

CS 315 – Intro to Human Computer Interaction (HCI)

Data Analysis and Interpretation



Two Approaches to Analysis

- Quantitative
 - Example:
- Qualitative:
 - Example:
- The method you choose will depend on your goals

Interpretation

- Common Mistake
 - Investigator's beliefs or biases influence the interpretation of the results
- Example:
 - You have discovered a pattern of responses to customer care questionnaires that indicates that inquiries from customers that are routed through the Sydney office take longer to process than those routed through the Moscow office

Interpretation

- Another mistake
 - Making claims that go beyond what the data can support
- Watch out for
 - Many
 - Often
 - all

Data & Analysis

- Quantitative & Qualitative Data
- Quantitative & Qualitative Analysis
- Be careful how you manipulate data and numbers!

Initial Processing

	Initial Processing Steps
Interviews	Transcription of recordings. Expansion of notes.
Questionnaires	Clean up data. Filter into different data sets.
Observation	Expansion of notes. Transcription of recordings. Synchronization between data recordings.

Simple Quantitative Analysis

- Averages
 - Mean:
 - Median:
 - Mode:
- (2, 3, 4, 6, 6, 7, 7, 7, 8)
- (2, 2, 2, 2, 450)

Question Design

- How do you feel about e-readers?
 - Responses:

Question Design

- In your opinion, are e-readers easy to handle or cumbersome?

Respondent	Easy to handle	Cumbersome	Neither
A	1		
B		1	
C		1	
...			
Z			1
Total	14	5	7

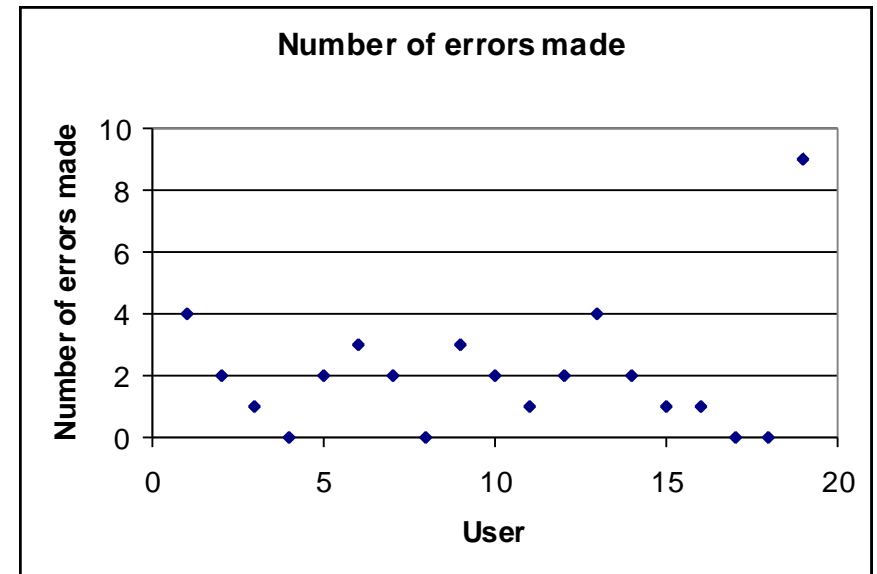
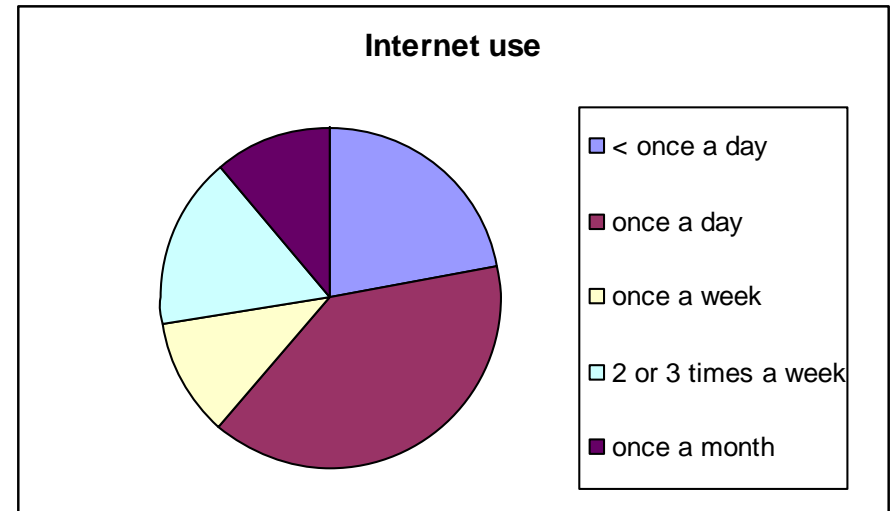
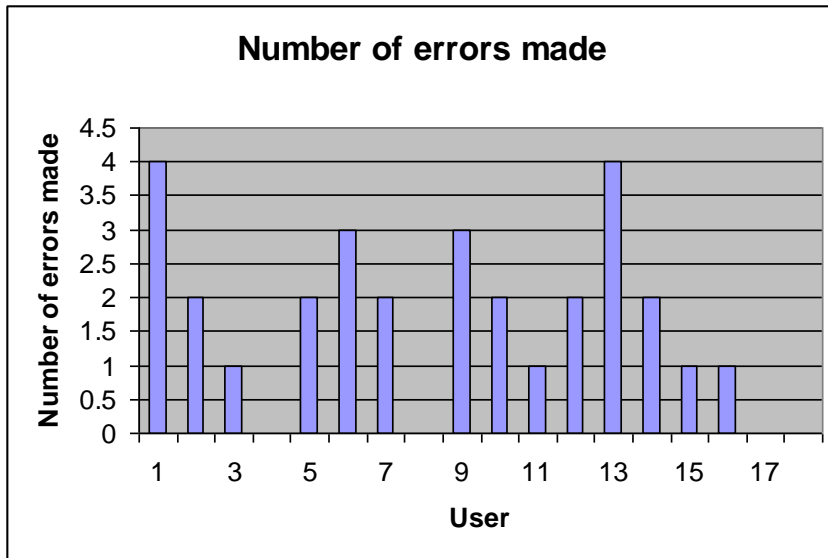
Question Design

- In your opinion, are e-readers easy to handle:

Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
A		1			
B	1				
C				1	
...					
Z					1
Total	5	7	10	1	3

Using Excel



Activity

- Data below represents the time taken for a group of users to select and buy an item from an online shopping website
- Generate a bar graph and a scatter diagram

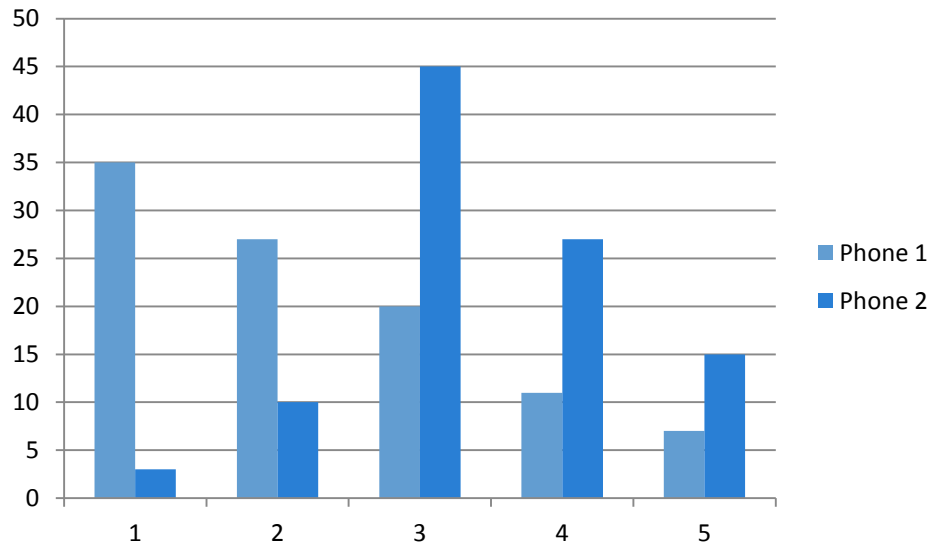
User	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
Time	15	10	12	10	14	13	11	18	14	17	20	15	18	24	12	16	18	20	26

- Make two initial observations about the data that might form the basis of further investigation

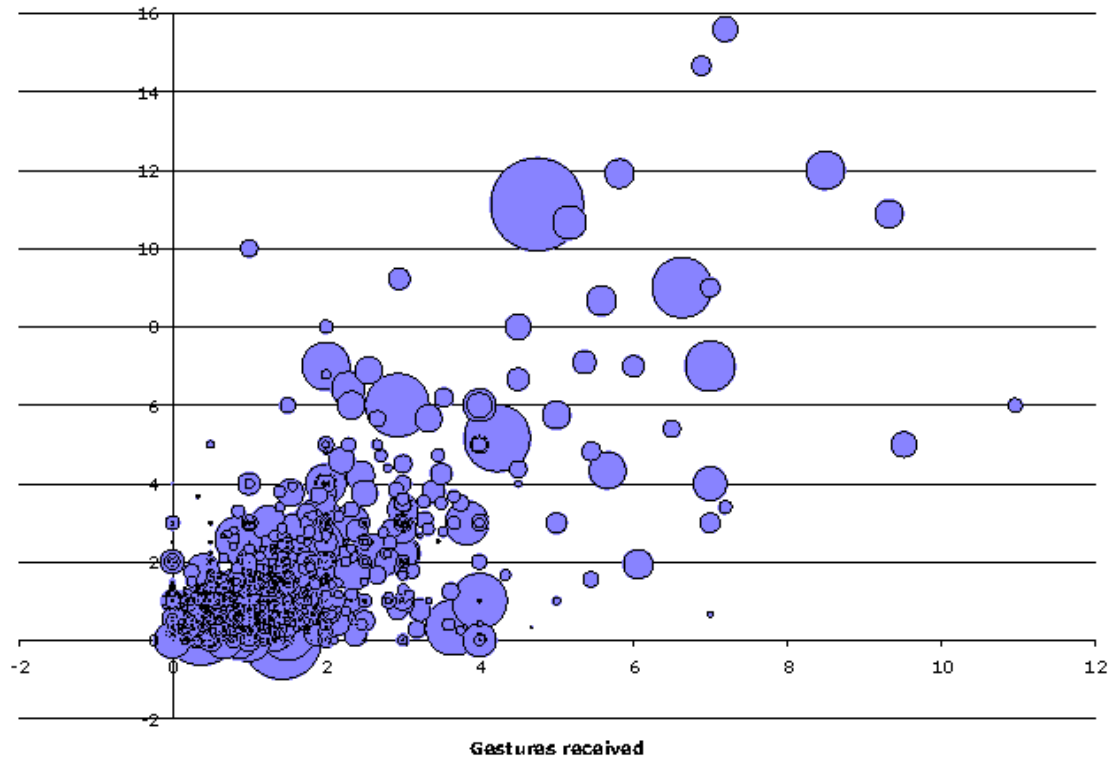
Evaluating Two Phone Designs

Phone 1	1	2	3	4	5	
Modern	35	27	20	11	7	Dated

Phone 2	1	2	3	4	5	
Modern	3	10	45	27	15	Dated



Visualizing Log Data



Simple Qualitative Analysis

- Identifying Recurring Patterns or Themes
 - Example: Facebook profiles
- Affinity Diagram:
 - A method for sorting and making sense of data. Data can be recorded on sticky notes and sorted into groups.



Simple Qualitative Analysis

- Categorizing Data
 - Think Aloud Transcript: “I’m thinking that it’s just a lot of information to absorb from the screen. I just I don’t concentrate very well when I’m looking at the screen. I have a very clear idea of what I’ve read so far ... but it’s because of the headings I know OK this is another kind of evaluation now and before it was about evaluation which wasn’t anyone can test and here it’s about experts so it’s like it’s nice that I’m clicking every now and then coz it just sort of organizes the thoughts. But it would still be nice to see it on a piece of paper because it’s a lot of text to read”

Simple Qualitative Analysis

- Criteria for identifying usability problems
- 1. Interface Problems
 - 1.1 Verbalizations show evidence of dissatisfaction about an aspect of the interface.
 - 1.2 Verbalizations show evidence of confusion/uncertainty about an aspect of the interface
 - ...
 - 1.10 The participant makes a suggestion for redesign of the interface of the electronic tools.

Simple Qualitative Analysis

- “[I’m thinking that it’s just a lot of information to absorb from the screen. UP 1.1] [I just I don’t concentrate very well when I’m looking at the screen UP 1.1]. I have a very clear idea of what I’ve read so far ... [but it’s because of the headings UP 1.1] I know OK this is another kind of evaluation now and before it was about evaluation which wasn’t anyone can test and here it’s about experts so it’s like it’s nice that I’m clicking every now and then coz it just sort of organizes the thoughts. [But it would still be nice to see it on a piece of paper UP 1.10] [because it’s a lot of text to read UP 1.1]”

Crowdsourcing

- Mechanical Turk
 - <https://www.mturk.com/mturk/>
 - HIT: Human Intelligence Tasks
 - How reliable is it?
 - Compared results from crowdsourcing with those from lab-based experiments
 - Results from turkers showed a wider variance than in the reported study, the overall results were the same
 - The total cost of the experiment was a sixth of the cost of a typical lab involving the same number of people

References

- http://www.mindtools.com/pages/article/newTMC_86.htm
- http://www.qsrinternational.com/products_nvivo.aspx
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- Jeffrey Heer and Michael Bostock. 2010. Crowdsourcing graphical perception: using mechanical turk to assess visualization design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '10)*. ACM, New York, NY, USA, 203-212.
DOI=10.1145/1753326.1753357
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