Software Engineering I

CS 361
Paper Prototyping
Big idea

✖ **Depict** what you think the system should look like
✖ **Test** the prototypes with customers or (preferably) users
✖ **Fix** the prototypes (repeat) then implement the real system.
What are paper prototypes?

- Hand drawn sketch of a user interface.
- Not an “pretty” artistic representation, should be simple
- User interface reduced to only the most important elements
https://www.thoughtworks.com/insights/blog/providing-just-enough-design-can-make-agile-software-delivery-more-successful
Examples

Examples

http://davewrightjr.com/work-npr-planet-money.html
Examples

Page Setup

Margins Paper Size Paper Source Layout

Paper Size:
- Letter (8.5 x 11 in)
- Width: 8.5
- Height: 11
- Orientation:
  - Portrait
  - Landscape

Default...

Ok  Cancel

Preview
Why Paper Prototypes

- To communicate ideas: between designers, developers, users, clients, stakeholders.

- As a usability testing technique: A way to observe interaction without developing a functional product.
MISCONCEPTION:
Creativity is a “lightning bolt from the sky” not the product of hard work.
**Brainstorming**

• Creative Problem Solving. Originated from the advertising industry.

• Two Principles:
  • Defer Judgement
  • Reach for quantity
4 rules for Brainstorming

1. Go for Quantity: “quantity breeds quality”
2. Withhold Criticism: by suspending judgment, participants will generate unusual ideas
3. Welcome Wild Ideas: if you are not generating bad ideas, you are not doing a good job brainstorming
4. Combine and Improve Ideas: “1+1=3”
Brainstorming Needs

We need a way to quickly and cheaply generate ideas, yet still be able to communicate them clearly.

Pencil and paper is:

• Fast
• Cheap
• Clear
Other Benefits of Paper Prototyping

- Abstracting away the details allows focus to be on important matters.
- Small investment from Creator reduces “Favorite Child” problem
- Unfinished look allows for questioning of entire design
EXERCISE

Develop one paper prototype per person. Must include some “bad” ideas.
Usability Testing

Paper prototypes can also be used to perform usability testing.

It is a low-cost way to help figure out if your design is suited to perform specific tasks.

Often includes a sequence of sketches.

Use as a tool to manage risk.
Roles

Facilitator
- Gives instructions
- Encourages user to speak

Computer
- Simulates response of system

Observer(s)
- Take notes
Questions we can answer

- Are end-users doing what you want them to be doing?
- Are they doing what you expected them to do?
- Did they become confused while trying to reach their goals?
- Did you really think through all possible paths through the application?
- Did they have a preferred path?
- Are some paths unused?
- Are some paths used in ways that weren’t intended?
Does Usability Testing Really Work?

https://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users/
The most striking truth of the curve is that zero users give zero insights.

A single test gives 1/3 of the total insights.

After five tests the usability problems found flattens out.
Hallway Usability Testing

“A hallway usability test is where you grab the next person that passes by in the hallway and force them to try to use the code you just wrote. If you do this to five people, you will learn 95% of what there is to learn about usability problems in your code.”

– Joel on Software

http://www.joelonsoftware.com/articles/fog0000000043.html
PERSONAS
Persona

- A fictional character created to represent the different user types that might use a design.
- A role played by a character
Persona Example

Abby (Abigail) Jones

- 28 years old
- Employed as an Accountant
- Lives in Cardiff, Wales

Although Abby lives right on the bus route to work, she prefers to drive and avoid the hassle. After arriving into work, she always looks over all the emails that she has received before answering any one of them. After work, she rushes to a yoga or spinning class. A game of Sudoku or Candy Crush Saga is her main pastime before bed.

Background knowledge and skills

- Abby works as an accountant in a consulting firm. She just moved to this employer 2 weeks ago, and their software systems are new to her. She also spends a good deal of her time working with spreadsheets with clients’ financial data. She describes herself as a “numbers person”. She is not a professional programmer but she writes and edits spreadsheet formulas in her work.
- Abby has a degree in accounting, so she knows plenty of Maths and knows how to think in terms of numbers. She’s never taken any computer programming or IT systems classes.
- Even though she’s an accountant and deals with numbers all day at work, she likes working with numbers in her free time, too. She likes Sudoku and other puzzle games.

Motivations and Strategies

Abby is proficient with the technologies she uses. She learns new technologies when she needs to, but she doesn’t spend her free time exploring technology or exploring obscure functionality of programs and devices that she uses.

- **Motivations**: When Abby uses computers to problem-solve, she has little desire to learn new functions, or to search for information on them. She tries to use methods she is already familiar and comfortable with to achieve her goals.
- **Information Processing Style**: Abby leans towards a comprehensive information processing style when she needs to gather information to problem-solve. That is, before following some option that seems promising, she first gathers information comprehensively to try to form a complete understanding of the problem before trying to solve it.

Attitude to Technology

Abby is generally comfortable using familiar technology, but she does not get a big kick out of obtaining the latest gadgets or learning how to use them.

- **Computer Self-Efficacy**: Abby has low computer self-efficacy, meaning that she has low self-confidence in performing computing tasks other than the ones she is familiar with. This has a variety of impacts on how she uses software. For example, she is not confident that she can learn to use new features and, as self-efficacy theory explains, she often gives up if she runs into challenges. Software with usability problems poses more challenges to her than it does to more confident users, and she often blames herself for problems that she encounters.
- **Attitude toward Risk**: Abby is risk averse when she uses computers to perform tasks. When confronted with new software features, Abby worries that she will spend time on them and not get any benefits from doing so. She tries to perform tasks “the safe” (i.e., familiar) way, even if the less familiar features might promise a more direct solution.
- **Willingness to Explore and Tinker**: Abby doesn't particularly like tinkering (i.e., just trying out new features or commands to see what they do) when she uses software in her work tasks. She prefers following step-by-step tutorials and wizards over tinkering. (However, when she does bring herself to tinker, it has positive effects on her understanding of the software.) When software features/commands cause problems for her, she tends to blame herself and, if she can, she then just avoids those troublesome features/commands. She then uses work-arounds, such as restricting her use to only features/commands she is familiar with already.

Benefits of Personas

- Build Empathy
- Develop Focus
- Communicate and form consensus
- Make and defend decisions
- Measure effectiveness
In Class Lab
Credits

Special thanks to all the people who made and released these awesome resources for free:

✖ Presentation template by SlidesCarnival
✖ Photographs by Unsplash