

Tutorial 3: Data Analysis

Usable Security and Privacy

Introduction

- How to analyse data thematically
- Analyse your own data
- Next tutorial: we will turn your insights into questions for a survey to validate your qualitative data

Why do we need to analyse data?

- We **analyse** data to:
 - Make sense of the data we have collected
 - Identify meaningful, interesting, and valuable findings
 - Translate findings into design specifications, guidelines, recommendations, further research

Types of data

- **Quantitative data**

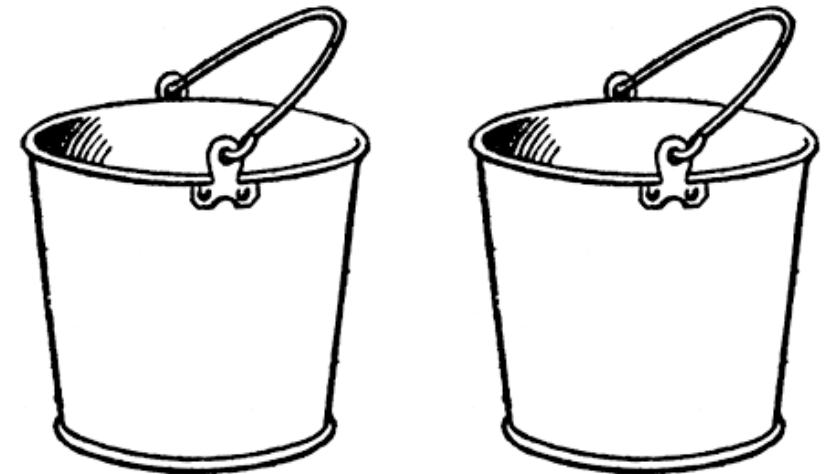
- Information that can be quantified (expressed as numbers)
- e.g.: Responses to closed questions (tick box, yes/no, Likert scale), time taken to complete task, error rate, number of times incident occurs, log data...

- **Qualitative data**

- Difficult to measure sensibly as numbers
- e.g.: Descriptions (such as field notes, observation notes), responses to open-ended questions, transcripts of interviews, think aloud talk, video recordings, images...

How do we make sense of qualitative data?

- Types of qualitative data:
 - Text & speech (words, sentences, paragraphs)
 - Images
 - Video recordings
 - Artifacts
- Qualitative data analysis involves **organising large volumes of data into categories** on the basis of codes, themes, concepts or similar features (like sorting things into buckets)



Thematic Analysis

- “Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data. It minimally organizes and describes your data set in (rich) detail” (Braun and Clarke 2006)

A 6-step method for identifying, analysing and reporting patterns (themes) within data in response to a research question.

1. **Familiarise yourself with the data**
2. **Generate initial codes**
3. **Search for themes**
4. Review themes
5. Refine and name themes
6. Produce the report

Thematic analysis is a practical method used across industry and research.

Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77-101.
https://www.researchgate.net/publication/235356393_Using_Thematic_Analysis_in_Psychology
<https://www.nngroup.com/articles/thematic-analysis/>

Phase 1: Familiarise yourself with the data

- Transcribe verbal data
- Immerse yourself in the data: read and re-read transcripts, notes, etc
- Read data in an active way: search for meaning, patterns, etc, take notes about ideas for coding.

Phase 2: Generate initial codes

- Codes identify a feature of the data that is important or interesting or meaningful to your research question.
 - A **code** is a word or a short phrase that describes a piece of data. It's essentially a label.
 - Codes can indicate the subject of a comment, the nature of a comment (question, request, etc.), tone (anger, praise, etc), its speaker, or whatever else makes sense
 - Each item can have multiple codes

Activity A - CODING DATA BY APPLYING EXISTING CODES (5 minutes)

Apply the list of codes to the text in the transcript extract from a user study about using an online educational environment

ACTIVITY 8.2

The following is another think-aloud extract from the same study. Using the categorization scheme in Figure 8.10, code this extract for usability problems. It is useful to put brackets around the complete element of the extract that you are coding.

Well, looking at the map, again there's no obvious start point, there should be something highlighted that says 'start here.'

Ok, the next keyword that's highlighted is evaluating, but I'm not sure that's where I want to go straight away, so I'm just going to go back to the introduction.

Yeah, so I probably want to read about usability problems before I start looking at evaluation. So, I, yeah. I would have thought that the links in each one of the pages would take you to the next logical point, but my logic might be different to other people's. Just going to go and have a look at usability problems.

Ok, again I'm going to flip back to the introduction. I'm just thinking if I was going to do this myself I would still have a link back to the introduction, but I would take people through the logical sequence of each one of these bits that fans out, rather than expecting them to go back all the time.

Going back . . . to the introduction. Look at the types. Observation, didn't really want to go there. What's this bit [pointing to Types of UE on map]? Going straight to types of . . .

Ok, right, yeah, I've already been there before. We've already looked at usability problems, yep that's ok, so we'll have a look at these references.

I clicked on the map rather than going back via introduction, to be honest I get fed up going back to introduction all the time.

ACTIVITY B—GENERATE CODES (5 minutes)

- See handout
- Work in groups of 2 or 3
- Write one code per post-it note

Phase 3: Search for themes

- All data have been initially coded.
- **Group similar codes together into overarching themes**
- Some initial codes may form main themes, others may become sub-themes, others may be discarded.
- group codes through an **affinity diagram**



Affinity diagram process

1. Write one code per note
2. Place notes on surface and add similar notes in close proximity
3. Keep revising arrangements
4. Name each group

Activity C: Group codes into themes (5 Minutes)

- Create an affinity diagram to group your codes from Activity B into themes
 - Use the whiteboard
 - 1 code per post-it note
 - Place similar codes together
 - Give each group/theme a label



Doing your own thematic analysis

1. Familiarise yourself with your notes from tutorial 1 and 2
 - What parts of the website interface were confusing or unusable?
 - What errors did participants make?
 - What did users need to know to correctly use the website?
2. Generate initial codes in groups of 2 or 3
 - Highlight specific issues users (or yourself) had when interacting with the site

Next tutorial we will turn your insights into questions for a survey to validate your qualitative data