

# Usability Testing

**a brief introduction**

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**Why does  
usability matter?**



Half of all “malfunctioning” products are returned working fine -- people just can’t figure out how to use them.

Companies often dismiss design-related product complaints as "nuisance" or “low priority issues.”

Product developers and project managers are often shocked to discover how hard their products are to use.

Most of the flaws originated in the first phase of design: product definition.

*Elke Den Ouden: Development of a design analysis model for consumer complaints: Revealing a new class of quality problems. Eindhoven: Technische Universiteit Eindhoven. March 2006.*



# Complexity causes 50% of product returns

# Blackberry by Research In Motion, circa 2007

## RiM Stock in June 2007: \$180 per share





June 29, 2007: RiM at \$180 per share



iPhone introduced: June 29, 2007  
Apple Stock: \$160 per share









RIM April 4 2014: \$8 per share



Apple April 4 2014: \$580 per share

## Confusion over Palm Beach County ballot

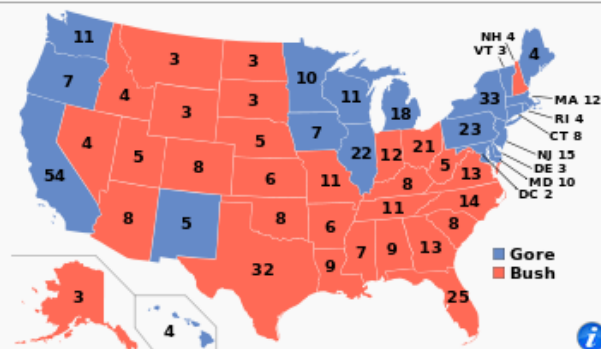
Although the Democrats are listed second in the column on the left, they are the third hole on the ballot.

Punching the second hole casts a vote for the Reform Party.

(REPUBLICAN)	3	(REFORM)	4
GEORGE W. BUSH - PRESIDENT		PAT BUCHANAN - PRESIDENT	
DICK CHENEY - VICE PRESIDENT		EZOLA FOSTER - VICE PRESIDENT	
(DEMOCRATIC)	5	(SOCIALIST)	6
AL GORE - PRESIDENT		DAVID McREYNOLDS - PRESIDENT	
JOE LIEBERMAN - VICE PRESIDENT		MARY CAL HOLLIS - VICE PRESIDENT	
(LIBERTARIAN)	7	(CONSTITUTION)	8
HARRY BROWNE - PRESIDENT		HOWARD PHILLIPS - PRESIDENT	
ART OLIVIER - VICE PRESIDENT		J. CURTIS FRAZIER - VICE PRESIDENT	
(GREEN)	9	(WORKERS WORLD)	10
RALPH NADER - PRESIDENT		MONICA MOOREHEAD - PRESIDENT	
WINDA LADUKE - VICE PRESIDENT		GLORIA La RIVA - VICE PRESIDENT	
(SOCIALIST WORKERS)	11	WRITE-IN CANDIDATE	
JAMES HARRIS - PRESIDENT		To vote for a write-in candidate, follow the directions on the long stub of your ballot card.	
MARGARET TROWE - VICE PRESIDENT			
(NATURAL LAW)	13		
JOHN HAGELIN - PRESIDENT			
NAT GOLDHABER - VICE PRESIDENT			

Sun-Sentinel graphic/Daniel Niblock

Nominee	George W. Bush	Al Gore
Party	Republican	Democratic
Home state	Texas	Tennessee
Running mate	Dick Cheney	Joe Lieberman
Electoral vote	271	266 <sup>[2]</sup>
States carried	30	20 + DC
Popular vote	50,456,002	50,999,897
Percentage	47.9%	48.4%



Presidential election results map. Red denotes states won by Bush/Cheney, Blue denotes those won by Gore/Lieberman.

2000 presidential election: George W. Bush won the vote in Florida by 2,000 votes.

# Defining Usability

Good definition: “Usability is a **quality attribute** that assesses how easy user interfaces are to use.” -- Jakob Nielsen

Better definition: "The extent to which a product can be used by **specified users** to achieve **specified goals** with **effectiveness, efficiency, and satisfaction** in a **specified context of use**." -- ISO

# Key Components

**Specified Users**

**Specified Goals**

**Specified Context of Use**

**Effectiveness**

**Efficiency**

**Satisfaction**

# Specifying Users: Personas

## Vera Anderson

**"I want a student culture where I feel comfortable and a curriculum that lets me get my hands dirty with real-world experiences."**



### Demographic

**Age:** 17

**Gender:** Female

**Education:** Current Senior student in Frankel Jewish Academy of Metro Detroit

**Activity:** The President of Business Club

**Location:** West Bloomfield, MI

### Profile:

Vera is a current senior student in Frankel Jewish Academy of Metro Detroit. She spends a good amount of time on social networking sites, and uses Google as the starting point for her information queries.

### Background:

Vera is an overachiever and has always had an entrepreneurial spirit. She will likely graduate as the valedictorian or salutatorian in her class, and she is the president of her private high school's business club. She is applying to a number of universities that have strong business schools, but because of Ross's proximity to her hometown, it's her default choice. She has visited Ann Arbor many times and knows some current students there.

### Key goals:

Vera is pretty sure Ross is where she wants to go, but she wants to do research on the website to find out more about student life at Ross and examples of experiences students have had working with clients in their classes and their internship experiences. She's mildly interested in the career outcomes for graduates of Ross, but she's primarily thinking about how she will be spending the next four years of her life.

### Needs:

Vera already has information from the U.S. News and World Report about how Ross compares to other business schools. Now she wants to zoom in on Ross and see what student life is like. She's hoping to find student profiles and examples of work students have done with clients.

### Technology

**Computer use:** expert user; 4-5 hours a day; very comfortable using multiple devices

**Internet use:** expert user; very comfortable browsing the web

**User type:** active Ross site user

**Devices:** laptop and smartphone

Photo by [gabrielsaldana](#)  
used under CC BY  
Cropped from original

Sebastian Ferrari  
<http://sferrari.org/ross.html>

# Specified Goals & Context of Use: User Journeys & Experience Maps

## UX Goal Specifications

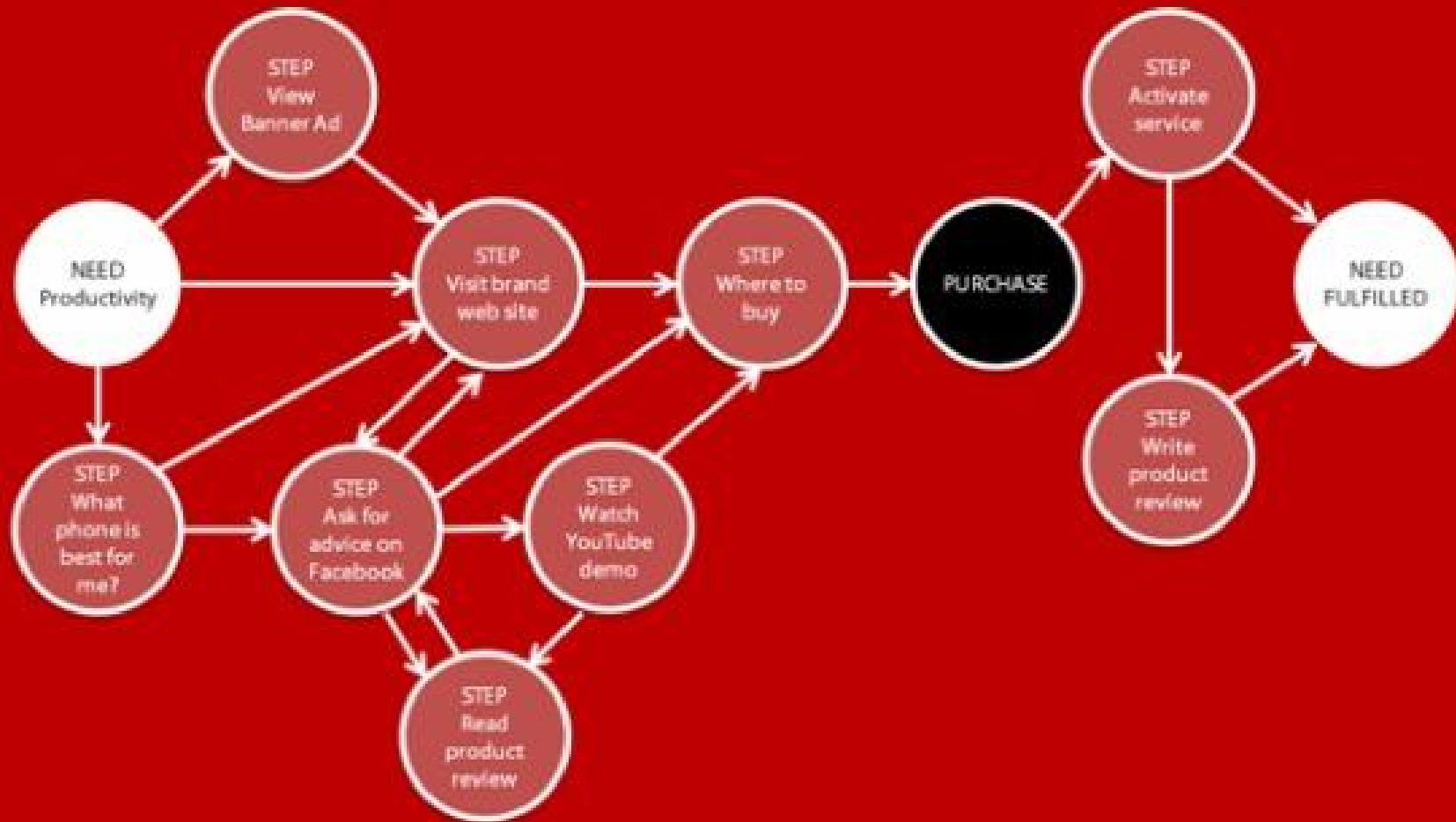
- Red Route Usability
- Experience Maps
- Agile User Stories

## Traditional Specifications

- Requirements
- UML Diagrams

## Sample Wireless Purchase Journey Map







As **who** I want  
**what** so that  
**why**

## Feature #1 - Publish Trainings

As a manager

I want to publish trainings

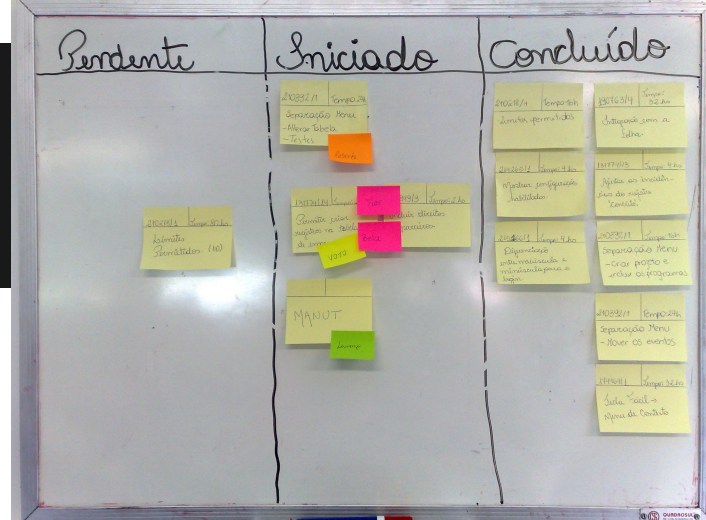
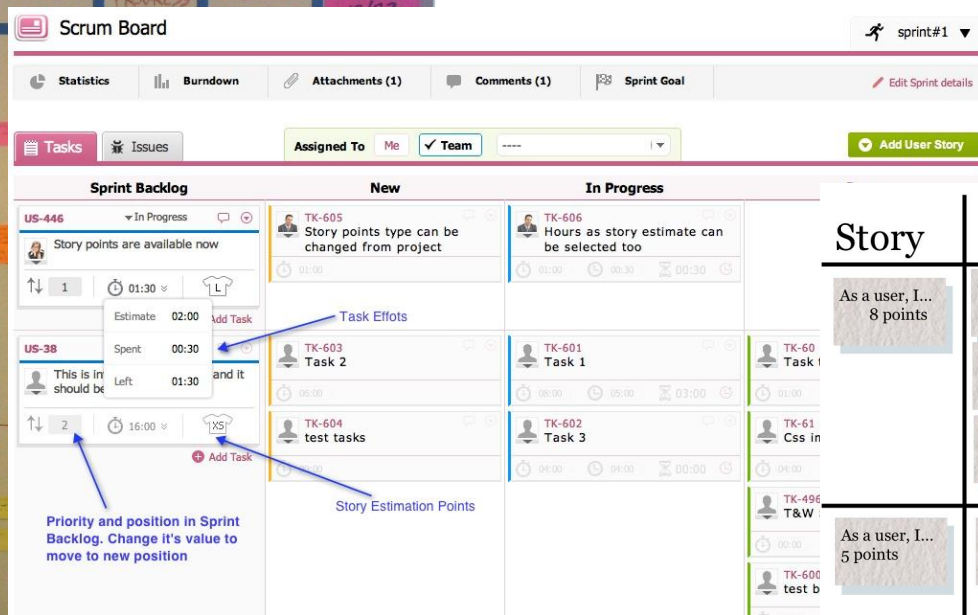
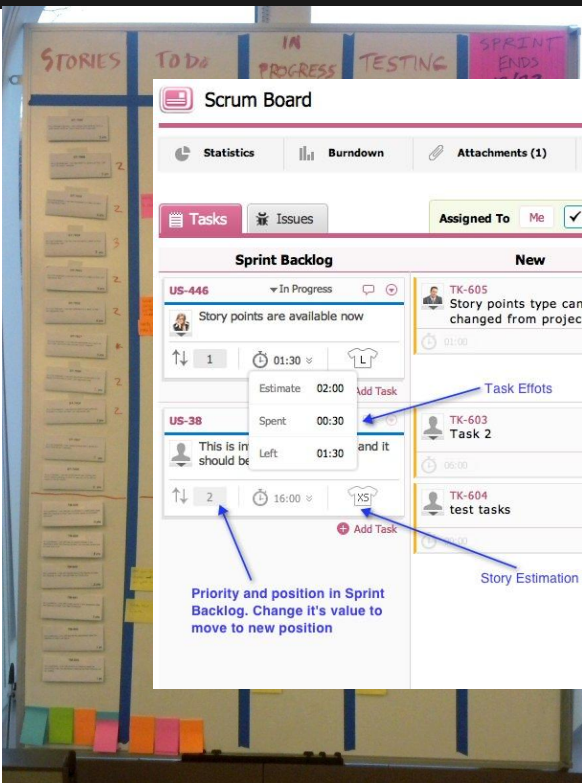
In order to make them available to  
customers

*As a Game Player,*

*I want my Rocket to move back  
and forth when I press left and  
right arrows*

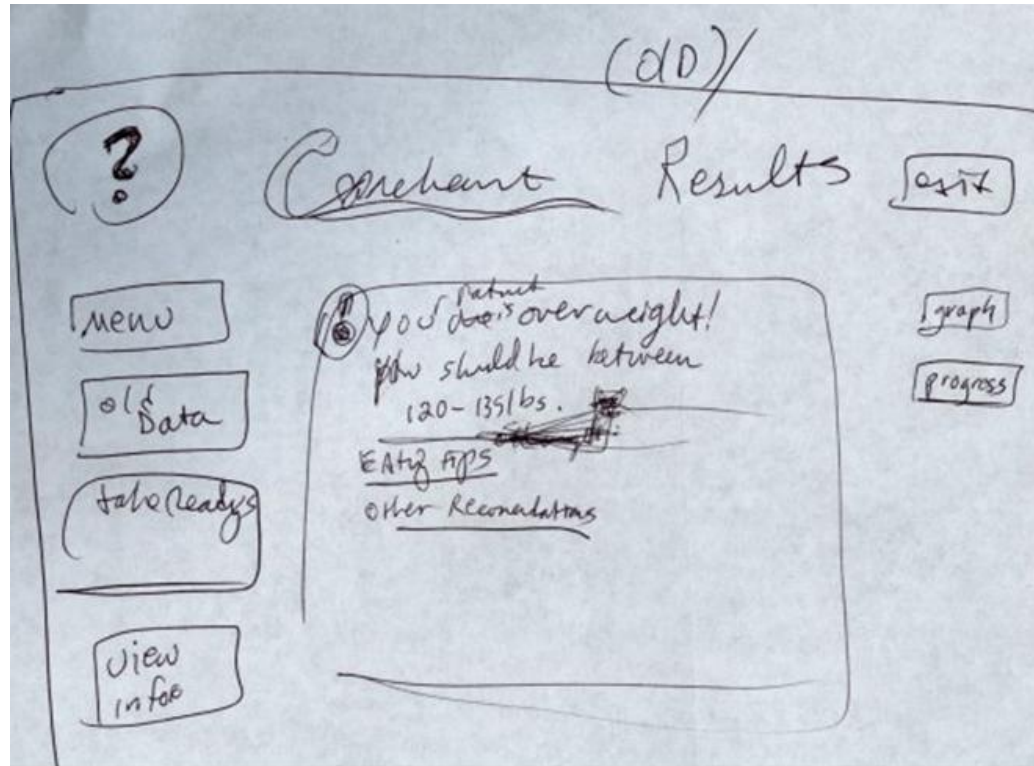
*so that I can avoid asteroids*

# Scrum: Prioritize User Goals for Development



Story	To Do	In Progress	Done	Story Accepted
As a user, I... 8 points	Code the... Test the... 2	Code the... MC 1	Test the... MC 2	
	Code the... Code the... 2	Test the... SC 2	Test the... SC 1	
	Test the... Test the... 1	Code the... LC 2		
As a user, I... 5 points	Code the... Code the... Code the... 2	Code the... DC 2	Test the... SC 2	

# Low-Fi Prototyping



# Low-Fi Prototyping

## Bestandsrapportering - Velg oppsett

1: Er organisasjonen(e) du rapporterer for en del av et konsern?  
☐ Ja ☒ Nei

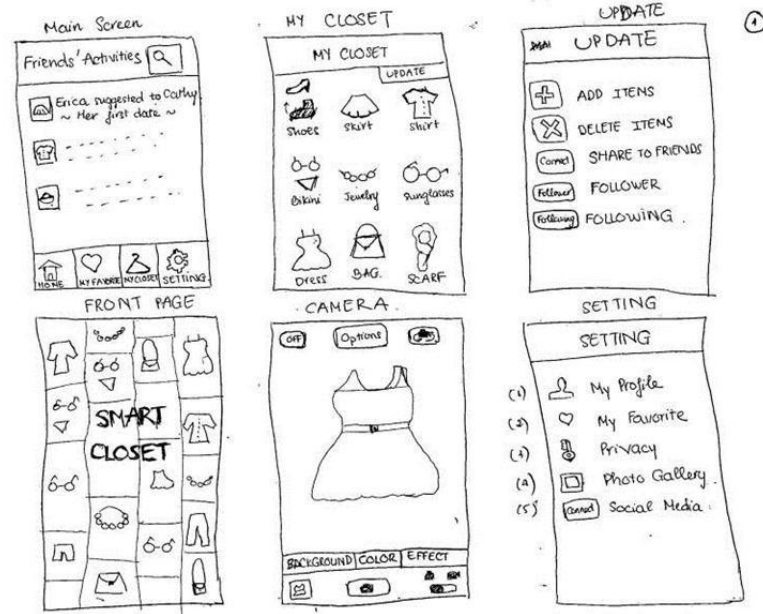
2: Lag et navn på oppsettet:

3: Definer oppsettet:

Kolonne fra fil	Forslag	Person1	Person2	Person3
Arbeidstidsprosent	Deltidsprosent ▾	100%	100%	100%
Ansattdato	Ansattdato ▾	01.07.2009	01.07.2009	14.07.2009
Periode	Periode ▾	07.2009	07.2009	07.2009
Fnavn	Fornavn ▾	Eskil	Thomas	Leif
ENavn	Etternavn ▾	Hansen	Olsen	Johansen
Orgnummer	Organisasjonsnummer ▾	900000009	900000009	900000009
Fnummer	Fødselsnummer ▾	01018000000	01018000000	10180000000

« Forrige      Neste »      Jeg trenger hjelp

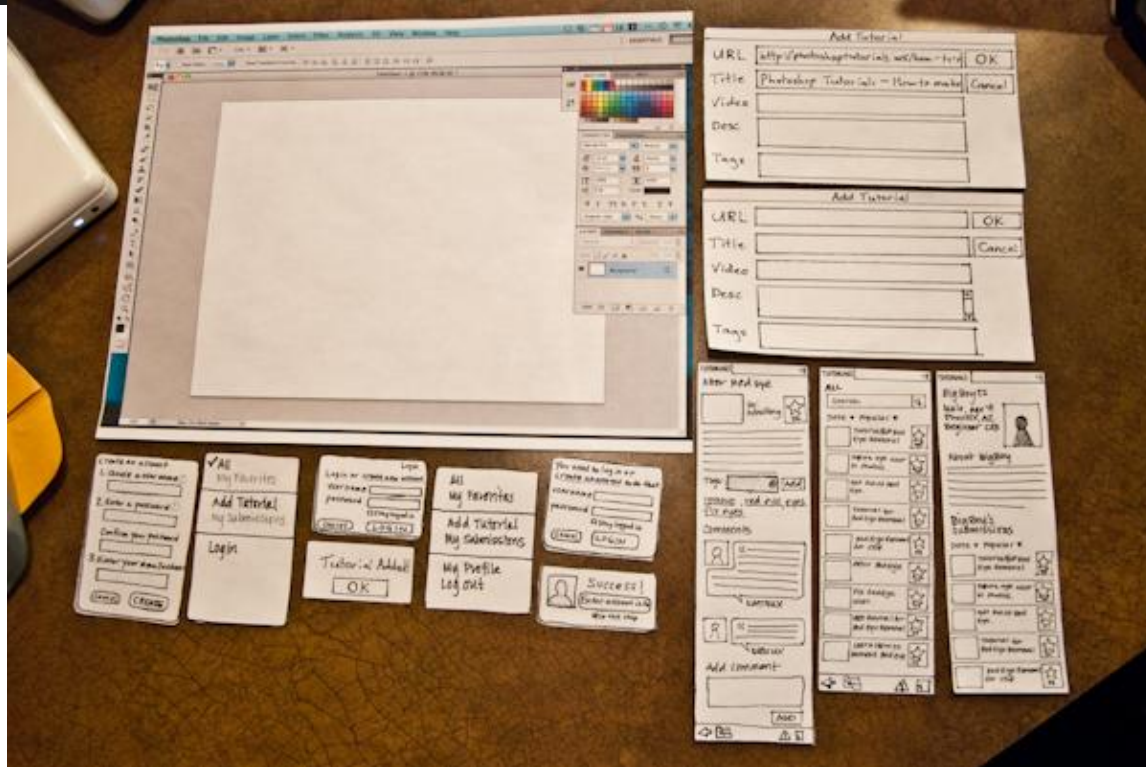
Balsalmiq



Pen & Paper



# Low-Fi Prototyping



# 80/20 Rule

**Remember this?** “Most flaws originate in the first phase of design: product definition.”

Good usability starts with defining a target user, defining what that target user wants to do most, developing those features first, iterating on them frequently, and getting them in front of users before you add more. Those are your Red Routes.

**SCOPE & FEATURE  
CREEP ARE WILY  
ENEMIES**

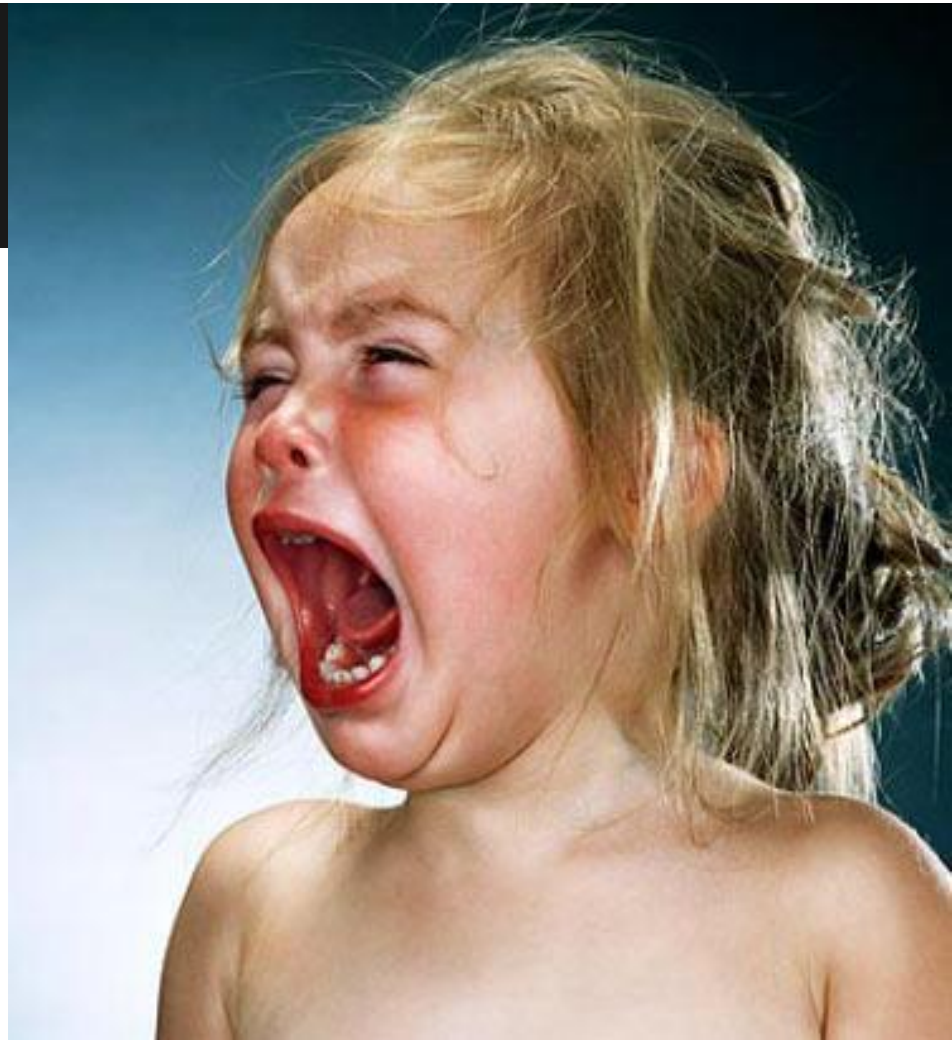
**Now that you've got a prototype with specified user, goal, and context of use...you can finally start testing for usability.**

# Effectiveness

**Task effectiveness:** What proportion of the task is completed correctly?

**Task completion:** What proportion of the tasks are completed (without help)?

**Error frequency:** What is the frequency of errors?





# Efficiency

**Time on task**

**Productive proportion:** What proportion of the time is the user performing productive actions?

**Waiting time**

**Relative user productivity:** How productive is a user compared to an expert?

**Task efficiency**

**Help frequency/discoverability:**  
What is the frequency of use of help?

# Satisfaction

- Much harder to measure satisfaction
- Qualitative vs. Quantitative Measure
- SUS - System Usability Survey
- Think-aloud protocol

# System Usability Survey

1. I think that I would like to use this system frequently.
2. I found the system unnecessarily complex.
3. I thought the system was easy to use.
4. I think that I would need the support of a technical person to be able to use this system.
5. I found the various functions in this system were well integrated.
6. I thought there was too much inconsistency in this system.
7. I would imagine that most people would learn to use this system very quickly.
8. I found the system very cumbersome to use.
9. I felt very confident using the system.
10. I needed to learn a lot of things before I could get going with this system.

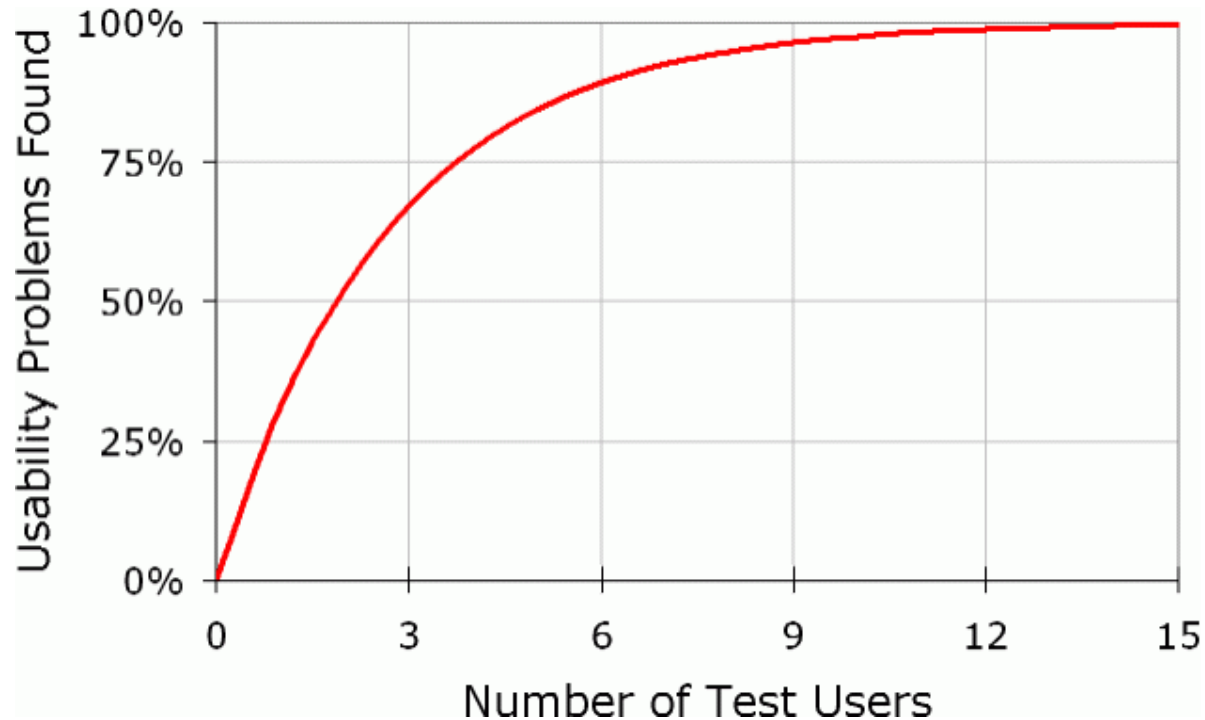


Hi-falutin User Testing Lab

# Discount Usability Testing

- In-House Users
- 3-5 Users
- Think-aloud walkthrough
- Low-fidelity prototyping
- Heuristic evaluation

# Test 3-5 users



# Think-Aloud Walkthrough

## METHOD

- Test one task at a time. Give users a clear goal and mission.
- Users do all the driving.
- Stress that the software or prototype is being tested, not the user.
- Put developers in a cone of silence (but do let them watch).
- If a user asks a question, don't answer right away. Instead ask: "What would you expect to happen?" Practice being silent.
- Encourage users to talk a lot about what they're seeing, thinking and doing, and why.

## EQUIPMENT

- Pen & Paper, a second person to do the recording
- Video (use your phone)
- Mechanical turk (sentiment analysis and survey)
- [usertesting.com](https://www.usertesting.com)

# Heuristic Evaluation

## **Visibility of system status**

The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

## **Match between system and the real world**

The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

## **User control and freedom**

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

## **Consistency and standards**

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

## **Error prevention**

Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.

## **Recognition rather than recall**

Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.



# Heuristic Evaluation

## **Flexibility and efficiency of use**

Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

## **Aesthetic and minimalist design**

Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

## **Help users recognize, diagnose, and recover from errors**

Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

## **Help and documentation**

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

# Classifying Defects: Severity vs. Priority vs. Complexity

**Severity:** A measure of the *user's perception* of how severe the problem is.

**Priority:** A measure of the development team's willingness or capacity to deal with the problem now or push it off until later.

**Complexity:** a measure of the technical difficulty of fixing the problem.

Many development teams -- even experienced ones -- conflate all three of these. Inevitably, severe but complex UX problems keep getting pushed out, and the result is lower and lower quality over time.

# Advice for achieving UX quality

- Track and triage *every* UX bug, no matter how minor or “cosmetic”.
- Don't keep pushing UX issues out, especially severe ones. That's a recipe for low quality.

If you can't fix a severe user problem in a given sprint, and you keep pushing the same issues out, it probably means you need to increase capacity on your dev team.

## WEBSITES

ISO Usability Standard: [http://en.wikipedia.org/wiki/ISO\\_9241](http://en.wikipedia.org/wiki/ISO_9241)

Jakob Nielsen's Usability Heuristics: <http://www.nngroup.com/articles/ten-usability-heuristics/>

Usability.Gov: <http://guidelines.usability.gov/guidelines/>

Red Route Usability: <http://www.userfocus.co.uk/articles/redroutes.html>

A List Apart: <http://alistapart.com/articles>

Smashing Magazine: <http://www.smashingmagazine.com>

## TESTING SITES & SURVEYS

System Usability Scale (SUS Survey): <http://www.usability.gov/how-to-and-tools/resources/templates/system-usability-scale-sus.html>

UserTesting.Com: <http://www.usertesting.com>

Mechanical Turk: <https://www.mturk.com/mturk/welcome>

## BOOKS & SOFTWARE

Paper Prototyping: [http://www.amazon.com/exec/obidos/tg/detail/-/1558608702/qid=1050447571/sr=8-1/ref=sr\\_8\\_1/104-9908720-5291915?v=glance&s=books&n=507846](http://www.amazon.com/exec/obidos/tg/detail/-/1558608702/qid=1050447571/sr=8-1/ref=sr_8_1/104-9908720-5291915?v=glance&s=books&n=507846)

The Inmates are Running the Asylum: <http://www.amazon.com/The-Inmates-Are-Running-Asylum/dp/0672326140>

Lean Analytics: <http://www.amazon.com/Lean-Analytics-Better-Startup-Faster/dp/1449335675>

Designing for the Digital Age: <http://www.amazon.com/Designing-Digital-Age-Human-Centered-Products/dp/0470229101>

Balsamiq (for rapid prototyping): <http://balsamiq.com>