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# Usability Evaluations

## Introduction


Notes from  
Heim Chapter 8 and  
<http://www.usability.gov/>


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## What is the point?

- To ensure that users can use the system as intended!
- There are many examples of bad usability.
- Often problems can be very easily solved!





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## The first time you user test your own software

1. You will be horrified at how bad it is!
2. You will find most of the problems are easy to fix
3. You will become intolerant of poor usability!

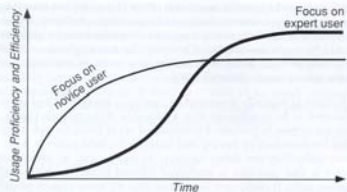
Usability Evaluations

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## What is usability?

- Usability is the measure of the quality of a user's experience when interacting with a product or system (www.usability.gov 2006)
- Usability is a quality attribute that assesses how easy user interfaces are to use (Nielsen 2003)



Usability Evaluations



## Usability Factors

- **Fit for use** (or functionality) - Can the system support the tasks that the user wants to perform
- **Ease of learning** - How fast can a user who has never seen the user interface before learn it sufficiently well to accomplish basic tasks?
- **Efficiency of use** - Once an experienced user has learned to use the system, how fast can he or she accomplish tasks?
- **Memorability** - If a user has used the system before, can he or she remember enough to use it effectively the next time or does the user have to start over again learning everything?
- **Error frequency and severity** - How often do users make errors while using the system, how serious are these errors, and how do users recover from these errors?
- **Subjective satisfaction** - How much does the user *like* using the system?



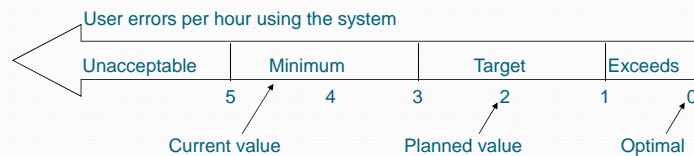
## Fit for use

- Does the system function as expected
  - Do the users meet their goals in a timely fashion?
- Finding 'bugs' - otherwise known as errors is NOT the goal!
  - usability testing  $\neq$  system testing
- What are the system goals?
  - To achieve a specific state
    - Book a flight
    - Pay someone the correct amount
  - To participate in a computer mediated experience
    - Play games



## Setting usability goals

- Not a 1-dimensional measure, for example
  - Average = 2 /hour
  - Over 50% less than 1 /hour
  - Less than 5% over 5 /hour
- Financial impact analysis
  - How many users for how much time per year
  - Measure value of improvements against this financial impact



## Ease of learning

- Do you expect to have to read a manual or the help?
- How much time are you prepared to invest in
  - Learning a new interface?
  - Finding something on a web site?
- What are your usability expectations for a
  - programming IDE?
  - a mobile phone?



## Efficiency of use

- Do you use the self checkout at the supermarket?
- Do you use ATM machines?
- Is it quicker to order a pizza over the phone or on line?
- How about business processes.
  - If every academic member of staff at UoA (3000) wastes 10 hours a year because the performance review system has a poor interface  
 $3000 * 10 = 30,000 / 1700 (\text{work hrs per year}) = 17.64 \text{ years work}$



## Memorability

- Are there some things you just can't remember how to do?
- Beryl uses Outlook for email, and saves her sent messages on the server. Every time she uses another machine (about twice a year), she has to look it up again! Why!
  - Tools/account settings/choose account/change/more settings/folders / check save in existing folder/choose folder/ok/next/finish/ - ... Whew
  - You can also get to it from tools/options/mail setup/email accounts.....
- A good interface is one where you remember or can, with prompts, recall what to do



## Error frequency and severity

- How frequently do users make errors?
  - Touch phone typing ☹️
  - Long and complicated forms
    - It might reduce errors to have dropdown lists to choose from
    - But it might be slower than entering with auto complete.
- What is the cost of errors
  - Course timetabled into inappropriate rooms!
  - Booking a flight for 8pm when you wanted 8am!

Tuesday 19 April 2011

Sort by Lowest Fare 2 options for

DEPARTS	ARRIVES	FLI
8:05 PM Tue 19th Auckland	8:35 PM Tue 19th Hamilton	
12:00 PM Tue 19th Auckland	12:30 PM Tue 19th Hamilton	

Midday?  
Midnight?



## Human error - slips and mistakes

slip

- 🟢 understand system and goal
- 🟢 correct formulation of action
- 🔴 incorrect action

mistake

- 🔴 may not even have right goal!

Fixing things?

- slip – better interface design
- mistake – better understanding of system



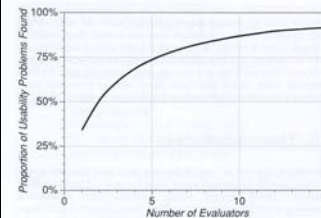
## Subjective satisfaction

- If users *like* the interface
  - They will make less errors
  - They will persist longer when they are having problems
- Aesthetics – how *nice* it looks is incredibly important in this respect



## Types of Usability Evaluations

- ✓ Heuristic evaluations
- ✓ Performance measurements
- ✓ Usability studies



	Analyze	Design	Test
Card Sorting	✓	✓	✓
Contextual Interviews	✓		
Focus Groups	✓	✓	
Heuristic Evaluation	✓		✓
Individual Interviews	✓	✓	✓
Parallel Design		✓	
Personas	✓		
Prototyping		✓	✓
Surveys (Online)	✓	✓	✓
Task Analysis	✓		
Usability Testing	✓	✓	✓
Use Cases		✓	
Writing for the Web		✓	

<http://www.usability.gov/methods/>



## Heuristic evaluations

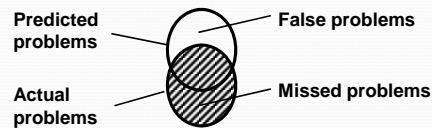
- Expert evaluation
  - An expert looks at a system using common sense and/ or guidelines (e.g. Nielsen's Heuristics)



Expert - reviewer

### First law of usability:

Heuristic evaluation has only 50% hit-rate



## Nielsen's Heuristics

1. Visibility of System Status
2. Match between System and the Real World
3. User Control and Freedom
4. Consistency and Standards
5. Error Prevention
6. Recognition Rather Than Recall
7. Flexibility and Efficiency of Use
8. Aesthetic and Minimalist Design
9. Help Users to Recognise, Diagnose, and Recover from Errors
10. Help and Documentation





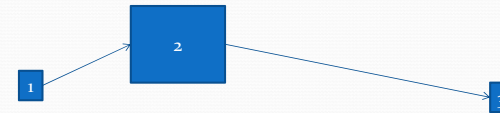
## Performance Measurements

- Fitts' Law is the classic performance measure.
- Hick-Hyman Law time taken to make a decision
  
- Usability Measures
  - Task completion
  - Error counts
  - Keystroke/mouse click counts



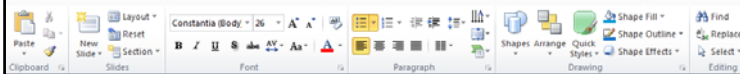
## Fitts' Law

- Fitts' Law is the classic performance measure.
  - Time to target depends on size and distance (tutorial exercise)
  - It is a very valuable measure for designing
    - Control size and location
    - Its also fun to play with!



## Hick-Hyman Law

- The time it takes for a person to make a decision as a result of the possible choices
- Particularly important for menus
  
- Can be quite complicated
  - Is it quicker to recognize an icon or a word
  - Spatial memory is very powerful –
    - Knowing its at the left/right side, top bottom



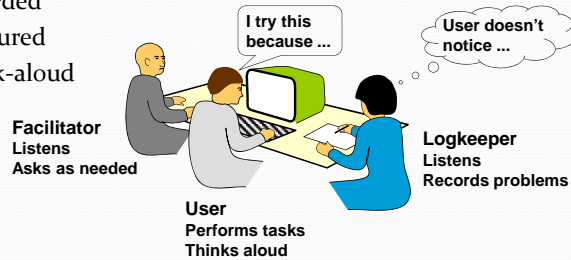
## Usability studies

- User test
  - Get *real* users to try to perform specified tasks
  - Observe and record
  - Ask their opinion
  
- Analyse results
  - What is causing problems?
  - How can you fix them?



## Usability studies

- Specific tasks
  - Observed
  - Recorded
  - Measured
  - Think-aloud



## Next

- Overview of usability testing
  - What you might find out
  - How you might use it
- Planning and performing a usability test
  - You have to do this for Assignment 1.