Human Computer Interaction (HCI)

Week 5: Data Analysis and Report Writing

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Today

- Data Analysis
  - Analysing qualitative data
  - Thematic analysis
- Report Writing
- Next steps

Analysing 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

Types of Data

Quantitative Data:

- Information that can be quantified or expressed as numbers
- Examples include responses to closed questions, time taken to complete task, error rate, log data, etc.

Qualitative Data:

- Difficult to measure as numbers
- Examples include descriptions such as field notes, responses to open ended questions, interview transcripts, think aloud talk, etc.

How to analyse qualitative data

- Qualitative data analysis involves organising large volumes of data into categories on the basis of codes, themes, concepts or similar features
- Often analysis starts as soon as data collection starts

Methods:

- Thematic analysis
- Content coding
- Topic modelling

Thematic Analysis

Thematic Analysis of Qualitative User Research Data



https://youtu.be/KUZ6iGvJlGI

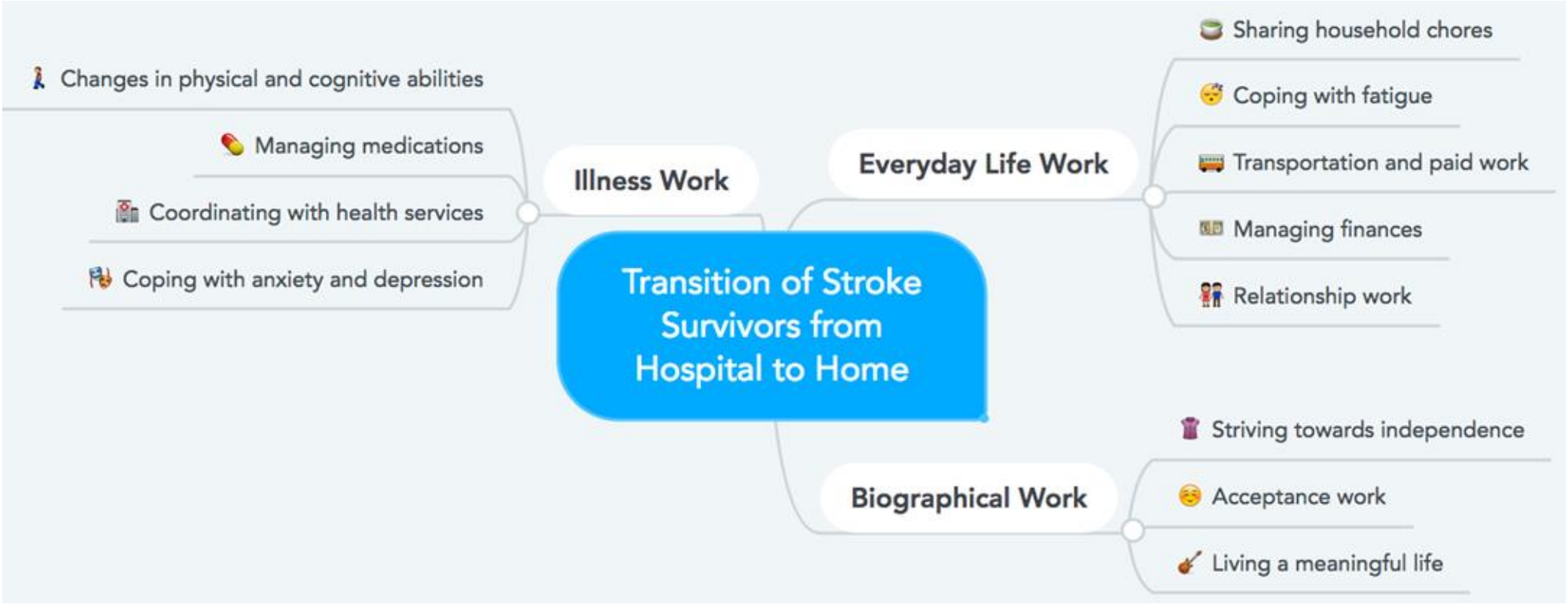
Thematic Analysis

- “Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data. It minimally organises and describes your data set in (rich) detail” (Braun and Clarke 2006).
- A six-step method for identifying, analysing and reporting patterns (themes) within data in response to a research question:
  - Familiarise yourself with the data
  - Generate initial codes
  - Search for themes
  - Review themes
  - Refine and name themes
  - Produce the report
- Thematic analysis is a practical method used across UX 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/

Example: codes and themes to describe the experience of stroke survivors in their transition from hospital to homes



Ploderer, B., Stuart, J., Tran, V., Green, T. L., & Muller, J. (2017). The transition of stroke survivors from hospital to home: understanding work and design opportunities. In *Proc. OZCHI* (pp. 1-9). https://doi.org/10.1145/3152771.3152772

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, and take notes about ideas for coding

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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 - essentially a label
  - Codes can indicate the subject of a comment, the nature of a comment, feelings or emotions, etc
  - Each item can have multiple codes
- Inductive (bottom up) and deductive (top down) coding

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Phase 3: Search for themes

- All data has 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 post-it note
  2. Place notes on surface and add similar notes in close proximity
  3. Keep revising arrangements
  4. Name each group

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https://www.nngroup.com/articles/thematic-analysis/

Phase 3-6: Review themes, refine and name themes, and produce the report

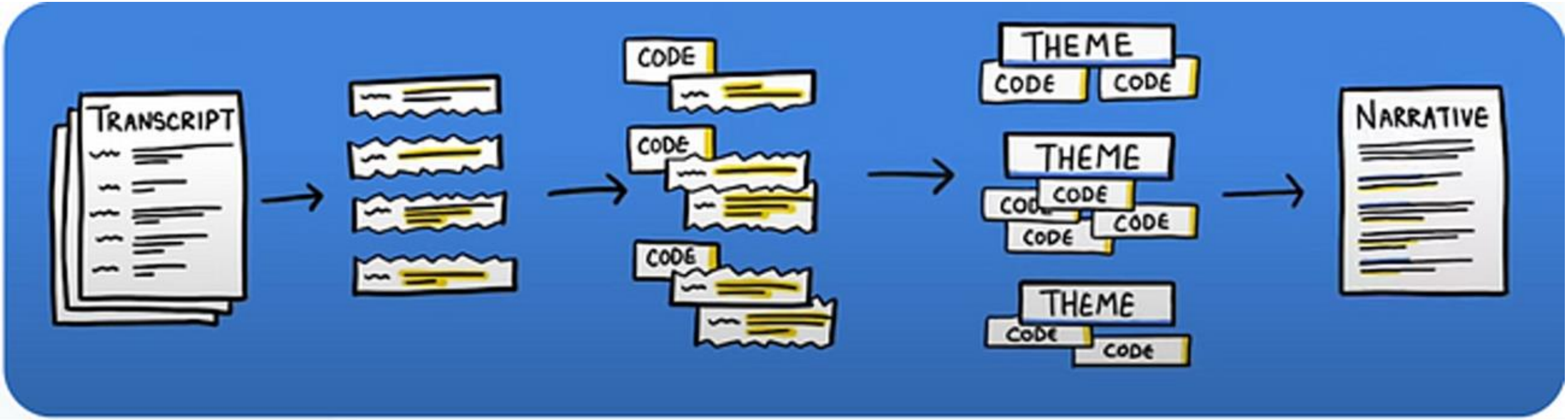


Image source https://medium.com/@aalaa.m.abdou/thematic-analysis-in-depth-ux-research-part-%E2%85%B0-6cbeca890aaa

Tools to support qualitative analysis

- Start coding on paper as you have more flexibility
- You can add codes as comments in Word or through a separate column in Excel
- Online whiteboards such as Miro
- Analysis tools such as Nvivo

Report Writing

Report Content

- Introduction
- Methods
- Findings
- Design Suggestions
- References
- Acknowledgement of use of GenAI
- Appendices
  - A: Method instruments used
  - B: Anonymised study data
  - C: Use of generative AI (if applicable)

The Brief

- Your goal for this coursework is to create technology design suggestions, based on findings from human-centred research in a real-world context.
- **Indicative length:** 4000-5000 words (not counting references and appendices; references and appendices have no word limit)

Introduction

Succinctly introduce your study

- Introduce the project topic, and problem/question you are addressing
- Describe the aim and scope of the work within the broader project topic
- Reference literature to define key terms and to provide further insights into the project
- Write in simple and clear language

Methods (Brief)

Choosing methods

- Each group (consisting of 3 students) will utilise at least **one "say", one "make", and one "do" method** to investigate:
  - the usability and user experience of an existing technology of your choice, and
  - the broader context in which the use of that technology is situated.
- You are asked to combine one "say", one "do", and one "make" method as this will provide you with a richer understanding of people, context and technology use.
- You will use the instruments you have created for your "say", "do", and "make" methods (for example, interview guide, usability test, collage - see Week 2 materials) to study the experiences, needs, and technology use of your participants.

Methods (Report Section)

Describe and justify the methods applied in the study

- Clearly state the project aim
- Describe the ethical process followed for your study
- Describe participants and their context
- Explain and justify the methods used with regards to your project aim; the study should cover one “say”, one “do”, and one “make” method
- Describe the data collection and analysis process
- Acknowledge the limitations of your research

Findings (Brief)

Gathering and analysing data

- You are asked to record each of your methods either via audio recording and/or video recording. For example, we recommend video and audio recording a usability test to capture the screen as your participant interacts with the technology. If using off-the-shelf tools that store recorded data in the cloud, please discuss with your tutor if the tool adheres to the data protection regulations. It is best to use Microsoft Teams through your University account to record video and audio. This also provides an AI-generated transcript as a starting point for you to transcribe your recordings. Each of your recordings must be transcribed and be included in your appendices.
- Ensure that you anonymise all participant data that you collect. For example, anonymise transcripts by changing participants' names to pseudonyms or "P1" and "P2". Anonymise any photos or images by covering or blurring faces. Similarly, video snippets should not be shared with participants' faces or any identifying information visible. You will then analyse your data through thematic analysis to give an overview of key findings that relate to your project aim. You must present data from all methods and all participants. Within your findings section, present each theme with evidence from your methods (for example, a participant quote, or an image).
- You should include appendices with all method instruments used and all anonymized data collected (see template for details).

Findings (Report Section)

- Describe key findings as relevant to your project aim and topic
- Structure your findings by key themes that relate to your topic and project aim
- Under each theme, describe concrete experiences supported by evidence from interview quotes, video stills, observations, objects (e.g., collages), etc. Apply HCI principles to illustrate different aspects of the experience. Describe what was unexpected, interesting, typical, problematic etc.

Findings Example

- Describe each theme in general terms
- Then illustrate your theme through examples of specific experiences
  - Include a quote from your interview or an image from you say-do-make research
  - Give the reader context to understand how this example illustrates your theme

Findings Example



Figure 4. Picture of P1's running playlist

This is supported by our survey where over 80% of the participants agreed that they were motivated to do sports because they wanted to stay healthy. Furthermore, we found out that specific personal goals as well as improvement and achievement acted as motivators. P5 describes her goal like this: "*We have cheerleaders on the side [of the football field] or dance teams and I want to be one of those girls. I have to train hard for that. I really want it* (P5, 21)". With the agreement of two-thirds of the participants the survey results strengthened specific goals and self-improvement as leading factors for motivation.

In the returned probe packs, P1 and P2's exercise diary revealed an unconscious dependency between the participants' mood and their exercise behaviour. The better the mood was on a day, the more they worked out. When the participants had not worked out, they reflected on why, and what could have motivated them. They mentioned this activity had helped them reflect on their individual barriers and change their behaviour afterwards. The maps and photographs in the returned probes pointed towards scenic locations for exercise acting as a motivating factor.

Barriers

The barriers we observed that prevented people from participating in sports were lack of time, lack of energy, prioritising other activities, weather and scheduling. The strongest barrier mentioned was the lack of time to participate in sport. The value of the cultural probes here was the additional insight regarding the causes behind participants reported lack of time. Most participants' diary entries showed that the reasons for not exercising were due to tiredness from university work or paid employment. When asked about his lack of motivation, P1 replied: "*When I'm super tired and I haven't slept because I have an assignment due that I haven't done… It's kind of like a lack of time and energy*" (P1, 19). Many participants enjoyed training or exercising with others, however scheduling activities to mutually acceptable times was a difficulty. For others, exercise became a low priority: "*You've got to cook dinner yourself or you go and see your parents and it's just kind of one of the things that gets shoved to the back*" (P6, 24). More than 60% of the survey participants agreed with the statement that 'there are other things with a higher priority' than sport. Further barriers identified in the returned probe materials and in interviews were scheduling sport amongst other activities and the weather: "*Winter is the hardest because it's cold and the days are shorter*" (P6, 24).

Technology

Five of the six participants used technology in their everyday physical activities. These ranged from a GPS watch used to track running speed, distance and location (P2, 24), to mp3 players used for listening to music while exercising (see Figure 4). These technologies played a key role in motivation: "*I really like running with the GPS watch. If your goal is to run a specific pace or get better it's really hard to do it without knowing how fast you run*" (P2, 24). P2's map, included as part of his returned probe, allowed us to see how he used this technology. He first tracks his run along the river, and then does a strength workout by the outdoor gym equipment (see Figure 5) where he requires his hands free for the activities. The use of favourite music at the right time scored high in the survey as a motivator. Through the interviews it emerged that people favoured lighter devices. For

https://dl.acm.org/doi/pdf/10.1145/2702613.2732800

Design Suggestions (Brief)

- Based on the findings, your group will generate novel and original design ideas for re-imagining the technology you have studied. Provide reasoning for your design suggestions based on the findings from your “say”, “do” and “make” methods, and the HCI principles you have learnt throughout the course (for example, human factors, Nielson’s heuristics, etc).

Design Suggestions (Report Section)

Describe how you have reimagined the technology.

- Ensure that the design suggestions are connected to your findings and consider HCI principles.
- You can include initial sketches or mock ups to further illustrate your design suggestions.
- 5 design suggestions are recommended.

References

- Provide the list of references. These can be course materials, textbooks, academic papers or news articles. There is no minimum number of references. You may choose the reference style of your choice, as long as it remains consistent.

Acknowledgement of use of GenAI

- If you have used Generative AI to support your work you should include a statement (up to 250 words) explaining how you have done this and with which AI tools. This should include a critical reflection of how your use of AI has influenced your research and thinking process. This statement does not count towards the word limit. Remove this section if you did not use Generative AI.

Appendices

- Structure your appendix well so that it is easy to find information and cross-reference appendices in the main report. Include the following sections
- **Appendix A: Method Instruments Used**
  - Instruments used in investigation e.g., e.g., interview guide, diary instructions
- **Appendix B: Anonymized Study Data**
  - Include anonymised study data e.g., coded interview transcripts, photos, drawings; evidence of your analysis e.g., affinity diagrams
- **Appendix C: Use of Generative AI (if applicable)**
  - Include key examples of your use of AI, using the template provided.

Marking Rubric

Any questions?

Next steps

- Week 6 lecture: Design Methodologies, Brainstorming and Ideation
- Collect and analyse data (weeks 5 and 6)
  - **Collect data**
    - Use the instruments created over the past weeks to study the experiences and needs of 3 to 5 participants.
  - **Transcribe recordings**
    - Transcribe your recordings (MS Teams preferred).
    - Anonymise data (transcripts by changing names to pseudonyms; photos or images by covering or blurring faces).
  - **Analyse data**
    - Analyse the data thematically to give an overview of key findings. Present data from all methods and participants. Present each theme together with concrete evidence (e.g., interview response, image).
  - **Derive recommendations for re-designing the technology** based on your combined study findings.