



User Research & Observation

CSCI 3002
Fall 2018

Today

- Understanding people!
- Observing and understanding activity

Meta

- Complete class project surveys by tonight at 11:59pm

Interviews vs. ...

Interviews vs. surveys

- + Survey will mostly be closed-ended questions
- + Survey can make it easier to reach a lot of people (or distant/rare groups)
- + Survey answers may be more honest...
- Only one shot: if the informant misinterprets the question, no chance to fix it
- Less engaging; informants often don't want to write or type long responses

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Open vs. closed ended questions

- Open questions allow any response
 - “text box” questions
- Closed ended questions involve a set of responses
 - Multiple choice, scales, etc.
- Best for questions where you want to learn about possible answers; telling stories, etc.
- Often best face to face
- Best when you know the possible answers
- ... and when consistency across answers matters

Often we use open ended questions early in our research so we can figure out what the closed ended questions should be.

Open vs. closed questions should be designed differently

- Open
 - “Tell me about the apps you use”
 - “How did you learn how to program Java?”
- Closed
 - “Indicate which of the following apps you use”
 - “How many times/week did you use Stack Overflow when learning Java?”

Make these work well for their Q type.

How we can mess this up

- When our closed ended questions don't accurately capture the right options

How many times per week do you send text messages?

- 1-5
- 6-10
- More than 10

What web sites do you use to learn coding?

- Instagram
- MyCUInfo
- Hulu
- Other _____

For the first one, everyone is going to put >10 so it's actually not useful. This is a wasted question because it doesn't actually reduce uncertainty about what people do.

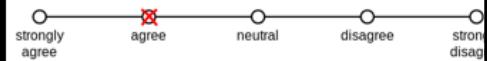
For the second one, even with an other option, now people have to type in a response (but they're lazy); and now we have to parse all the responses. We also might look ignorant because we seem not to even have any idea what people are doing.

Designing closed-ended questions

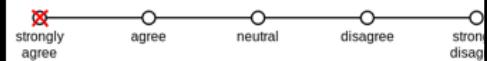
- Response scales
 - Likert scale most common (agree/disagree)
 - How many points? 5 or 7 is common
 - Should there be a middle option?
- Can statistically analyze these (but consider them ordinal scales; they are not evenly spaced)

Example Likert Scale

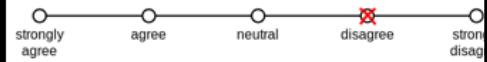
1. Wikipedia has a user friendly interface.



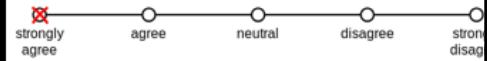
2. Wikipedia is usually my first resource for research



3. Wikipedia pages generally have good images.



4. Wikipedia allows users to upload pictures easily.



5. Wikipedia has a pleasing color scheme.



Debugging response scales

- Look out for missing or overlapping values
 - How old are you?
0-18 18-36 36-72
0-18 20-40
- Do your response options capture every possible option (or combination)?
 - How do you get to school?
car bus bike

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may be multiple

Guidelines: questionnaires

- Make sure to run a pilot
- Keep the questionnaire short
 - Few questions
 - Iterate on questions; keep them concise
- Highlight important parts of questions
 - Did you find the **share to snapchat** feature useful?
- Don't change the polarity of scales
 - If 5 is good, don't make 5 bad

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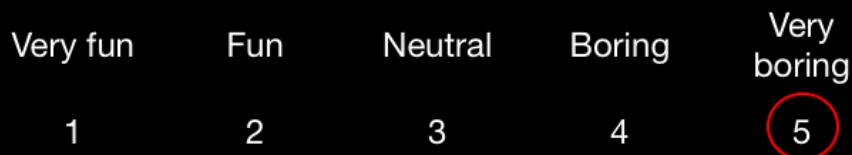
No one is thinking about this stuff as much or as carefully as you are

Scale polarity

Do you dislike or like this class?



Is the class fun or boring?



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You might want to do this intentionally...
But can you tell which you're getting?

Standard instruments

- System Usability Scale (SUS)
 - General instrument for measuring usability
 - ... but may not apply to all situations
- NASA Task Load Index (TLX)
 - Measure cognitive load

Participant ID: _____ Site: _____ Date: ____/____/____

System Usability Scale

Instructions: For each of the following statements, mark one box that best describes your reactions to the system today.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I think that I would like to use this system frequently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I found this system very user friendly.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I thought the system was easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I think that I would need assistance to use this system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I found the various functions in this system to be well integrated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I thought there were too many inconsistencies in this system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I could imagine how most people would react to this system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I found this system very reliable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I found this system very consistent using this system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I needed to make a lot of changes before I could get going with this system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please provide any comments about this system:

NASA Task Load Index

Hart and Stassen's NASA Task Load Index (NASA-TLX) method measures subjective task load. Increases in task load result in higher, medium and low estimates for each point result in 21 gradations on the scales.

Score	Task	Score
Very Low	Mental Demand	How mentally demanding was the task?
Very High		
Very Low	Physical Demand	How physically demanding was the task?
Very High		
Very Low	Temporal Demand	How hurried or rushed was the pace of the task?
Very High		
Very Low	Performance	How successfully were you in accomplishing what you were asked to do?
Very High		
Perfect	Effort	How hard did you have to work to accomplish your level of performance?
Fatigue		
Very Low	Frustration	How irritable, discouraged, irritated, annoyed, angry?
Very High		

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Interviews vs. focus groups

- Can just be a group interview (but rarely saves effort)
- Find commonalities, trigger memories of focus group members
 - “Oh yeah, I’ve had that experience too...”
- Can assign roles for more structured activities
 - Think-pair-share
 - Participatory design activities

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Why focus groups are hard

- One person dominates conversation
- Shy participants hesitant to engage
- Run out of things to talk about

Why focus groups are hard

- One person dominates conversation
→ Turn taking, sub-teams, ask focused questions to everyone
- Shy participants hesitant to engage
- Run out of things to talk about
→ Structured meetings (“today we’ll talk about riding the bus”)

Group design activities

What Not to Wearable: Using Participatory Workshops to Explore Wearable Device Form Factors for Blind Users

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ABSTRACT

In this paper we document two participatory design workshops conducted with a team of eight visually impaired adults that explored features and form factors for a wearable navigation technology. We compare and contrast our experiences conducting a low-fidelity prototyping activity using office supplies and a medium-fidelity prototyping activity using electronic components and a scenario-based approach. While both sessions produced designs with similar features and form factors, participant engagement was much higher during the medium-fidelity session primarily due to the tangible materials used and the more directed structure of the activity. We present the resulting designs as well as recommendations for participatory design prototyping methods for wearable technology development, particularly for people with vision impairments.

Categories and Subject Descriptors

K.4.2 [Social Issues]: Assistive technologies for persons with disabilities

General Terms

Design; Human Factors

Keywords

Blind; Navigation; Participatory Design; Wearable Technology

1. INTRODUCTION



Figure 1 – Navigation device design from low-fidelity prototyping (Activity 1) included two tactile maps worn around a camera that could be clipped to a bag's s

In our project we are exploring the creation of a device for people with vision impairments. Understanding needs, priorities, and preferences is essential to users often abandon assistive technologies [7],[8]. To gather user preferences, we conducted two part workshops with visually impaired adults that medium-fidelity prototyping. These workshops insights about what device features users found their preferred form factors for wearable navigation. Workshops also provided insights about conducting design activities with this population.

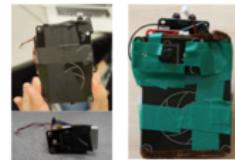


Figure 4 – Activity #2 Final Designs (Left: Group 1; Right: Group 2). Both groups created near identical designs with a camera and touchpad; Group 1 detached the camera to put on glasses, however.

2. RELATED WORK

<https://dl.acm.org/citation.cfm?id=2746664>

User research questions

Some goals for this kind of research

- Understand how people/groups do tasks
- Understand how people/groups see the world and talk about things
- Understand people's experiences
- Understand group practices
- "How does a blind person buy groceries?"
- "How do college students organize their class notes?"
- "What happens when someone has spinal surgery?"
- "How do groups on Twitter encourage or discourage harassers?"

These questions are less directly about the user interface - but instead about understanding people and groups better. In many cases in order to design something that works, we first have to understand some stuff about our users.

Asking research questions

- Let's practice brainstorming what we might want to know to help solve a problem
- Example: how can we develop tools and resources to help reduce stimulant abuse in college?
- Discuss with your neighbor: what things might we want to know?

What might we want to know?

Themes

- Why do people start?
- Who are they?
 - Support systems
 - Social network
- What is the process like?
- Role of other stakeholders
 - Who do they trust?

More interesting user research methods

Research methods

- When are interviews and surveys not enough?
 - When people may not be good at answering a question (for whatever reason)
 - When we need to know more about an experience than a simple answer
 - When we want to build rapport with our research participants

Opinion vs. behavior

- People are often bad at reporting on their own behaviors, especially future behaviors
- Understanding the relation between these can be very helpful

We've done a cool \$50 million of R & D on the Apple Human Interface. We discovered, among other things, two pertinent facts:

- Test subjects consistently report that keyboarding is faster than mousing.
- The stopwatch consistently proves mousing is faster than keyboarding.

— Bruce Tognazzini (1989), asktoq.com

If you could just ask people what they want and get correct answers, we wouldn't have failed products...CONTEXT matters

(Some) HCI research methods

Observing

- Observation
- Ethnography/
participant observation
- Contextual inquiry
- Think aloud technique

Asking

- Interviews
- Focus groups
- Surveys

Participant-driven

- Diary study
- Experience sampling
- Cultural probe

Performance-based

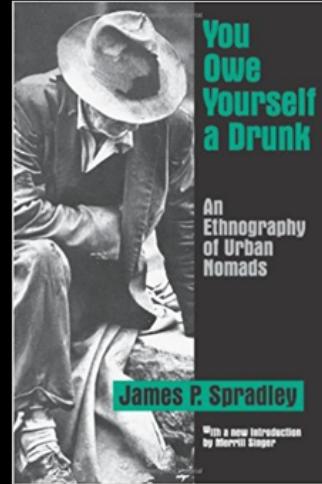
- Lab study
- Longitudinal study
- Collecting performance
data

Ethnography (“culture writing”)

- Research method from anthropology
- Participant observation – not just observing other participants, but acting as a participant
- Become a member of the group to understand how the group works, talks, and thinks

Ethnography in action

- J. Spradley (1970), *You Owe Yourself a Drunk*
- An ethnographic study of “urban nomads” (tramps, hobos)
- Spradley lived in their community for years, rode trains, went to jail, etc.
- Identified cycle of public drunkenness, paying fines, and being thrown in jail
- Led to reforms in laws about public alcohol consumption



This is a clear example of where an interview would be insufficient. It would be very difficult to get someone in this situation to have the right perspective about what was going on.

Traditional ethnography

- + Get out of the lab
- + Gain deep experience of a specific culture
- + Approach understanding from inside

- Extremely time consuming (months, years)
- Demanding on participants

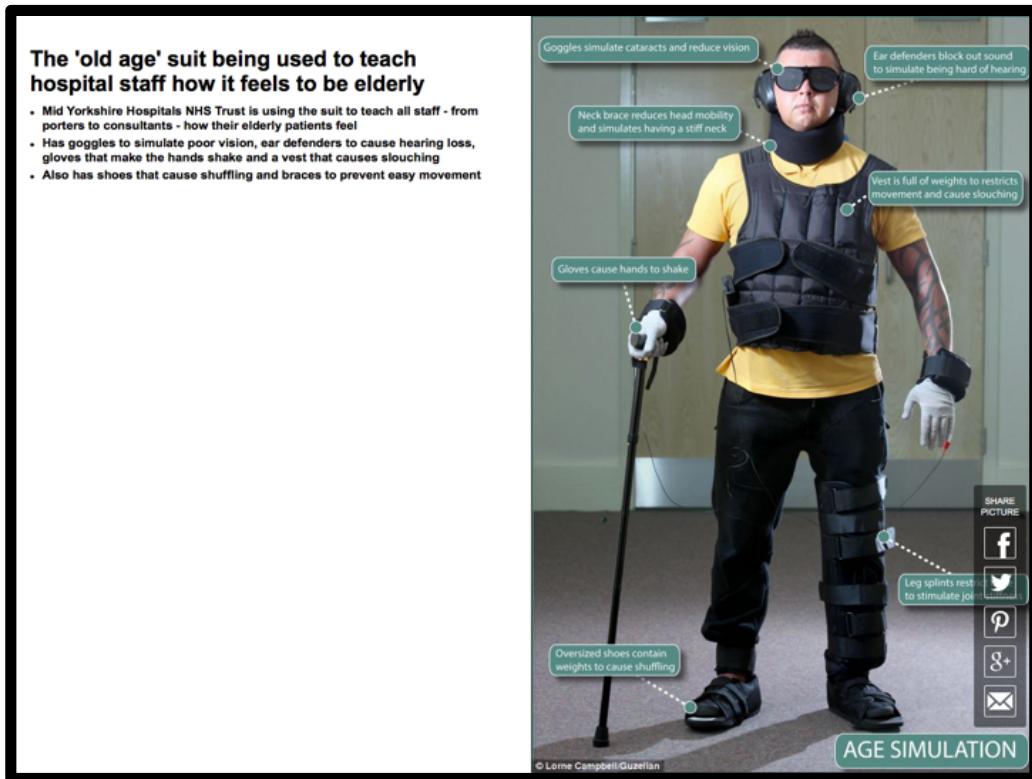
Rapid ethnography

- In most cases, HCI researchers or designers don't perform ethnography at a respectable level (for anthropologists)
- “Rapid ethnography” (Millen) and other “quick and dirty ethnography” methods are inspired by ethnography, but lack the complete richness of ethnography

Bodystorming / simulation

- Role playing a specific persona or use case
- Can include taking on the physical characteristics of the participant (but not always)
- Example: Imagine you just woke up and you are late for class in Fleming! What do you do?
(and then actually do it)

Oulasvirta, Antti; Kurvinen, Esko; Kankainen, Tomi (July 2003). "Understanding contexts by being there: case studies in bodystorming". *Personal and Ubiquitous Computing* 7 (2): 125–134. [doi:10.1007/s00779-003-0238-7](https://doi.org/10.1007/s00779-003-0238-7)



<http://www.dailymail.co.uk/health/article-2573779/Deafness-shaking-hands-shuffling-The-old-age-suit-used-teach-hospital-staff-feels-elderly.html>

Patricia Moore

- At age 26, she transformed herself into a range of women over the age of 80.
- The disguises involved more than makeup and clothing: She altered her body with prosthetics that blurred her vision, reduced her ability to hear and limited her motion. She relied on canes, walkers and a wheelchair.
- From 1979 to 1982, she was in the roles about every third day for as much as 20 hours at a time. The experiment took her to 116 cities in 14 states and two Canadian provinces.

• [Video](#)



Problems with simulation

- Often miss out on crucial aspects of what it's "really" like
- May focus on differences that are easily to simulate, and miss out on others
 - Learned experience and workarounds
 - Coping skills
 - Social and cultural aspects

For example, blindfolds.

Representation > simulation

At 90, She's Designing Tech For Aging Boomers

[LISTEN 4:36](#) [+ QUEUE](#) [...](#)

January 19, 2015 · 2:32 PM ET
Heard on All Things Considered

 LAURA SYDELL [Facebook](#) [Twitter](#) [Instagram](#)



Barbara Beskind, 90, is a designer at IDEO who works with engineers on products that improve the quality of life for older people.
Nicole Zunken/Courtesy of IDEO

In Silicon Valley's youth-obsessed culture, 40-year-olds get plastic surgery to fit in. But IDEO, the firm that famously developed the first mouse for [Apple](#), has a 90-year-old designer on staff.

Barbara Beskind says her age is an advantage.

"Everybody who ages is going to be their own problem-solver," she says. And designers are problem-solvers. Beskind speaks while sitting on a couch at the open office space of IDEO in San Francisco. She commutes to the office once a week from a community for older adults where falling is a problem.

"People where I live fall a lot," she says, adding, "For a friend of mine, I tried to design air bags of graded sizes that would be activated at a lurch of 15 degrees." She is stumped on how to find the right power source for her air bags.

Beskind says she started designing when she was 8 years old — toys, of course.

"Well, in the Depression, if you can't buy toys, you make 'em," she says. Beskind's first design was for a hobbyhorse. "I was determined I was going to have one, and so I made it with old tires. I learned a lot about gravity, 'cause I fell off so many times."

When it was time for college, Beskind told her counselor she wanted to be an inventor. That required an engineering degree. In those days, women couldn't get into those departments. So she studied home economics and later enlisted in the Army and became an occupational therapist.

Contextual inquiry

- Adapting ethnography to understanding workplaces
- Act like an apprentice to someone and learn about their work (“apprentice model”)
- Shadow participants, ask questions about what’s happening (and work history)
- Understand users’ environment, task, working groups and culture (expectations, norms, policies, values, etc.)



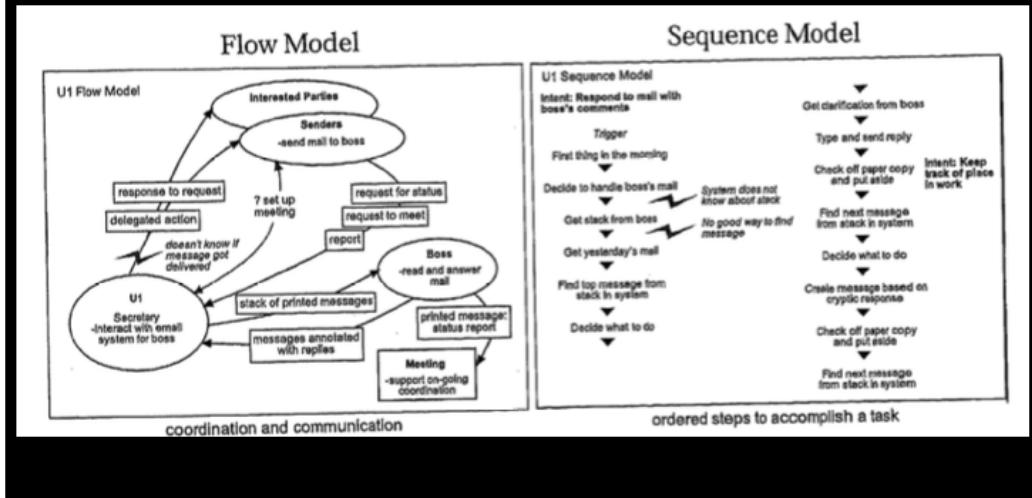
Example Contextual Questions

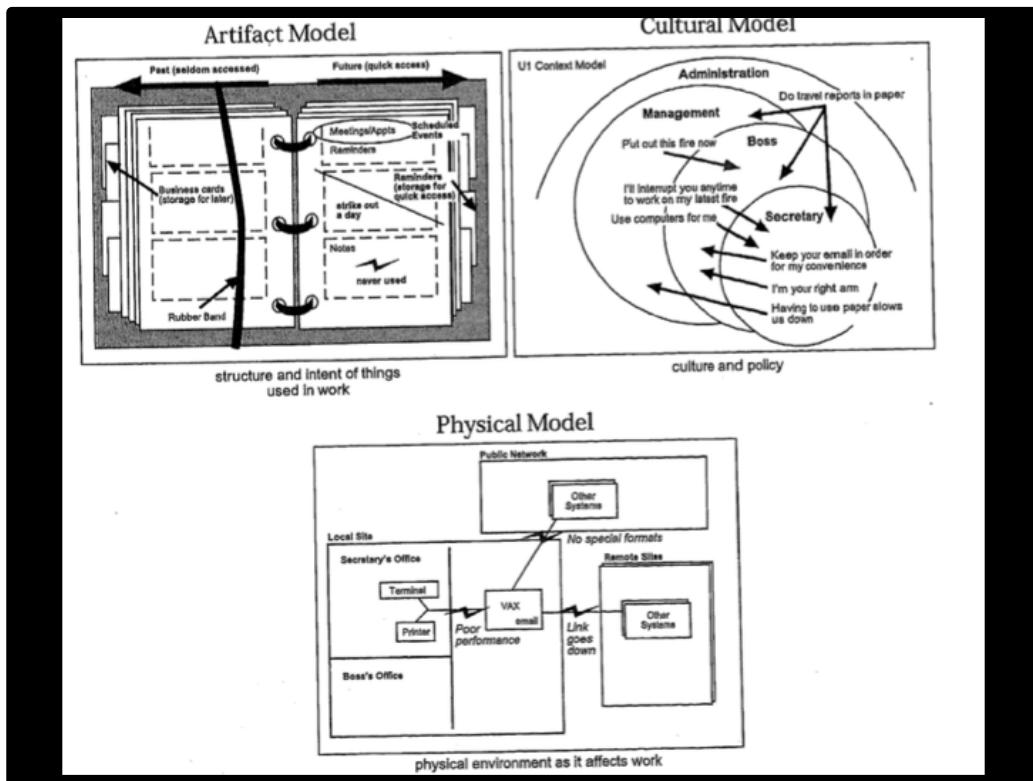
1. What is important to the user?
2. How, why are certain choices made?
3. How does the user think about their needs and goals?
4. How does the user understand the system?

Note: user may not always understand herself, so we study the understanding, and study her objectively (in context)

Contextual inquiry: models

- Capture different aspects of working context





Diary study

- Ask participants to record their experiences over a period of time (usually some number of days)
- Ask them to consider specific issues or problems
- Example prompt:
Write down the times today where you needed to search Google to solve a programming problem.

This is a self-report method - rather than asking people questions, let them be in charge.

Palen, L., & Salzman, M. (2002, November). Voice-mail diary studies for naturalistic data capture under mobile conditions. In Proceedings of the 2002 ACM conference on Computer supported cooperative work (pp. 87-95). ACM.

Voice-Mail Diary Studies for Naturalistic Data Capture under Mobile Conditions

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ABSTRACT

Mobile technology requires new methods for studying its use under realistic conditions "in the field." Reflexively, mobile technology also creates new opportunities for data collection while participants are remotely located. We report on our experiences with a variation on the paper-based diary study technique, which we extend by using voice-mail paired with mobile and landline telephony to more easily collect data in natural situations. We discuss lessons learned from experiences with voice-mail diary studies in two investigations of different scope. We also present suggestions for tailoring the technique to different research objectives, garnering high subject participation, and configuring the voice-mail system for data collection.

we have fielded many questions about our implementation of and experiences with voice-mail diary studies. These experiences and discussions with research scientists and usability specialists point to a need for efficient, non-intrusive data collection methods that yield informative, naturalistic data when studying issues of mobility.

We offer this paper as one response to these data collection challenges, with an in-depth discussion of the voice-mail diary study technique (see Mark's approach [11] as another interesting response). Our discussion is not intended to be a rigorous analysis of the diary study method in comparison to other data collection methods. Rather, this paper is meant to serve as an introduction to an approach that can be creatively extended to support many research

We can use whatever method makes sense to record the diary: paper, web forms, voice mail.

txt 4 l8r: Lowering the Burden for Diary Studies Under Mobile Conditions

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Abstract
We present and evaluate a new technique for performing diary studies under mobile or active conditions. Diary studies play an important role as a means for ecologically valid participant data capture. Unfortunately, when participants are asked to capture data while mobile or active, they are often unwilling or unable to invest time in thorough, reflective entries. Ultimately, this leads to lowered entry quality and quantity. The technique presented here suggests the capture of only small snippets of information in the field. These snippets then serve as prompts for participants when completing full diary entries at a convenient time. We describe how this system automates collection of snippets via text (SMS), picture (MMS) and voicemail messages and later presents these snippets for full entry elicitation. We then present results from a preliminary evaluation of this technique.

Keywords
Diary study, field work, mobile data capture, mobile computing, text messaging

ACM Classification Keywords
H.5.2 [Information interfaces and presentation]: User Interfaces - Evaluation/methodology, theory and methods, user-centered design.

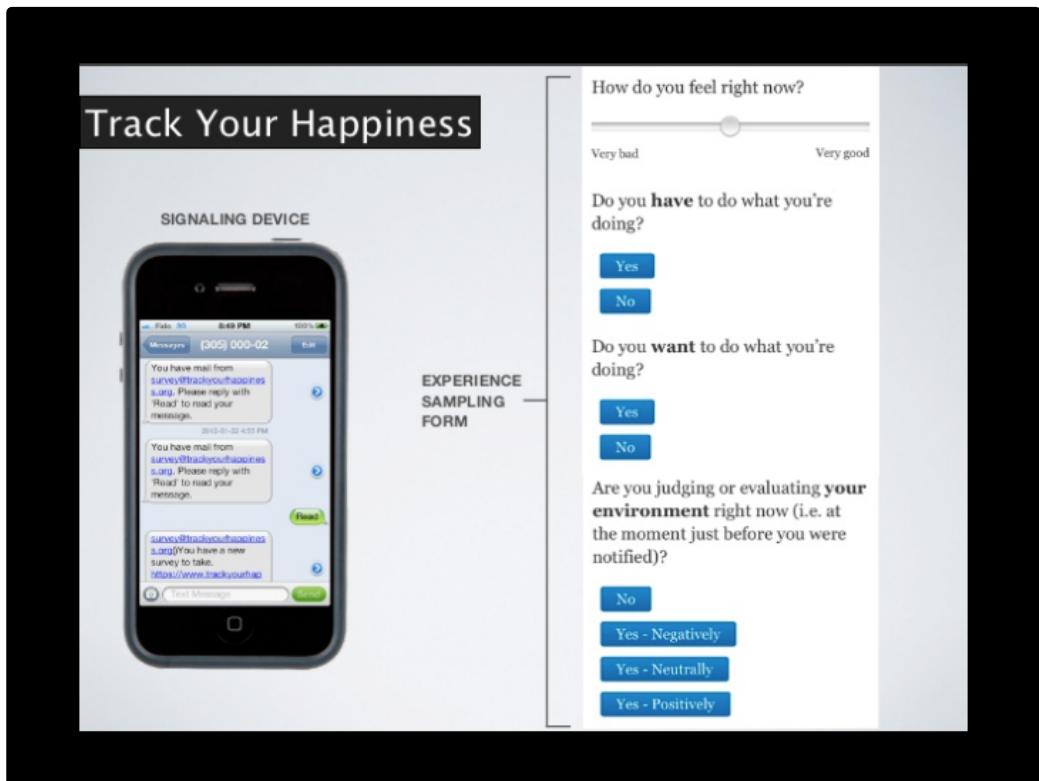
Copyright is held by the author/owner(s).
CHI 2007, April 28-May 3, 2007, San Jose, California, USA.
ACM 978-1-59593-642-4/07/0004.

Diary study

- + Capture experiences that may not come up in an interview
- + Identify changes over time
- Can be time consuming for participants
- Participant may forget to record diary (or may need incentives)
- Difficult to maintain compliance over days, weeks

Experience sampling

- How do you capture data at the moment something is happening?
- Experience sampling: deliver questions to participants while they are performing the task you want to know about
- Example: message someone at work at random intervals to ask them how busy they are
- We can sometimes use technology to figure out when to prompt people (e.g., when away from their desk)



From <https://www.slideshare.net/JayarL/experience-sampling>

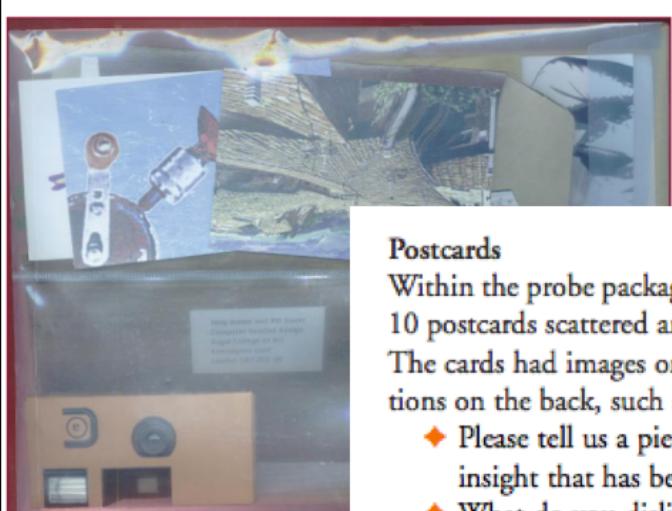
Cultural probes

- Rather than asking questions of informants, give them tasks to do
- Provide informants with a way to document their everyday experiences
- Make interesting activities to motivate people to do them
- Often delivered as a *kit* of assorted activities

The cultural probe package



The cultural probe package



Postcards

Within the probe packages, people found 8 to 10 postcards scattered among other materials. The cards had images on the front, and questions on the back, such as:

- ◆ Please tell us a piece of advice or insight that has been important to you.
- ◆ What do you dislike about Peccioli?
- ◆ What place does art have in your life?
- ◆ Tell us about your favorite device.



Figure 2. A postcard ("what is your favorite device?")

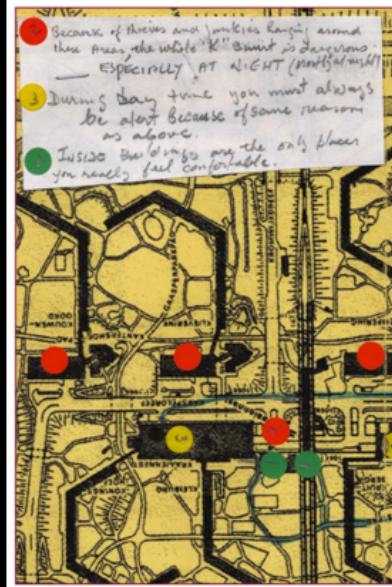


Figure 7. A returned map showing zones of safety and fear in the Bijlmer.

Cultural probes

- + Rich, interesting data
- + Engaging for participants
- May be difficult to draw conclusions

Examples:

<https://www.youtube.com/watch?v=EJqpUG4pJIE>

Gaver, B., Dunne, T., & Pacenti, E. (1999). Design: cultural probes. *interactions*, 6(1), 21-29.

Cultural probes for CU students

- Make a photo diary of everything you eat this week
- Every time you sit down, sketch a mini map of the people around you
- Mark the CU campus map with areas that feel **nearby**, **far away**, **really far away**



Maps as data source



Sarah Van Wart, K. Joyce Tsai and Tapan S. Parikh, [Local Ground: A Paper-Based Toolkit for Documenting Local Geo-spatial Knowledge](#), ACM Symposium on Computing for Development (DEV), December 17-18, 2010, London, UK

From http://tap2k.org/papers/localground_dev10.pdf

"Cute boys", "loser hangouts"

In this map, "cupcakes" referred to kids make out spots.

What research method do I use?

- **Many factors:** time, access to participants, resources, stage of system being evaluated, goals, research ethics
- **Triangulate** methods to increase our understanding
- With humans, it's important to capture both what people say and what they actually do

Observation

Observation as user research

- **On the surface:** watch stuff happen, notice problems and report them
- If we put in some time, we'll either see the problems or know there aren't any

Observation as user research

- **On the surface:** watch stuff happen, notice problems and report them
- If we put in some time, we'll either see the problems or know there aren't any
- **In reality:** we need to carefully choose the conditions of observation, what to look for
- Must make sense of what we see and apply it to the problems we care about

This is a process that can fail silently

What can we learn from observation?

- Can observe problems even when end users are not aware that they're happening
 - e.g., notice that supermarket shoppers frequently forget to take their receipt
- Can observe tensions and trade-offs that may not feel like problems, but are relevant
 - e.g., notice that shoppers who take a hand basket put things back when their basket is full
- Can observe human behaviors in context
 - e.g., notice that most shoppers arrive alone or in pairs
- Learn the structure of tasks

You can ask somebody: what did you forget today?
But that's not necessarily going to tell you much.

How to observe well

- Choose appropriate location and setup
- Have a sense of the topic you wish to observe, so you know what to look for
(may require multiple sessions)
- Learn to spot tasks, errors, obstacles, workarounds
- How people use devices, work alone or in groups
- Also, practice

Failure modes for observation

- Observe without planning → end up with a bunch of data but don't know what to do with it
- Assume that not seeing anything interesting means that nothing interesting is there
- Fail to process and synthesize your findings
- Read too much into behaviors without triangulating; incorrectly assuming motive
 - research often leads to more research

Analyzing observational data

- Who are the subjects?
- What are they doing?
 - What are their goals?
 - Tasks?
- What do we know about their context?
 - Are they multitasking? Carrying stuff?
 - Environmental distractions e.g. noise?
- What steps do they follow in completing a task?
- Did they run into any problems?
- If so, what did they do about it? (workarounds)

Analyzing observational data

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- If so, what did they do about it? (workarounds)
- Across all of these, were there groups, patterns?

Synthesizing observations

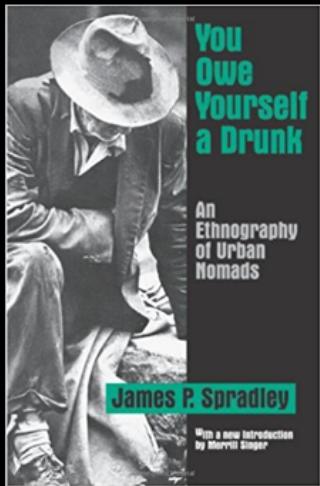


TABLE 3.3 COMPONENTIAL DEFINITION OF TRAMP DOMAIN

	Mobile ¹⁰	Mode of travel	Home base	Livelihood
Working stiff	Yes	Freight Commercial	Job	Specialized— Works
Mission stiff	Yes	Commercial	Mission	Specialized— Missions
Bindle stiff	Yes	Freight	Pack	Generalized
Airedale	Yes	Walk	Pack	Generalized
Rubber tramp	Yes	Car	Car	Generalized
Home guard tramp	No	Ø	Town and Kinsmen	Generalized
Box car tramp	Yes	Freight	None	Generalized
Ding	Yes	Freight	None	Specialized— Begs

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J. Spradley (1970), *You Owe Yourself a Drunk*

Identifying patterns



Figure 5: Photo showing the three spaces of activity

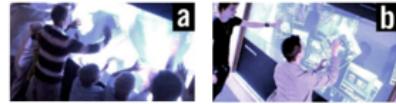


Figure 6. Parallel use



Figure 10. Pondering grip vs. grandiose gestures

Brignull and Rogers, Enticing People...

Peltonen et al., "It's mine! Don't touch!"

Different regions
Different kinds of behaviors

Identifying processes

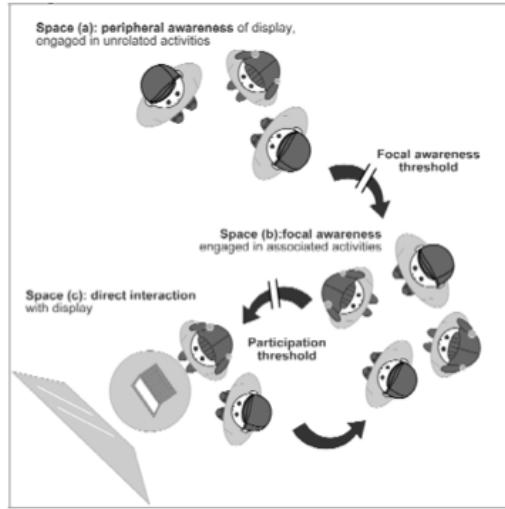


Figure 6: A diagram showing a model of public interaction flow across thresholds

Brignull and Rogers,
Enticing People...

A process

Next up

- Tomorrow: Practicing interview skills
- Next week: Sketching (bring materials!)