

TYPES OF DATA

QUALITATIVE ANALYSIS

TECHNIQUE

690A- Advanced Methods in HCI

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TODAY

- Type of data [10min]
- Qualitative analysis techniques [20min]
- In class activity [20min]
 - Coding
- Discussion of readings [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
- understand why reliability and validity are important in qualitative research
- make and justify strategic decisions in evaluation planning

TYPES OF DATA THAT HCI METHODS PROVIDE

spectrum of data...

qualitative:

- *users describe/report X*, to extent they are aware
- *you observe X*, that users may not be fully aware of

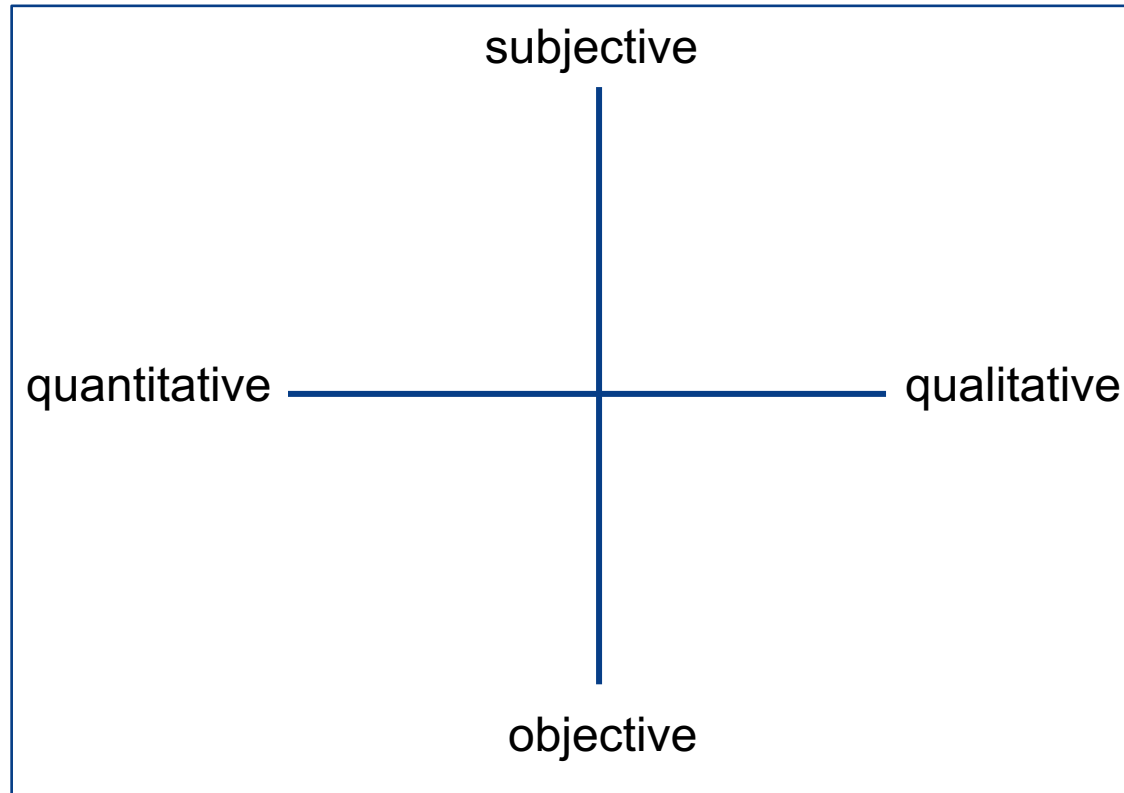
where X can be: **behaviors, processes, usability challenges...**

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 instructions

ACTIVITY:

TYPES OF DATA THAT HCI METHODS PROVIDE

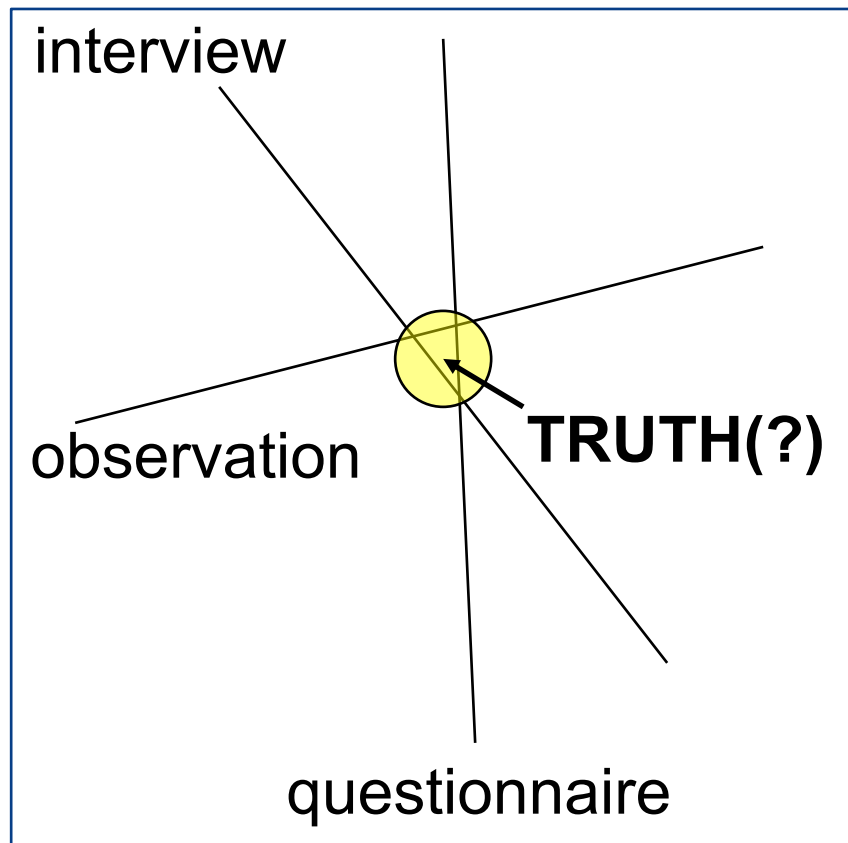


- controlled observations – of time to complete task?
- unstructured observations – of observed steps to complete a task?
- unstructured interviews – of user telling stories?
- questionnaire – self report numbers of times do something?

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

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.*

your choice of analysis method will depend on what you're using it for

- remember you can often transform from qualitative to quantitative

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

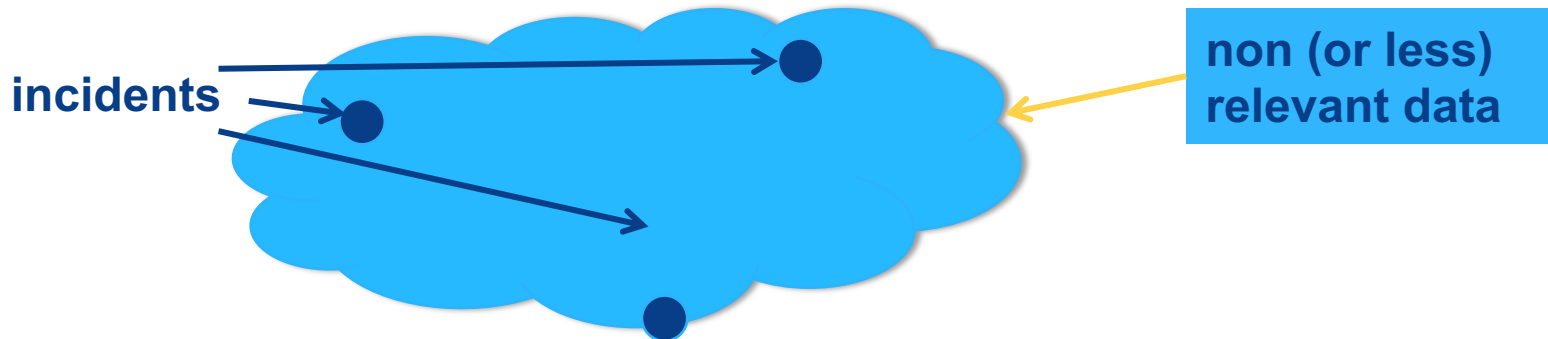
FINDING CRITICAL INCIDENTS

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

am home
alone / lonely
When you move into your own home, you're alone. There is no bustle of people around the
house. I miss company
miss company
I put the TV or some music so
background noise
there's some background noise, the silence makes me feel so alone. Sometimes I will be sat
lonely
watching trash TV and thinking I should be out doing something rather than watching this
wasting time / inactive
rubbish. I read a lot but sometimes I am too tired and just want to veg out. But it's been good
doing
bored / depressed
unhealthy to be dependent
to move out of mum and dads as it's not healthy to rely on them as they won't last forever. I
independence
support
become independent and made my own decisions. It's good they still there when I need them.
distance
conflict
It's good to have some distance as when I was at home I was arguing a lot with my dad and
moving out
that was made me decide it was time to go.

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.

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)
 - will talk about it more on Thursday

can support many types of user study goals

- e.g., understanding behaviour, 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

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

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

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

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'

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

4 Creativity: Where's The Inspiration?
 5 Honestly, I find it **tough to be creative in a classroom** sometimes. Not that I lack a sense
 6 or want to be creative, I got tons of ideas jammed in my head and many notebooks filled with
 7 stuff. But I find that students just get into their routines and day-to-day easiness of a class that
 8 doing or **trying something creative** can sometimes be a forlorn hope. **They actually like boring**
 9 **busy and easy work.** It doesn't require much thought, they can **chat about other off-topics things**,
 10 and feel that it's an **easy "A"**. That's a tough challenge indeed for any teacher. To just have it
 11 **"done and turned in"** seems like that is the only goal in my classes right now. **I do not agree and**
 12 **it is not the most effective way of learning.** I have struggled throughout my past field placements
 13 with that. Why are teachers being too predictable and too **easy**? Just because it is not AP or
 14 Honors **does not mean we have to be that "basic" with them**.
 15 There is almost no "creativity" in my placement. Book Work with a worksheet and
 16 long tedious Vocabulary lists with, of course, the textbook, after a basic PowerPoint with few, if
 17 any, discussions or deep questioning is the pattern. The students are going to really get a quick –
 18 and I hope successful – taste of my different method of teacher this next week. Next Week's
 19 Reflection will be over how all that went.
 20 The best moment of this past week? Hmm, I guess the PowerPoint over the Home front
 21 in America during World War One. My **Co-op teacher** did use some **good propaganda material**,
 22 but the questions attached to the lesson were **very easy** and **not Big Picture enough**. The **students**
 23 **did not see how** really this method of Control and Influence was vital during the war and at
 24 home.
 25 Most Difficult? Well, I was asked 5 minutes beforehand to start a class (**My co-op**
 26 **teacher had a Meeting with a parent**) over Women's roles during WWI. Wow, was it **tough**
 27 **teaching someone else's lesson with someone else's PowerPoint**, and **teaching that class for the**
 28 **first time**. I at least tried. I did pretty much OK with managing the class. They tested me. But that
 29 was only natural for them and I was ready for it. **"Be Prepared, Be Ready, and Be Organized"** is
 30 my **Teacher's motto**. I guess he is right about that. **Teachers have to always be ready.** Always.
 31

— Co-op teacher stuffs:
 1. questions of the lesson:
 very easy & not Big Picture
 2. left 5 min before and....

— Views of teachers
 1. tough to be creative, e.g.
 no creativity in my place
 2. "done and turn" is not the
 most effective way of learn.
 3. No: too predictable & too easy
 work.

— Views of students
 1. like boring busy and easy
 work.
 2. they like to chat about
 off-topics things.
 3. have it done and turning

— Analysing for social studies

— Context of schools

— emergent codes

2

— No "creativity": Bookwork,
 tedious Vocabulary after a
 basic P.P. - few discussions

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.

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.

5. DEFINING AND NAMING THEMES:

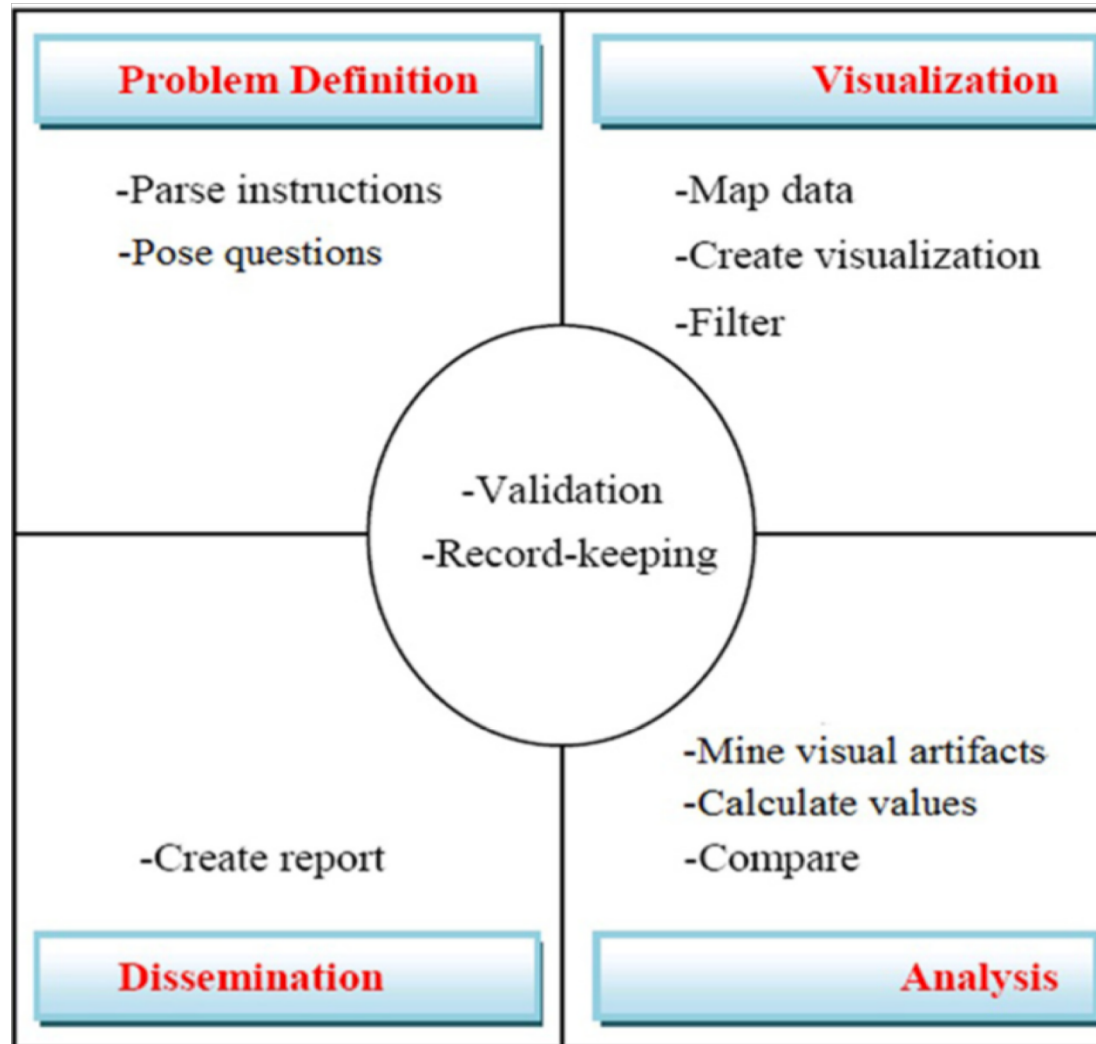
Identify the 'essence' of what each theme is about

- 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

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.



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]

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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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
 - Note: different schools of thought on need for inter-rater reliability

IN CLASS ACTIVITY [20 MIN]

- Coding a transcript

Hoarding and Minimalism: Tendencies in Digital Data Preservation

Francesco Vitale, Isabelle Janzen, Joanna McGrenere

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ABSTRACT

Digital data, from texts to files and mobile applications, has become a pervasive component of our society. With seemingly unlimited storage in the cloud at their disposal, how do people approach data preservation, deciding what to keep and discard? We interviewed 23 participants with diverse backgrounds, asking them about their perceived digital data: what “stuff” they kept through the years, why, how they used it, and what they considered important. In an iterative analysis process, we uncovered a spectrum of tendencies that drive preservation strategies, with two extremes: hoarding (where participants accumulated large amounts of data, even if considered of little value) and minimalism (where they kept as little as possible, regularly cleaning their data). We contrast and compare the two extremes of the spectrum, characterize their nuanced nature, and discuss how our categorization compares to previously reported behaviors such as filing and piling, email cleaners and keepers. We conclude with broad implications for shaping technology.

ACM Classification Keywords

H.3.m Information Storage and Retrieval: Miscellaneous

Author Keywords

side. This explains why they are an increasingly popular choice to store digital data for everyday users [44]. Storage is either cheap or outright free. Google Photos, for example, offers unlimited space for pictures (although at reduced quality).

This is the “seductive” digital landscape that Marshall [25] predicted a decade ago when studying long-term preservation of digital items. At the time, a similar change was taking place: hard drive storage was becoming cheaper, giving users the option to store nearly “everything” [26]. The pervasiveness of the cloud is once again reinforcing this possibility. Now that we are living in this seductive landscape, how are data preservation practices changing? It is critical to understand how users are experiencing this new world, as we are just in its foothills. As storage gets cheaper and digital data more of a commodity, how do users deal with this new environment?

We are interested in the act of *preserving* data, by which we mean deciding what data to keep and discard. As Whitaker [47] points out: little is known about “when and why people keep or delete different types of information.” Therefore, we focused on a main, broad research question: how do people approach digital data preservation in the cloud age? How do they decide what to keep and discard?

DISCUSSION ON DATA ANALYSIS READINGS [15 MIN]

Get into group of 3-4 answering the following questions:

- What surprised you? or
- What you disagreed with?
- Others?

ON DECK...

Next class (Tuesday) ...

- 2 readings
- Bring your transcripts

Thursday class...

- First Project milestone: Empathy
 - ✧ due on Monday Feb 13
- Call presentation
- No reading for this class

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.

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