Human-Centered Design in a Nutshell

Key topics for this talk
1. User-centered design lifecycle
2. Early data gathering
3. Design and prototyping
4. Usability testing
Some resources


- CptS 443/543 (offered next in spring 2019)

- Questions? Contact me: hundhaus@wsu.edu
User-centered design process (Preece et al.)

Lifecyle → Early Data Gathering → Prototype → Usability Test
User-centered design process (Barnum)

Lifecycle → Early Data Gathering → Prototype → Usability Test
Phase 1: Study users to establish requirements

• Ensure people who participate in design process match target audience
• Observe/talk to potential users in their native environments
• Realize that design studies are much different from marketing studies
Phase 2: Design and prototype

- Ideation
  - Generate lots of ideas
  - Be creative, without regard for constraints
  - Question everything

- Prototyping
  - Low fidelity materials
  - "Wizard of oz" method

http://liftuptransformation.com/workshops-for-organisations/
Phase 3: Empirically evaluate with target users

- Find 3-5 users who match target population
- Have them interact with prototype to complete realistic tasks
- Consider recruiting pairs to work together
- Record and observe interaction
- Consider eliciting participants’ thought processes and impressions afterwards, using video as prompt

http://www.sitepoint.com/choosing-usability-tests-participants/
Iterate, iterate, iterate!
“Fail frequently, fail fast” –David Kelly

- Each iteration reveals new issues and insights
- Translate these into new requirements and design refinements
- Requirements are the hardest part to get right!
- Iteration ends when you’re out of time and/or money

Lifecycle → Early Data Gathering → Prototype → Usability Test
Early data gathering: A closer look

http://www.slideshare.net/mniola/introduction-to-ux-research-16626959?qid=06698ebe-b896-488c-b18b-75553f13c4e5&v=&b=&from_search=5
Early empirical research involving users is crucial!

• What?
  – Understand as much as possible about users, activities, tasks, and contexts
  – Produce stable requirements
• How?
  – Data gathering and analysis
  – Synthesize data into personas, scenarios, and requirements
  – Iterate!
• Why?
  – Establishing requirements is stage where failure occurs most commonly
  – Getting requirements right is crucial to designing usable and useful technologies
There are a variety of early data gathering methods to choose from:

- Questionnaires
- Interviews
- Focus groups
- Field techniques
  - (Participant) observation
  - Artifact collection (including documentation)
  - Audio and video recording
- Software log data
- Researching similar products
- Contextual Inquiry
Questionnaires

- A series of questions designed to elicit specific information
- Questions may elicit different kinds of answers:
  - YES/NO
  - Range of pre-supplied answers (e.g., Likert Scale)
  - Comments
- Can provide quantitative or qualitative data
- Good for learning about a large, dispersed group of people
- Good for obtaining a representative sample

Lifecycle → Early Data Gathering → Prototype → Usability Test
Interviews

- Three basic types
  - **Structured**: Predetermined questions
  - **Semi-structured**: Predetermined questions with open-ended follow-up
  - **Unstructured**: No predetermined questions
- Props can be used to stimulate responses
- Can prove helpful to audiotape and transcribe
- Good for getting personal perspectives and exploring issues
- Can be time-consuming
- May be difficult to interview all key stakeholders

http://www.indianscribes.com/blog/preparing-questions-for-a-qualitative-research-interview/
Focus groups

- Group interviews
- Good for consensus-building
- Good for highlighting areas of contention
- Require a skilled facilitator for best results
- See [http://www.webcredible.com/blog-reports/web-usability/focus-groups.shtml](http://www.webcredible.com/blog-reports/web-usability/focus-groups.shtml) for guidelines on running a focus group

Lifecycle → Early Data Gathering → Prototype → Usability Test
(Ethnographic) field techniques

- Spend time with stakeholders in their day-to-day environments, observing work as it happens
- Gain insights into stakeholders’ real life tasks and problems, firmly grounded in context
- Several ethnographic field techniques can help
  - Participant observation
  - Audio and videotaping
  - Artifact collection
- Good for understanding the nature and context of the tasks
- Requires potentially significant time commitment to conduct study and analyze data

Contextual Inquiry

(A focused ethnographic field technique)

- An in situ interview
  - Takes place as participant does activity in natural environment
  - Participant is expert, designer is apprentice
- Four main principles:
  - **Context**: see what happens in context of activity
  - **Partnership**: Participant and designer collaborate; there’s no dominant partner
  - **Interpretation**: observations interpreted by participant and designer together
  - **Focus**: Inquiry is relevant to the design being developed; a “project focus” is established

http://www.uxpassion.com/blog/uxability-contextual-inquiry/
Tips for successful early data gathering

- Focus on identifying the stakeholders’ needs
- Involve all the stakeholder groups
- Involve more than one representative from each stakeholder group
- **Triangulate** using a combination of data gathering techniques
- Support the process with props such as prototypes and task descriptions
- Run a pilot session
- Know your **key research questions**
- Consider carefully how to record the data
Prototyping: A Closer Look

Paper Prototyping:

Please remember that this is a test of the design and not a test of you.

What?! I think I broke it!

We haven't started yet. OK... not all the parts are working so at times I will describe what would happen in—

Oh no! I'm so pathetic!

What now?

I... I can't find the mouse!

You are pathetic—I mean...

This is the test of the system not of you...

OK/Cancel

User: copyright 2004 Tom Chi and Kevin Cheng...
What is a prototype?

• In other fields: a small scale model that communicates design

• In interaction design: A model of a user interface, e.g.,
  – a series of screen sketches
  – a storyboard, i.e. a cartoon-like series of scenes
  – a Powerpoint slide show
  – a video simulating the use of a system
  – a cardboard mock-up
  – a piece of software with limited functionality

Lifecycle → Early Data Gathering → Prototype → Usability Test
Why create a prototype?

• Fundamental tenet of user-centered design: *Involve users early and often*

• A prototype is much easier to create than an actual implementation, and takes far less time

• A prototype *communicates* design and encourages *feedback*
  
  – A user study with a prototype can provide designers with valuable feedback, even if the prototype isn’t fully functional
  
  – People are more likely to give feedback on “rough, unpolished” sketches (see, e.g., Schumann et al., 1996)
What should we prototype?

- Work flow and tasks
  - Screen layouts and information display
  - Difficult, controversial areas of design
- Prototype should respond to the questions that need answering
  - Paper mockup can test feasibility of interface design
  - Limited computer-based prototype can address technical feasibility (e.g., response times)
Low fidelity prototypes

- Use “art supplies”, e.g., Post-it Notes, paper, index cards
- Can also be implemented on computer with, e.g., SketchFlow
- Are quick, cheap and easily changed
- Example: *Storyboards*
  - Series of sketches representing progression through task
  - Supports role-playing; provides context for interaction (as in “wizard-of-oz” study)
High fidelity prototypes

- Use materials that users would expect to be used for the final product
- Look more like final system than a low-fidelity version
- Danger that users will think they have a full system, and then be disappointed
- Common high-fidelity prototyping environments include Adobe Flash, .NET, and PHP
Usability testing:
A closer look

Quotes on usability testing

“If you want a great [interface], you’ve got to test. After you’ve worked on a site for even a few weeks, you can’t see it freshly anymore. You know too much. The only way to find out if it really works is to test it.”

--Steve Krug, book author

“Users are not always logical, at least not on the surface. To be a great designer, you need to look a little deeper into how people act and think.”

--Paul Boag

“There’s nothing like putting your assumptions to the test in front of users.”

--Patrick Neeman
What is Usability?

ISO Definition

“The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use.”

Note focus on effectiveness, efficiency, and satisfaction
Usability and user experience defined relative to requirements

- You establish **usability requirements** and **user experience requirements** for your interface
- You need to **measure** usability and user experience relative to these requirements
Usability testing involves watching users perform tasks

- Representative users perform realistic tasks with an interface while designers observe.
- Usability testing can be both formative and summative:
  - **Formative**: Small studies focused on early prototypes.
  - **Summative**: Larger studies focused on finished product.
Usability study data collection and analysis

• Data collection
  – Videotaping and/or screen recording (always)
  – Interaction logging (sometimes)
  – User satisfaction questionnaires (often)
  – Exit interviews (sometimes)

• Data analysis
  – Identify and classify problems (always)
  – Calculate task completion times (sometimes)
  – Analyze questionnaires for trends (often)
  – Analyze exit interviews (sometimes)
Nielsen and Landauer discovered you can find most problems with 5 test users!
Five steps to conducting a usability study

1. Define user profile for one subgroup of user population
2. Construct task-based scenarios
3. Have participants *think aloud* as they work through tasks
4. Identify usability problems
5. Fix problems and test again! (*Iterative!*)

Lifecycle → Early Data Gathering → Prototype → **Usability Test**
You can do usability testing anywhere!

- In a usability lab
- In any space, such as your living room or bedroom
- In the field—at participants’ homes, places of work or play
- Remotely
  - via the web while you observe (moderated, synchronous)
  - Remotely via software logging (unmoderated, asynchronous)

blog.waypostmarketing.com
Summary: User-centered design is an iterative, empirically-driven process
Some resources

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