



credit: <https://www.youtube.com/watch?v=6mcZKWhjr9o>

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Human-Centered Design in a Nutshell

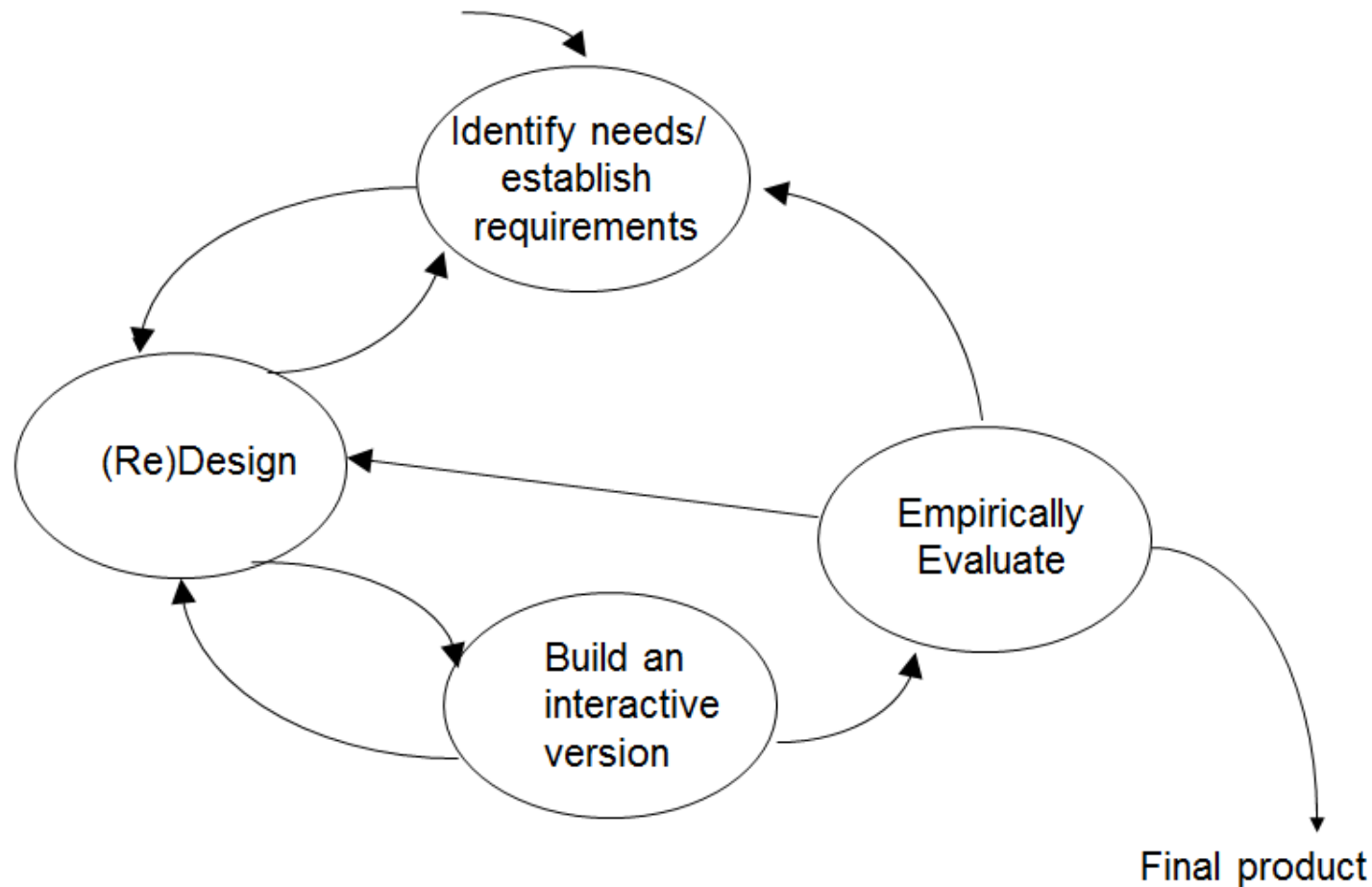
Key topics for this talk

1. User-centered design lifecycle
2. Early data gathering
3. Design and prototyping
4. Usability testing

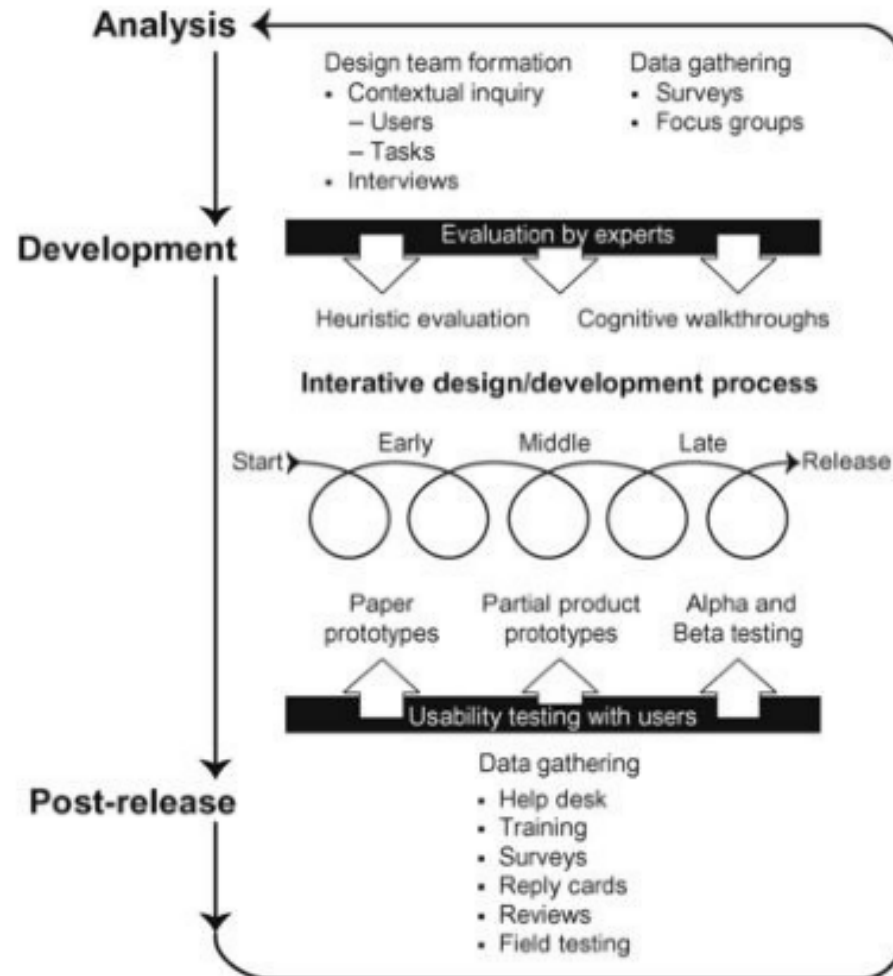
Some resources

- Norman, D (2013). [*The Design of Everyday Things*](#) (Revised and expanded ed.) New York: Basic Books (ISBN: 978-0465-050659).
- Johnson, J. (2014). *Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Rules* (2nd ed.). Burlington, MA: Morgan Kaufman (ISBN: 978-0-12-407914-4).
- Barnum, C. (2010). [Usability Testing Essentials: Ready, Set...Test!](#) Burlington, MA: Morgan Kaufman (ISBN ISBN-13 978-0-12-375092-1)
- CptS 443/543 (offered next in spring 2019)
- Questions? Contact me: hundhaus@wsu.edu

User-centered design process (Preece et al.)



User-centered design process (Barnum)



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

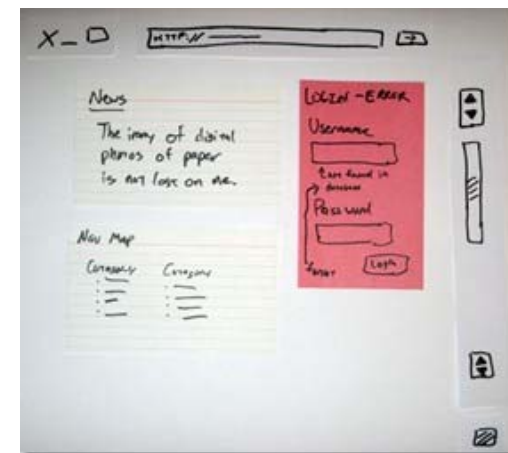


Phase 2: Design and prototype

- 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/>



<http://jonas.follesoe.no/oldblog/2009-09-26-agile-ux-development-using-low-fidelity-prototypes/>

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



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

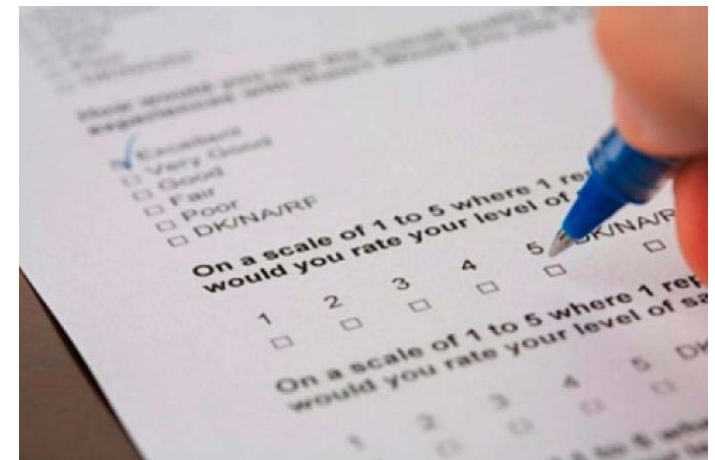


There are a variety of early data gathering methods to choose from

- 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



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> for guidelines on running a focus group



<http://www.usability.gov/how-to-and-tools/methods/focus-groups.html>

(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

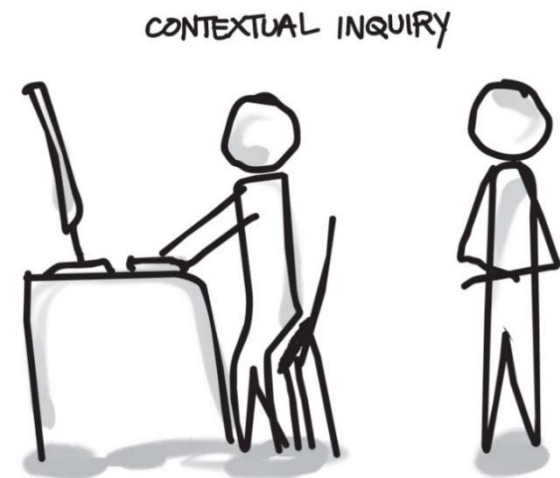


<http://www.stevebromley.com/blog/2011/02/09/ethnography-as-an-application-of-3rd-space-theory/>

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

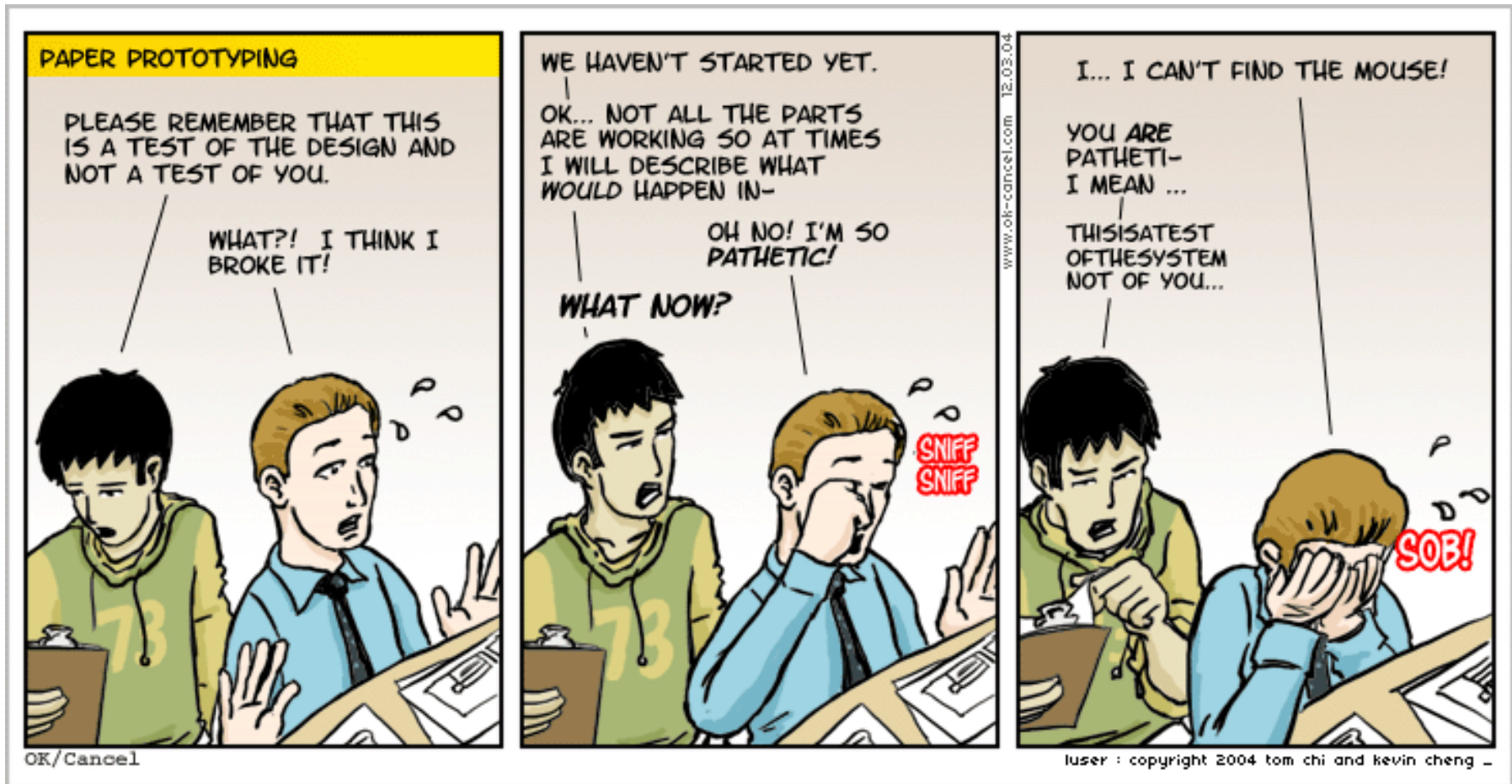


<http://www.uxpassion.com/blog/usability-contextual-inquiry/>

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



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

Why create a prototype?

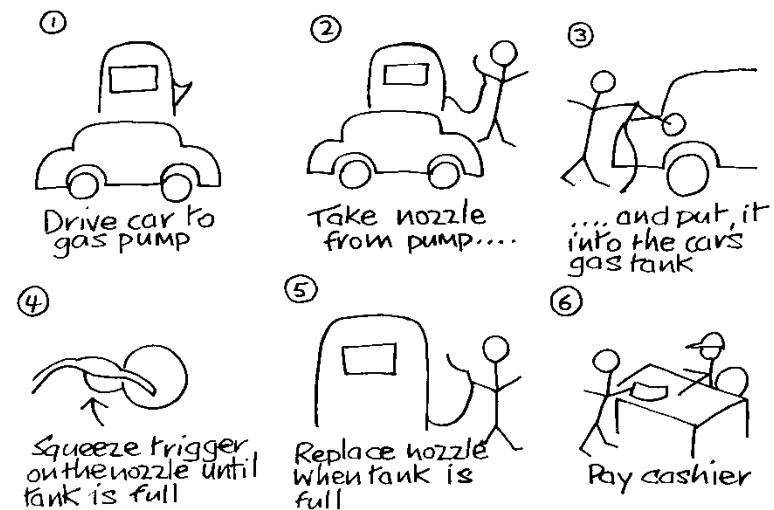
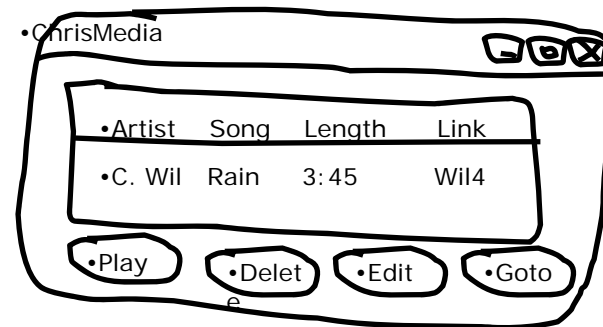
- Fundamental tenet of user-centered design: *Involve users early and often*
- A prototype is much easier to create than an actual implementation, and takes far less time
- A prototype *communicates* design and encourages *feedback*
 - A user study with a prototype can provide designers with valuable 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



Johnson, J. (2007). *GUI Bloopers 2.0, 2nd Ed.* Morgan Kaufman, p. 50.

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

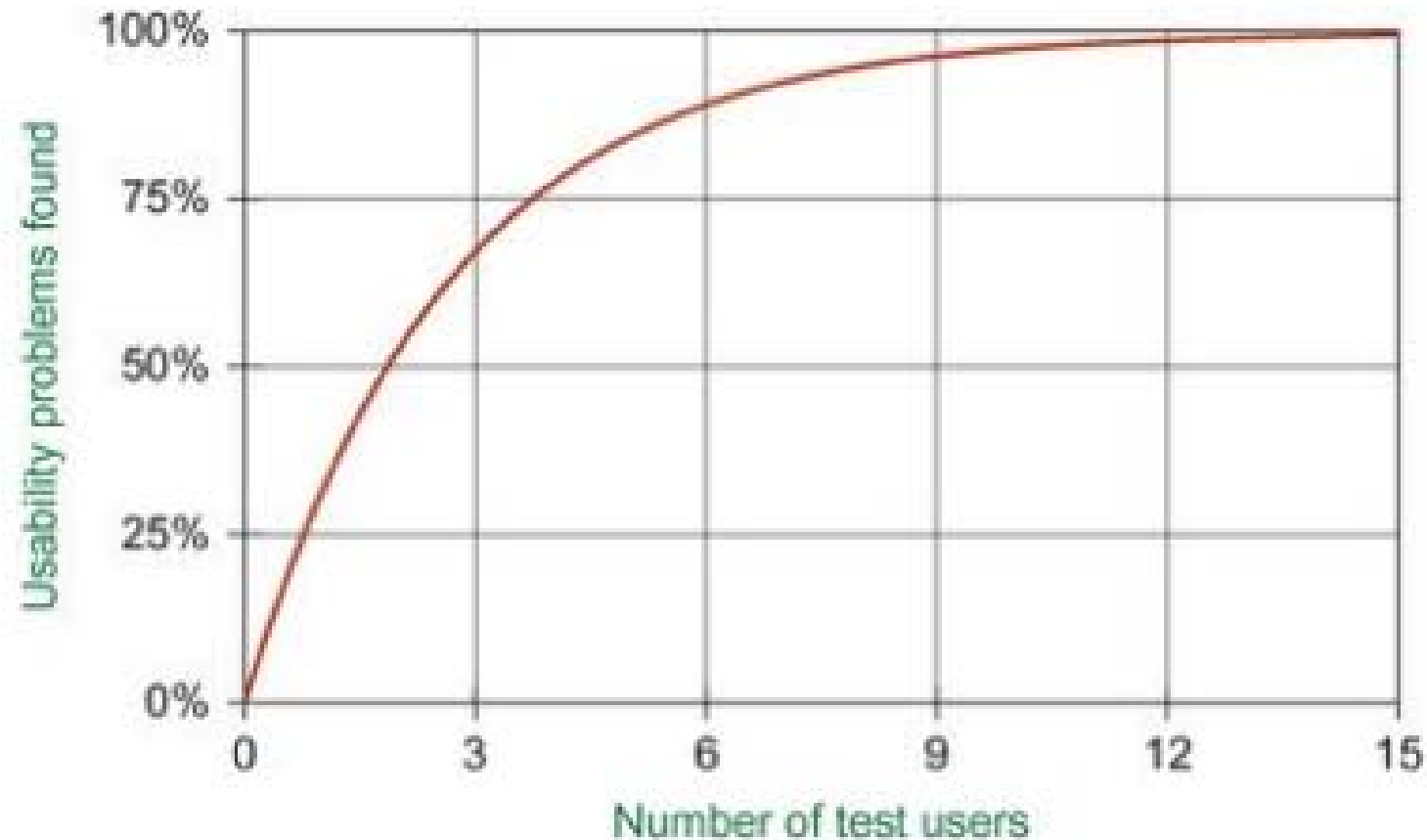
Usability testing involves watching users perform tasks

- 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!*)

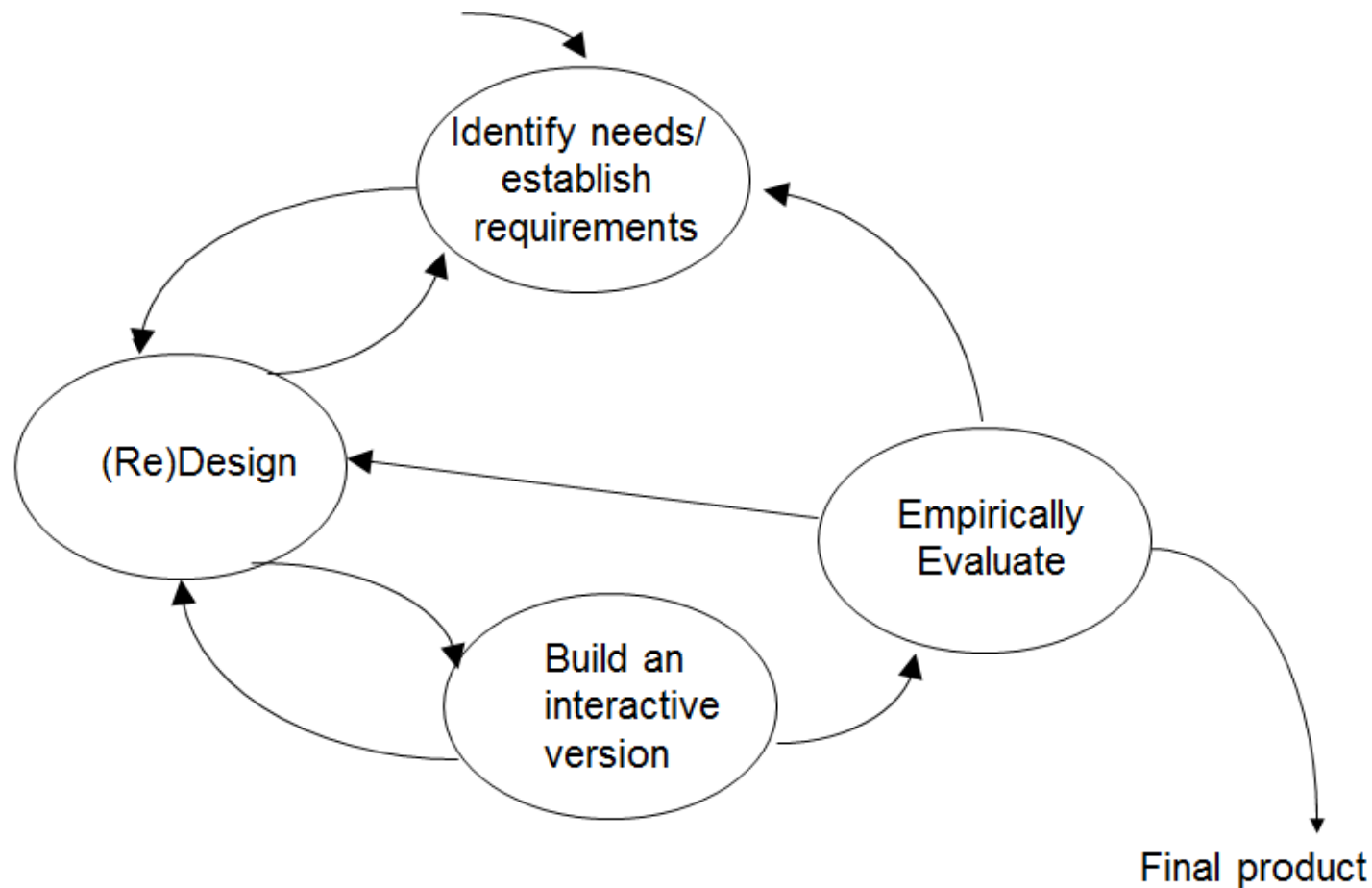
You can do usability testing *anywhere!*

- 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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