Usability Testing as an Assessment Technique

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11/2/10
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.*
  - 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*
  - UX Design Goal: help users fulfill their goals and perform their tasks while satisfying business and functional requirements

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1. 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)

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
- 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.”

  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.

Types of Usability Evaluation

- Inspection
  - Heuristic Evaluation, Cognitive Walkthrough, UX Walkthrough, Accessibility Review

- Testing

- Inquiry
  - Contextual Inquiry, Interviews, Focus Groups, Surveys, Diary Studies

For more info, see: http://wiki.fluidproject.org/display/fluid/User+Testing+Methods
For more information on these techniques, check out:
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
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

  - **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.

Accessibility Tools

- Validator: WAVE by WebAim
  - [http://wave.webaim.org/](http://wave.webaim.org/)

- Quick Accessibility Page Validator

- 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](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

- A procedure for examining a user interface following a set protocol and making assessments based on predetermined criteria.
  - Detailed protocols & checklists are provided

- Created and developed by the Fluid project

1 http://wiki.fluidproject.org/display/fluid/Accessibility+Markup+Review
2 http://wiki.fluidproject.org/display/fluid/UX+Walkthrough+Protocols+and+Checklists
3 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.

From "A Practical Guide to Usability Testing" (1990), J. Dumas and J. Redish
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!

Design

Prototype

Evaluate

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:
Scenario Example

- It's Monday morning on the second week in the semester and Cobbler 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
Usability Testing Documentation

Status

Completed November 2018 by Erin Yu, Alison Bloodworth, Daphne Ople, & 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 running 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:

- 60% of users realize they can edit inline.
- 100% of 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.
- 90% 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 University of Toronto, University of California-Berkeley and Unicrn.
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.

<table>
<thead>
<tr>
<th>Instructor's Overview</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name A</th>
<th>Graduate Student Instructor/COAs</th>
<th>Day</th>
<th>Time</th>
<th>Location</th>
<th>Max. # of Students</th>
<th>Available</th>
<th>Remove</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Astronomy TA P 001 LEC</td>
<td>T, Th</td>
<td>3:00pm - 4:00pm</td>
<td>Lecture Hall A</td>
<td>80</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Astronomy TA S 102 LEC</td>
<td>T, Th</td>
<td>2:00pm - 3:00pm</td>
<td>Lecture Hall A</td>
<td>80</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Astronomy TA S 101 LEC</td>
<td>T, Th</td>
<td>2:00pm - 3:00pm</td>
<td>Lecture Hall A</td>
<td>80</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Astronomy TA S 104 LEC</td>
<td>T, F</td>
<td>2:00pm - 3:00pm</td>
<td>Lecture Hall B</td>
<td>25</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results</th>
</tr>
</thead>
</table>

Full notes and analysis of the user tests.

Simple Text Inline Edit User Testing - Round 2 Results
- 3 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 *Edit* 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

<table>
<thead>
<tr>
<th></th>
<th>Never had webcast class</th>
<th>Has watched webcasts of class</th>
<th>Studies with class webcasts</th>
<th>Has computer at home</th>
<th>Works in computer lab</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Undergrad Student</strong></td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1, 2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Graduate Student</strong></td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3, 4</td>
</tr>
<tr>
<td><strong>Virtual Student</strong></td>
<td>5,6</td>
<td>5</td>
<td>5</td>
<td>5,6</td>
<td></td>
</tr>
</tbody>
</table>
How Many Users are Enough?

<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad</td>
<td>Activities such as surveys, data analysis, etc.</td>
</tr>
<tr>
<td>Focused, extended</td>
<td>Work such as participatory design</td>
</tr>
<tr>
<td>In-depth</td>
<td>Qualitative work such as contextual inquiry or usability testing</td>
</tr>
</tbody>
</table>

![Number of Participants](image)
Recruiting Users

• Use your network

• It’s often helpful to offer an incentive

• UC Berkeley’s GoTo Network
  • Contact Tony Christopher: tonyc@berkeley.edu

• 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 icebreaker 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 – Daphne
- Formal/lab testing – Daphne
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

• "UIE seminars" bSpace site: [http://bspace.berkeley.edu](http://bspace.berkeley.edu)
  • ask any of today's speakers to be added as a member
• Useit.com: [http://www.useit.com/](http://www.useit.com/)
• Usability Professionals Association: [http://www.upassoc.org/](http://www.upassoc.org/)
• [http://www.stcsig.org/usability/](http://www.stcsig.org/usability/)
• [http://www.usableweb.com/](http://www.usableweb.com/)
• [http://usabilitynet.org/](http://usabilitynet.org/)
• ACM SIGCHI: [http://acm.org/sigchi](http://acm.org/sigchi)
Campus User-Centered Design Group

- UC Berkeley's Campus User Experience (UX) Group is a group for anyone in the campus community to share knowledge and learn about user experience.

- We foster user experience community and user-centered design skills on campus in a supportive environment by:
  - Discussing & giving presentations on UX topics
  - Sharing resources including news, information, and articles of interest, both in person and via the mailing list
  - Reviewing websites for usability
  - Giving feedback on plans for user-centered design activities

- Meetings first Thursday of the month at 4:30pm
- Subscribe to the mailing list: ucd@lists.berkeley.edu
- Contact me to be the topic of an upcoming meeting: abloodworth@berkeley.edu
Group Activity - Let's all do some user testing!

- Break into groups of 3: Facilitator, Observer/Note taker, User
- Facilitators & Observers - Take a couple minutes to get familiar with the users tasks (users take a stretch break :)) (5 minutes)
- Run user test each in your role (15 minutes)
- Discussion (15 minutes)
Goals for the Activity

- **Facilitator goals**
  - make participant feel comfortable
  - help participant understand task
  - make sure participant has what they need logistically
  - walk users through protocol (greeting script, consent form, demographic questionnaire, setup scenario & tasks, post-test questionnaire & post-test questions)
  - (secondary) evaluate how easy or hard is it to accomplish task

- **Observer / Note-taker goals**
  - evaluate how easy or hard is it to accomplish task
  - take notes to refer to later
  - make participant feel comfortable

- **User goals**
  - Relax- Remember this is NOT a test of you, it is a test of the system
  - Follow instructions & try to complete activities given
Remember....

- **Facilitators, remember:**
  - Don't offer help; let the user attempt to perform the task themselves. If they ask for help reply with:
    - "What do you think you/that would do?"
    - "What do you think that means?"
  - Don't react to the user's actions; you don't want to influence them in any way

- **Observers/note-takers, remember:**
  - Capture themes, not every action
  - Try to capture a few direct quotes to illustrate pain points