

*Please excuse any formatting issues, as this syllabus is typically displayed as a website.*

# Syllabus

## CSCI376: Human-Computer Interaction

Mondays & Thursdays; 2:35-3:50pm; TCL206

<http://bit.ly/csci376>

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## Overview

Human-Computer Interaction (HCI) principles are practiced in the design and evaluation of most software, greatly impacting the lives of anyone who uses interactive technology and other products. There are many ways to design and build applications for people, so what methods can increase the likelihood that our design is the most useful, intuitive, and enjoyable? This course provides an introduction to the field of human-computer interaction, through a user-centered approach to designing and evaluating interactive systems.

HCI draws on methods from computer science, the social and cognitive sciences, and interaction design. In this course we will use these methods to:

- ideate and propose design problems
- study existing systems and challenges
- explore design opportunities and tradeoffs
- evaluate and improve designs
- communicate design problems and solutions to varying audiences.

## Learning Objectives

By the end of this course, students will be able to:

- Provide a Process-Focused Perspective on Interaction Design
- Apply Design Research Methods and Skills
- Develop Task-Focused Scenarios, Sketches, and Storyboards
- Rapid Prototype and Iterate
- Explicate Critical Perspectives on Design Solutions

## Topics

Course Topics can be found on the [Schedule](#) page.

## Course Components

This course involves the following components:

- Lectures – core user experience design concepts will be presented and discussed.
- In-Class Activities and Assignments – group & individual activities to introduce and practice user experience design techniques, similar to lab-style activities. Some will be graded as homework, and some will be participation-based.
- Individual Assignments - it's important to reflect on user-centered design around you. These individual assignments help you do this.
- Readings – recent book chapters and online resources related to user experience design will be read by students, and discussed in class and online.
- Projects – projects that cover all phases of the user experience design project lifecycle will be completed, including (1) exploring a design space, (2) generating design concepts, and (3) refining design concepts, (4) ultimately producing an interactive prototype.
- Critiques – in-class group critiques of the design concepts produced for each project will be conducted.
- Final Exam - much of the assessment in this course is group-based, so the self-scheduled final exam works as an individual assessment of your progress in the course, as well as ensuring spaced practice of important concepts.

## Readings & Responses

There is a two-part Course Reading Packet available which includes most of the required readings, as well as some optional readings. Please be sure to retrieve your copies (one blue, one white) from the CS Department Office.

Readings are assigned throughout the semester. You are required to contribute a discussion post to the appropriately-named channel on our course [Slack workspace](#), by the deadline set on the [Schedule](#). Discussion posts should be a *minimum* of 140 words (~6 sentences), and should include your response to the reading, including: a question, dis/agreement, something surprising, a point of confusion, criticism, a connection to your personal experiences, etc. It should be clear from your discussion post that you studiously completed the reading. Some readings may have specific prompts or additional instructions. Please see the Reading Assignments pages for details:

- [Scheduled Readings](#) (*updated throughout the semester*)
- [Reading Response Instructions](#)

## Materials Required

This course makes heavy use of industry methods for designing software. Students are expected to purchase/borrow supplies as needed for these methods, including:

- Sharpies or other permanent markers
- Post-it notes or other sticky notes
- Scratch paper of various sizes for sketching (I have plenty of scratch paper, just ask)
- Pencils, pens
- Ruler or straight edge
- Scissors (optional)
- Laptop (occasionally) - if you need a [longterm loan of a laptop from the library](#) for the semester, I am more than willing to be your faculty sponsor. Just send me an email!

## Software Required

The following software packages may be necessary to complete course assignments over the course of the semester. Some of these are available through Williams College machines, some are free, and some have temporary trials available. More instruction about accessing some of these services will be provided when needed:

- Microsoft Powerpoint
- InVision App, by InVision (<http://www.invisionapp.com/>)
- Balsamiq, by Balsamiq Studios (<http://balsamiq.com/>)
- Adobe Illustrator, Photoshop
- InkScape (<https://inkscape.org/en/>)
- Omnigraffle (<https://www.omnigroup.com/omnigraffle>)
- Microsoft Visio (<http://office.microsoft.com/en-us/visio/>)
- Axure RP Pro, by Axure Software Solutions (<http://www.axure.com/>)

## Evaluation

Strive to do good work because you care about your own opportunities to learn, including the opportunities this course provides in working with a group in an intensive project.

## Participation and Citizenship

In order to learn the most from our in-person meetings, it is necessary to attend each session and to complete the assignments. Peer feedback will often be given on assignments the following class session, and so if you have not done the assignment, it will be difficult to discuss your efforts with classmates. This category also includes cleaning up your workspace at the end of class and providing respectful feedback to your peers.

## Grade Breakdown

The overall course grade will be computed as follows:

- Individual Assignments (15%)
- Group Project (45-50%)
  - Part 1, Project Proposal (2%)
  - Part 2, UXR Looking to Understand (13%)
  - Part 3, UXD Understanding to Make (11%)
  - Part 4, Communicating the Design (11%)
  - Presentations (8%)
- Exam (15-20%)
- Online Discussion Posts (15%)
- Participation & Citizenship (5%)

Your 2 lowest discussion forum post grades will be dropped.

Each assignment will also provide a point breakdown intended to convey how it will be graded. Design is an inherently subjective practice, and so grading in this course is necessarily subjective. The stated project requirements are the minimum, leaving room for groups to wow me with your work.

Because the course is designed around feedback on project milestones, grades given to those milestones indicate that you have invested sufficient effort and insight at the time of the milestone. You will get feedback and are expected to continue acting upon that feedback in your design process. The bulk of project grades is therefore attached to the final deliverables, which are evaluated on their quality.

I expect groups to take collective responsibility and to resolve any coordination issues. I am always happy to make suggestions with regard to your effort and coordination. If an issue needs to be raised with me, I expect it to be raised early enough to be addressed. If necessary, I reserve the ability to adjust an individual's grade with regard to the group project.

The Total grade percentage shown in the Glow gradebook is *not* representative of your actual standing in the course.

The grade break down is as follows: A (93.3+), A- (90+), B+ (86.6+), B (83.3+), B- (80+), C+ (76.6+), C (73.3+), C- (70+). Final grades will not be rounded and it is *very unlikely* that there will be a curve.

## Submission

Many assignments are due the night before class. I will implement this as 11:59pm. In order to be prepared to give you feedback, the instructor must have your submission in the morning. Submitting the day of class, just before class, or in class is therefore unacceptable, risking zero credit.

Submissions should be in PDF format (i.e., not plain text, not Word, not a Google Drive link), a website URL, or dependent on accompanying instructions. A PDF should be printable, containing everything I need to review and grade the assignment (e.g., your name). Each Assignment will describe the Submission process (sometimes we'll use [Glow](#) and often we'll use websites or something else).

**Late work** will be suspect to one letter drop in grade for each day that assignment is late, as well as a 0 for the presentation portion of any assignment with a presentation component. If you are absent for a Group Presentation, without an excuse approved by the professor, you will receive a '0' for the Presentation portion of the deliverable (this will not impact your teammates' grades).

## Expected Workload

At Williams, we operate under the course unit system (rather than the credit hour system) as the metric required by many employers, granting organizations, graduate schools, and federal agencies. In addition to the 3 hours we spend together during our class meeting time, you should expect to spend (on average) at least 10 hours per week on the academic and creative work related to class. If you find that you are spending considerably more (or considerably less!) time to engage with this course academically, please contact me so that we can determine the best course of action as you approach the materials. Should you have any additional questions about the relationship of course units to credit hours, refer to the Office of the Registrar, which [explains our course unit equivalency in greater detail](#).

## STUDENTS WHO NEED ACCOMMODATIONS

If formal accommodations need to be made to meet your specific learning or physical abilities, please contact me as soon as possible to discuss appropriate accommodations. Please also contact the Director of Accessible Education, Dr. G. L. Wallace (413-597-4672) or the Dean's office (413-597-4171). We will work together to ensure this class is as accessible and inclusive as possible. Also, students experiencing mental or physical health challenges that are significantly affecting their academic work are encouraged to contact me or to speak with a dean. The deans can be reached at 413-597-4171.

## THE HONOR CODE

Homework and assignments are to be the sole work of each student unless the assignment explicitly states otherwise. Students may discuss issues related to an assignment, provided that such discussions are cited in the material turned in. Any ideas, code, images, or text that is not original to the student(s) must have the original source cited, both in the code comments and in the display text. Uncredited collaborations will be considered a violation of the honor code and will be handled appropriately. For a full description of the Computer Science Honor Code, please see <https://csci.williams.edu/the-cs-honor-code-and-computer-usage-policy/> If in doubt of what is appropriate, do not hesitate to ask.

# Schedule

## CSCI376: Human-Computer Interaction

### Overview

Please see the appropriate sub-pages under [Assignments](#) for additional direction about [Readings](#), [Projects](#), and [Assignments](#).

[Google Drive, accessible to Williams College accounts](#) All course readings can also be found on

### Schedule (Readings, Assignments, Projects)

Papers **not** available in your Course Reading Packets are marked with an \*asterisk. More instruction on what should be included in reading responses is on the [Readings page](#). All readings, assignments, and projects are generally due the night before the class under which they are listed.

#### Week 1

Th 9/5 | Welcome! [[slides](#)]

- HANDOUT: [Honor Code Roleplay Scenarios](#)
- USEFUL: [daattali's beautiful jekyll Github repository](#)
- USEFUL: [Sign-up](#) for the [Course Slack Group](#).

#### Week 2

Mo 9/9 | User-Centered Design + HCI History [[slides](#)]

- QUIZ on Glow on the [Syllabus](#) by 11:59pm Sunday night.
- READ “[The Psychopathology of Everyday Things](#)”, Ch.01, pp.1-36, in [The Design of Everyday Things](#), by Norman.
- SKIM “[The Psychology of Everyday Actions](#)”, Ch.02, pp.37-73, in [The Design of Everyday Things](#), by Norman.
  - *Optional "As We May Think", in Atlantic Monthly (1945), by V. Bush.*
- POST your response to both of the above Norman readings to the appropriate Slack channel (w02-ucd) by 11:59pm Sunday night and respond to at least one classmate's comment by class on Monday.
- READ “[Learning to See](#)” by iA Inc. <https://ia.net/know-how/learning-to-see>
- DUE: Individual [Good Design/Bad Design Assignment](#)

Th 9/12| Brainstorming & Teamwork [[slides](#)]

- HANDOUT: [UCD Charette](#)
- READ Andy Ko "How to be Creative."  
<http://faculty.washington.edu/ajko/books/design-methods/how-to-be-creative.html>
  - *Optional* [Robert Sutton. 2006. "Eight tips for Better Brainstorming." In \*BusinessWeek\*.](#)
- READ [Katzenbach and Smith \(1993\). The Discipline of Teams.](#)
- READ Pausch. "Tips for Working Successfully in a Group."  
<https://www.cs.cmu.edu/~pausch/Randy/tipoForGroups.html>
  - POST to the appropriate Slack channel by the night before class: Think back to your previous experiences working in groups, particularly an experience that could have been improved.
    - Briefly describe the project and the group - don't use names! (e.g., two sentences).
    - What went poorly in this group (e.g., two sentences)?
    - From concepts discussed in these readings, what could have been done differently to improve the group experience (e.g., up to two paragraphs)?

### Week 3

#### Mo 9/16 | Affordances, Controls, Interface Metaphors

- NOTE: Class is at WCMA on this day.
- HANDOUT: [Fly on the Wall Observations](#)
- READ ["Applying Affordances, Signifiers, and Constraints to Everyday Objects", in Ch.04, pp.132-141, in \*The Design of Everyday Things\*, by Norman](#)
- READ ["Controls" and "Non-Traditional Inputs", Ch.07, pp.158-167, in \*Designing for Interaction\*, by Saffer](#)
  - POST your response to both of the above Affordance, Controls, Interface Metaphors readings to the appropriate Slack channel by Sunday 11:59pm and respond to at least one classmate's comment by 11am on Monday.

#### Th 9/19 | Contextual Inquiry + Pitches [[slides](#)]

- READ ["Ch. 3 Principles of Contextual Inquiry", pp.41-66 in \*Contextual Design\* by Beyer and Holtzblatt.](#)
  - POST to the appropriate Slack channel by the night before class: After completing the readings, consider how you might apply this approach to the project you've proposed.
    - Briefly, what is your proposal (e.g., two sentences).
    - Who and what might you propose to observe in a contextual inquiry (e.g., two sentences).
    - What focus might you bring to your CI observation, and why? (e.g., two or three sentences).
    - Identify a pitfall that seems likely during a CI (e.g., getting caught in abstractions) (e.g., two or three sentences).

- Describe how you might avoid or attempt to correct for this pitfall in your contextual inquiry (e.g., two or three sentences).
- DUE: [Individual Project Proposal](#)

## Week 4

### Mo 9/23| How To Critique [[slides](#)]

- *Bring laptops today! (at least half the class)*
- HANDOUT: [Contextual Interview Feedback](#)
- HANDOUT: [Brainstorm & Team Contracts](#)
- READ Karen Cheng. 2012. “How to Survive Critique: A Guide to Giving and Receiving Feedback” in *ARCADE* 30(3). <http://arcadenw.org/article/how-to-survive-critique>
  - *Optional "How to Survive a Critique (Part 2)" by Karen Cheng*
- READ Jon Kolko. 2011. “Endless Nights—Learning from Design Studio Critique.” In *interactions* 18(2), 80-81. <http://dl.acm.org/citation.cfm?id=1925838>
  - POST your response to both of the above Critique readings to the appropriate Slack channel by 11:59pm Sunday and respond to at least one classmate's comment by 11am on Monday. What makes a good critique? How do we avoid creating a bad critique?
- DUE: Complete the [Project Preferences Survey](#) on Glow by 11:59pm on Sunday.

### Th 9/26|Interviews [[slides](#)]

- HANDOUT: [Logo Critique Feedback](#)
- HANDOUT: [I Like, I Wish, What If](#)
- READ “Interviews” (includes focus groups), Ch.7.4, pp.228-238, in *Interaction Design*, by Rogers, Sharpe, & Preece
- READ Carter McNamara. “Basics of Conducting Interviews.” <http://managementhelp.org/businessresearch/interviews.htm>
  - *Optional* Jakob Nielsen. 1997. “The Use and Misuse of Focus Groups.” <http://www.nngroup.com/articles/focus-groups/>
  - *Optional* Bill Gaver, Tony Dunne, and Elena Pacenti. 1999. “Design: Cultural probes.” In *interactions* 6(1), 21-29.
- POST your response to the above readings on methods to the appropriate Slack channel by 11:59pm Wednesday and respond to at least one classmate's comment by 11am on Thursday. How do interviews differ from contextual inquiries? What are 3 tips you would give to someone about to do a UX Research interview?
- DUE: [Revised Group Project Proposal](#)
- DUE: [Project Contextual Inquiry Plan](#)

## Week 5

### Mo 9/30| Affinity Diagramming [[slides](#)]

- BRING post-it notes to class!
- HANDOUT: [Name That Design Research Method](#)
- READ [Affinity Diagram content from \*Contextual Design\*, by Beyer & Holtzblatt](#):
  - READ “The Affinity Diagram”, Ch.09, pp.154-163, in *Contextual Design*, by Beyer & Holtzblatt
  - READ “Walking the Affinity”, Ch.10, pp.201-202, in *Contextual Design*, by Beyer & Holtzblatt
  - READ “Walking the Data”, Ch.13, pp.275-276, in *Contextual Design*, by Beyer & Holtzblatt
- POST your response to the above readings on affinity diagramming to the appropriate Slack channel by 10am day of class. How might this method be useful in your project? What can this method reveal for your project, what can it not help with?
- DUE: [Contextual Inquiry Check-In](#) (i.e., one CI + reflection)

### Th 10/3 | User Personas & Scenarios [[slides](#)]

- HANDOUT: [Contextual Inquiry POINT Critique](#)
- READ [Defining the Problem content from \*Interaction Design\*, by Rogers, Sharpe, & Preece](#):
- READ “Establishing Requirements”, Ch.10.1-10.3, pp.352-363, in *Interaction Design*, by Rogers, Sharpe, & Preece
- READ “Task Description”, Ch.10.6, pp.373-383, in *Interaction Design*, by Rogers, Sharpe, & Preece
- READ “Using Scenarios in Design” & “Generating Storyboards from Scenarios”, Ch.11.5-11.6, pp.415-420, in *Interaction Design*, by Rogers, Sharpe, & Preece
- READ [John Pruitt and Jonathan Grudin. 2003. “Personas: practice and theory.” In \*Proceedings of the 2003 conference on Designing for user experiences\*. ACM, New York, NY, USA, 1-15.](#)
  - POST your response to the above readings on user personas and scenarios to the appropriate Slack channel by 10am day of class. (1) Why do you think personas are contentious in UXR? (2) How can you tell if a scenario is too specific, or not specific enough?
- DUE: [Project Contextual Inquiry Review](#)
- DUE: [Team Check-in 1](#)

## Week 6

### Mo 10/7 | Storyboarding & Video Sketches [[slides](#)]

- READ [Colville-Hyde \(2016\). UX Comics: Visually Communicating User Experiences](#). ([original link](#) might be easier to read).
- READ [“Snapshots in Time: The Visual Narrative”, Ch.04 in \*Sketching User Experiences: The Workbook\*, by Greenberg et al.](#)

- *Optional: \*Truong et al (2006). "[Storyboarding: An Empirical Determination of Best Practices and Effective Guidelines](#)," in ACM SIGCHI Conference on Designing Interactive Systems (DIS).*
- WATCH *at least* one video sketch from each of the following groupings (i.e., 10 videos at a minimum):
  1. *Technique: [Mackay-StopAction](#)* (and then watch a tiny bit of [Mackay-Result](#) to see what the final version looks like!)
  2. *Low-level Techniques (timing): [MS Surface document interaction](#), [MS Surface Context Lens](#)*
  3. *Narration, Pace, and Flair: Don't Forget [1](#), [2](#), and [3](#)*
  4. *Using Projectors and Simple Props: [Buddy Map](#)*
  5. *Pace and Scene Relevance: [Consumester](#)*
  6. *Split Presentation, Simple Effects: [PickUp](#)*
  7. *Still-Frame, More Effects: [Graffiti Karma](#)*
  8. *Scenario with a Contrast: [ParkSmart](#)*
  9. *Playful while Keeping Pace: [Plantr](#)*
  10. *High-level Visions: [StarFire \(1994\)](#), [KnowledgeNavigator \(1987\)](#), [A Day Made of Glass \(2011\)](#)*
- POST After viewing and considering these video examples, think about what approaches were more or less effective.
  - In one paragraph, describe a technique you saw in these examples that was highly effective (i.e., in either storyboarding or video prototyping, in the readings or the videos), which you might therefore want to apply in your storyboarding or video prototyping. Be specific, such that it is clear you considered the examples. Discuss why it was effective.
  - In another paragraph, describe a technique you saw that was ineffective (i.e., in either storyboarding or video prototyping, in the readings or the videos), which you might therefore want to be mindful of in your storyboarding or video prototyping. Be specific, such that it is clear you considered the examples. Discuss why it was ineffective.
  - These examples thus support your reflection on how to effectively convey a design. Techniques in these and other examples will also directly apply as you prepare your storyboards and video prototypes. How do storyboards and video sketches provide different insights?
- DUE: [Project Task Review](#)

## Th 10/10 | Information Architecture, Wireframing: Techniques and Tools [[slides](#)]

- HANDOUT: Mid-Semester Evaluations
- HANDOUT: [Design Check-in Critique](#)
- READ [“Conceptual Design: Moving from Requirements to First Design”](#) & [“Physical Design: Getting Concrete”](#), Ch.11.3-11.4, pp.400-415, in [Interaction Design](#), by Rogers, Sharpe, & Preece
  - *Optional* [“Navigation Design”](#), Ch.5.6, pp.203-211, in [Human-Computer Interaction](#), by Dix et al.

- READ [“Task Flows”, “Use Cases”, “Mood Boards”, and “Wireframes”, Ch.07, pp.147-155, in \*Designing for Interaction\*, by Saffer.](#)
- READ Elaine McVicar. 2012. “Designing for Mobile, Part I: Information Architecture.” In *UX Booth*. <http://www.uxbooth.com/articles/designing-for-mobile-part-1-information-architecture/> ([Part 2](#) and [Part 3](#) are *optional* and may be relevant to some of your projects)
  - POST your response to the above readings on information architectures, etc. on the appropriate Slack channel by 10am day of class. List three concepts that will be useful in your project design and describe why you chose them.
- DUE: [Project Design Check-In](#)

## Week 7

**Mo 10/14 | Reading Period - No Class!**

**Th 10/17 | Low-Fidelity Prototyping, Paper Prototyping [[slides](#)]**

- HANDOUT: [Design Review Critique](#)
- READ [Marc Rettig. 1994. “Prototyping for Tiny Fingers.” \*Commun. ACM\* 37, 4 \(April 1994\), 21-27.](#)
- READ [Carolyn Snyder, "Making a Paper Prototype", Ch. 4, pp. 69-95, in \*Paper Prototyping\*.](#)
  - *Optional* \*[“Interacting with Paper”, pp.370-391, in \*Sketching User Experiences\*, by Buxton.](#)
- POST your response to the above readings on paper prototyping, etc. on the appropriate Slack channel by 10am day of class. Provide a description of a specific idea or thought you might be able to apply in your paper prototyping:
  - Describe why this idea is non-obvious or how it will help ensure good results for your paper prototyping.
  - Describe what in the readings gave you this idea.
  - Your thoughts here should be specific. You are already required to do a paper prototype with usability testing, so that is obviously too high-level for this reading. Convey a specific idea that indicates you did the reading and thought about how to apply it in the context of your project.
  - This reading thus serves to get you thinking about these methods in the context of your project. What actual techniques your team applies will depend on your larger decisions as a team. This reading is not intended to require that you actually apply the ideas you individually develop here.
- DUE: [Project Design Review](#)

## Week 8

**Mo 10/21 | Graphic Design | Iris is at the [IEEE INFO VIS Conference](#) - No class! [[slides](#)]**

- *Open Project Time!*

- READ [“Layout and Color on Small Screens”, Ch.08, pp.140-156, in \*Designing for Small Screens\*, by Studio 7.5](#)
- READ [“Getting Started”, pp.9-20, in \*Layout Essentials : 100 Design Principles for Using Grids\*, by Tondreau](#)
  - *Optional: “Coming to Order” & “Grid Basics”, pp.14-31, in *Making and Breaking the Grid: A Graphic Design Layout Workshop*, by Samara.*
  - *Optional \*[“Color”, pp.71-83, in \*Graphic Design: The New Basics\*, by Lupton & Philips](#) (this reading is in your packet, but it's printed in black & white :(*
- READ vaneos design. "4 Types of Grids And When Each Works Best." <http://vaneosdesign.com/web-design/grid-types/>
  - *Optional: [Tuck. 2010. “Gestalt Principles Applied to Design.” In \*Six Revisions\*.](#)*
  - *Optional: [Chapman. 2010. “Color Theory for Designers: Part 1: The Meaning of Color.” In \*Smashing Magazine\*.](#)*
  - *Optional: [Rye. 2012. “Color Code: What Color is ‘Brave’?” In \*AIGA\*.](#)*
  - *Optional: [Dean. 2008. “A Guide to Web Typography”. In \*I Love Typography\*.](#)*
  - *Optional: [Dean. 2008. “On Choosing Type”. In \*I Love Typography\*.](#)*
  - *Optional: [Dean. 2008. “eXtreme Type Terminology: Part 3: The ‘Black Art’”. In \*I Love Typography\*.](#)*
- POST your response to the above readings on graphic design for user interfaces on the appropriate Slack channel by 10am day of class. What are two surprising concepts you learned in the above readings? How might you apply them to your group project?
- DUE [QUIZ on Glow](#) (on the below readings+above slides). Open notes, no collaborating. Low stakes.

**Th 10/24 | HCI Research | Iris is at the [IEEE INFO VIS Conference](#) - No class!**

- *Open Project Time!*
- READ: You'll need to find & read a paper for your research paper report!
- DUE: [Individual Assignment: Research Paper Report](#)

## **Week 9**

**Mo 10/28 | UX Research Presentations [[slides](#)][[presentations](#)]**

- READ: Review your notes on low-fidelity prototyping
- WATCH Only the **first 10** minutes of [Nielsen Norman Group. Paper Prototyping: A How-To Video.](#)
- POST what's your number one take-away from the paper prototyping video? How does this differ from your thoughts about the paper prototyping readings from 10/17?
- DUE: [User Experience Research Project Overview + Presentations](#)

## Th 10/31 | Heuristic Evaluation [[slides](#)]

- BRING your paper prototypes to class!
- HANDOUT: [Heuristic Evaluation Forms](#)
- READING: There are 10 Usability Heuristics. Assign each member of your team to read (and be experts in) 2-4 of the heuristics. Assign one group member to be an expert in heuristics from sections 5.1 & 5.2 (14 pages); another team member to sections 5.3, 5.4, 5.5, 5.6, & 5.7 (15 pages); and the last teammate to sections 5.8, 5.9, 5.10 (14 pages). The Heuristics are split by sub-section in Chapter 5 of: [Jakob Nielsen "Usability Heuristics" Ch. 5, pp. 115-164, in Usability Engineering](#)
- READING: Everyone should read 5.11 "Heuristic Evaluation" from the above usability heuristics reading.
  - POST to the appropriate Slack channel by 10am day of class: Name each of your assigned heuristics, and provide a one line summary of each. For 2 of your heuristics provide a link to a website that does this heuristic well or poorly, and explain.
- DUE: [Project Paper Prototype](#)

## Week 10

### Mo 11/4 | Usability Testing [[slides](#)]

- BRING your paper prototypes to class!
- HANDOUT: [Cognitive Walk-through](#)
- READ [Carolyn Snyder, Ch. 8 "Introduction to Usability Test Facilitation", pp. 171-195, in Paper Prototyping.](#)
- READ [Kathleen Gomoll \(1990\). "Some techniques for observing users." pp. 85-90, The Art of Human-Computer Interface Design.](#)
- *Optional* ["Uncovering the Initial Mental Model" & "Wizard of Oz & "Think Aloud", Ch.6.1-6.3, pp.217-240, in Sketching User Experiences: The Workbook, by Greenberg et al.](#)
- WATCH from **9:55** onward of [Nielsen Norman Group. Paper Prototyping: A How-To Video.](#)
  - *Optional* [\\*Davidoff, Lee, Dey, & Zimmerman \(2007\). "Rapidly Exploring Application Design Through Speed Dating." Ubiquitous Computing Conference.](#)
  - *Optional* [\\*Spencer \(2000\). "The Streamlined Cognitive Walkthrough Method, Working Around Social Constraints Encountered in a Software Development Company," in ACM SIGCHI Conference on Computer-Human Interaction.](#)
- POST to the appropriate Slack channel by 10am day of class: what challenges do you anticipate encountering during usability testing of your paper prototype? How might you reduce/avoid those obstacles?
- DUE [Heuristic Evaluation](#) (mostly done in class, 10/31)

### Th 11/7 | Accessibility [[slides](#)]

- BRING laptops to class! (at least half the class)
- READ Theofanos & Redish. 2003. "Guidelines for accessible and usable web sites: Observing users who work with screen readers." *Interactions*, 10(6). <http://redish.net/images/stories/PDF/InteractionsPaperAuthorsVer.pdf>
- READ Smyk. 2017. "Design With Accessibility in Mind: The POUR Methodology" on Adobe. <https://theblog.adobe.com/design-with-accessibility-in-mind-the-pour-methodology/>
  - *Optional* \*May. 2018. "The Same, But Different: Breaking Down Accessibility, Universality, and Inclusion in Design" on Adobe.
  - *Optional* \*2013. "Constructing a POUR Website," on WebAIM.
- READ Pun. 2016. "Do's and don'ts of designing for accessibility" on [Gov.uk](http://gov.uk).
  - *Optional* \*"The Principles of Universal Design."
- POST to the appropriate Slack channel by 10am day of class: First, identify one way in which your group could make your *project* accessible to a wider audience of users. Second, identify one way in which you could make your *project website* accessible to a wider audience of users. Be sure to include explicit references to the readings.
- DUE: [Project Usability Testing Check-in](#)

## Week 11

### Mo 11/11 | High-Fidelity Prototyping, Techniques, and Tools [[slides](#)]

- BRING laptops to class! (one per group)
- READ "[Design, Prototyping, and Construction](#)", Ch.11.1-11.2, pp.389-400, in [Interaction Design](#), by Rogers, Sharpe, & Preece
  - *Optional* Lyndon Cerejo. 2010. "Design Better and Faster with Interactive Prototyping." In *Smashing Magazine*. <http://www.smashingmagazine.com/2010/06/design-better-faster-with-rapid-prototyping/>
- WATCH Balsamiq. "[Balsamiq Mockups 3 Application Overview.](#)" Video.
  - *Optional* Balsamiq. "[Balsamiq Mockups 3 Application Overview.](#)"
- WATCH InVision. "[How to create an interactive prototype with InVision.](#)" Video.
- WATCH InVision. "[Welcome to InVision Studio.](#)" Video.
  - *Optional* InVision. "[Getting Started with InVision.](#)" (in-depth tutorial!)
- POST to the appropriate Slack channel by 10am day of class: How might click-through wireframing tools like Balsamiq & InVision assist in the high-fidelity prototyping phase? Which software would you prefer to use and why? Be sure to include explicit references to the readings/videos.
- DUE: [Project Usability Testing Review](#)

### Th 11/14 | UX Research Methods [[slides](#)]

- READ Rohrer. 2014. "[When to Use Which User-Experience Research Methods](#)," in *Nielsen Norman Group*.

- READ Hanington & Martin. 2012. *Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions*:: [\\*01 A/B Testing](#) and [\\*10 Card Sorting](#).
  - *Optional* [\\*Gallo. 2017. "A Refresher on A/B Testing" in Harvard Business Review.](#)
- SKIM these design methods from [\\*Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions](#) (available via [e-access](#) or physical copy at the [Schow Library](#)).
  - POST to the appropriate Slack channel by 10am day of class about how/why two *new* methods you haven't yet used may have been (or could still be) informative in your project research and design. Pick two methods we haven't mentioned in class/readings yet! (i.e., 2 methods other than {participatory design, A/B testing, card sorting, and methods we used in our projects} - find *new* methods you'd be interested in trying!)
- DUE: [Project Digital Mock-up](#)

## Week 12

### Mo 11/18 | Design Patterns & UXD Project Presentations [[slides](#)] [[presentations](#)]

- READ [\\*Vlahovic. 2018. "Becoming a UX researcher: my experience and things I've learned along the way."](#) *Medium*.
- SKIM these design patterns, starting with [\\*Chapter 2: Jenifer Tidwell. 2011. "Designing Interfaces."](#)
- POST to the appropriate Slack channel by 10am day of class about how *one* of these patterns, or a pattern you find [elsewhere](#), may be relevant in your project design, by the night before class. Specifically:
  - Briefly, what pattern did you identify as relevant (e.g., by name and page number from *Designing Interfaces*, by URL).
  - Describe why this pattern is relevant in your design.
  - Describe how you might modify your design or your design process based on insights on perspective surfaced by the pattern. (e.g., describes changes in text, before / after images).
- DUE: [UX Design Project Overview + Presentations](#)

### Th 11/21 | Computer Ethics [[slides](#)]

- HANDOUT: Therac-25 Analysis
- DUE: work on your TWO deliverables (website + video) due Monday!!
- POST to the appropriate Slack channel by 10am day of class: Imagine you are an in-house AECL software developer at the time AECL submitted its first corrective action plan (CAP). Does implementing the CAP solve the problem? Propose a solution that works for AECL and its customers and that can be "sold" inside AECL as a feasible approach. What additional information would be helpful to have?

- READ \*Huff & Brown. 2004. "[A Case Study of the Therac-25](#)," in *Using History to Teach Computer Science and Related Disciplines*.
  - Optional \*[Leveson & Turner. 1993. "An Investigation of the Therac-25 Incidents," in IEEE Computer.](#)
  - Optional \*[Huff & Brown. 2004. "Integrating Ethics Into a Computing Curriculum: A Case Study of the Therac-25," in Using History to Teach Computer Science and Related Disciplines.](#)
- READ \*[Section 1: General Ethical Principles of the Association for Computing Machinery \(ACM\)](#).
  - Optional (1992-2018 Code of Ethics): \*"[General Moral Imperatives](#)" and "[More Specific Professional Responsibilities](#)" from the ACM Code of Ethics and Professional Conduct.
- Optional additional readings on Computer Ethics topics.
  - Optional \*[AirInter Flight 148 Mode Awareness Design Flaw: FAA Accident Overview.](#)
  - Optional \*[Ariane 5 Rocket Explosion: Gleick. 1996. "A Bug and a Crash: Sometimes a Bug is More Than a Nuisance," in The New York Times or Official Accident Report.](#)
  - Optional \*[Arnold. 2000. "The Patriot Missile Failure." or GAO Official Report.](#)

## Week 13

### Mo 11/25 | HCI Ethics [[slides](#)]

- HANDOUT: [Video Prototype Critique](#)
- DUE: [Project Initial Video Prototype](#)
- DUE: [Project Initial Website Redesign](#)

\* None of the HCI Ethics Readings are included in your Reading Packets! \*

If you cannot gain access to any of the following articles, PDFs are posted to GLOW and [Google Drive](#) (readings > ethics > ethics-....pdf).

- READ any one of the following articles on *Deception*:
  - [Angwin et al. 2016. "Machine Bias: There's software used across the country to predict future criminals. And it's biased against blacks" in ProPublica.](#)
  - [Dvoskin & Romm. 2018. "Facebook's rules for accessing user data lured more than just Cambridge Analytica," in The Washington Post.](#)
  - [Goel. 2014. "Facebook Tinkers With Users' Emotions in News Feed Experiment, Stirring Outcry" in The New York Times.](#)

- [Rudder. 2014. "We Experiment on Human Beings \(and so does everybody else\)" on Medium.](#)
- [Shane & Wakabayashi. 2018. "'The Business of War': Google Employees Protest Work for the Pentagon" in \*The New York Times\*.](#)
- [Isaac. 2017. "How Uber Deceives the Authorities Worldwide" in \*The New York Times\*.](#)
- [Lecher. 2018. "What Happens When an Algorithm Cuts Your Health Care" in \*The Verge\*.](#)
- READ any one of the following articles on *Publicizing Personally Identifiable Information*:
  - [Hsu. 2018. "The Strava Heat Map and the End of Secrets," in \*Wired\*.](#)
  - [Fowler. 2012. "When the Most Personal Secrets Get Outed on Facebook" in \*The Wall Street Journal\*.](#)
  - [Raymond, Howarth, & Hudson. 2012. "Crisis Mapping Needs an Ethical Compass," in \*Global Brief\*.](#)
- READ any one of the following articles on *Workers in the Gig Economy*:
  - [Barash. 2017. "Meet the Camperforce, Amazon's Nomadic Retiree Army," in \*Wired\*.](#)
  - [Menegus. 2017. "Amazon's Last Mile," in \*Gizmodo\*.](#)
  - [Semuels. 2018. "The Internet is Enabling a New Kind of Poorly Paid Hell," in \*The Atlantic\*.](#)
- READ any one of the following articles on *Casualties of the Sharing Economy*:
  - [Peck & Maldonado. 2017. "How Airbnb is Pushing Locals Out of New Orleans' Coolest Neighborhoods," in \*HuffPost\*.](#)
  - [Siddiqui & Laris. 2018. "Self-driving Uber Vehicle Strikes and Kills Pedestrian," in \*The Washington Post\*.](#)
  - [Stone. 2015. "Living and Dying on Airbnb," in \*Matter\*.](#)
  - [Theibault-Spiker et al. 2018. "Towards a Geographic Understanding of the Sharing Economy: Systemic Biases in UberX and TaskRabbit" in \*ACM Transactions in Computer-Human Interaction\*.](#)
- READ [Harvard Humanitarian Initiative. \*The Signal Code: A Human Rights Approach to Information During Crisis\*, pp. 10-19.](#)
  - [Optional \*Harvard Humanitarian Initiative, "The Signal Code: A Human Rights Approach to Information During Crisis," pp. 1-74.\*](#)
  - [Optional \*Russell et al. 2015. "Robotics: Ethics of Artificial Intelligence," in \*Nature\*.\*](#)
  - [Optional \*Zook et al. 2017. "Ten Simple Rules for Responsible Big Data Research," in \*PLoS Computational Biology\*, 13\(3\).\*](#)
  - [Optional \*Monteiro. 2018. "This Design Generation Has Failed," in \*Co.Design\*.\*](#)
  - [Optional \*Zunger. 2018. "Computer Science Faces an Ethics Crisis. The Cambridge Analytica Scandal Proves it," in \*The Boston Globe\*.\*](#)
- POST to the appropriate Slack channel by 10am day of class: List which 5 articles you chose to read and provide a brief ~2 sentence summary for each. Then, provide a higher-level reflection: Why were these ethics violations allowed to

- occur? Who's responsible? How can a computer scientist, such as yourself, prevent this from continuing or happening again?
- Be prepared to summarize & discuss your selected readings in class.
  
  - *Optional* additional readings on a variety of *Computing Ethics* topics:
    - *Optional* [Ungerleider. 2013. "Google Translate's Gender Problem \(and Bing Translate's and Systran's...\)," in Fast Company.](#)
    - *Optional* [Makinen. 2015. "China Prepares to Rank Its Citizens on Social Credit," in the LA Times.](#)
    - *Optional* [Angwin & Parris. 2016. "Facebook Lets Advertisers Exclude Users by Race," in ProPublica.](#)
    - *Optional* [Gross. 2013. "Snapchat: Sexting Tool, or the Next Instagram?" on CNN.](#)
    - *Optional* [Grossman. 2016. "Inside Apple CEO Tim Cook's Fight with the FBI," on Time.](#)
    - *Optional* [Sanders. 2017. "How The Media Are Using Encryption Tools To Collect Anonymous Tips," on NPR.](#)
    - *Optional* [Madrigal & Lafrance. 2014. "Net Neutrality: A Guide to \(and History of\) a Contested Idea," in The Atlantic.](#)
    - *Optional* [O'Neil. 2016. Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy.](#)
    - *Optional* [Eubanks. 2018. Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor.](#)
    - *Optional* [Davis, Monroe, & Reiter. 2004. "On User Choice in Graphical Password Schemes," In USENIX Security Symposium \(Vol. 13\).](#)
    - *Optional* [Fiveash. 2016. "Why Google's Monopoly Abuse Case in Europe Will Run and Run," in arsTechnica.](#)
    - *Optional* [2002. "Supreme Court Strikes Down Ban on 'Virtual Child Porn,'" on CNN.](#)
    - *Optional* [Abelson & Ledeen. 2008. "Naked in the Sunlight: Privacy Lost, Privacy Abandoned," in Blown to Bits: Your Life, Liberty, and Happiness After the Digital Explosion.](#)

## Thanksgiving Break

### Week 14: Project Week

#### Mo 12/2 | Design Manifestos / Project Critiques [[slides](#)]

- BRING: A laptop or smart phone for SCS Evaluations
- One day to get a critique on any part of your project you feel could use more feedback.
- READ "[How to Write for Medium](#)" by Lantz
  - Browse some examples of Medium posts:

- ["What Makes Software Good?"](#) by Bostock
- ["What Makes an Article Popular on Medium?"](#) from Medium
- ["How to Pitch a Project"](#) by Monteiro
- ["Why most redesigns fail"](#) by Rawat
- ["Participatory Design: What it is, and what makes it so great"](#) by Anic
- ["What Prevents Good Cybersecurity and Privacy Behaviors?"](#) by Das
- ["Value Sensitive Algorithm Design: Method, Case Study and Lessons"](#) by Zhu
- ["Tenured Professor Rogers Talks About: Imposter Syndrome"](#) by Fiesler
- ["Best HCI graduate programs in the US"](#) by Xiao
- ["The Jobs I Didn't See"](#) by Peck
- DUE: [Individual Design Manifesto Assignment](#)

**Th 12/5| Final Project Pitches [\[slides\]](#)**

- DUE: [Final Video & Final Website](#)
- DUE: [Project Pitch + Project Demo](#)
- DUE: [Team Check-in 2](#)

**Disclaimer**

This schedule is subject to change at the discretion of the faculty. Students will be notified of such changes ahead of time via email.

CSCI 376  
Human-Computer Interaction

Iris Howley  
iris@cs.williams.edu  
Assistant Professor of Computer Science



Williams



Project

### Upcoming

- **Wednesday night**
  - Project Contextual Inquiry Review
  - Team Check-in
  - Readings
    - User Personas & Scenarios
- **Sunday night**
  - Project Task Review
  - Readings
    - Storyboarding & Video Sketches



### Contextual Inquiry

- For your contextual inquiry (3):
- Do not randomly solicit customers at private establishments w/o permission of the business!
  - You *can* externally recruit someone and set-up an appointment
- It works for fly-on-the-wall observations, but not for conversations



### Outline

- HCI Party Fun Times
- Value-Sensitive Design
- Design Research Methods ++
  - Class activity
- Affinity Diagramming
  - Discussion
  - Team activity

Some portion of the slides in this lecture are adapted from Lisa Anthony.

### The Tyranny of Convenience



<https://www.nytimes.com/2018/02/16/opinion/sunday/tyranny-convenience.html>

### Convenience as Convention

- “Convenience has the ability to make other options unthinkable...”
- “...To resist convenience — not to own a cellphone, not to use Google — has come to require a special kind of dedication that is often taken for eccentricity, if not fanaticism.”

### Convenience is a Human Value?

- “Americans say they prize competition, a proliferation of choices, the little guy.”
- “The easier it is to use Amazon, the more powerful Amazon becomes — and thus the easier it becomes to use Amazon.”

### The Tyranny of Convenience

- “Given the growth of convenience — as an ideal, as a value, as a way of life — it is worth asking what our fixation with it is doing to us and to our country.”

### Convenience – good || bad

- “But we err in presuming convenience is always good, for it has a complex relationship with other ideals that we hold dear.”
- “It would be perverse to embrace inconvenience as a general rule. But when we let convenience decide everything, we surrender too much.”

**THINK OF AN ACCOMPLISHMENT  
OF WHICH YOU ARE PROUDEST**

...was it convenient?



Value Sensitive Design

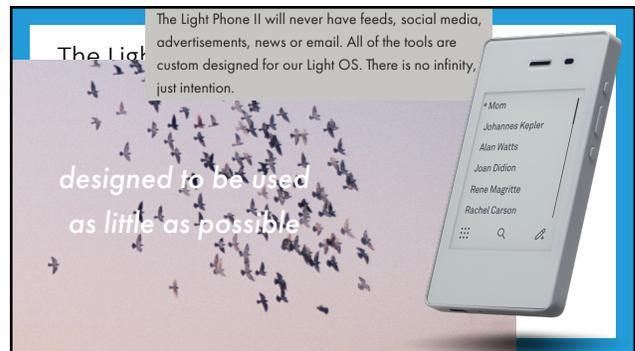
## Value Sensitive Design

- To be useful or usable is not the same as supporting important human values
  - Examples?

Independence	Fairness
Privacy	Freedom from Bias
Trust	Human Safety
Accountability	Universal Access
Ownership and Property	Sustainability

## Value Suitabilities

- Value Sensitive Design is an interactional theory
  - Values are not inherent in a given technology
  - But a technology is not value neutral
  - Some technologies are more suitable than others for supporting given values
- Value Sensitive Design investigates stakeholders, values, and value suitabilities
  - Direct and indirect stakeholders



## Tripartite Method

- Conceptual Investigations
  - Analyses of the values involved in a system
- Technical Investigations
  - Identify or develop technical mechanisms
  - Investigate suitability to support values
- Empirical Investigations
  - Investigate who the stakeholders are, which values are important to them, and how they prioritize these values



## 1

My group is working on an app to help citizen scientists track cows they've spotted. So I set up an appointment with a cow-spotter, and tagged along on her cow-spotting trip. She drove us to her chosen location, and I observed her take notes and photographs. I didn't ask any questions, because I didn't want to disrupt the flow of what she was doing.

Shadowing-ish

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## 2

I set up an appointment with a customer at her workplace. I had some preset questions I planned to ask, but I was also going to let the conversation lead where it leads, in the hopes of possibly encountering some spontaneous insight about potential directions for our system.

Semi-structured Interview

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## 3

I set up an appointment with a customer at his workplace. I observed how he handles printing and stapling large quantities of exams and asked a lot of questions about each step of the process. Asking so many questions made me feel awkward and intrusive, but I think it was necessary to get useful insights about potential directions for our system.

Contextual Inquiry

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## 4

My group is trying to identify ways to encourage college students to communicate their response to happenings in the local community. On Saturday, I sat under the community bulletin board at the local coffee shop and observed student interactions with the board, without interacting. If I asked them questions, I don't think I'd be able to get at their desire to communicate.

Fly-on-the-wall Observation

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## 5

My team is adding a special, temporary, "Move In: What you need to know" section to our College's app. Since move-in day is long gone, I visited a client at his dorm and had him re-enact his most recent move-in day. We even borrowed moving carts, and had boxes full of stuff in the car. I made sure to ask plenty of probing questions about the logistics. Where there lots of cars or people around? Was this exactly where he parked? I even observed how he got up and down the steps with his belongings!

Retrospective Pseudo-Contextual Inquiry

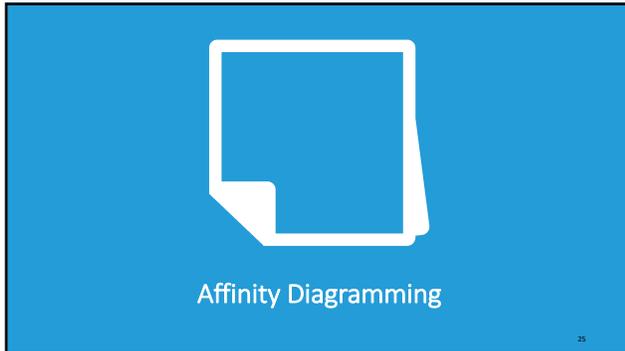
23

## 6

I observed a customer at their workplace and asked lots of questions about why she was navigating through this "Main Menu" button, and then what "Self Service" meant, and plenty of other questions about her navigation choices. I took notes throughout, but when my team and I got together to process this in an affinity diagram, it looks like I didn't take nearly enough notes. *What should I have done?*

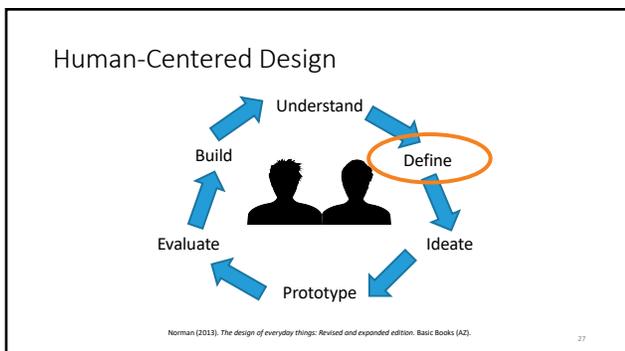
Contextual Inquiry

24



### After the Contextual Inquiry

- Affinity Diagrams
  - Generated during group session
  - Each observation, idea, note to a post-it
  - Notes are hierarchically organized into themes, based on project focus

 A photograph of a wall covered with numerous colorful sticky notes, representing an affinity diagram. The wall is labeled "General Methods of Design" on the left side. In the bottom right corner, the number "26" is visible.


# WHAT IS AN AFFINITY DIAGRAM USEFUL FOR?

### Affinity Diagramming

Purposes

- Sort and prioritize brainstorming ideas
- Analyze findings from user research
- Identify and group user functions as part of design

- **Make sense of [user] data**

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### Affinity Diagramming

Purposes

- Affinity diagramming helps designers use **induction** to find **emergent themes and structure** in the data.
  - Trying to design based on "logical" or "rational" ideas of what "should" be true only yields products that meet *designer needs*. User needs must be *extracted*.
- Externalizing the **emerging system** model helps **communication** among the team and exposes possible fallacies or problems.
- Seeing the **Big Picture**, the cumulative picture of all the data at once, leads better to leaps of intuition.

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# WHAT ARE THE BASIC RULES OF AFFINITY DIAGRAMMING?

## Affinity Diagramming

### Process

- *Sorting large amounts of data into logical groups*
  - Group "items" into homogeneous categories
    - Items can be anything: brainstormed ideas, user needs, user quotes, features, web pages, etc.
1. Write all items on sticky notes.
  2. Ask team members to stick the notes on workspace, close to other notes on a similar topic.
    - Consider grouping items from a user perspective.
  3. Discuss any disagreements in groupings together.
  4. Once consensus has been reached on groupings, use a different-colored sticky note to name each group.

# HOW DO WE NAME OUR GROUPINGS?

## Affinity Diagramming

### Grouping Names

- Good group names are like *users talking to designers*.
- Don't just summarize the notes, make notes examples of the theme.

Rain negatively affects commutes.

I like walking to school the best, but sometimes it rains (U3).

Waiting for the bus in the rain is really inconvenient because there's no shelter (U4).

I prefer to drive in the rain so I don't get caught in the downpour (U2).

## Affinity Diagramming

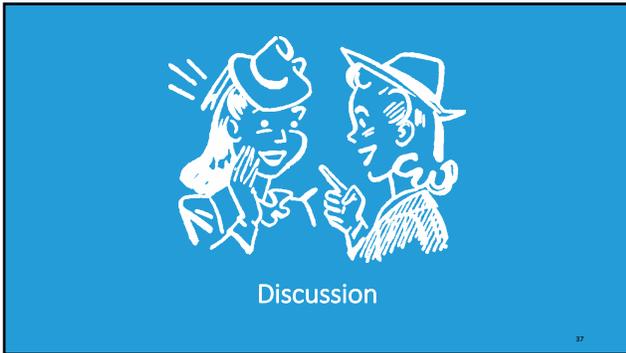
### Tips

- **Scale and scope** (and # of notes) varies from one user issue to the entire system.
- **Always start with the full set of items.** Starting too small can bias your groupings
- **Never start with the theme labels.** Always allow theme labels to emerge from the natural groupings.
  - Induction: building up what we don't know from what we know.
  - Starting with theme labels only tells us what we already know or expect from the data.
- Try **banning certain words** like "feature", "implement", and "develop" to get team thinking out of the box.

## Affinity Diagramming

### Walking the Data

- After creating the affinity, "**walk the data**":
  1. Each team member **reads through** the threads individually.
  2. Write down "**holes**" (additional info needs or questions to be answered) and **design ideas** based on the affinity. Aim for larger scope than one note: themes, segments, etc.
  3. Post these notes (**different color!**) next to spot in diagram they relate to.
- What are the most important issues that emerge?
  - Consider **whole of the space** together, not incrementally.



### In-Class Activity

Class-wide Affinity Diagram

- As a team, pick one of your Contextual Inquiry interviews
- Write down items from the inquiry onto post-it notes
- Group each item by affinity (walls as workspaces?)
  - First ~5 minutes silently
  - When announced, can begin talking approach

## REFLECTION

Which method (silence/talking) does your team prefer?

What's most challenging about affinity diagramming?

A white icon on a green background showing a person silhouette next to a gear, with two small white rectangles below it.

### Leftover Slides