates this principle!
Why Not?

• Minds are not easily forced to hold a continuous representation.
• Animations are comprehended discretely.
• Different viewers will take away different elements from an animation.
• Animation is fleeting.
Advice

• Useful when timing is important
• Realism is not important, your information is
  – Slow down animations at critical phases
  – Annotate, highlight, direct attention
  – Eliminate unnecessary information
• Allow interaction
The Music Animation Machine
Animation useful for timing?
Interactive Animation

• Richard Lowe. User-Controllable Animated Diagrams: The Solution for Learning Dynamic Content?
Interactive Animation

• Animation is not fleeting
• Animation is not overwhelming
• View animation at any speed
• Extract fine and coarse grained information
Interactive Animation

• Given:
  – 28 frame user-controllable weather map representing a 7 day period
  – Another “Original” weather map

• Task:
  – Use patterns learned in the animation to predict the weather map 24 hours after the “Original”
Interactive Animation

Interactive Animation

- Animation only used for an overview

- Novice users did not use animation to learn temporal relations between features; they didn’t know to look!

- The animation degraded to a flip-book of images
Animated Interaction

• Animation does aid understanding of interactive and dynamic changes to an interface.
Animated Interaction
Principles of Animation

Principles of Animation

• From classes promoted by Walt Disney in the 1930s, The 11 Principles arose
Squash and Stretch
Timing
Anticipation
Staging
Staging
Slow-In Slow-Out
Arcs
Exaggeration
Appeal
Three Other Principles

• Follow-through and Overlapping Action

• Straight Ahead or Pose-to-Pose

• Secondary Action
Principles Applied
An Application

An Application

• How is staging applied?
• How is anticipation applied?
• What other principles are applied?
• What principles could have been applied?
Discussion

• Animation did allow for different types of navigation - short-cuts

• The short-cuts were not effective - users got lost.
Figure 3.4. Responses to selected questionnaire statements.
Summary

• Animation is deceivingly attractive

• Interactive animation might help

• Animated interaction does help
Papers


Papers
