

CS-E5250 Data-Driven Concept Design

Qualitative Data Analysis
Assignment 1

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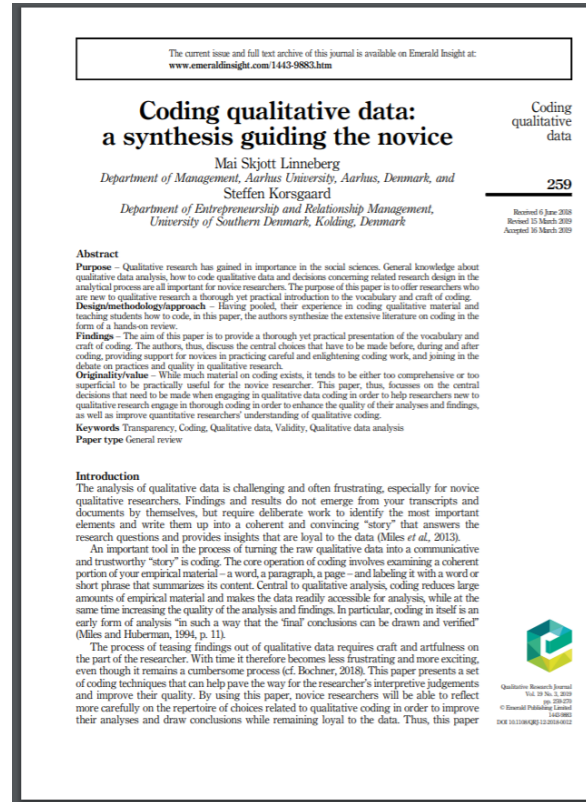
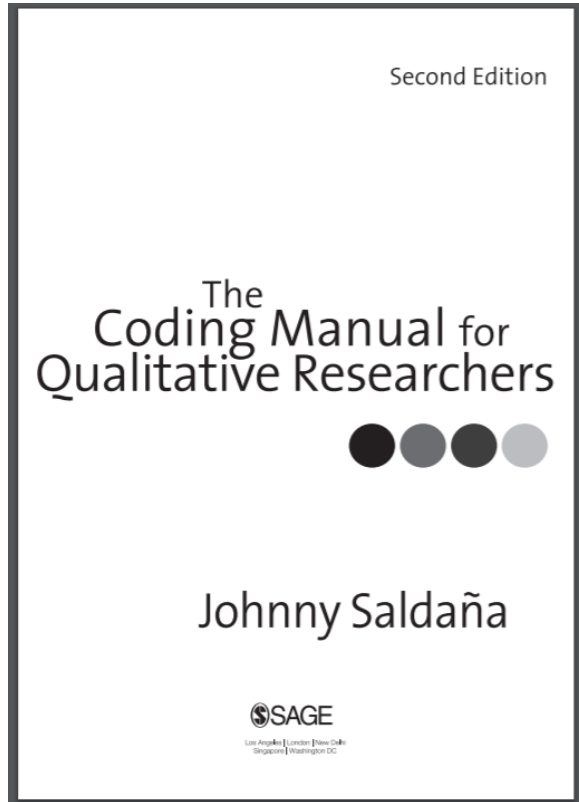
Agenda & Learning Outcomes for A1

- Introduction to qualitative data analysis
- Introduction to Assignment 1

After this assignment:

- You know how to prepare and analyse real-world qualitative user research data to produce relevant user knowledge and insights.
- Become familiar with basic qualitative research theory and methodology.
- Learn basic qualitative research practices (coding, categorizing, developing themes).

Recommended resources



Saldaña, J., 2013. *The Coding Manual For Qualitative Researchers*. 2nd ed. Sage.

Skjott Linneberg, M. and Korsgaard, S., 2019. Coding qualitative data: a synthesis guiding the novice. *Qualitative Research Journal*, 19(3), pp.259-270.

Qualitative Data Analysis

What is qualitative analysis?

Qualitative analysis commonly deals with unstructured, non-numerical data. It often captures valuable insights not found by purely quantitative methods of analysis.

The goal of qualitative analysis is to develop an understanding of the characteristics and meanings of the researched topic.

*“Findings and results do not emerge from your transcripts and documents by themselves, but require deliberate work to identify the most important elements and write them up into a coherent and convincing **“story”** that answers the research **questions** and provides insights that are loyal to the data.”*
(Linneberg & Korsgaard, 2019)

Examples of qualitative data

- Interview transcripts
- Social media posts
- Customer feedback
- Participant observation field notes
- Documents
- Photos and videos
- Focus groups

How do we analyze qualitative data?

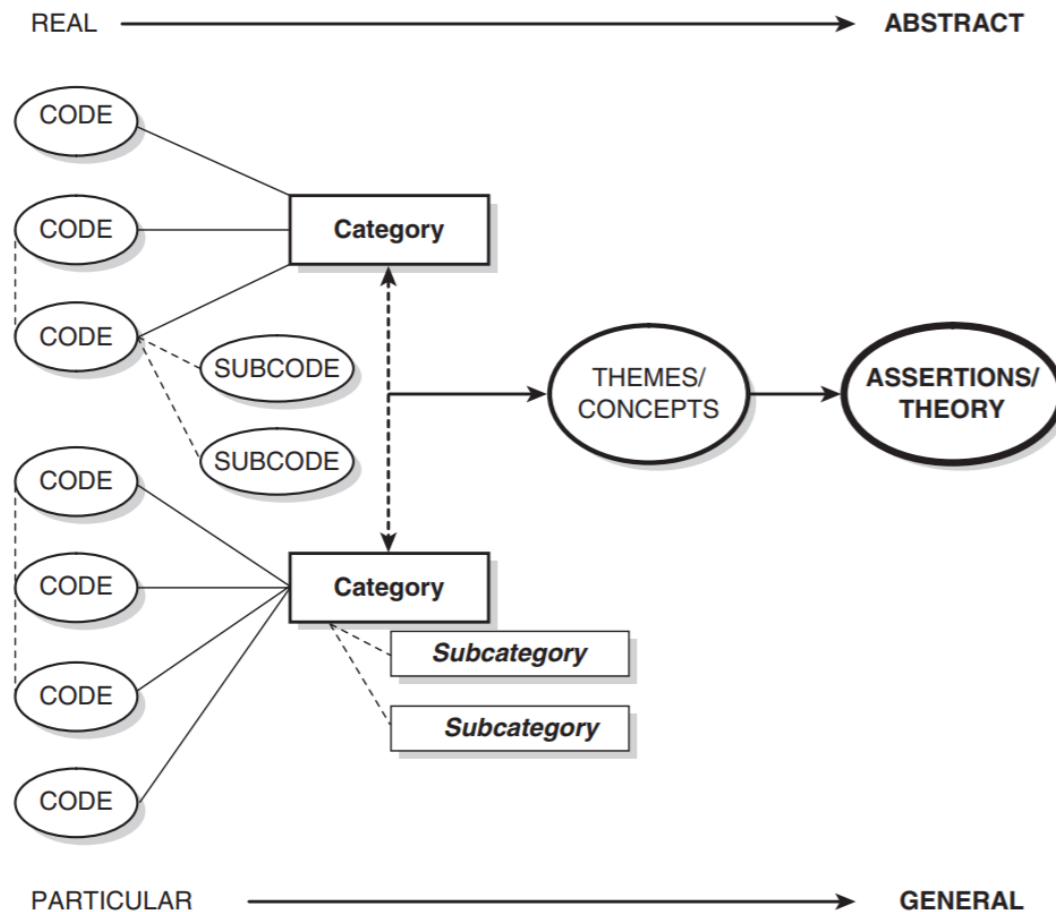
Start by:

“Breaking data into meaningful parts” (**Savin-Baden & Major, 2013**)

And then:

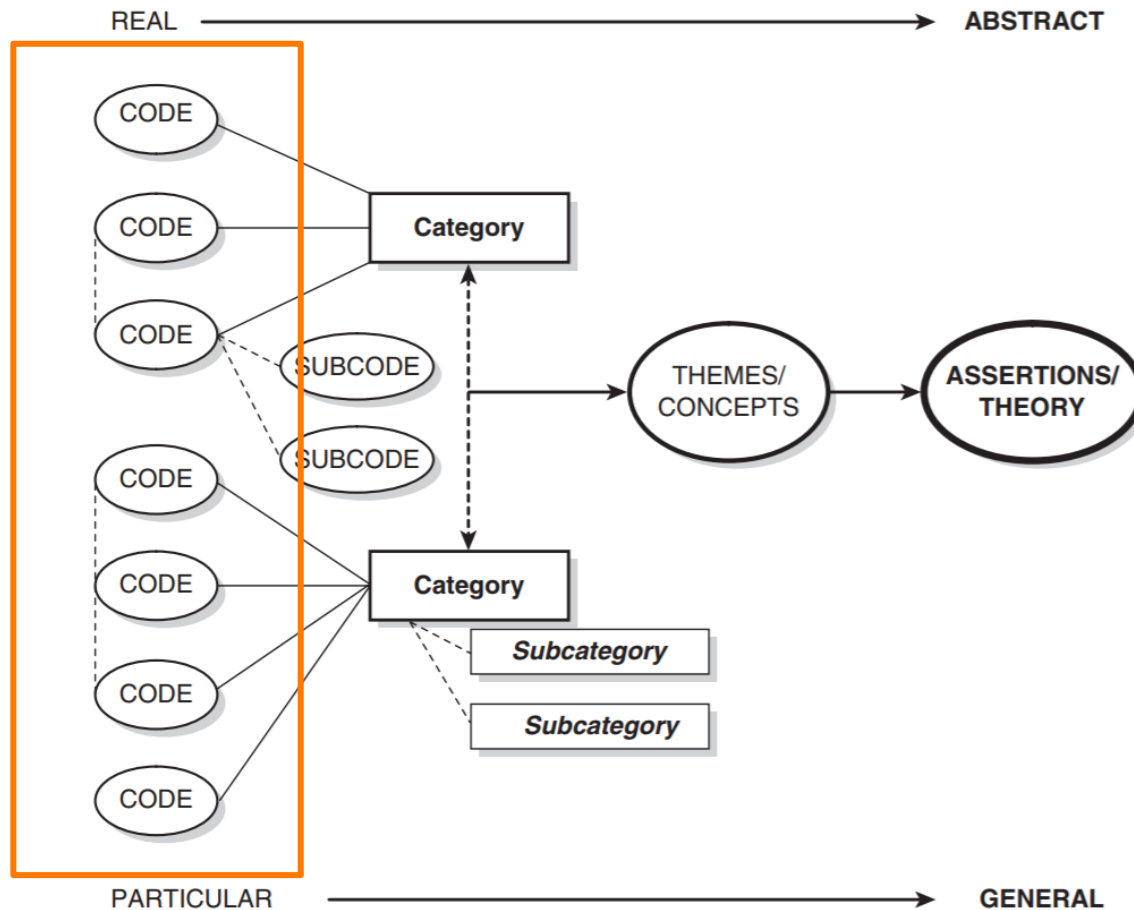
“Systematic search for meaning” (**Hatch, 2002**)

Analyzing qualitative data: an overview



(Saldaña, 2013)

Analyzing qualitative data: an overview



(Saldaña, 2013)

Codes

Developing codes, or coding, is the first step in making sense of unstructured qualitative data.

A code is “a word or short phrase that symbolically assigns a summative, salient, and essence-capturing attribute for a portion of language-based or visual data.” (Saldaña, 2013)

“Coding in its most basic form is the simple operation of identifying segments of meaning in your data and labeling them with a code.” (Linneberg & Korsgaard, 2019)

Codes can be attached to words, phrases, sentences or whole paragraphs.

What do we look for when coding?

Hatch (2002) describes coding as looking for patterns in your data. Patterns can be characterized by:

- similarity (things happen the same way)
- difference (they happen in predictably different ways)
- frequency (they happen often or seldom)
- sequence (they happen in a certain order)
- correspondence (they happen in relation to other activities or events)
- causation (one appears to cause another)

Example code (1/2)

¹ I notice that the grand majority of homes have chain link fences in front of them. There are many dogs (mostly German shepherds) with signs on fences that say “Beware of the Dog.”

¹ SECURITY

(Saldaña, 2013)

Example code (2/2)

¹ Mrs. Jackson rises from her desk and announces, “OK, you guys, let’s get lined up for lunch. Row One.” Five children seated in the first row of desks rise and walk to the classroom door. Some of the seated children talk to each other.

² Mrs. Jackson looks at them and says, “No talking, save it for the cafeteria. ³ Row Two.” Five children seated in the second row of desks rise and walk to the children already standing in line.

¹ LINING UP FOR LUNCH

² MANAGING BEHAVIOR

³ LINING UP FOR LUNCH

(Saldaña, 2013)

Approaches to coding

There are two commonly used approaches to coding, inductive and deductive.

Inductive coding starts from scratch and develops the codes based on the qualitative data itself. Here, you don't start with a pre-determined codebook. This approach is most useful when doing an exploratory study or when no theoretical concepts are available to help with understanding the studied phenomenon.

Deductive coding involves developing a codebook ahead of time to guide the researcher during the coding process. The codebook is generally based on previous literature on the studied phenomenon.

In practice, a combination of both approaches is often used (Graebner, Martin & Roundy, 2012; Alvesson & Kärreman, 2007).

(Linneberg &
Korsgaard, 2019)

Coding as an interpretive act

“Coding is not a precise science; it is primarily an interpretive act.” **(Saldaña, 2013)**

Your codes can be shaped by your research question, what you are trying to get from the data, your academic discipline, theoretical and conceptual frameworks, choice of coding method, and more.

Coding as an interpretive act: example

Participant A: I had chicken and rice for lunch.
Participant B: I had beef lasagna for dinner and
drank some wine.

(Yi, 2018)

Coding as an interpretive act: example

Participant A: I had chicken and rice for lunch.	MEALS
Participant B: I had beef lasagna for dinner and drank some wine.	MEALS

(Yi, 2018)

Coding as an interpretive act: example

Participant A: I had chicken and rice for lunch.

FOOD

Participant B: I had beef lasagna for dinner and drank some wine.

FOOD DRINK

(Yi, 2018)

Coding as an interpretive act: example

Participant A: I had chicken and rice for lunch.

CHICKEN

Participant B: I had beef lasagna for dinner and drank some wine.

BEEF ALCOHOL

Coding as an interpretive act: example

Participant A: I had chicken and rice for lunch. MEALS
Participant B: I had beef lasagna for dinner and drank some wine. MEALS

Participant A: I had chicken and rice for lunch. FOOD
Participant B: I had beef lasagna for dinner and drank some wine. FOOD DRINK

Participant A: I had chicken and rice for lunch. CHICKEN
Participant B: I had beef lasagna for dinner and drank some wine. BEEF ALCOHOL

How do you ensure the validity of your codes?

Transparency: Make it clear how your conclusions are linked to your data, allowing the reader to understand the role of the researcher in shaping and analyzing the data (Guba and Lincoln, 1994; Elo et al., 2014).

Collaboration: Employ multiple coders working independently on the same data. Compare the codes you developed and reach a mutual understanding of what codes are most conducive to your research. Using multiple coders also has the added benefit of producing a richer data analysis that may not be achieved alone (Church, Dunn and Prokopy, 2019).

Coding: an iterative process

Coding often occurs in two or more cycles - rarely will anyone get coding entirely right during the first go (Linneberg & Korsgaard, 2019; Saldaña, 2013).

The initial cycle can be relatively fast and straightforward. Familiarize yourself with the data and use broad codes.

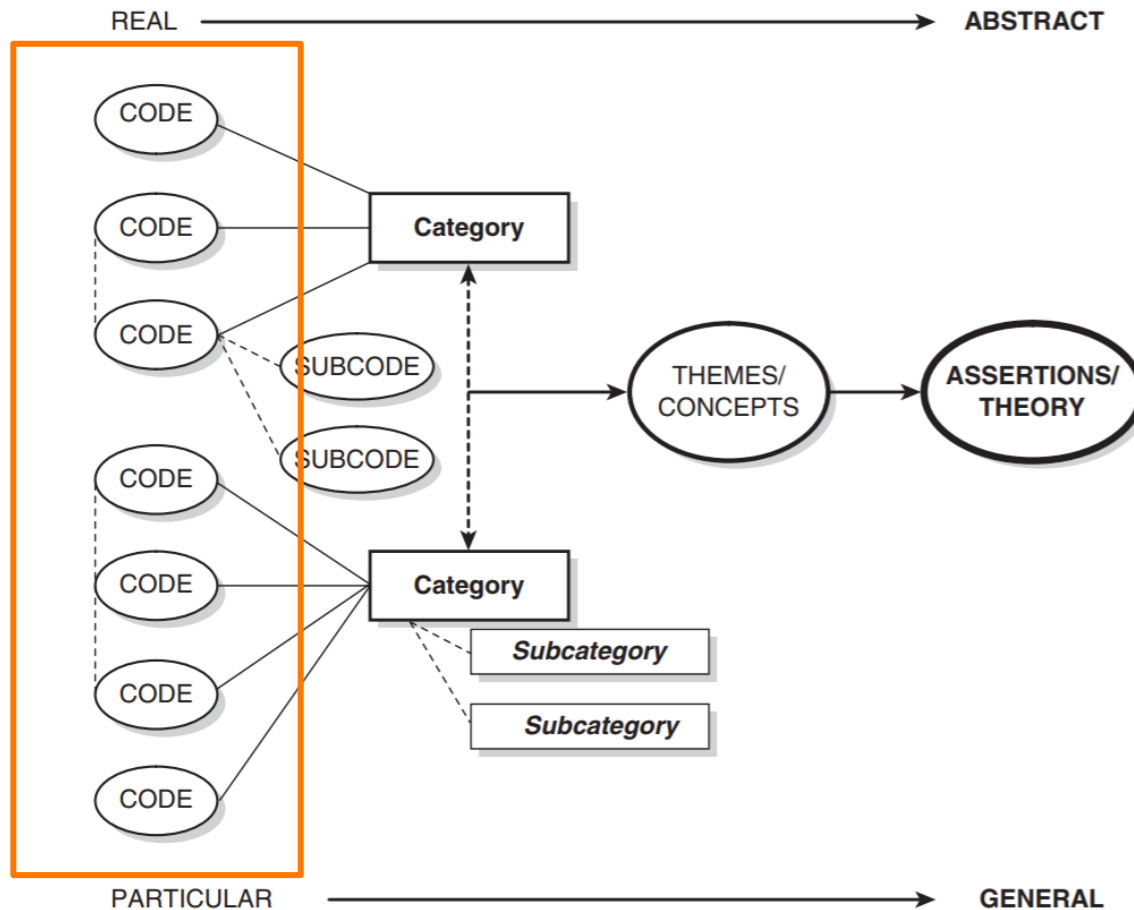
During subsequent rounds, look for patterns and refine your codes to include more detail. Add codes that were developed later to your earlier data.

Example of iterative coding

COLUMN 1 Raw Data	COLUMN 2 Preliminary Codes	COLUMN 3 Final Code
<p>¹ The closer I get to retirement age, the faster I want it to happen. I'm not even 55 yet and I would give anything to retire now. But there's a mortgage to pay off and still a lot more to sock away in savings before I can even think of it. I keep playing the lottery, though, in hopes of winning those millions. No luck yet.</p>	<p><i>"retirement age"</i></p> <p><i>financial obligations</i></p> <p><i>dreams of early retirement</i></p>	<p>¹ RETIREMENT ANXIETY</p>

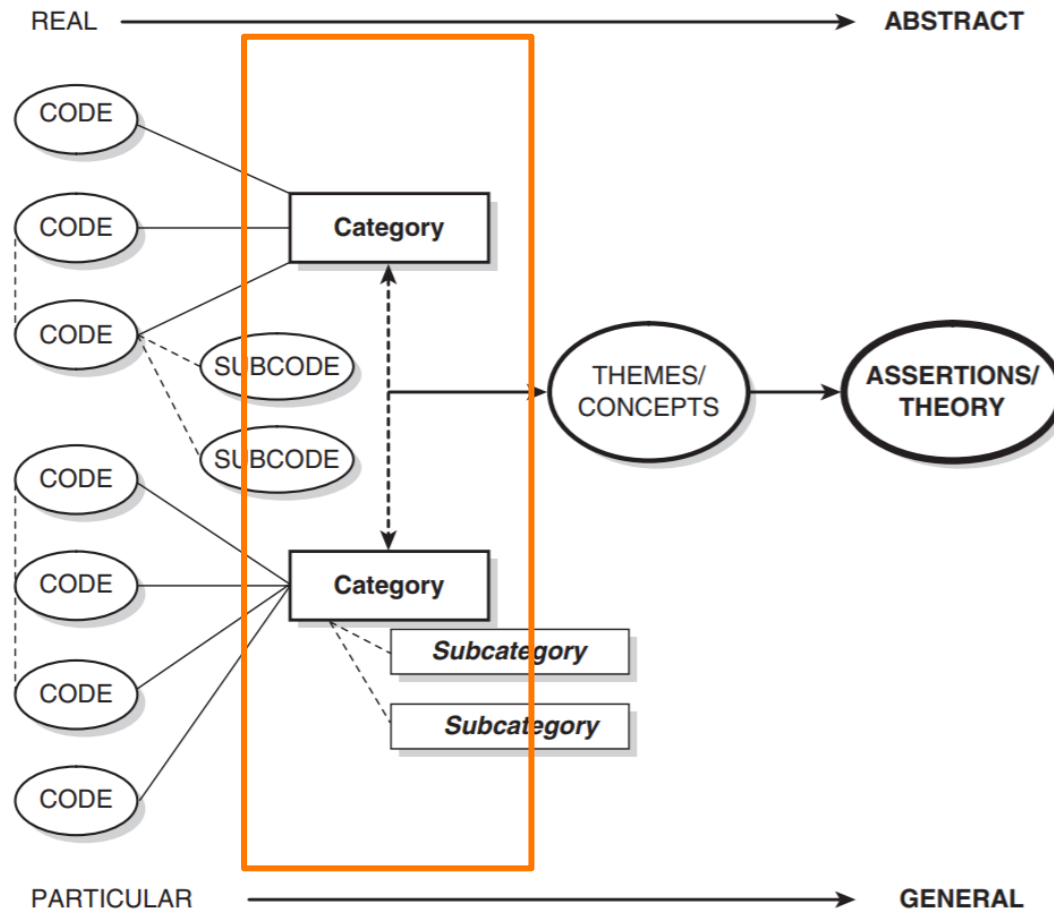
(Saldaña, 2013)

Analyzing qualitative data: an overview



(Saldaña, 2013)

Analyzing qualitative data: an overview



(Saldaña, 2013)

From codes to categories

As you go through the process of coding qualitative data, you'll notice that certain codes can be thematically grouped together. These groupings form your categories, which allow you to move beyond a messy collection of individual codes.

“Coding is thus a method that enables you to organize and group similarly coded data into categories or “families” because they share some characteristic – the beginning of a pattern.”
(Saldaña, 2013)

Choosing what to categorize: *“You use classification reasoning plus your tacit and intuitive senses to determine which data ‘look alike’ and ‘feel alike’ when grouping them together.”* **(Linneberg & Korsgaard, 2019; Lincoln & Guba, 1985)**

Categories: example

Category: Physical Oppression

Code: PUSHING

Code: FIGHTING

Code: SCRATCHING

Category: Verbal Oppression

Code: NAME-CALLING

Code: THREATENING

Code: LAUGHING AT

(Saldaña, 2013)

Categories: another example

Category: Teacher Skills

Subcategory 1: Instructional Skills

Code: PEDAGOGICAL

Code: SOCIO-EMOTIONAL

Code: STYLE/PERSONAL EXPRESSION

Code: TECHNICAL

Subcategory 2: Management Skills

Code: BEHAVIORIST TECHNIQUES

Code: GROUP MANAGEMENT

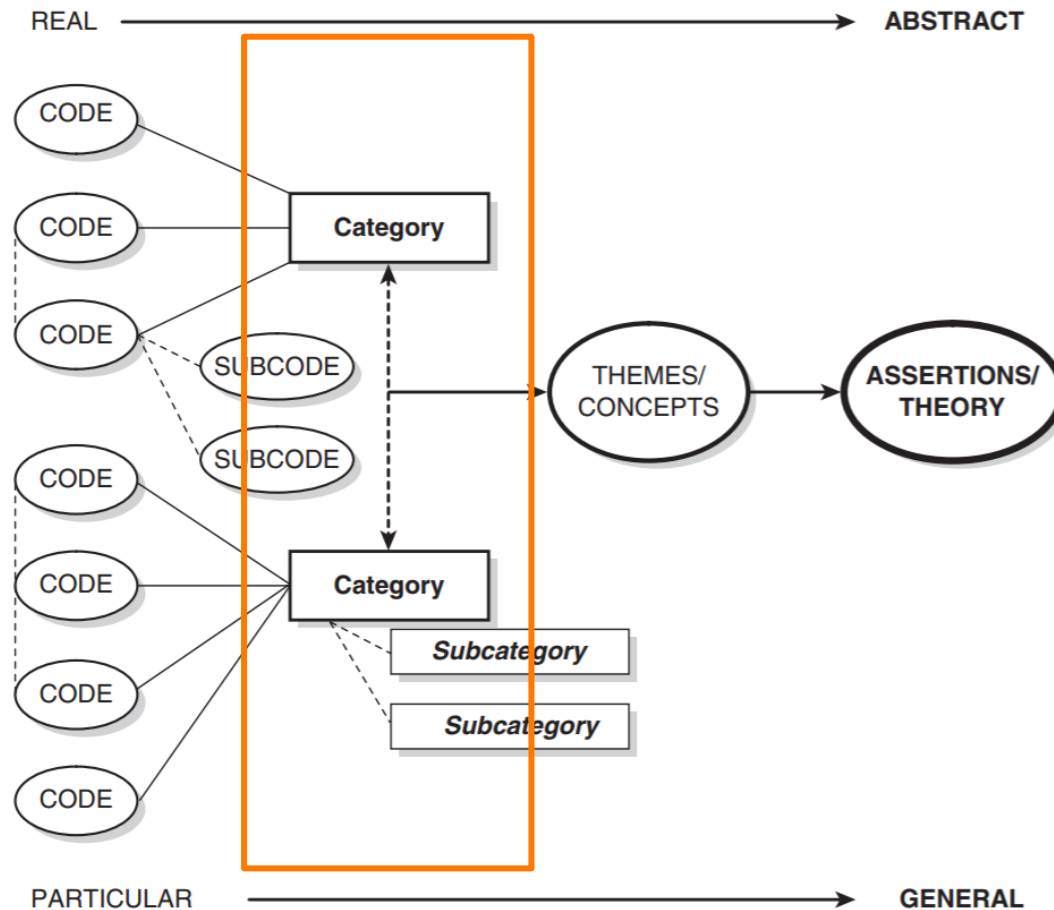
Code: SOCIO-EMOTIONAL

Code: STYLE (overlaps with instructional style)

Code: UNWRITTEN CURRICULUM

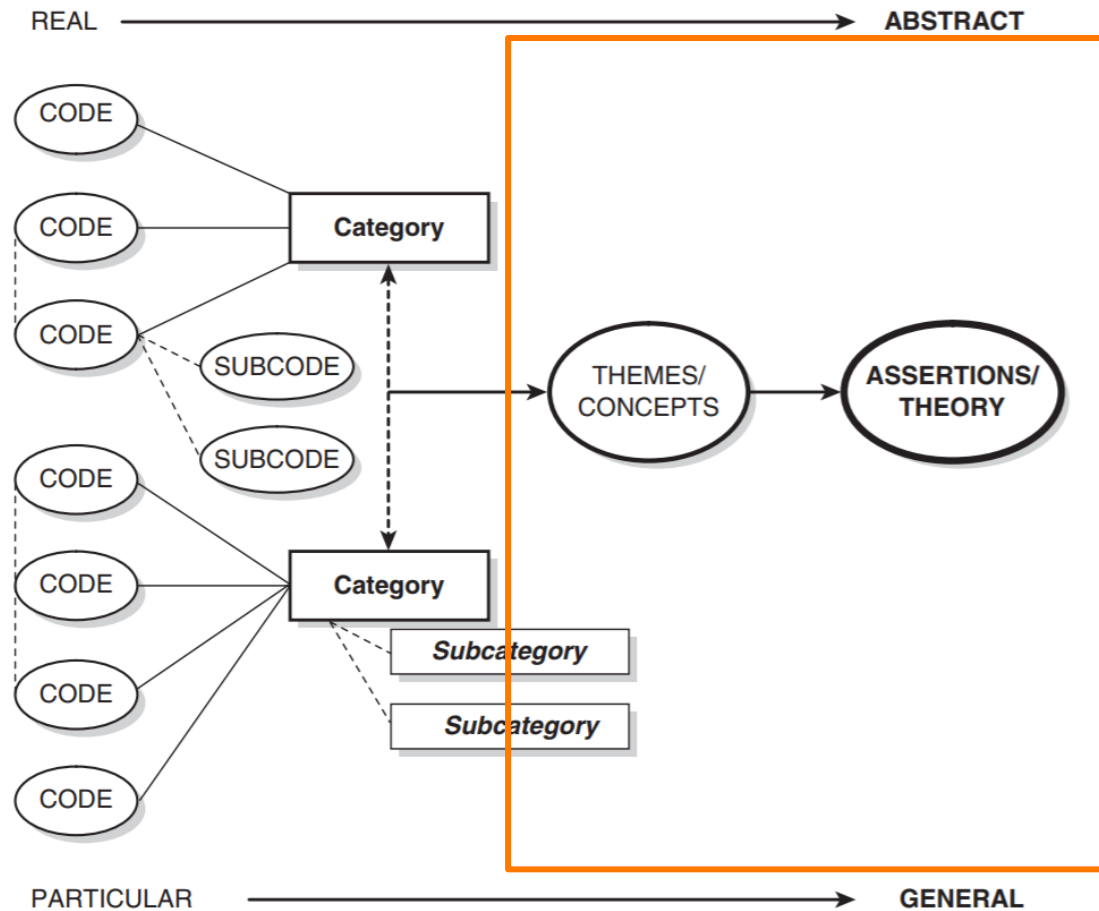
(Saldaña, 2013)

Analyzing qualitative data: an overview



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Analyzing qualitative data: an overview



(Saldaña, 2013)

From categories to themes

“When the major categories are compared with each other and consolidated in various ways, you begin to transcend the “reality” of your data and progress toward the thematic, conceptual, and theoretical.” (Saldaña, 2013)

From categories to themes

While codes and categories describe the data, themes try to explain what is happening rather than referring to any particular data point. This is where you engage in **storytelling** from your data.

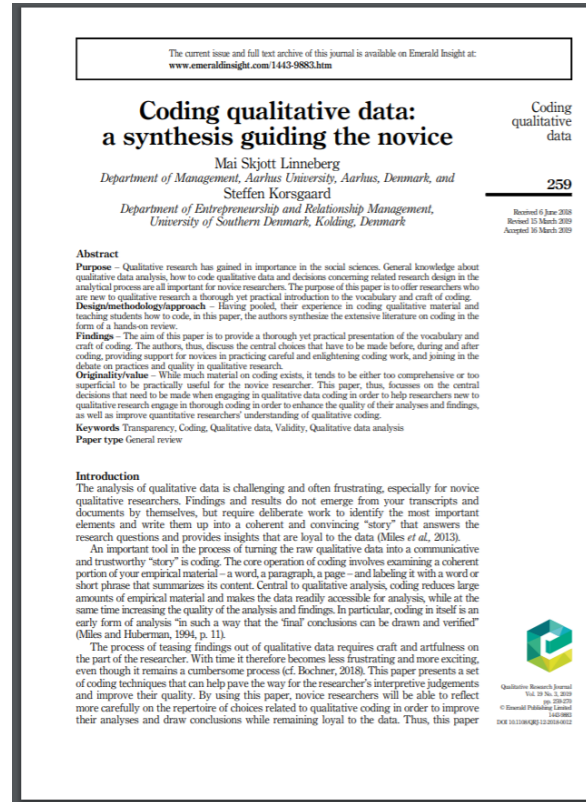
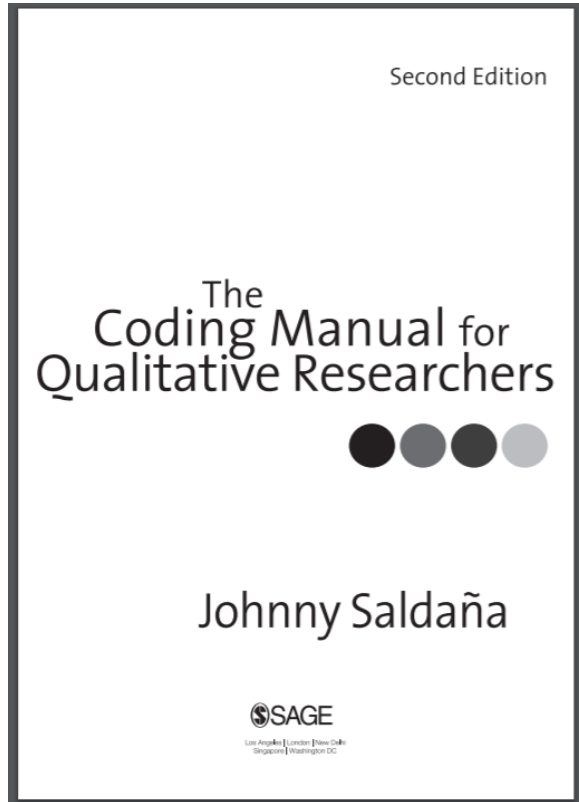
Themes vs Categories

“Think of a category as a word or phrase describing some segment of your data that is explicit, whereas a theme is a phrase or sentence describing more subtle and tacit processes.” (Rallis & Rossman, 2003)

Recap: the qualitative analysis process

1. Familiarize yourself with the data
2. Generate initial codes (first cycle)
3. Refine and add detail to codes (subsequent cycles)
4. Organize codes into categories
5. Develop themes to tell the story of your data

Recommended resources



Saldaña, J., 2013. *The Coding Manual For Qualitative Researchers*. 2nd ed. Sage.

Skjott Linneberg, M. and Korsgaard, S., 2019. Coding qualitative data: a synthesis guiding the novice. *Qualitative Research Journal*, 19(3), pp.259-270.

ATLAS.ti for coding

Get started by downloading ATLAS.ti from
(download.aalto.fi)

Suggested viewing:

<https://www.youtube.com/watch?v=EK9yZ0VqZgE>

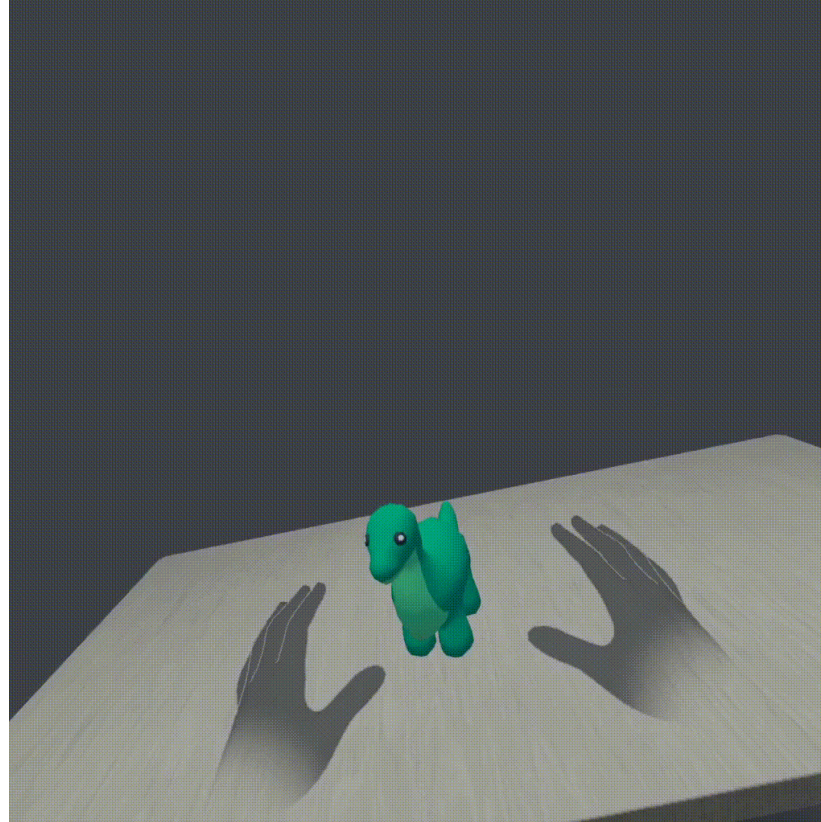
ATLAS.ti workshop

Assignment 1: Qualitative Data Analysis

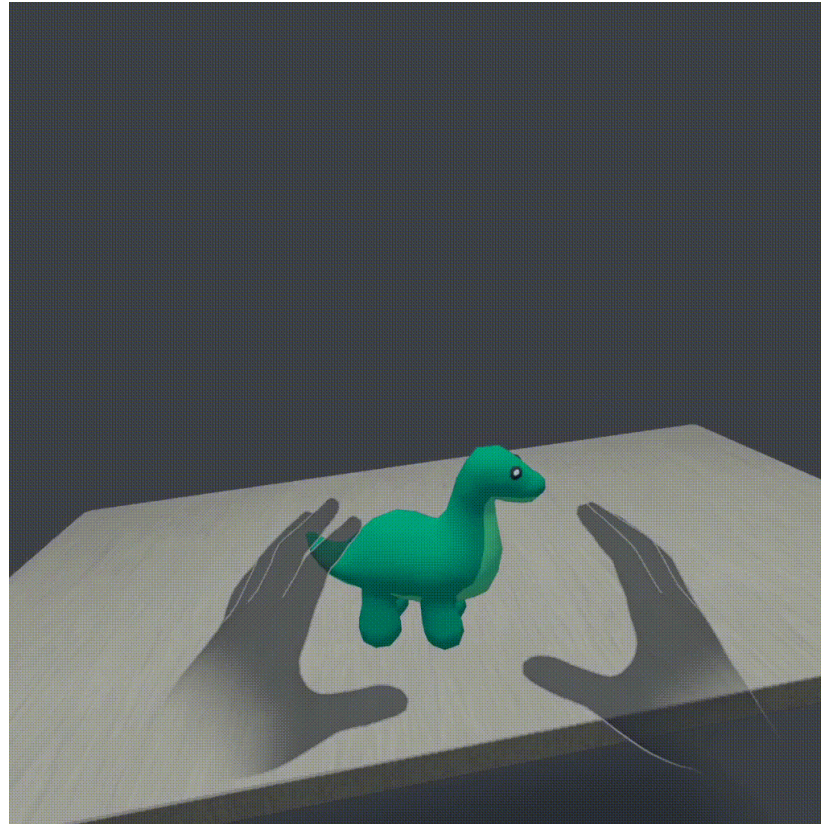
Assignment 1: Qualitative Data Analysis

Background: The data for this assignment comes from a recent real-life user study conducted at Aalto. During the study, 12 participants were asked to try out two different approaches to interacting with objects using hand tracking (rather than controllers) in virtual reality (VR). The purpose of the study was to compare the usability of these two VR hand tracking interaction systems. During the study, participants were asked to manipulate a range of virtual objects in a grab-and-place task using both interaction methods.

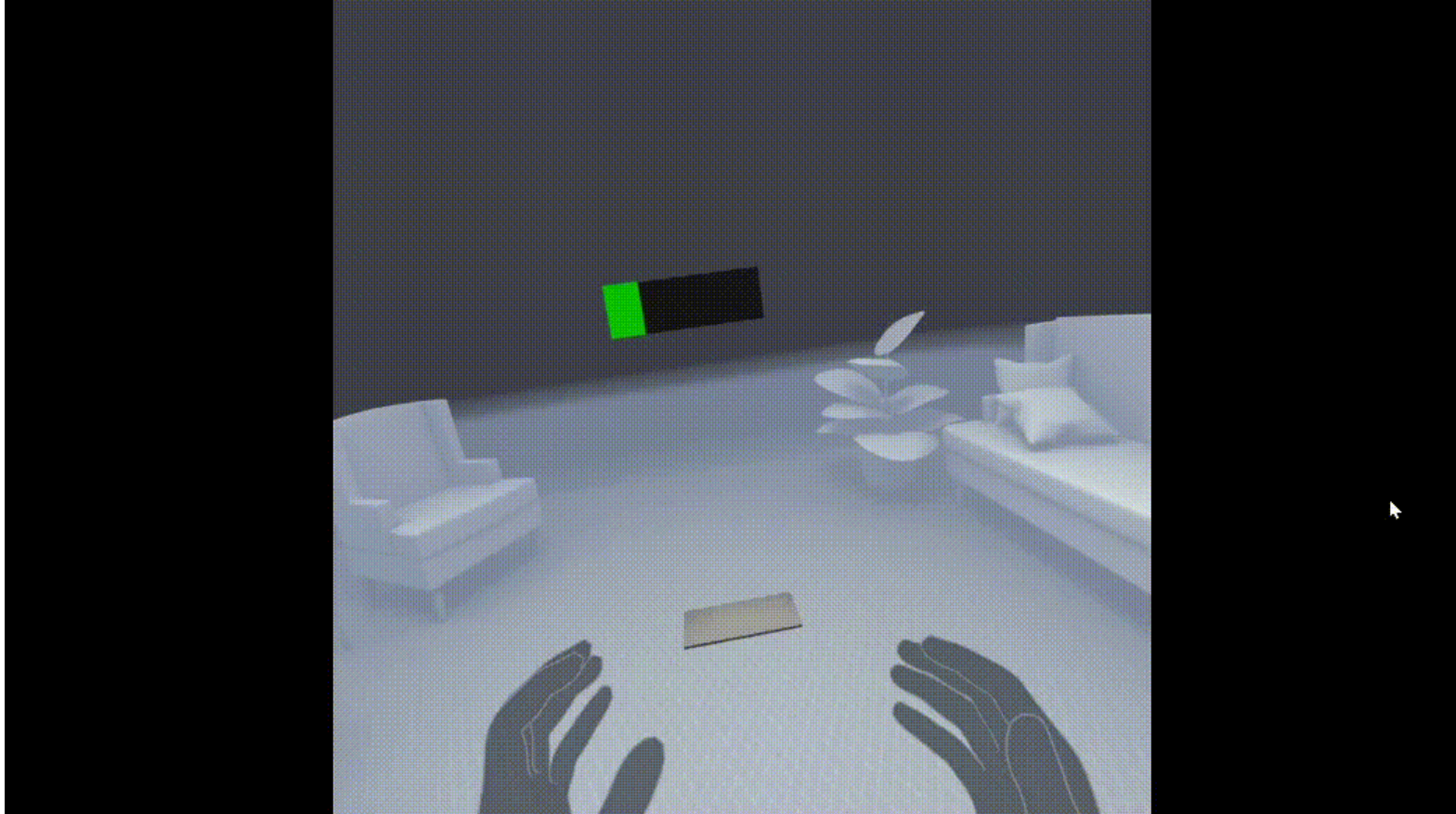
Pinch-to-Grab



Physics



Task: Grab-and-Place



Data: 12 user transcripts

uid 1

Order: Snap Hands, Dynamic Hands

M: First impressions, what did you think?

U: I think it was pretty cool. It was the first time I dev kit, at some convention, and this felt actually around. It was like... it was a little blurry, a bit hard

M: Yeah, the text might be a bit small...

U: Yeah, but it was fun.

M: Ok! And what about the hands, did you have easier to use than the other?

U: Well, the first pair of hands, L... they worked a stuff, the... getting close to something and having little bit. The other pair of hands, I've seen... inter fair bit of game development and such, and then it first hand, actually having the adaptive hands, I how it adapted to... yeah, hard to describe.

M: Yeah, surprised by how natural it felt...

U: Yeah, it didn't glitch out or... yeah. A little bit, pushed it, at some point it did a smooth grab - t

M: Was that a good thing or a bad thing?

U: Well, I wasn't expecting, when it said that "th it to be following the linear action of the button i would be like, you can do a half way grab -

M: Yeah

U: - instead, you have to go close enough and the M: Yeah, makes sense.

U: So that was... yeah.

M: So at the end we had a little comparison whe task. I was thinking that we could go through the through the hands and tasks one by one. So for t

U: Yeah. I put the second pair of hands because i where I could grab. When I was doing the grabbi grabbing it like I did with the first pair, from the t object, and... once it worked with the... I was qui grabbed it from along the pen, instead of grabbi fingers adapting to that instead of going everyw grab it from the side instead of from where it glo

hands you had to find the point where it glowed, so with the second pair of hands, it felt more natural? More fun. I preferred that.

M: Ok, natural. Fun.

U: And it was more interesting.

M: Getting to position the hand yourself?

U: Yeah, getting to think about ok, how am I going to grab it, not like "this is a video game, so to get close to it and find the position where I can grab it." I could experiment, I could be more experimental about how I'd grab it. Like a normal object.

M: Yeah. Makes a lot of sense. And what about pushing then?

U: Pushing. Yeah. I think I didn't have a preference for pushing. But for the first pair of hands I missed the prompt that you should push, I tried to grab it.

M: Yeah, I think I saw you do that, I was thinking that we need a better way of informing you a what to do on the task.

U: Yeah, maybe like a "ding" or something. But yeah, I don't think they were that different. Pu in VR, it's a little... grabbing feels kind of good in VR, even if it doesn't have weight, it feels like does, but with pushing it feels like you're not that much in control, because when you grab something, the process of grabbing something is until you have it in your hand, and then you'd done grabbing-

M: Mmmm.

U: But with pushing, it feels weird, because there's no force, there's no resistance, and you do feel that much in control, because the process is just... virtual. Yeah.

M: Yeah, that's an interesting point.

U: But yeah, that's how I felt about pushing.

M: Yeah, makes sense. And finally, petting?

U: Petting.

M: Did you like the dog?

U: It was pretty fun. I missed the prompt for petting on the first one. It didn't react as much, it itself didn't react, but the hands treated it well, there was some resistance when pushing into dog.

M: Good point about missing the prompts. Great. So, you touched on this before, but did you a change in how you grabbed objects with the two hands? You mentioned putting more thoug it with the second ones at least.

U: Yeah, um, in the first one I always tried to go from the top. Or in the first one, I mostly went the top because it was the shortest path. But when there was some irregular shaped object, it little more difficult, I didn't know if I had to align my hand properly first. But with the second c when I noticed that I could grab the box from the side, I was like "ah, ok, I can actually grab it anywhere," and with the drill and the pen, I tried grabbing that and didn't care where I grabbe

uid 2

Order: Snap Hands, Dynamic Hands

M: Nice, so I have 3 questions here. The first one is about first impressions. You tried out the two hands, does anything immediately come to mind when thinking about them and how the experience of using either one was?

U: I think I preferred a lot more the second approach. It seemed a lot more natural in a way. I think that the snapping, the snap one felt very clumsy and unnatural in a way, so when I was grabbing the objects, I didn't... I didn't intentionally want to grab it as I would in the real world. It was a lot more like "ok I'll put my hand nearby and click the button and it does it for me," whereas with the second approach, it was a lot more natural in a way, where I intentionally would've tried to grab it the way I would have in the real world. Uhh, so I guess that was the first impression I had with the grabbing. With the pushing, I think it was... it wasn't so much that... it's not that I would have pushed them differently, but observing how the hand grabbed around it and the fingers wrapped around it, I think it just looked a lot more natural and it felt a lot more immersive in that regard, because the first approach was a lot more clunky and unnatural in a way. It didn't really feel like...

M: the approach where the hand was just static?

U: Yeah, pretty much, it was like, you know, pushing it, it was like if the fingers were just in a horizontal position and you were pushing it, whereas in the second approach it was, you know, you could actually guide it, not only side to side, but also up and down and stuff like that. So I think that was, you know, the impressions I got from the second experiment, and then the third one, the dog, I think that was also like a huge difference.

M: mmm.

U: The second approach again prevailed, like seeing the fingers wrap around the contours... there was a big difference between the two approaches for sure, seeing the fingers wrap around the contours of the dog, that was cool to see, more realistic in a way, whereas in the first approach it once again felt like I could only pet the dog with the fingers horizontally kind of like this [holding their fingers straight out], whereas in the real world you wrap your fingers around objects as one would... and I don't remember how the fingers were in the first approach, did they wrap around it or did they snap on, but I remember that there was this significant difference between the two, especially petting the dog.

M: yeah.

U: Yeah, the dog one was where you could really... and the first one, with the grabbing, and the petting, I think those were the biggest differences. In the second one there were also differences, but it was more like, being immersed. Whereas the functionality of the approaches was the difference in the first and third one.

M: Yeah, makes sense. So with pushing it didn't make as much of a difference, other than visually.

U: Yeah.

M: nice, so you covered my first and second questions, I was going to ask about each task-

U: Ahh! Two birds with one stone!

Assignment 1: Qualitative Data Analysis

Your task: Using real data from these post-session interviews, perform a qualitative analysis on what users thought about the two approaches.

Assignment 1

Deliverable one (due 16.01)

- Code 5 user transcripts individually.

Deliverable two (due 16.01)

- In groups, compare your individual codes and then merge them into one project.

Detailed instructions available on MyCourses. **Please read before starting.**

Thank you!

References

References (1/2)

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