# Introduction to HCI

## Qualitative Data Analysis

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# Today

- Type of data [10min]
- Qualitative analysis techniques [20min]
- In class activity [20min]
  - Coding
- Project discussions [20min]

# Learning goals

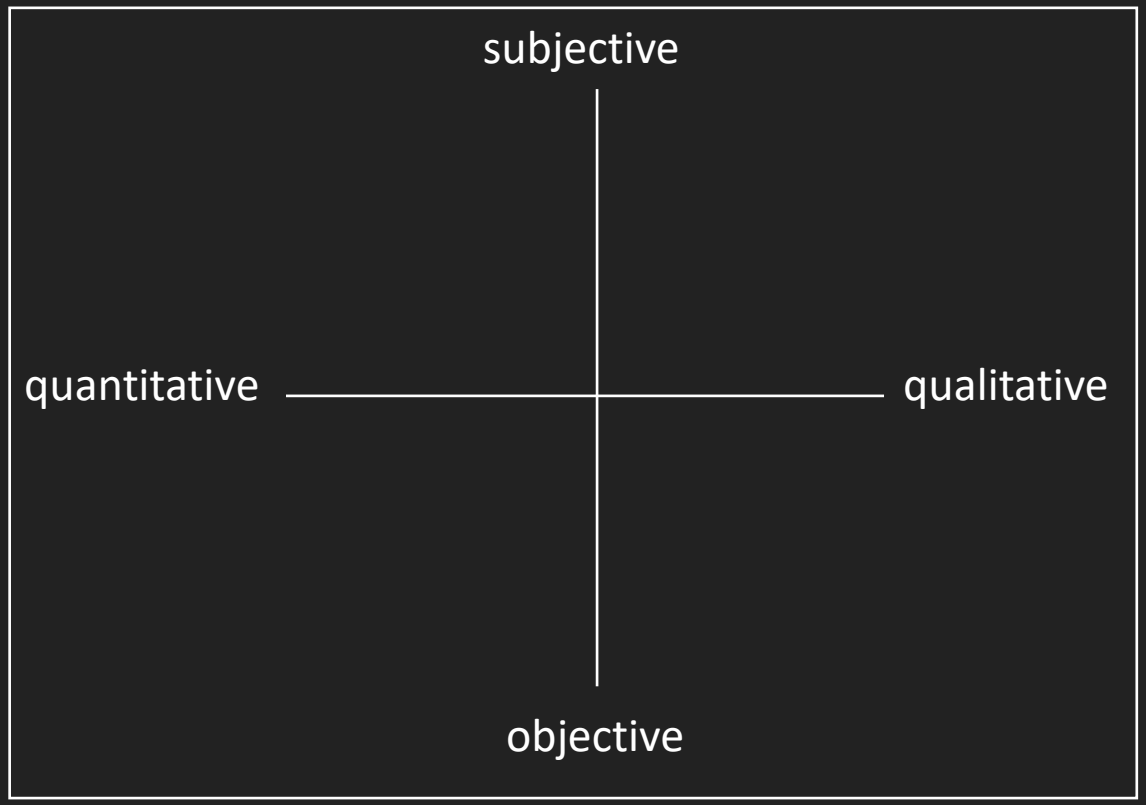
- Explain types of data that HCI methods provide
- Explain what it means to triangulate in data gathering and analysis
- Understand theme-based approaches to analysis
- Understand thematic analysis as one of the most common forms of analysis and describe how to do thematic analysis in detail
- Uunderstand why reliability and validity are important in qualitative research
- Make and justify strategic decisions in evaluation planning

# Types of data that HCI methods provide

- Qualitative:
  - *Users describe/report* X, to extent they are aware
  - *You observe* X, that users may not be fully aware of
  - Where X *can* be: behaviors, processes, usability challenges…
- Quantitative:
  - Measure task performance with existing tools / methods:
    - e.g., Speed, errors, dead-ends, learning curves for novices …
  - Numerical data from user-reported answers: e.g., # of emails/day
  - Counting observed occurrences: e.g. # of times looked at instruction

# Activity:

types of data that HCI methods provide

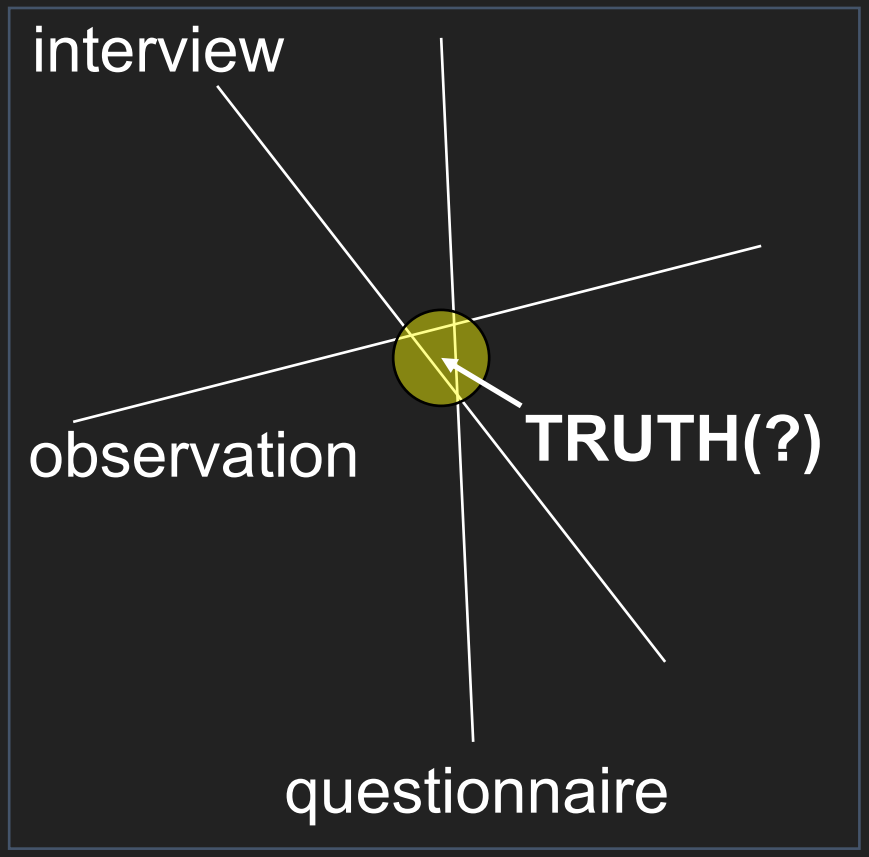



- controlled observations – of time to complete task?
- unstructured observations – of observed steps to complete a task?
- unstructured interviews – of user telling stories?
- questionnaire – self report numbers of times do something?

# Triangulation

•a strategy to enhance validity:

use the *multiple perspectives* available from complementary sources




Use multiple:

- data sources
  people, places, times
- data collection methods
- researchers/evaluators

image credit: Sandra Mathison, UBC EPSE 595

# Analyzing & interpreting data

**Qualitative data** – interpreted to tell a "story"

- Categories, themes, patterns, etc.

**Quantitative data** – presented as values, tables, charts and graphs

- Counts (e.g., Summary of total # of errors)
- Simple statistical analysis (e.g., Averages)
- Advanced statistical analysis (e.g., Linear regression)

… more on quantitative coming later this term.

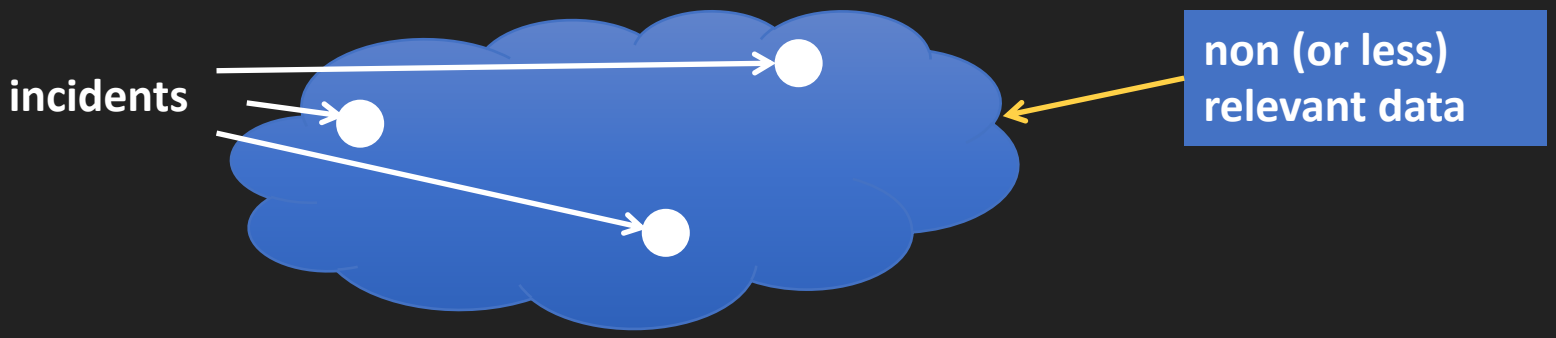
# Methods for qualitative analysis

- From simpler (less effort) to more advanced (more effort):
  - Identify critical incidents
  - Simple categorization
  - Categorization - themes, patterns

- In all cases your aim is to interpret the data in ways that encapsulate and document your understanding.
- Level of effort depends on your goal.
- Many methods often used in combination.

# Qualitative analysis methods
## *finding critical incidents*

- Identify and focus on the most significant incidents
  - Efficient when you have lots of data
  - Incidents can be either desirable or undesirable
- NOT about summarizing all incidents that occur
  - → **More like finding tiny gold nuggets in buckets of sand**
  - → Appropriate for usability studies, where qualitative is not primary analysis

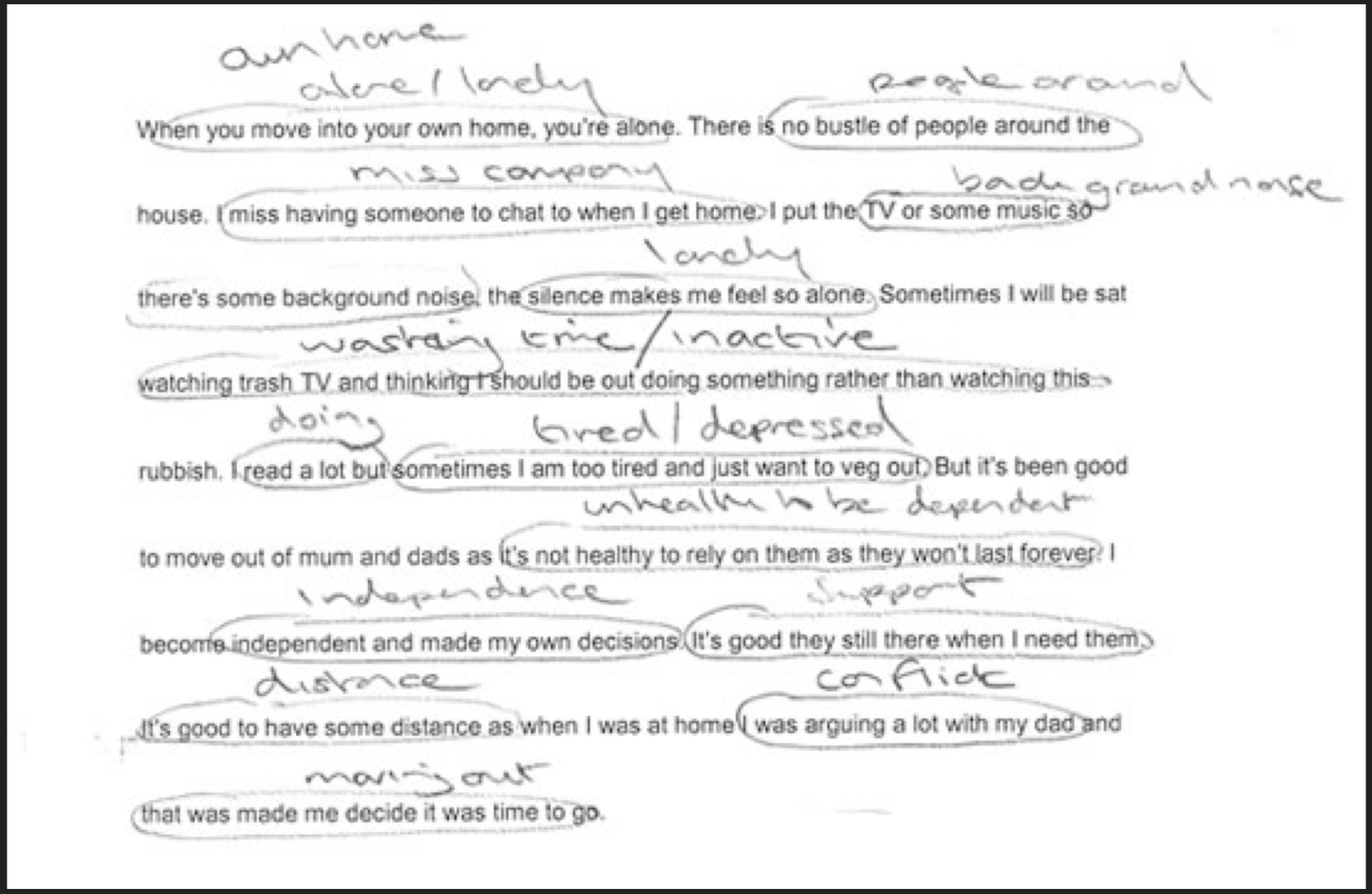


# Qualitative analysis methods
## *categorizing data*

- Typically used on transcripts (observations, interviews, etc.)
  - At non-granular level of detail to find stories or themes
  - At fine-grain level of detail focusing on words, sentences, gestures, etc.  (E.G., Discourse analysis)

- First data are ‘coded’ according to a scheme of categories
  - Can be predetermined, or arise from the data
    - *At a high level:* ***affinity diagram***

# Example of coded transcript mid- to *low-level of detail*




Very informative, but time consuming!

# Thematic analysis

- Thematic analysis is one of the most common forms of analysis in qualitative research.

- It is a method for identifying, analyzing and reporting patterns (themes) within data. It minimally organizes and describes your data set in (rich) detail.

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# Qualitative analysis methods
*patterns and themes*

- Can be revealed in many ways:
  - Through the process of conducting the study
  - Use of tools and techniques (e.g., Affinity Diagrams)

- Can support many types of user study goals
  - E.G., Understanding behavior, culture, places or situations where events occur, breakdowns, user characteristics, etc.

- Very flexible and widely used
  - Can be reported as findings or inform more analysis

# Inductive vs. theoretical thematic analysis

- Inductive or ‘bottom up’ way
  - Data-driven; process of coding the data without trying to fit it into a preexisting coding frame, or the researcher’s analytic preconceptions
- Theoretical or deductive or ‘top down’ way
  - Analyst driven; driven by the researcher’s theoretical or analytic interest in the area



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# A closer look at note taking in the co-located collaborative visual analytics process

**Narges Mahyar**, Ali Sarvghad, and Melanie Tory, “A closer look at note taking in the co-located collaborative visual analytics process,” *IEEE VAST 2010*. [**TOP 4 papers**]

# Exploratory user study

- 27 participants (9 groups of 3)
- 2 set of tasks
- 4 groups: tabletop
- 4 groups: wall display
- 1 group: both

# Data gathered

- ~630 min of video
- screen logs were captured (~ 70 min per session)
- ~20 min of interviews per session

# Record-keeping actions

**Table 1.** Number of note-taking and chart-saving actions by each group. Shaded groups relied heavily on saved charts for analysis.

| | Group | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Display used | Table | | | | Wall | | | | Both |
| Task 1 | Number of note-taking actions | 5 | 2 | 4 | 3 | 0 | 13 | 18 | 0 | 5 |
| | Number of charts saved | 0 | 0 | 0 | 2 | 2 | 0 | 4 | 0 | 2 |
| | Designated note-taker | N | N | N | N | N | Y | N | N | Y |
| | Number of note-takers | 2 | 1 | 1 | 3 | 0 | 1 | 3 | 0 | 1 |
| | Number of times all took notes simultaneously | 0 | 0 | 0 | 1 | 0 | 0 | 8 | 0 | 0 |
| Task 2 | Number of note-taking actions | 8 | 4 | 7 | 7 | 20 | 8 | 11 | 9 | 6 |
| | Number of charts saved | 4 | 22 | 8 | 12 | 3 | 8 | 7 | 2 | 2 |
| | Designated note-taker | N | N | N | N | Y | N | N | Y | Y |
| | Number of note-takers | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 1 | 2 |
| | Number of group notes | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |

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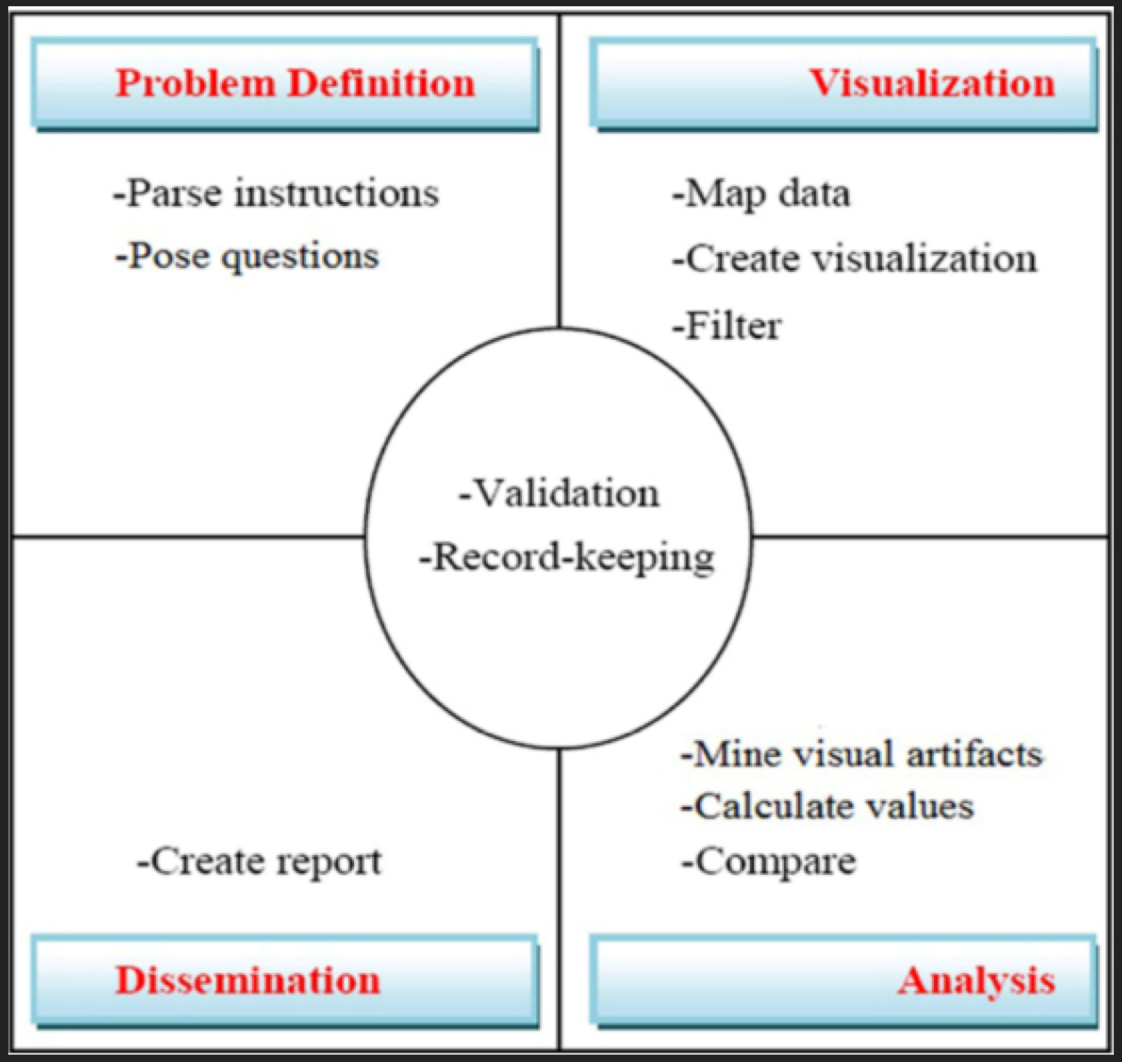


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# Doing thematic analysis: a step-by-step guide

1. Familiarizing yourself with your data
2. Generating initial codes
3. Searching for themes
4. Reviewing themes
5. Defining and naming themes
6. Producing the report



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# 1. FAMILIARIZING YOURSELF WITH YOUR DATA

- Transcribing data, reading and re-reading the data, noting down initial ideas.

- Note:
  - writing is an integral part of analysis
  - analysis is not a linear process
  - read through the entire data set before you begin your coding



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# 2. GENERATING INITIAL CODES

- Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
  - your coded data differ from the units of analysis (your themes), which are (often) broader.
  - coding will, to some extent, depend on whether the themes are more 'data-driven' or 'theory-driven'



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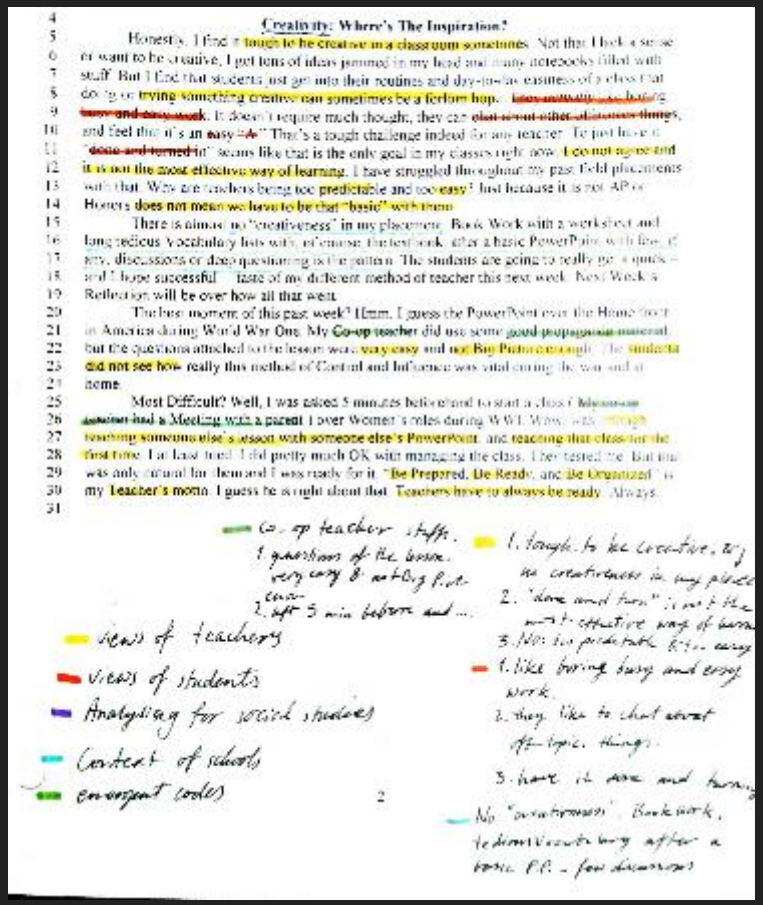
# Coding manually

Code your data by writing notes on the texts you are analyzing, by using highlighters or colored pens to indicate potential patterns, or by using ‘post-it’ notes to identify segments of data. Key advice for this phase is:

(a) Code for as many potential themes/patterns as possible

(b) Code extracts of data inclusively / i.e., Keep a little of the surrounding data if relevant



# Coding with computer software

- If using computer software, you code by tagging and naming selections of text within each data item.

- NVivo: http://www.qsrinternational.com/nvivo-product
- ATLAS.ti: http://atlasti.com
- Saturate App: http://www.saturateapp.com

# 3. Searching for themes

Collating codes into potential themes, gathering all data relevant to each potential theme.

- Analyze codes and consider how different codes may combine to form an overarching theme.
- It may be helpful at this phase to use ***visual representations*** to help you sort the different codes into themes. You might use tables, or mind-maps, or write the name each code.



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# 4. Reviewing themes

- Checking if the themes work in relation to the coded extracts and the entire data set, generating a thematic 'map' of the analysis.

- Goal:
  - to ascertain whether the themes 'work' in relation to the data set.
  - to code any additional data within themes that has been missed in earlier coding stages.

- Note:
  - Data within themes should cohere together meaningfully, while there should be clear and identifiable distinctions between themes.



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# 5. Defining and naming themes

- Identify the ‘essence’ of what each theme is about
- Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
- Identify whether or not a theme contains any sub-themes
- Give names to the themes



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# 6. Producing the report

- The final opportunity for analysis.
- Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.
- It is important that the analysis (the write-up of it, including data extracts) provides a concise, coherent, logical, non-repetitive and interesting account of the story the data tell / within and across themes.



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# Reliability in qualitative research

- Reliability and validity are fundamental concerns of the qualitative researchers

- Transparency of technique
  - Carefully documenting all their steps so that they can be checked by another researcher

- Reliability checker
  - Organizing an independent assessment of transcripts by additional skilled qualitative researchers and comparing agreement between the raters.
  - Can be done statistically (called inter-rater reliability) or qualitatively by discussing disagreements

# In class activity [20 min]

- Coding a transcript
- Check the website for the activity description

# On deck…

- Please check the website for upcoming deadlines

# Extra slides

# Advantages of thematic analysis

- Flexibility.
- Relatively easy and quick method to learn, and do.
- Accessible to researchers with little or no experience of qualitative research.
- Results are generally accessible to educated general public.
- Can usefully summarize key features of a large body of data, and/or offer a 'thick description' of the data set.
- Can highlight similarities and differences across the data set.
- Can generate unanticipated insights.
- Allows for social as well as psychological interpretations of data.



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# Pitfalls to avoid when doing thematic analysis

1. Failure to actually analyze the data
   - Thematic analysis is not just a collection of extracts strung together with little or no analytic narrative.
2. Using of the data collection questions (such as from an interview schedule) as the ‘themes’ that are reported.
3. A weak or unconvincing analysis
   - where the themes do not appear to work, where there is too much overlap between themes, or where the themes are not internally coherent and consistent.
4. A mismatch between the data and the analytic claims that are made about it.
   - the claims cannot be supported by the data