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Representation and Interaction Design

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Overview

Theoretical framework for Interaction Design
- Cognition and Interaction Design
- Emotion and Interaction Design

Design Process
Design Activity
Design Research
Interaction Design

Apple – iPhone • http://www.apple.com/iphone
Interaction Design

Jeff Han – Multitouch Interaction Research • http://cs.nyu.edu/~jhan/
Collabolla Project site, Interaction Design Project at the Institute of Interaction design, Ivrea, Italy • [http://www.collabolla.com/](http://www.collabolla.com/)
Fisher-Price Smart Cycle • www.smartcycle.info
Dance Dance Revolution as Experienced by a Librarian • photo by Michael Stephens [www.flickr.com/photos/michaelsphotos](http://www.flickr.com/photos/michaelsphotos)
Interaction Design

Refreshable braille display
www.washington.edu/computing
Interaction Design

Optical Motion Capture • www.cs.berkeley.edu/b-cam
Theoretical framework for Interaction Design
Interaction Design

Practical Relevance: Theoretical bases

- Dual coding (Clark & Paivio)
- Multimodal theory of memory (Engelkamp & Zimmer)
- Generative learning (Wittrock)
Dual coding (Clark & Paivio)

- Information received is “coded” according to modality
  - verbal and non-verbal
- Individuals form connections between mental representations
- Cognitive activity is the activation of mental representations
- Involving multiple modalities in encoding can result in multiple opportunities for retrieval.
Multimodal theory of memory (Engelkamp & Zimmer, 1994)

Cognition occurs on 2 levels: sensory-motor, conceptual

- Sensory-motor: input, output; modality-specific
- Conceptual: “a-modal”
- Both INPUT and OUTPUT influence coding
- Encoding in different modalities effective ONLY if conceptual processes are also involved.
Generative learning (Wittrock)

- Focus is not on the environment or on instruction, but on what the learner does
- For meaningful learning to occur, learner must create relationships
  - among instructional concepts
  - between concepts and prior experience
- Generating examples, pictures, metaphors, etc. helps learners to generate these critical connections
Functional Model of Learning (Wittrock)

- Learning processes—attention
- Motivational processes—attribution and interests
- Knowledge creation processes—preconceptions, beliefs
- Generation—analogies, metaphors, summaries

Interaction Design can facilitate all of these levels
Example: Instructional Animations

- Attention-guiding principle: Perceptually salient features help learner focus on important aspects of the display (Lowe, 2003)
- Interactivity principle: User control over displayed information increased comprehension (Mayer & Chandler, 2001)
Interaction Design

Design Process (Plass & Salisbury, 2002)
Interaction Design

- CHI/HCI design
- Instructional Strategies
- Navigation
- Instructional ID: takes into account cognitive aspects of interactions
Interaction Design

Interaction Design Process (Moggridge)

- Synthesize solution from all relevant constraints
- Frame or reframe problem and objective
- Create and envision alternatives
- Select wisely from these alternatives
- Visualize and prototype the intended solution
Interaction Design Tools

- Diagrams
- Drawings, illustrations
- Prototypes
- Sketches
Interaction Design

Design Tool–Sketching
Interaction Design Methods (Saffer, 2007)

- Visualizations
- Personas & Scenarios
- Sketches and Models -> Storyboards
- Tasks Analyses -> Task Flows
- Use Cases
- Mood Boards
- Wireframes
- Prototypes
Interaction Design Activity

Instructional Interaction Design Task

— Analyze an existing Interaction Design artifact

— Describe the task the interaction supports

— Describe how the interaction was designed

— Describe the (theoretical) approach this design represents

— Use a sketch or wire frame to illustrate

Artifacts listed on course web site:

http://create.alt.ed.nyu.edu/courses/2015/2015_documents.html
Interaction Design

Design Research
Interaction Design

Design Research Defined

- Study of a product’s intended users and environments
  - At authentic sites
  - In activities with potential users as design partners
  - Recorded and analyzed later
- Conducted at various stages of design process
Interaction Design

Design Research

- Study use of product in authentic situations

Methods

- Video research
- Observations
- Interviews
- Activities
- Self-reports
Interaction Design

Design Research Analysis and Conclusions

- Use triangulation method (concurrent validity)
- A strong theoretical base can make design research easier
- Keep open mind to reap full benefits of design research

Result: Redesign product and conduct another round of design research