

CPE/CSC 484: User-Centered Design and Development

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Chapter 8

Data analysis, interpretation and presentation



Logistics

- ❖ **Open House: Fri, April 13 + Sat, April 14**

- ❖ thanks to the teams who participated

- ❖ **Assignments**

- ❖ presentations for A2 - UCD Tools
 - ❖ Tue, April 17: Balsamiq
 - ❖ Thu, April 19: Morae
 - ❖ ??: Usabilla
 - ❖ ??: ClickHeat
 - ❖ ??
 - ❖ ??

Overview

- Qualitative and quantitative
- Simple quantitative analysis
- Simple qualitative analysis
- Tools to support data analysis
- Theoretical frameworks: grounded theory, distributed cognition, activity theory
- Presenting the findings: rigorous notations, stories, summaries

Quantitative and qualitative

- Quantitative data – expressed as numbers
- Qualitative data – difficult to measure sensibly as numbers, e.g. count number of words to measure dissatisfaction
- Quantitative analysis – numerical methods to ascertain size, magnitude, amount
- Qualitative analysis – expresses the nature of elements and is represented as themes, patterns, stories
- Be careful how you manipulate data and numbers!

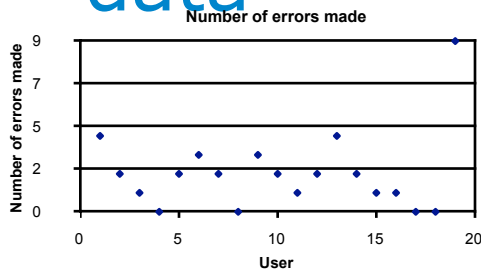
Simple quantitative analysis

- Averages

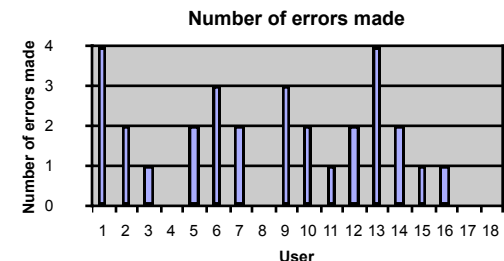
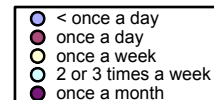
- Mean: add up values and divide by number of data points
- Median: middle value of data when ranked
- Mode: figure that appears most often in the data

- Percentages

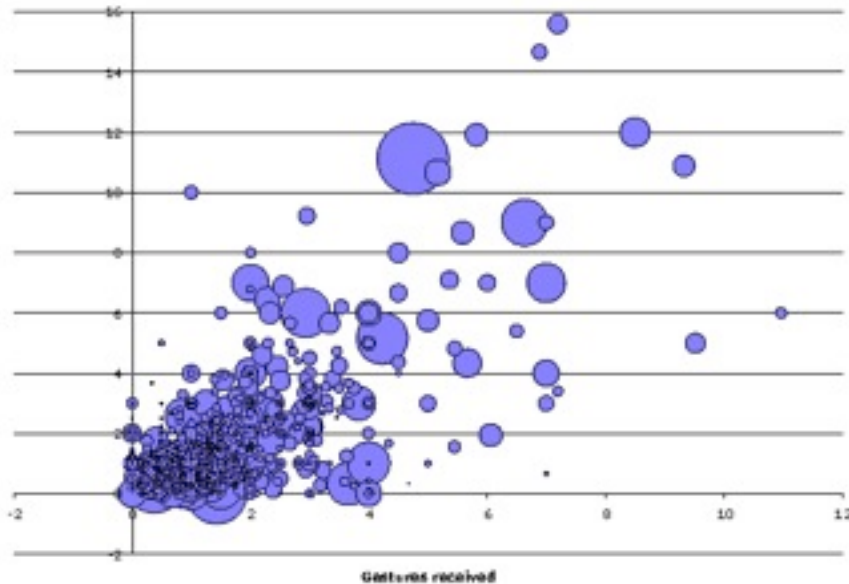
- Graphical representations give overview of data



Internet use

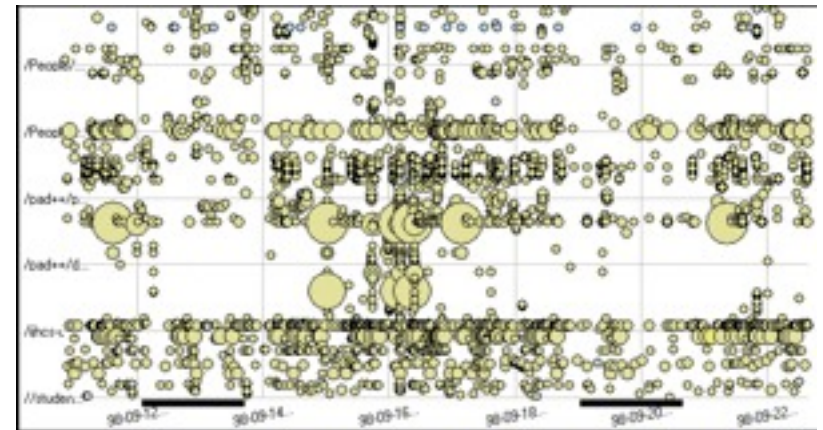


Visualizing log data

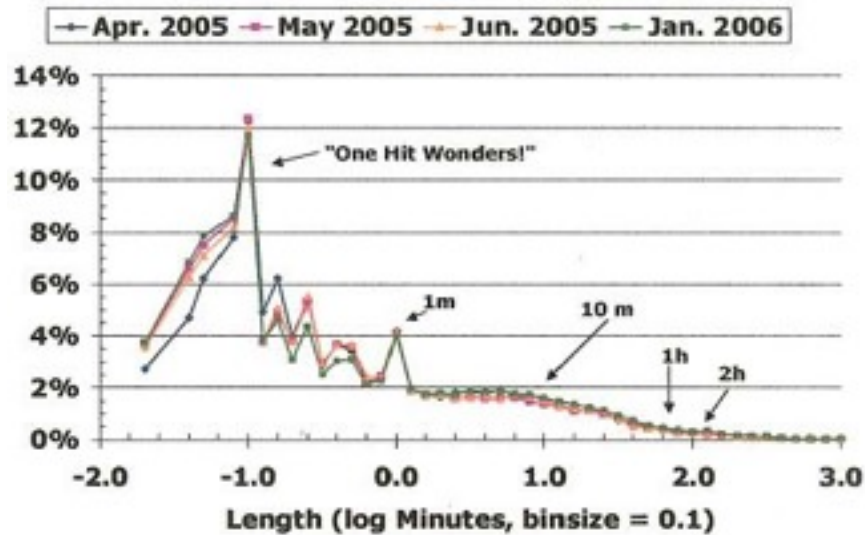


Interaction
profiles of players
in online game

Log of web page
activity

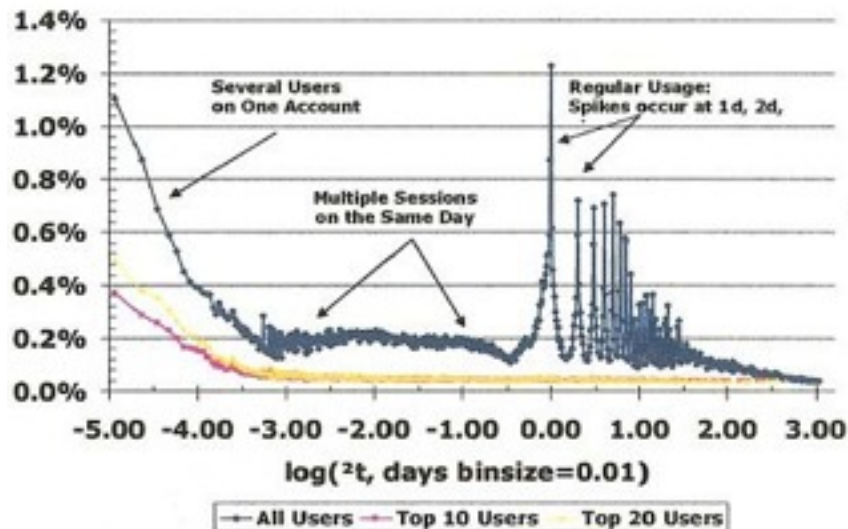


Session Length



Web analytics

Login Frequency Histogram



Simple qualitative analysis

- Recurring patterns or themes
 - Emergent from data, dependent on observation framework if used
- Categorizing data
 - Categorization scheme may be emergent or pre-specified
- Looking for critical incidents
 - Helps to focus in on key events



Tools to support data analysis

- Spreadsheet – simple to use, basic graphs
- Statistical packages, e.g. SPSS
- Qualitative data analysis tools
 - Categorization and theme-based analysis, e.g. N6
 - Quantitative analysis of text-based data
- CAQDAS Networking Project, based at the University of Surrey (<http://caqdas.soc.surrey.ac.uk/>)

Theoretical frameworks for qualitative analysis

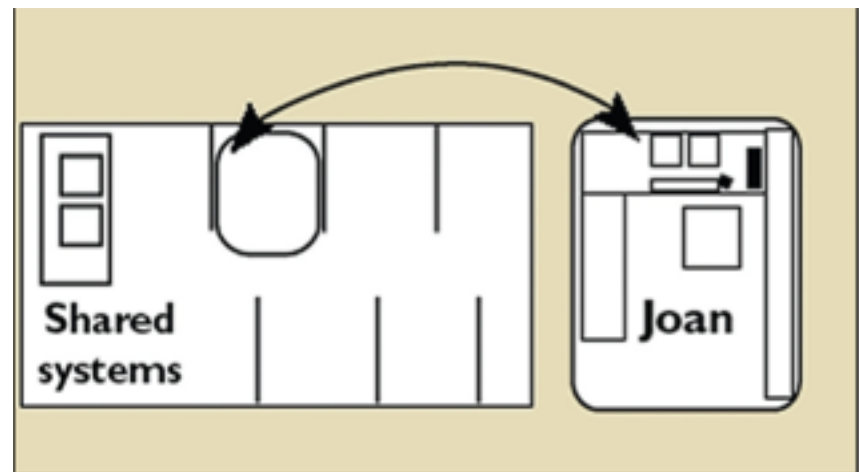
- Basing data analysis around theoretical frameworks provides further insight
- Three such frameworks are:
 - Grounded Theory
 - Distributed Cognition
 - Activity Theory

Grounded Theory

- Aims to derive theory from systematic analysis of data
- Based on categorization approach (called here 'coding')
- Three levels of 'coding'
 - Open: identify categories
 - Axial: flesh out and link to subcategories
 - Selective: form theoretical scheme
- Researchers are encouraged to draw on own theoretical backgrounds to inform analysis

Distributed Cognition

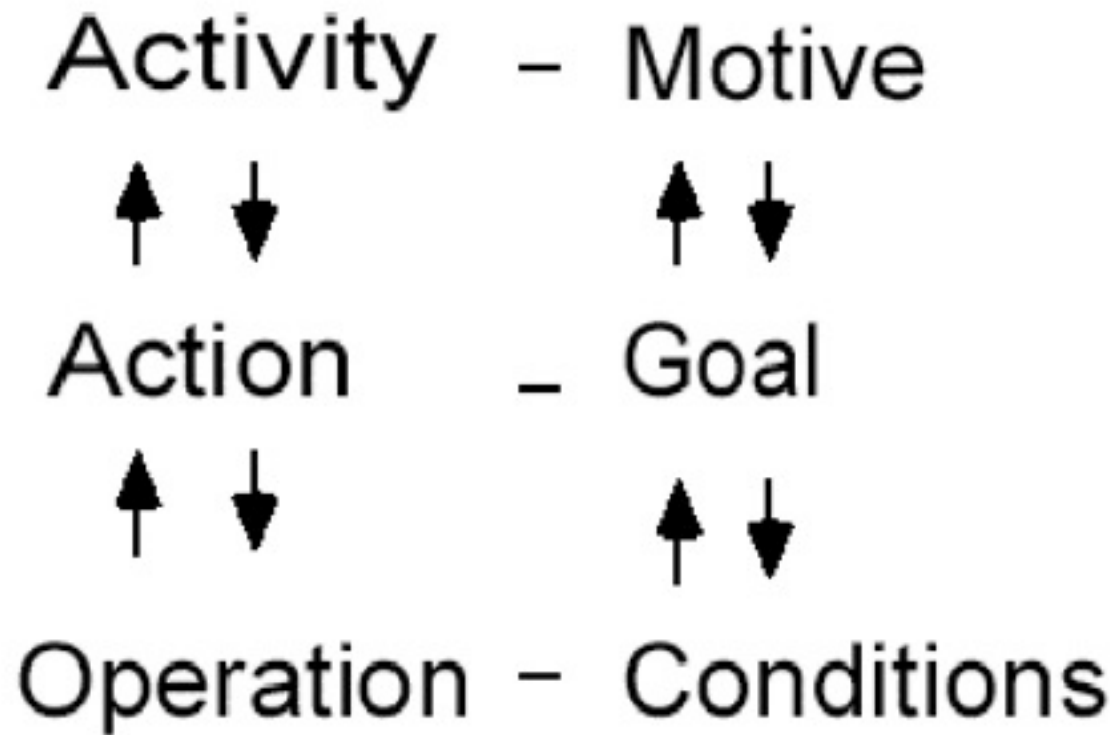
- The people, environment & artefacts are regarded as one cognitive system
- Used for analyzing collaborative work
- Focuses on information propagation & transformation



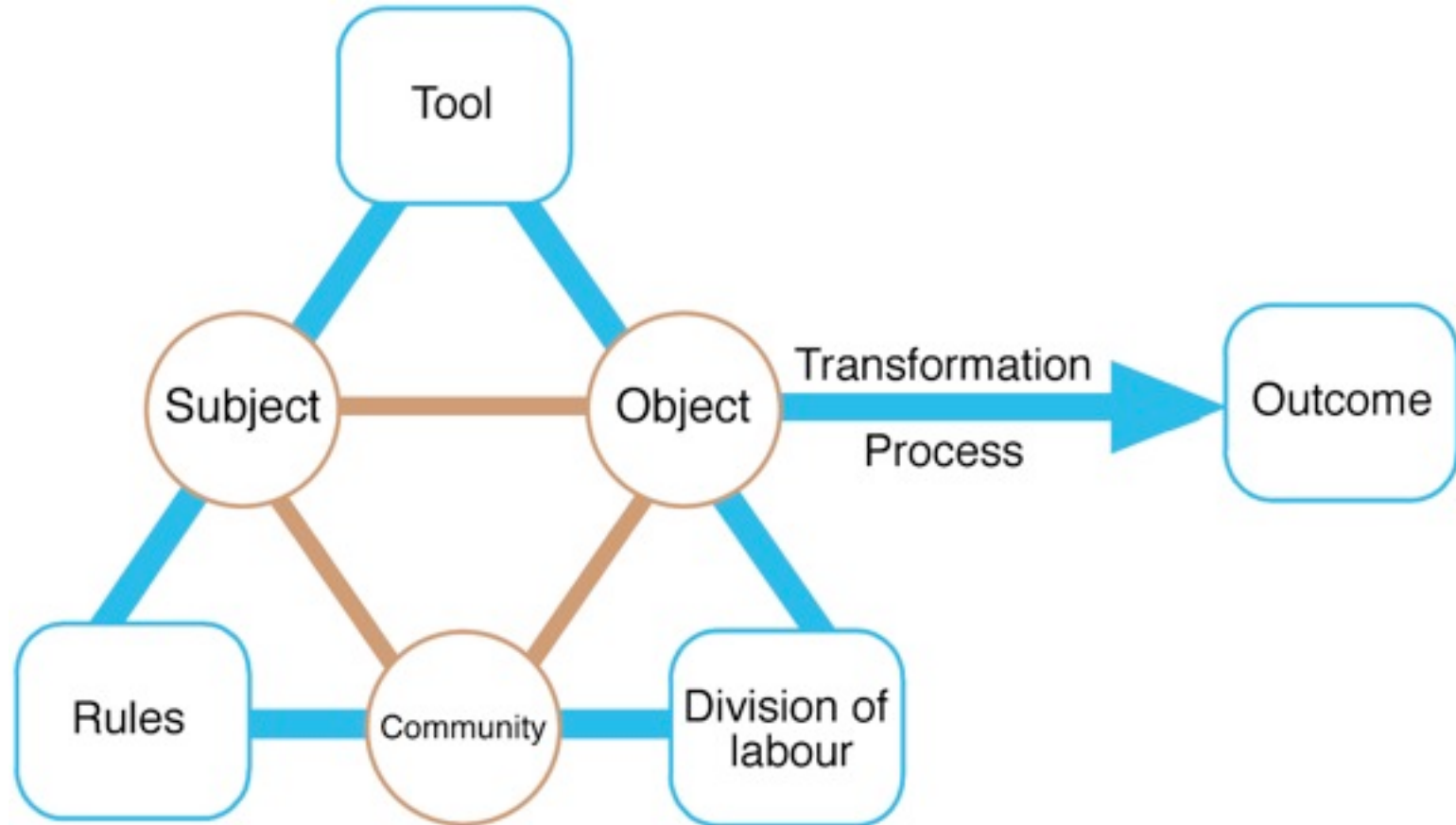
Activity Theory

- Explains human behavior in terms of our practical activity with the world
- Provides a framework that focuses analysis around the concept of an 'activity' and helps to identify tensions between the different elements of the system
- Two key models: one outlines what constitutes an 'activity'; one models the mediating role of artifacts

Individual model



Engeström's (1999) activity system model



Presenting the findings

- Only make claims that your data can support
- The best way to present your findings depends on the audience, the purpose, and the data gathering and analysis undertaken
- Graphical representations (as discussed above) may be appropriate for presentation
- Other techniques are:
 - Rigorous notations, e.g. UML
 - Using stories, e.g. to create scenarios
 - Summarizing the findings

Summary

- The data analysis that can be done depends on the data gathering that was done
- Qualitative and quantitative data may be gathered from any of the three main data gathering approaches
- Percentages and averages are commonly used in Interaction Design
- Mean, median and mode are different kinds of 'average' and can have very different answers for the same set of data
- Grounded Theory, Distributed Cognition and Activity Theory are theoretical frameworks to support data analysis
- Presentation of the findings should not overstate the evidence