04 – Design Research

April 4, 2024
Amazing Color Changing Card Trick

Quirkology Channel

THE COLOUR CHANGING CARD TRICK

www.RichardWiseman.com
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Why did I show you that?
Why did I show you that?

If we are focusing on the wrong thing, we can completely miss other important things

Assumptions, pre-conceptions, and background play a huge role in how we focus our attention

Today is about this danger when understanding the context for which you design technology

You will always have a focus, so be aware and explicit in managing that focus
“You Are Not the Customer”

Seems obvious, but...

- You have different experiences
- You have different terminology
- You have different ways of looking at the world

Easy to think of self as typical

Easy to make mistaken assumptions
Overview

Project Status

Design Research and Contextual Inquiry
  - Ethnographic Principles
  - Contextual Inquiry Principles and Practice
  - Additional Design Research Methods

Time with Project Groups
Course Reminders

1b_rev (Revised Group Proposals) Due Tonight @ 8pm

Section Tomorrow: 1b_rev Crit
  Goal: Get all the feedback you need to pick the right idea

1c (Finalized Proposal) Due Monday @ 3pm

Looking Ahead:
  Tuesday: Project Ideation Activity (2a, in class)
  Thursday: Design Research Plan
Additions to 1c

Newly added content to include in your writeup:

Describe your connection to your chosen audience. What prior experience does your group have in interacting with members of this audience?

If your group does not have experience interacting with members of this audience: how do you plan to ensure that you interact appropriately and respectfully with your design research participants?
Objectives

**Be able to:**

Describe master/apprentice relationship in contextual inquiry, contrast it to other relationships with a participant.

Enumerate and describe principles of contextual inquiry.

Describe stages of a contextual inquiry, including withdrawal and return.

Give examples of other design research methods, be able to consider how they might be applied to different design research needs.
Ethnography

Emerged in 1920s as a new method in anthropology, exploring why groups think and act as they do

In contrast to prior colonial perspectives

Learn local language, record myths, customs, and ceremonies in much greater detail

You will likely never perform an ethnography

Sometimes “ethnographically inspired methods”
Ethnography

Traditional science attempts to understand a group or individual objectively
  Understand the subject of study from the outside in a way that can be explained to “anyone”

Ethnography attempts to understand a group or individual phenomenologically
  Understand the subject of study as the subject of study understands itself
Contextual Inquiry

Applied design ethnography

“The core premise of Contextual Inquiry is very simple: go where the customer works, observe the customer as [they work], and talk to the customer about the work. Do that, and you can’t help but gain a better understanding of your customer.”

Hugh Beyer and Karen Holtzblatt
Many Design Research Methods

Many other design research methods are available, with different strengths.

Often apply multiple methods for complementary perspectives.

Fundamental goal is to gain design insight.

Will focus on contextual inquiry because:
- It is an effective and commonly-used method.
- Its principles extend to many other methods.
User, Subject, or Participant?

“User” is a loaded term, but sometimes we need it

In traditional science, “subjects” are “subjected to” experiments as researcher develops understanding

In ethnographically-oriented design methods, “participants” instead “participate” in helping the researcher develop understanding

This is not simple correctness, nor only about respect, it is a mindset that matters for being open
What is your relationship?

In a scientist/subject relationship:

- The scientist does stuff
- The subject responds in some way
- The scientist collects data, goes back to their office, and analyzes the data to gain understanding

This is not very appropriate for gaining phenomenological understanding
What is your relationship?

In an interviewer relationship:

- The interviewer asks a question, the interviewee responds
- At a pause, the interviewer asks the next question from their list
- Complete when all the questions are answered

This would support gaining phenomenological understanding IF you knew what questions to ask

Implying you have at least SOME phenomenological understanding
What is your relationship?

In a master/apprentice relationship:
- The master is doing stuff
- The master explains what they are doing
- The apprentice asks clarification questions
- The master answers

This relationship is at the heart of contextual inquiry
Master/Apprentice Relationship

Seeing the work reveals structure

Difficult to describe when not doing the task

“A doctor said he read journals outside his specialty because they often had information of interest to him. How did he decide what was of interest? “Oh, I just scan the article titles.” That wasn’t very specific. But when asked to do it, he was able to say, “Look, this article is about another use of a drug I prescribe. I’ll read that. And here’s an article about a procedure that uses a device I use a lot. There might be good stuff there...”"
Master/Apprentice Relationship

Every current activity recalls past instances

“A financial manager received a stock alert on his phone while we were talking. This reminded him about the time recently when he had gotten an alert of a PayPal transaction while he was watching a ballgame. But he knew he hadn’t made any transactions—so he called, discovered it was fraudulent, and was able to resolve it immediately.”
Not Quite Master/Apprentice

If you do not understand, you ask

Huge contrast to assuming you are correct and understand

But the goal is not to learn to do the task

Instead, the goal is to learn how the participant does the task in order to learn how to support it

And for the researcher to enlist the participant’s active assistance in understanding the task
Not Quite Master/Apprentice

In a contextual inquiry relationship:

- The participant is doing stuff
- The participant explains what they are doing
- The researcher offers an interpretation
- The participant agrees or corrects

Partners

- Not really an interview
- Not really an apprentice
Principles of Contextual Inquiry

Context
  Must be done in the setting of the participant.

Partnership
  Master/apprentice model; investigator is humble.

Interpretation
  Observed facts must be regarded for their design implications.
  Raw facts without interpretation are not very useful.

Focus
  Themes that emerge during the inquiry.
  You cannot pay attention to all facets of all things at all times.
Context

Go and see the work as it unfolds
People summarize, but you need want details
Keep it concrete when people start to abstract

“Do you have one? May I see it?”
Imagine studying how a student writes a paper, why not just ask?
Context

Imagine studying how a student writes a paper, why not just ask?

May not remember details
  Getting roommate to read drafts

May skip critical difficulties
  Trouble locating references on the Web

May recount *intent* rather than *what actually happened*
  “I started writing it Thursday Night” → Are we talking 7pm or 2am?
Context

Avoid summary data by watching work unfold

Have participants talk aloud about their work and thoughts

“I’m looking for something my husband and kids will both be happy with. Look, my husband would love this—a golf tour of Scotland. But what would we do with the kids? Here’s a cruise—maybe that would work. Lots of kid activities, and my husband has always wanted to do a cruise...Getting it right really matters to me. I want everyone to have a great time!”

Seeing what a person does is much easier than why they do it
Context

If cannot observe, ground in an instance

Span time by replaying past events in detail

Look for holes

Ask questions to fill them

Use artifacts for context

If story has not yet ended, go back to a story that did

A car owner (U) talks to the interviewer (I) about how he handled a road trip to another city:

I: You entered in the address?
U: That's right.
I: Where did you get the address? Did you have it on your phone?
U: Yes, but I actually entered the address the night before.
I: The night before?
U: Right. Before I go on a trip, I enter all the places I'll go as destinations.
I: You mean you saved them as favorites?
U: No, I just entered them like I was going to go there, then I canceled. That's what I did the night before. Then, the day I left, they were all right there, easy to pick. [He shows the recent destinations list].
I: So you never have to delete them.
U: Right—they just disappear off the bottom of the list. I may never go to these places again, so if I entered them as favorites I'd have to delete them later.
I: Okay. So the night before, where did you get the address from?
U: My first address was a client we do business with all the time, so I got it from the contacts on my phone.
I: Can I see?
Partnership

Traditionally, interviewer has too much power
   You do not know what will turn out to be important
Apprenticeship model tilts power back too far
   You are not there to learn the skill

Interviewer should create a partnership
   Alternate between watching and probing

Avoiding Other Relationship Models
   Interviewer / Interviewee: You are not there to answer a list of question
   Expert / Novice: You are not there to answer questions
   Guest / Host: Move closer, ask questions, be nosy
Partnership

Do not squash design ideas if they arise
This is design, not dispassionate science

Get instant feedback

If it works, you understand the work practice and have a solution

If it fails, you can improve your understanding of the work

Find the issues behind design ideas
Withdrawal and Return

Key in partnership

Researcher observes action that indicates something meaningful

The researcher asks about this, and the pair withdraw from the task

Discuss the question

Then return to the task

In one interview with a user of page layout software, the user was positioning text on the page, entering the text and moving it around. Then he created a box around a line of text, moved it down until the top of the box butted the bottom of the line of text, and moved another line of text up until it butted the bottom of the box. Then he deleted the box.

Interviewer: Could I see that again?
Customer: What?
I: What you just did with the box.
C: Oh, I'm just using it to position this text here. The box doesn't matter.
I: But why are you using a box?
C: See, I want the white space to be exactly the same height as a line of text. So I draw the box to get the height. (He repeats the actions to illustrate, going more slowly.) Then I drag it down, and it shows where the next line of text should go.
I: Why do you want to get the spacing exact?
C: It's to make the appearance of the page more even. You want all the lines to have some regular relationship to the other things on the page.
Interpretation

Chain of Reasoning
- Fact, Hypothesis,
- Implication for Design, Design Idea

Design is built upon interpretation of facts
- Design ideas are end products of a chain of reasoning
- So interpretation needs to be correct

Share interpretations with participants to validate
- Will not bias the data
- Teaches participant to see structure in the work
Interpretation

Sharing interpretation allows participant to correct or refine

“‘It’s like a traveling office,’ we said, looking at how a Salesman has set up his car. ‘Well—like a traveling desk,’ he responded.”

“‘So you’re acting like a master coder,’ we said to a development project manager. ‘Yeah,’ he said. ‘Except I wasn’t looking at code. More like master QA.’”

Participants fine-tune interpretations

Probe contradictions until assumptions fit
Interpretation

Non-verbal cues can confirm or negate

Yes and Nos

“Huh?” – way off
“Umm, could be” – probably no, just being polite
“Yes, but...” or “Yes, and” – depends what follows

Commit to hearing what people actually say
Most have not ever had people actually pay careful attention to what they are doing
Focus

Everybody has a focus, you cannot prevent it
   Entering focus
   Project focus

Because you will have a focus, be mindful of that focus and use it to your advantage
   Focus reveals detail
   Focus conceals the unexpected

Brainstorm and define your focus, then expand
Focus

Opportunities to expand focus:

Surprises, contradictions, idiosyncrasies
- Nothing any person does is for no reason

Nods
- Question assumptions even if they match
  “Do they really do that? Why would they do that?”

What you do not know
- Treat interview as an opportunity to learn new stuff
- Even if the participant is not knowledgeable, extent of their knowledge / misinformation can be useful
The Stages of a Contextual Inquiry

1. Interview / Warm Up
2. Transition
3. Observe Behavior
4. Share Interpretation
5. Refine Interpretation
6. Wrap-up
7. Withdraw / Return
Explain the Rules

Be sure you explain “the rules” of how you’ll be interacting during the contextual inquiry.

If this is not completely clear, the encounter may devolve into a traditional interview (a relationship that is more familiar to people).
How to Mess it Up

Slipping into abstraction
  Keep it concrete, in the work, in the details

Not being inquisitive or nosy enough
  If you have the impulse to ask, do it right away

Being too pushy with interpretation
  If you ignore corrections, participant will shut down
How to Mess it Up

With the wrong person
   They need to be willing to partner with you

Turning it into a regular interview
   If you could have done it in a coffee shop,
      then you did not do a contextual inquiry

Multiple people present
   Can be good if they talk, surface their thoughts
   Bad if they do not talk, are not forthright
How to Mess it Up

Overly disrupting the task

- If you change the task, your data is less useful
- Withdrawal and return, maybe on a schedule
- Retrospective methods might be necessary
  (e.g., going through artifacts, prior critical incident)

Being stuck in your focus

- Important to have a focus,
  expectations of what you expect to be important
- But you learn by attending to misconceptions
Affinity Diagrams

Generated during group session

Each observation, idea, note to a post-it

Notes are hierarchically organized into themes, based on project focus

Various models for analysis
Today

Project Status

Design Research and Contextual Inquiry
  Ethnographic Principles
  Contextual Inquiry Principles and Practice
  Additional Design Research Methods

Time with Project Groups
Many Design Research Methods

Many other design research methods are available, with different strengths.

Often apply multiple methods for complementary perspectives.

Fundamental goal remains to gain design insight through improved understanding of problems.

See Canvas Resources
Interviews

Similar to contextual inquiry, but lacking context of direct observation

- Set a focus, record, take notes, have two people

Can be Structured / Semi-Structured

- Avoid leading questions

Interpret responses

- Repeat and rephrase, probe terms and concepts
- “can you give an example”, “tell me more”,
- “what do you mean”, “why was that important”

Ask when it did not happen as expected
Interview Timeline

(Thanks to Michael Barry for this model)
Interview Timeline

**Intro:** “Hi, I’m a UW student studying coffee drinkers. I’m interested in hearing about your experience with coffee. There are no right or wrong answers, I just want to hear what you have to say.”

**Kick-off:** “Do you drink coffee?”

**Build rapport:** “Did you have a coffee today? How was it? Do you have a favorite coffee?”

**Grand Tour:** “Can you describe your most memorable coffee experience? Why was it so unique? What happened?”

**Reflection:** “If you were designing the ultimate coffee shop based on your ideal experience...”
Types of Interviews

Classic 1-on-1

Debrief/Reflection
Participant does [activity], Follows up with Interview

Pair/Group Interview
Participants with a preexisting relationship, interviewed about their joint experiences
Interview Activities

What would provide something meaningful to reflect on?

Storytelling Exercise:
   “Tell me about a time when…”
   [Participant tells story]
   “Thinking about that specific example…”

Prompted Reaction:
   “Take a look at this Thing™. How would you…”

Pros/Cons, Guided Critique
   “What specifically about X do you find frustrating / challenging / etc.?”
   “If we were to totally redesign the system– what parts of it would you want to keep?”
Questionnaires / Surveys

Can gather quantitative data
- Do you need quantitative data?
- Is that data at a meaningful scale?

Can be used for screening, paired with other methods for more depth
- Screening questions to confirm / identify eligibility
- Open-ended questions for analysis
- Contact for follow-up interviews

Method 67/83
Focus Groups

Moderated conversation among peers
  Moderator helps establish this, participants share experiences, wants/needs

Researcher benefits from their conversations

Prompts discussion topics
  Explanations of problems in status quo
  Underlying emotions in a process
  Desires / disagreements for new designs
Diary Study

Participants keep a diary
   Possibly as primary data
   Possibly to create mindfulness before interview
Diary Study

Participants keep a diary
Possibly as primary data
Possibly to create mindfulness before interview
Experience Sampling

Emerges from “beeper study” method
Can be random, can be context-aware
Can gather self-report, photos, sensor data
Card Sorting

Elicit groups / relationships
Talk aloud can also reveal understanding
Can evaluate existing categories
Could be combined with brainstorming
Many Design Research Methods

Personal Inventories
“collections of artifacts selected by the participant”

Cultural Probes
“materials designed to inspire people to thoughtfully consider personal context and circumstance”

“maps ... asked the elderly to mark zones for meeting others, being alone, dreaming...”
Many Design Research Methods

Behavior Mapping
“place-centered mapping”
“individual-centered mapping / traces”

Graffiti Wall
“candid feedback on behaviors and perceptions of current spaces”
Shadowing

“observational method that involves tracking somebody in their role”

“not intended to be covert ... however subtle instances might be completed in public spaces ...”

Useful reminder to be thoughtful and safe
multiple groups have been asked to leave
be safe, be mindful of people
Participatory Design

Set of methods focused on engaging people throughout a collaborative design process

In democratic society, design needs to be democratic

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User
Tester
Informant
Design Partner

Druin, 2002.
Participatory Design
Additional Reading

Ethnographic themes

7

Ethnographic Field Methods and Their Relation to Design

Jeanette Bickelberg
Kanye Peirce-Allen Research Center

Joan Glassner
Andrew Mishler
Pam Swansson-Wall
Aeros Corporation

In this chapter we examine the relationship between developing a descriptive understanding of human behavior and designing artifacts which, to a surprising extent, reflect the activities described. Although there is growing recognition that an understanding of users’ current work practices would be useful to the design of new technologies, the debate about what would make this approach useful has been framed in terms of design and not in terms of designing artifacts that reflect the knowledge useful to design.

The ethnographic approach with its emphasis on “context, period, rules,” beliefs, and material settings provides a unique perspective that is ideally suited for understanding, designing, and implementing new technologies. This perspective involves observing and understanding users’ work activities. However, ethnography is more than just observing and documenting work activities. The language of design and ethnography must be spoken in different contexts and in relation to different concerns. While the ethnography is essential in understanding human behavior, the design must be derived from the observed behaviors. The ethnographer must be trained in designing artifacts that will support the activities of those observed. The current challenge is to develop ways of linking these two understandings.

1This work is based on members of the National Health/Health Services Research Programs who worked with us on our exploration of the ethnographic and use of ethnographic field methods in design.

See Canvas Resources
Additional Reading

Contextual Inquiry

  Principles
  Associated Models

A reasonable book for “how to design”, with good theory, although examples feel dated

  Slightly improved in newer version

See Canvas Resources
Additional Reading

Overview of Methods
Many methods
Each briefly described

Useful for browsing, as a jumping off point

See Canvas Resources
Additional Reading

Text presentation of ideas and approaches developed over many VSD-based projects
Additional Reading

Jumping off point for participatory design

1. The challenges of children and technology

   "Children have their own biases, dislikes, and needs that are very different from their parents or teachers. As someone in this field, we are designing new technologies for children and we are working to understand what it means to live in a world where everyone has access to the same opportunities." (Perkins et al., 1994)

   Children have their own biases, dislikes, and needs that are very different from their parents or teachers. As someone in this field, we are designing new technologies for children and we are working to understand what it means to live in a world where everyone has access to the same opportunities." (Perkins et al., 1994)
Assignment 2b (Design Research Plan):
“You are required to conduct design research to learn from at least three people who might use your design.”
Design Research Advice

Critical Perspective:
You are not doing “science” or even “testing”, you are seeking design insight, are there to learn

Be sure you design your research to learn
Many projects defined by a single participant insight
Others by a contrast between two participants

Do not assume you already know the answer
When surprised, remember to follow up for more

Ensure 2b’s description of method is detailed enough for feedback
Participants

Be intentional in your recruitment

- Some projects will be relatively constrained
- Others have more choice, should be purposeful in who is recruited
- Recruit people who can give you that “surprise”

Our requirement of 3 participants is the minimum

- Keep going until you find your key insights

Ensure 2b’s description of recruitment plan is detailed enough for feedback
Working with Marginalized Populations

Ethnographic methods have a history of being “extractive”
(This is a bad thing)

There is a mutual exchange:
- Participants are giving you their time and expertise
- What are you giving them in return?

Be respectful & considerate of participants’ time
Working with Marginalized Populations

Your “entering focus” is probably different from your participants’

This is a good thing! But also:

- Be careful not to project your focus onto them
- Be mindful not to push back
- Your participants don’t owe you anything
  - Be careful asking a question you wouldn’t ask your grandmother
Seeking Insights

Hawley provides a “checklist” of ideas on how to structure research

Perspective can be relevant beyond interviews

Use it to review and revise your research plan

Also in critique next week

CSE 440 – Introduction to HCI
Today: “Design Research”
Picking Methods:  
*What are you trying to learn?*

**Deep Understanding of...**
- Relationship between Person & Specific Context: **Contextual Inquiry**
- Person’s lived experience, perspective: **Interview-based Methods**
- How a Person varies over time / across contexts: **Diary Study-type Method**

**General Understanding of...**
- Many people’s interaction with a system: **Fly on the Wall / Shadowing**  
  *Can augment with follow up interviews!*

**Large-scale, shallow data**
- Statistics (that cannot otherwise be found): **Survey**  
  *This is the ONLY place I would recommend a Survey*
EXP: Doing Something *Different*

In addition to your core research method, propose additional research that uses an *uncommon* method 

(*ie, not Interview, CI, Diary, Fly on the Wall, or Survey*)

Use these slides & provided resources for reference, but some of my personal faves:

- Personal Inventory
- Cultural Probe
- Graffiti Wall
- Artifact Analysis
- Behavioral Mapping
- Love Letter / Breakup Letter
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