

# Usability Assessment: Making Software Work For Your Users!

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# What is User-Centered Design (UCD)?

- The user is put in the center of the design



# What is ...

- User-Centered Design (UCD)
  - *User-centered design (UCD) is an approach to design that grounds the process in information about the people who will use the product. UCD processes focus on users through the planning, design and development of a product.*<sup>1</sup>
  - Goal: to make the user's interaction experience as simple and intuitive as possible
- User Experience (UX)
  - *The overall experience and satisfaction a user has when using a product or system*<sup>2</sup>
  - UX Design Goal: help users fulfill their goals and perform their tasks while satisfying business and functional requirements

<sup>1</sup>From Usability Professionals' Association, [http://www.upassoc.org/usability\\_resources/about\\_usability/what\\_is\\_ucd.html](http://www.upassoc.org/usability_resources/about_usability/what_is_ucd.html)

<sup>2</sup>From Wikipedia, [http://en.wikipedia.org/wiki/User\\_experience](http://en.wikipedia.org/wiki/User_experience)

# Why User-Centered Design?

- Increased productivity
- Increased usage and adoption
- Decreased support and training costs
- Reduced development time and costs
- Reduced maintenance costs
- Increased customer satisfaction



# User-Centered Design at Berkeley

- ✓ User Research
- ✓ Modeling
- ✓ Requirements Definition
- ✓ UI Framework Definition
- ✓ UI Design
- ✓ Development Support



# User-Centered Design at Berkeley

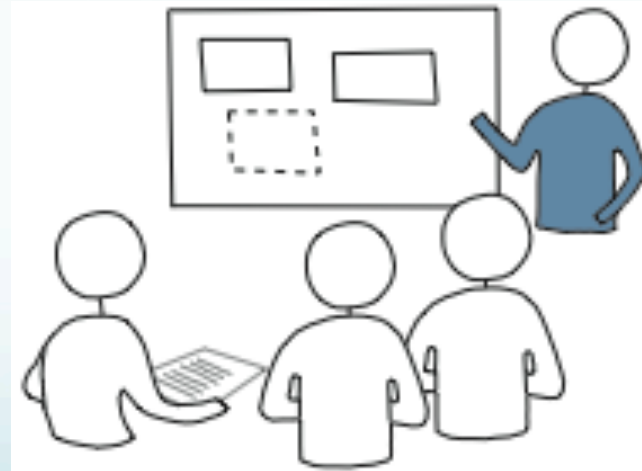
- ✓ User Research
- ✓ Modeling
- ✓ Requirements Definition

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- ✓ UI Framework Definition
- ✓ UI Design
- ✓ Development Support

*A lot of UX work is required before any UI design can begin. In the Agile process this is referred to as "iteration 0." Sometimes, there is no project-supplied UI. But there is always UX.*

*Notice how many phases come before UI Design.*



# What is Usability?

- **Usability** is *“the extent to which the product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use.”*<sup>1</sup>
- Usability is defined by five quality components:
  1. Learnability
  2. Efficiency
  3. Memorability
  4. Errors
  5. Satisfaction
- **Usability Evaluation** is *an assessment of the usability of a product, item, system, or interface.*

<sup>1</sup> [http://www.iso.org/iso/catalogue\\_detail.htm?csnumber=16883](http://www.iso.org/iso/catalogue_detail.htm?csnumber=16883)



# Types of Usability Evaluation



- Inspection
    - Heuristic Evaluation, Cognitive Walkthrough, UX Walkthrough, Accessibility Review
  - Testing
    - Card Sorting, Paper Prototype Testing, Prototype Testing, Production System Testing, Naturalistic Usability Testing, Co-Discovery Testing, Hallway Testing, Formal (Lab) Usability Testing, Remote Usability Testing
  - Inquiry
    - Contextual Inquiry, Interviews, Focus Groups, Surveys, Diary Studies
- For more info, see:  
<http://wiki.fluidproject.org/display/fluid/User+Testing+Methods>



# Fluid Design Handbook

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Fluid

## Design Handbook

Added by [Colin Clark](#), last edited by [Vicki Moulder](#) on Apr 01, 2010 ([view change](#))  
Labels: [ux](#) [toolkit](#) [walkthrough](#) [persona](#) [design](#) [pattern](#) [release](#) [manual](#) [EDIT](#)

### What is the Fluid Design Handbook?

The **Fluid Design Handbook** is a How-to Guide filled with user-centered design (UCD) techniques you can use to learn from your users and design better user experiences. The handbook includes information on a variety of UCD practices, from performing user research and creating models (such as personas and scenarios) to inform the design process, to performing UX walkthroughs and user testing of your website or application to assess usability and accessibility. This is by no means a comprehensive guide of design practices but rather focuses on a few methods near and dear to us on the Fluid project.

#### User Research

### Contextual Inquiry

*Contextual inquiry* is a cross between interviews and observation and combines the strengths of both. In a contextual inquiry, the interviewer goes to the user and interviews them where they do their work.

- > [Learn more](#)
- > [Fluid examples](#)

### Interviews and Observation

*Interviews* and *observations* are field study methods like contextual inquiries. In both cases, you should visit the participant "in the wild" to better understand how they get their work done in the context of their work.

- > [Learn more](#)

### Surveys and Focus Groups

*Surveys* and *focus groups* are good tools to evaluate users' interests and feelings about a product (or potential product). They can be a starting point for determining areas you want to focus more in depth research like observations and contextual inquiry. > [Learn more](#)

#### User Modeling

#### Evaluation and Assessment

### User Experience Walkthroughs

A User Experience (UX) Walkthrough is a technique created and developed by the Fluid project to identify usability and accessibility issues in a website or application. It is a procedure for examining a user interface following a set protocol and making assessments based on predetermined criteria. > [Learn more](#)  
> [Fluid examples](#)

The Fluid UX Walkthrough takes an all-in-one approach by combining the best methods of the other inspection techniques described in this handbook.

### Heuristic Evaluation

Heuristic evaluation is a method for finding usability problems in a user interface by reviewing it for compliance with a checklist of recognized usability principles called *heuristics*. > [Learn more](#)

### Cognitive Walkthrough

A cognitive walkthrough is a step-by-step exploration of a service to see how well a particular type of user, usually represented by a *persona*, is able to accomplish a particular objective or set of objectives. > [Learn more](#)

### Accessibility Markup Review

In an accessibility markup (code) review, the focus of the inspection is not the interface as the user sees it, but an *under-the-covers* examination of the code used to implement it - often HTML. > [Learn more](#)

### Accessibility Review Protocols

Accessibility can be evaluated through simple heuristics, or using a more detailed approach with assistive technologies and specific platforms. > [Learn more](#)

### User Testing

**User testing**, also sometimes referred to as usability testing, is a technique for evaluating usability, working with an actual or potential user of a product or system.

- For more information on these techniques, check out:  
<http://wiki.fluidproject.org/display/fluid/Design+Handbook>

#### Fluid Components

Downloads  
Demos  
Components  
Infusion Documentation  
Daily builds

#### Community

Get Involved  
Meetings  
Collaborate  
User Experience  
Development  
Project Coordination

#### Other Fluid Projects

Decapod  
Design Handbook  
Design Patterns  
OpenVULab

#### More Information


What is Fluid?  
What is Fluid Engage?

 Page Operations

#### View

Edit  
Attachments (0)  
Import Word Document  
Info

 Browse Space

 Add Content

# Heuristic Evaluation

- Visibility of system status
- Match between the system and the real world
- User control and freedom
- Consistency and standards
- Error prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Help users recognize, diagnose, and recover from errors
- Help and documentation

From Jakob Nielsen, "Ten Usability Heuristics,"

[http://www.useit.com/papers/heuristic/heuristic\\_list.html](http://www.useit.com/papers/heuristic/heuristic_list.html)

# Heuristic Evaluation

- For more info:  
<http://wiki.fluidproject.org/display/fluid/Heuristic+Evaluation>
- One checklist:  
<http://www.stcsig.org/usability/topics/articles/he-checklist.html>

# Cognitive Walkthrough

- *A step-by-step exploration of a service or interface to see how well a particular type of user (usually represented by a persona) is able to accomplish a particular objective or set of objectives.*
  - Step 1: Choose a User
  - Step 2: Define the Goal & Task
  - Step 3: Perform the tasks
- For more info:  
<http://wiki.fluidproject.org/display/fluid/Cognitive+Walkthrough>

# Accessibility Review

- Accessibility can be evaluated through simple heuristics, or using a more detailed approach with assistive technologies and specific platforms.
- Fluid's Simple Accessibility Review Protocol<sup>1</sup>
  - **Step 1:** Assess the overall layout, structure and content of the page
  - **Step 2:** Play around with the layout: enlarge the font size; change the size of the window (bigger and smaller); adjust your resolution
  - **Step 3:** Use the Tab key to navigate through the entire page.
  - **Step 4:** Use Internet Explorer or Firefox with Popup Alt Attributes Extension to check for alternative text for all images and title text for links.

<sup>1</sup> <http://wiki.fluidproject.org/display/fluid/Simple+Accessibility+Review+Protocol>

# Accessibility Tools

- Validator: WAVE by WebAim
  - <http://wave.webaim.org/>
- Quick Accessibility Page Validator
  - <http://accessify.com/tools-and-wizards/accessibility-tools/favelets/quick-page-test/>
- Screen Readers
  - VoiceOver – comes standard on the Mac
  - JAWS – Most used screen reader for Windows
- Web Content Accessibility Guidelines
  - <http://www.w3.org/WAI/intro/wcag.php>

# Fluid UX Walkthrough

- Used to identify usability and accessibility issues in a website or application.
- A combination of a:
  - Heuristic Evaluation
  - Cognitive Walk-through
  - Accessibility Markup Review<sup>1</sup>
- A procedure for examining a user interface following a set protocol and making assessments based on predetermined criteria.
  - Detailed protocols & checklists<sup>2</sup> are provided
- Created and developed by the Fluid project<sup>3</sup>



<sup>1</sup> <http://wiki.fluidproject.org/display/fluid/Accessibility+Markup+Review>

<sup>2</sup> <http://wiki.fluidproject.org/display/fluid/UX+Walkthrough+Protocols+and+Checklists>

<sup>3</sup> <http://wiki.fluidproject.org/>

# What is Usability (a.k.a. User) Testing?

- *A technique used to evaluate a product or system by testing it on users.*
  - The user completes certain typical tasks
  - An observer records the results
- Formal vs. informal or guerrilla
- Quantitative vs. qualitative
- Formative vs. summative





# What is Usability (a.k.a. User) Testing?

While there can be wide variations in where and how you conduct a usability test, **every usability test shares these five characteristics:**

1. The primary goal is to improve the usability of a product.
2. For each test, you also have more specific goals and concerns that you articulate when planning the test.
3. The participants represent real users.
4. The participants do real tasks. You observe and record what participants do and say.
5. You analyze the data, diagnose the real problems, and recommend changes to fix those problems.

# Why Usability Testing is Important

- You are not your user
- You know too much about your product and can't assess it with 'fresh eyes'
- There is nothing as illuminating as watching a user struggle through your interface



# Test Early & Often!

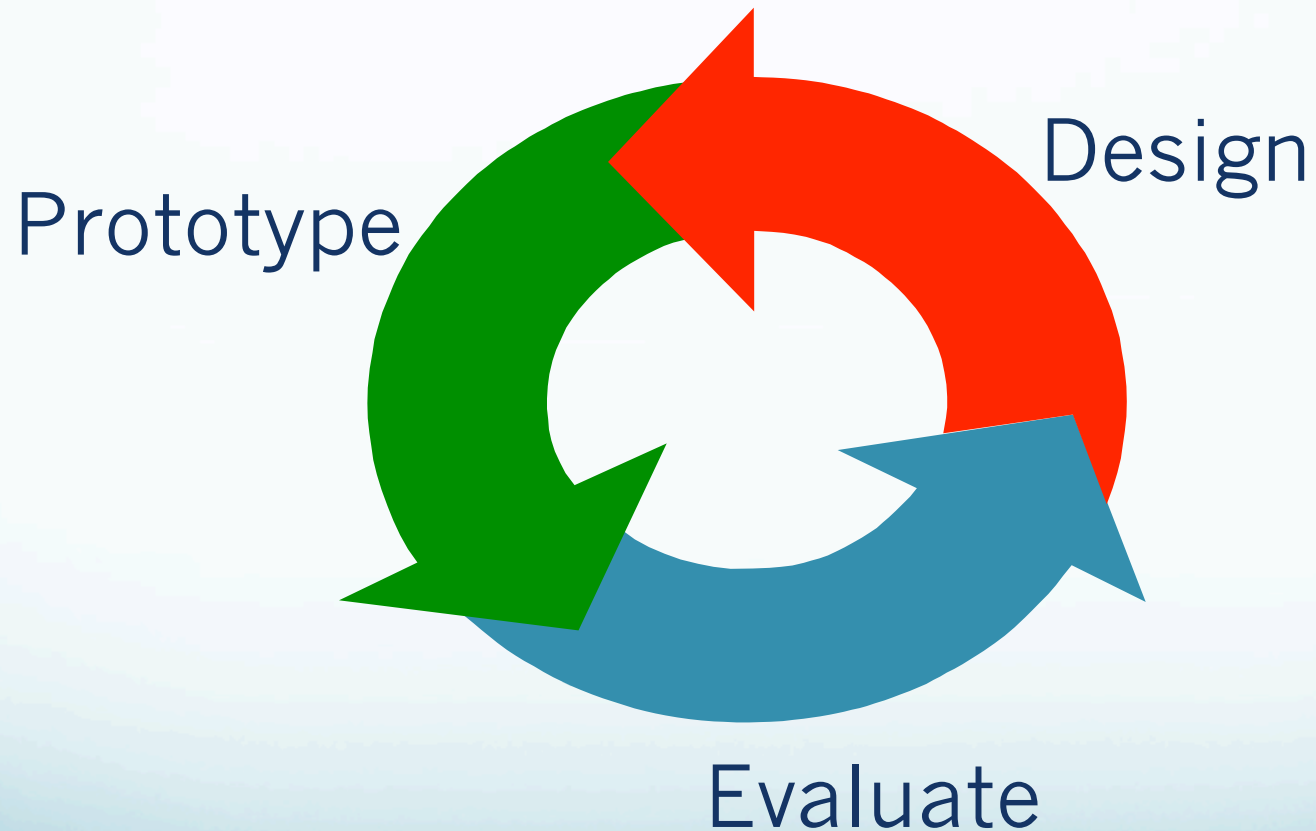


Figure courtesy of James Landay

# Scenarios

- Written description of a persona achieving a goal through a set of tasks in a specific context
- A design technique used to envision future use of a system
  - Helps designers & developers understand how system will really be used
  - May be based on user research or a use case (or set of use cases)
  - Scenarios become progressively more detailed as project progresses
- Can be used as the basis for for usability testing tasks
- Info on writing scenarios & tasks:
  - <http://wiki.fluidproject.org/display/fluid/User+Testing+Scenarios+and+Tasks>

# Scenario Example

- It's Monday morning on the second week in the semester and Cobble U is podcasting 40 different courses. When Mary comes in at 7:45 a.m., **she takes a look to see which ones will be recorded today.\*** She also does a quick check to **make sure that all the capture agents are online.\***
- No classes have started yet, but everything looks fine. Even Schulte Hall, the room in which the capture agent failed last week. Thinking about that, **she takes an in-depth look at Schulte Hall,\*** to make sure that there are no problem areas or even potential problems. **She then checks to see which recordings will happen in Schulte Hall today,\*** and see that there are four of these, one of which will start in a few minutes, at 8. She makes a mental note to take a look when class starts to be sure everything is okay. In the meantime she checks her email.

\* = potential task

# Usability Testing Tasks

**You are the Webcast Administrator at your university. You are responsible for ensuring that recordings go smoothly, take place as scheduled, and are distributed to various distribution channels (e.g. YouTube, iTunes, your local portal). It's Monday morning on the second week in the semester and your university is podcasting 40 different courses.**

1. When you come in at 7:45 a.m., you take a look to see which recordings are coming up today.
2. Next, you do quick check to make sure that all the capture agents are online.
3. Check to see what recordings will be happening today in Schulte Hall (known as "SH1"), the room in which the capture agent failed last week.
4. You see that one of the recordings in Schulte Hall is about to start in a few minutes, at 8:10. You make a mental note to take a look when the 8:10 class starts to be sure everything is okay. In the meantime you check your email. At 8:15 a.m., you turn back to Matterhorn. Check to see what is happening in Schulte Hall.

# Preparing for a Usability Test

- Define goals, objectives & success criteria
- Write scenarios & testing tasks – ensure prototype can handle them
- Create task sheets
- Create consent form
- If needed, create:
  - demographic questionnaire
  - pre-test questionnaire or interview
  - post-test questionnaire
- Sample user testing protocol:  
<http://wiki.fluidproject.org/display/fluid/User+Testing+Protocol>
- Protocol templates:  
<http://wiki.fluidproject.org/display/fluid/User+Testing#UserTesting-templates>

# Usability Testing Documentation

## Status

**Completed** November 2008 by Erin Yu, Allison Bloodworth, Daphne Ogle, & Judy Stern

## Summary

The 1st round of testing uncovered some problem areas for users, mostly around discoverability of inline editing and the undo and redo capabilities. Users were also unsure about when their changes were saved. Most users found the interactions easy. Updates have been made on the design and we are will run the same protocol as before to see how the changes affect the user's experience.

## Notes

## Goals

This test should discover:

- Is the highlight on rollover and the tool tip enough for discoverability (or do we need a more permanent visual indicator like a faint outline)?
- Do users realize fields are editable?
- Are users successful at editing simple text?
- Do users understand how edits are saved (clicking outside the field)?
- Are visual affordances meaningful and helpful to users?
- Is it obvious to the user that an edit has been made?
- Do users realize they can undo an edit by clicking on the "Undo" icon?
- Do users realize they can redo an edit by clicking on the "Redo" icon?

## Success Criteria

A successful design has been achieved when:

- 80% of users realize they can edit inline.
- 100% of the users that realize they can edit inline can successfully make inline edits.
- 100% of users that make inline edits recognize whether or not an edit has been successful.
- 80% of users realize they can undo an edit by clicking on the "Undo" icon
- 60% of users realize they can redo an undone edit by clicking on the "Redo" icon

## Protocol

Method and test coordinator script.

- [Simple Text Inline Edit User Testing - Round 2 Protocol](#)

## Users

The desire is to test across a range of technology skill of students and faculty. Users tested in this round are from the University of Toronto, University of California-Berkeley and Unicon.



# Usability Testing Documentation

## Interaction Design

Underlying design patterns and description of component behavior.

- [Inline Edit](#)
- [Inline Edit Design Pattern](#)

## Test Environment

Location and version of the environment that was used. Attach a screenshot of the environment at the time of testing if the environment will change over time.

- <http://build.fluidproject.org/fluid/sample-code/inline-edit/section-info/section-info.html>

Section Info

[Overview](#) | [Add Sections](#) | [Student Memberships](#) | [Options](#)

### Instructor's Overview

Editable items will highlight as you mouse over them. To edit an item click on the item.

[Don't show me this message again](#)

Name	Graduate Student Instructor (GSIs)	Day	Time	Location	Max. # of Students	Available	Remove
<b>Sections</b>							
Astronomy 7A P 001 LEC <a href="#">Assign GSIs</a>   <a href="#">Assign Students</a>	Melissa Basman Julie Chambers	T, Th M	3:00pm - 4:00pm 4:00pm - 5:00pm	Lecture Hall A Lecture Hall B	50	3	✖
Astronomy 7A S 102 LEC <a href="#">Assign GSIs</a>   <a href="#">Assign Students</a>	Rachel Hollowgrass	T, Th	2:00pm - 3:00pm	Lecture Hall A	50	0	✖
Astronomy 7A S 103 LEC <a href="#">Assign GSIs</a>   <a href="#">Assign Students</a>	Judy Stern	T, Th	2:00pm - 3:00pm	Lecture Hall A	No limit	n/a	✖
Astronomy 7A S 104 LEC <a href="#">Assign GSIs</a>   <a href="#">Assign Students</a>	DAVIS, Ray	T,F	2:00pm - 3:00pm	Lecture Hall B	25	10	✖
Astronomy 7A S 105 LEC <a href="#">Assign GSIs</a>   <a href="#">Assign Students</a>	Ray Davis	T, Th	4:00pm - 5:00pm	Dwinelle 47	45	2	✖

## Results

Full notes and analysis of the user tests.

### Simple Text Inline Edit User Testing - Round 2 Results

- 2 of 4 users had trouble when they tried to highlight specific text before the inline edit field was active, and were confused when after the field was opened on click \*all\* the text was highlighted.

# Selecting Representative Users

- Your results may not be valid if your users aren't representative
- Find users based on your personas/user profiles
- Depending on your project 3-5 users (or less!) may be enough
- If necessary, create a short screening questionnaire
- In some domains, may be helpful to track users via a profile matrix
- Don't forget accessibility testing!

# Sample Profile Matrix

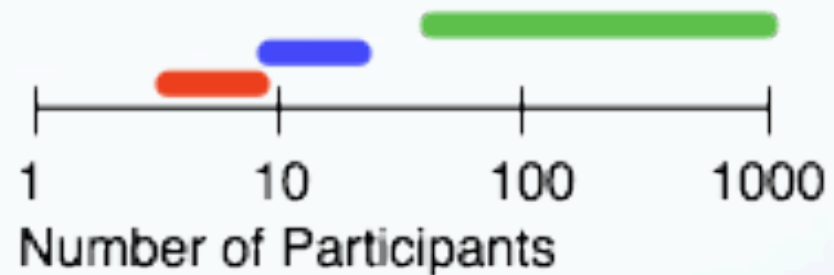
	Never had webcast class	Has watched webcasts of class	Studies with class webcasts	Has computer at home	Works in computer lab
Undergrad Student	2	1	1	1, 2	1
Graduate Student	3	3	4	3	3,4
Virtual Student		5,6	5	5,6	

# How Many Users are Enough?

**Broad** activities such as surveys, data analysis, etc.

**Focused, extended** work such as participatory design

**In-depth** qualitative work such as contextual inquiry or usability testing



# Recruiting Users

- Use your network
- It's often helpful to offer an incentive
- If you can't find representative users, you can try:
  - Friends and family testing  
<http://24ways.org/2006/fast-and-simple-usability-testing>
  - Surrogate testing  
<http://www.userfocus.co.uk/articles/surrogates.html>
- For more info:  
<http://wiki.fluidproject.org/display/fluid/Selecting+and+Recruiting+User+Test+Participants>

# Usability Testing Facilitation

- Explain that you're testing the product, not the user
- You may want to ask the user to think aloud
- Distance yourself from the product
- Don't react
- Don't help
- Don't ask leading questions
- Don't give away your thoughts with facial expressions
- Don't lead with your note-taking
- Often there is no need to write down exactly what each user does – trends will emerge
- Save discussion or explanations for the end
- Watch what people do with your site/application, not what they say about a design
- Keep usability heuristics in mind



# During a Usability Test

1. Greet user.
2. Introduce them to any other observers or note takers.
3. Have user sign consent form
4. Explain user testing procedure and that you are testing the system and not them.
5. Ask them if they have any questions.
6. Have them complete the demographic questionnaire.
7. Ask an ice breaker question about some of the demographic information you want to collect anyway. Want to put user at ease if possible.
8. Have them sit down in front of computer (or in front of paper prototype).
9. Conduct user test.
10. Have them complete any post-test questionnaires.
11. Ask any questions you have (do this after they've completed the questionnaires so not to bias their answers).
12. Let them ask any questions and debrief them.
13. Let them know how they can find out about changes made to the software as a result of the user testing data.
14. Thank them for participating.
15. Give them their compensation.

# Note-Taking During a Test

- Goal: Document user's experience with system
- Activities:
  - The path they take to accomplish task
  - Challenges you see them having while trying to complete task
  - Questions they ask & comments they make (may ask them to think aloud)
  - How many attempts it took them to complete task
  - Time on task (if this is important to test)
  - Answers to any post-test questions
- After tests:
  - Immediately write up top handful of issues you saw while it's fresh in your mind (can do this iteratively)
  - Discuss test with facilitator (others involved) while it's fresh in your mind



# Note-Taking Tools

- Paper & pencil
  - Positives: non-distracting, easy to write without table if use hard notebook, can make pictures easily
  - Challenges: have to write fast (use drawings & short hand), may have to digitize later (depending on formality & needs of project)
- Laptop
  - Positives: digitized notes easily shareable with team
  - Challenges: may not have good surface to set it on, can be off-putting to participant to hear you typing and the screen can be a "wall" between you
- Tablet PC
  - Positives: can be good compromise
  - Challenges: most people find they write slower than on paper
- Photos
  - Positives: help tell the story, a great compliment to notes
  - Challenges: makes some users nervous, you'll be busy writing can be hard to also take pics

# Note-Taking Tips

- You are a fly on the wall. Too many people talking to participant can be confusing.
- Using preset forms can help quickly capture expected results- Use short hand that makes sense to you
- Can expand later – If you're not sure if it's important, capture it
- Sometimes hard to see exactly what challenges are in the thick of it so capturing every step will help you replay it
- If using a camera, be very casual about it to make people more comfortable
- Audio & video can be helpful but expect significant time transcribing, pulling out interesting snippets. can also make users less forthcoming if they are being recorded
- Schedule time right after test to discuss amongst facilitation team while it's all still fresh

# Discount Usability - Nielsen

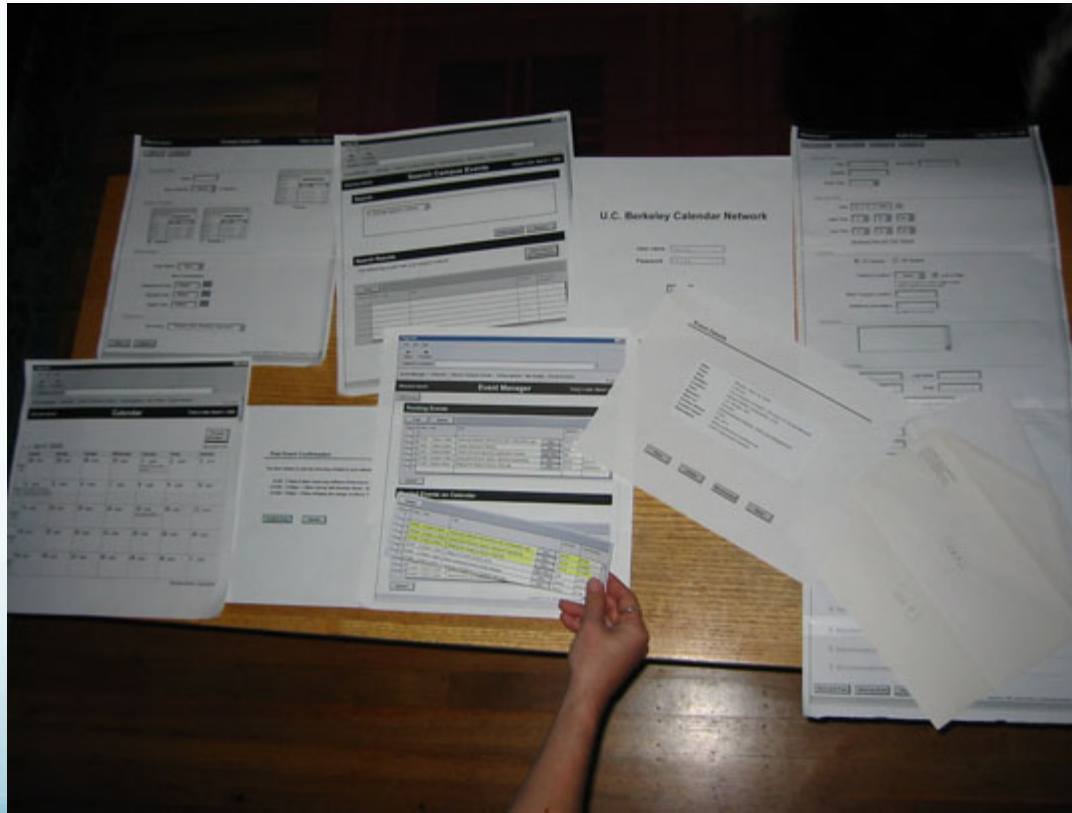
- Create prototypes using scenarios
- Usability test using simplified thinking out loud method
- Do a heuristic evaluation

# Usability Testing Examples

- Paper prototype testing – Allison
- Distributed testing – Judy
- Hallway testing – Rachel
- Formal/lab testing – Rachel

# Usability Testing Examples

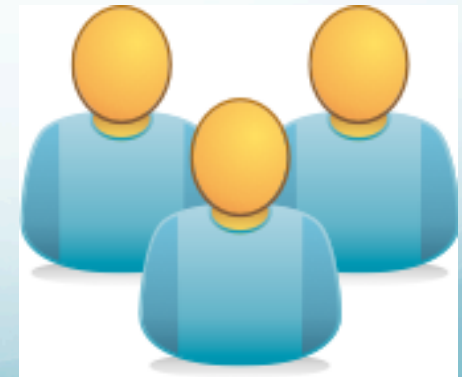
## Paper Prototype Testing



For more info: <http://wiki.fluidproject.org/display/fluid/Fluid+User+Testing>

# Usability Testing Examples

## Distributed Testing



For more info: <http://opencast.jira.com/wiki/display/MH/0.5+Admin+App+user+testing+--+RC+testing>

# Usability Testing Examples

## Hallway testing

“Psst!

Want a Peet’s gift card?  
Come test our software  
for 5 minutes.”



# Usability Testing Examples

## Formal/lab testing





# Recommended Usability Testing Books

- Handbook of Usability Testing by Rubin J. and Chisnell, D.
- A Practical Guide to Usability Testing by Dumas, J. and Redish, J.
- Don't Make Me Think by Steve Krug
- Usability Engineering by Jakob Nielsen

# Recommended User-Centered Design Books

- The Inmates are Running the Asylum and About Face 3.0 – Alan Cooper
- The Design of Everyday Things and Emotional Design – Don Norman
- User Interface Task Analysis - Joann T. Hackos and Janice Redish
- Designing for Interaction - Dan Saffer
- For more suggestions, check out:
  - Adaptive Path Reading List
  - Society for Technical Communication's Usability & User Experience Group's Bookshelf

# Recommended Websites

- Fluid User Testing website:  
<http://wiki.fluidproject.org/display/fluid/User+Testing>
- "UIE seminars" bSpace site: <http://bspace.berkeley.edu>
  - ask any of today's speakers to be added as a member
- Useit.com: <http://www.useit.com/>
- Usability Professionals Association:  
<http://www.upassoc.org/>
- <http://www.stcsig.org/usability/>
- <http://usability.gov/>
- <http://www.usabilityfirst.com/>
- <http://www.usableweb.com/>
- <http://usabilitynet.org/>
- ACM SIGCHI: <http://acm.org/sigchi>
- IBM's User-centered Design manual:  
[http://www-3.ibm.com/ibm/easy/eou\\_ext.nsf/publish/13](http://www-3.ibm.com/ibm/easy/eou_ext.nsf/publish/13)