Chapter 3 - User Centered Design & Prototypes

• User Centered Design (UCD)
  – Understanding
  – Design
  – Envisionment
  – Evaluation
  – Iterative Design
  – Implementation

• Sketches

• Prototypes
  – Resolution, Fidelity, Scope
  – Wizard of Oz Prototypes
  – Paper Prototypes
  – Video Prototypes
User-Centered Design according to Dix et al. and Benyon (2010)

Design (according to Dix et al., 2004) = Achieve goals under consideration of constraints
User-Centered Design according to Don Norman

Problem

Solution

time

Alternatives
Group Exercise!

• Form groups of 3-5 persons!
  – Within each group, try to fulfill the following two tasks:

• Task 1:
  – Name as many concrete experiences in private or professional life, where you have already used an approach similar to the double-diamond idea – or where you think in afterthought it would have been applicable
  – Result: List of situations in keywords, as many as possible

• Task 2:
  – Which tools and techniques do you know to support the steps of
    • envisioning
    • understanding
    • designing
    • evaluating?
  – Result: List of keywords
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Understanding
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Conceptual Design
Questions

• What do you think was the meaning of the *colors* of the sticky notes?
• How much time should be spent on such conceptual design activities?
• How can we assess the quality of the result of conceptual design?
Concrete or Physical Design
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Evaluation
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Iterative Design

(re)Design

Evaluation

Implementation

Question: Can anybody explain what the buzzword "agile" actually means?
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Implementation

• During the process only prototypes have been developed
• Source code of prototypes usually is not re-usable
  – this is intentional! See chapter on prototyping…
• Final implementation brings on new challenges
  – Scalability
  – Platform diversity
  – Error tolerance
  – Commercialization
  – …others? discussion…
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Proof Sketch in Mathematics

**Theorem**  There does not exist $r$ in $\mathbb{Q}$ such that $r^2 = 2$.

**Proof sketch:** We assume $r^2 = 2$ for $r \in \mathbb{Q}$ and obtain a contradiction. Writing $r = m/n$, where $m$ and $n$ have no common divisors (step 1), we deduce from $(m/n)^2 = 2$ and the lemma that both $m$ and $n$ must be divisible by 2 (steps 2 and 3).

**Assume:**
1. $r \in \mathbb{Q}$
2. $r^2 = 2$

**Prove:** False

1. Choose $m, n$ in $\mathbb{Z}$ such that
   1. $\gcd(m, n) = 1$
   2. $r = (m/n)$
2. 2 divides $m$.
3. 2 divides $n$.
4. Q.E.D.

Leslie Lamport:
How to Write a Proof,
Digital Equipment Corporation 1993

Sketch in Patent Application

United States Patent Application 20100081477

Motorola, Inc.

PORTABLE DEVICE DISPLAY PRESENTING TWO AND THREE DIMENSIONAL IMAGES
Properties of Sketches

• Quick
• Timely
• Inexpensive
• Disposable
• Plentiful
• Clear vocabulary
• Distinct gesture
• Minimal detail
• Appropriate degree of refinement
• Suggest and explore rather than confirm
• Ambiguity

Based on Material by A. Butz & A. Krüger
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Resolution and Fidelity


• **Resolution** = Volume of representation of final system in prototype (e.g. only one screen vs. complete system)

• **Fidelity** = Similarity of details in prototype implementation to final system (e.g. drawing sketch vs. photorealistic rendering)
Horizontal Prototypes
Vertikal Prototypes

- page 1
- page 2
- page 3
- page 4
- page 5

- subpage 2
- subpage 3
- subpage 4

- detail 2
- detail 3
- detail 4

- function 2
- function 3
- function 4

Based on Material by A. Butz & A. Krüger
Wizard of Oz Prototypes
Wizard of Oz Prototype Example

Östergren/Juhlin, Stockholm University: Soundpryer, 2002-2008
http://mobility.dsv.su.se/projects/soundpryer/
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COLORING PAGES

Cats
16 pictures

Pandas
14 pictures

Giraffes
25 pictures

Dogs
18 pictures

Worms
25 pictures

Traps
9 pictures

https://www.youtube.com/watch?v=9wQkLthhHKA
Paper Prototype of an Email Application

www.youtube.com/watch?v=GrV2SZuRPv0
POP App (Prototyping on Paper)

https://popapp.in
Rapid Prototyping & Wireframing Tools

- Software to create interface prototypes ("mockups")
- Many systems available, examples: Axure, Balsamiq

www.axure.com
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Sun Microsystems: "Starfire"
1992 ->>> 2004

http://www.asktog.com/starfire/