

Asking Questions in Research

CSCI 3002
Fall 2018

Image from A Web for Everyone: <http://rosenfeldmedia.com/books/a-web-for-everyone/>

Meta

- Project sign-up form coming later today
- Complete by Friday at 12 pm

Register to Vote



- As a CU student, you can register to vote here or at your home address
- General election **November 6**
- Information at <https://www.colorado.edu/registrar/students/registration/mycuinfo/register-vote> or <http://govotecolorado.com>

Today

- Question-based research methods
(interviews, focus groups, surveys)

Goals

- Designing effective questions
 - Learn what we want to know without wasting anyone's time
 - Increase likelihood of collecting useful data
- Translating questions across methods (interviews, focus groups, surveys)

Facts of life

- Human research is costly (time, actual money, access)
- Very difficult to re-do (sometimes you can't!)
- So there is good value in planning ahead
- Sometimes useful to iterate, but do so intentionally

What can we learn from interviews?

- Current behaviors
→ will your ideas disrupt these?
- User needs and requirements
→ unmet needs?
→ immovable requirements?
- Problems and workarounds

What is more difficult to learn?

- Preferences for UI and features
→ much more reliable to show examples and solicit feedback
- Prospective behavior
→ people are bad at estimating this

What is more difficult to learn?

- Preferences for UI and features
→ much more reliable to show examples and solicit feedback
- Prospective behavior
→ people are bad at estimating this
- **Note: people will often answer poorly designed questions without telling you (or even knowing) they're bad**

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Silent failure!

Example not-great questions

- “Do you prefer apps with the buttons on the top or along the side?”
- “What features do you want in a homework planning app?”

Planning interviews

- Recruitment
- Location
- Preparation
- Questions

Who to interview?

- Single group of stakeholders → understand group, but with a limited perspective
- Multiple groups of stakeholders (triangulation) → understand relationships between perspectives

Triangulation

- “Should we widen bike lanes in Boulder?”
- If we ask...

No one	We'll find out if we made the wrong choice...
Bike riders	Yes, no, maybe (from bikers' perspective)
Bike riders and drivers	<ul style="list-style-type: none">• Agree, disagree, don't care• Who cares or is impacted more?• Compromise position (“yes, but not on two-lane roads...”)

When subjects are difficult to access

- Identify the **gatekeeper** → talk to them or earn access
- Use **proxies** when direct access is not possible

Using proxies

The Design and Field Evaluation of PhotoTalk: A Digital Image Communication Application for People with Aphasia

Meghan Allen, Joanna McGrenere
Department of Computer Science
University of British Columbia
[meghana, joanna]@cs.ubc.ca

Barbara Purves
School of Audiology and Speech Sciences
University of British Columbia
purves@audiospeech.ubc.ca

ABSTRACT

PhotoTalk is an application for a mobile device that allows people with aphasia to capture and manage digital photographs to support face-to-face communication. Unlike any other augmentative and alternative communication device for people with aphasia, PhotoTalk focuses *solely* on image capture and organization and is designed to be used independently. Our project used a streamlined process with 3 phases: (1) a rapid participatory design and development phase with two speech-language pathologists acting as representative users, (2) an informal usability study with 5 aphasic participants, which caught usability problems and provided preliminary feedback on the usefulness of PhotoTalk, and (3) a 1 month field evaluation with 2 aphasic participants, which showed that both used it regularly and fairly independently, although not always for its intended communicative purpose. Our field study demonstrated PhotoTalk's promise in terms of its usability and usefulness in *real life* situations.

Categories and Subject Descriptors

K.4.2 Computers and Society: Social Issues – Assistive Technologies for Persons with Disabilities; H5.2, Information Interfaces and Presentation: User Interfaces – Evaluation/Methodology, Graphical User Interfaces, Prototyping, User-Centered Design

General Terms

estimated to affect 1 million Americans, is most often caused by a stroke, although other brain damage can also be the cause [2].

The incidence of stroke increases with age, so the majority of people with aphasia are older; however, aphasia can affect people of any age. Although people with aphasia often have difficulty communicating with written or verbal language, they generally retain their ability to recognize images [17].

There are many augmentative and alternative communication (AAC) devices for individuals who have communication impairments; however, they typically focus on the expression of basic needs and wants, and always require someone other than the end user to import and organize the contents of the system, such as icons, images, sound, and text (e.g., [18]).

PhotoTalk supports communication by providing a platform for users to independently capture personally meaningful images and share them with their communication partners. The ease of sharing images allows for communication that would otherwise be more difficult or impossible verbally or gesturally. Someone with aphasia can use PhotoTalk to share important personal information with others, such as photographs of her family, pets or hobbies or to show her husband photographs captured during daily events, taken while he was at work. The ability to share personally meaningful photographs supports a wider range of communication goals, including social closeness [11], than systems that only support needs and wants.

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<https://dl.acm.org/citation.cfm?id=1296876>

For extreme cases. But understand different opinions...

Location

- Optimize for attention (avoid distractions, noise, etc.)
- ... but interviewing in context can help jog memory

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<https://dl.acm.org/citation.cfm?id=1639663>

The “show me your stuff” method

Freedom to Roam: A Study of Mobile Device Adoption and Accessibility for People with Visual and Motor Disabilities

Shaun K. Kane,¹ Chandrika Jayant,² Jacob O. Wobbrock,¹ and Richard E. Ladner²

¹The Information School

DUB Group

University of Washington

Seattle, WA 98195 USA

{skane, wobbrock}@u.washington.edu

²Computer Science & Engineering

DUB Group

University of Washington

Seattle, WA 98195 USA

{cjayant, ladner}@cs.washington.edu

ABSTRACT

Mobile devices provide people with disabilities new opportunities to act independently in the world. However, these empowering devices have their own accessibility challenges. We present a formative study that examines how people with visual and motor disabilities select, adapt, and use mobile devices in their daily lives. We interviewed 20 participants with visual and motor disabilities and asked about their current use of mobile devices, including how they select them, how they use them while away from home, and how they adapt to accessibility challenges when on the go. Following the interviews, 19 participants completed a diary study in which they recorded their experiences using mobile devices for one week. Our results show that people with visual and motor disabilities use a variety of strategies to adapt inaccessible mobile devices and successfully use them to perform everyday tasks and navigate independently. We provide guidelines for more accessible and empowering mobile device design.

Categories and Subject Descriptors:

H.5.2 [Information Interfaces and Presentation]: User Interfaces – input devices and strategies, voice I/O.
K.4.2 [Computers and society]: Social issues – assistive technologies for persons with disabilities.



Figure 1. The devices a visually impaired participant carries with her frequently: (a) signature stamp, (b) water-level sensor, (c) CCTV magnifier, and (d) mobile phone.

For people with disabilities and older users, mobile phones and other mobile devices can provide increased freedom by allowing users to act independently while remaining in contact with friends, family, and caregivers [1]. Mobile devices can also be used to implement assistive software for people with special needs [14].

However, mobile device interfaces are often inaccessible to people with visual and motor disabilities due to problems such as

Display a menu

Preparation

- Do everything you can to make your own life easier!
- Write out a script, make worksheets...

1. Demographic info

1. [Don't forget to record gender]
2. OK. First I'll just ask you a few demographic questions.
3. How old are you?
4. What's your occupation?
5. Could you briefly describe any medical disability that you have?
6. [For each] Could you briefly say what the functional effects of that condition are?
7. [For each] How long have you had that condition?

2. Mobile devices

1. Now we're going to talk for a bit about mobile devices that you use on a regular basis, at least once per week. We'll include any device that you have with you at least once per week, including electronic devices such as phones, and other accessibility-related tools such as a white cane or a service dog.
2. Let's start by listing all of the devices that you own that fit this description. [Check: laptop, phone, PDA, PacMate, music player, talking book reader, cane, other]
3. Now, I'll ask you some questions about each device.
 - a. Do you remember when exactly you got this device?
 - b. Did it replace a device you had previously?
 - i. If so, what device did it replace?
 - ii. Why did you update this device?
 - c. How did you choose this device? What kind of research did you do to choose it?
 - d. How did you acquire this device?
 - e. When do you typically carry this device? [Every day, weekdays, etc.]
 - f. Where do you keep this device during the day?
 - g. Do you have any accessible adaptations or modifications to this device? [Hardware or software]

Designing interview questions

- How can we mess this up?
 - Ask questions about things we don't actually need
 - Neglect to ask about things we really need
 - Miss out on interesting and relevant information...

How to get the right data

- Interview in context
 - Critical incident technique can be helpful
- Practice, pilot questions
- **Figure out what you want to say first**

Critical incident technique

- People have difficulty describing abstract events, so prompt a specific event
- “Do you have troubles with your computer?” 😬
- “Describe a time that you had trouble with your computer” 😊

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More effort to analyze, but very good for

One weird trick

- To optimize your interviews, write out your report ahead of time
- Make sure they line up
- Think ahead about how people might misinterpret questions, or answer vaguely
 - Redesign questions or be ready with follow-up questions (semi-structured interview)
- Focus on what you want to say, not what you think you should ask...

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Writing out the findings

Participants in our study
graduated from college
between 5 and 10 years
ago...

They said that their most
commonly used apps were
either Spotify, Chrome, or
Instagram.

This is not actually about choosing the findings, but figuring out their form
Like test-driven development

Writing out the findings

Participants in our study graduated from college between 5 and 10 years ago...

They said that their most commonly used apps were either Spotify, Chrome, or Instagram.

When did you go to college?

- "I started college in 2010"
- "I went to college in the 90s"
- "I went to college twice, once in 1998 and again in 2011"

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When did you go to college?

- "I started college in 2010"
- "I went to college in the 90s"
- "I went to college twice, once in 1998 and again in 2011"

What apps do you use?

- "I don't use apps very often"
- "I use these 10 apps: ..."
- "I like to try all the new apps."

This is not actually about choosing the findings, but figuring out their form
Like test-driven development

Writing out the findings

Participants in our study graduated from college between 5 and 10 years ago...

They said that their most commonly used apps were either Spotify, Chrome, or Instagram.

~~When did you go to college?~~

In what year did you graduate from college?

~~What apps do you use?~~

Which is the app that you use most often on your device?

Make it difficult to

Problematic questions

- Too vague
 - “Do you like your teacher?”
- Double-barreled question
 - “How do you get to school and is it affordable?”
- False dichotomy
 - “Do you enjoy classes or do you think they are boring?”
- Leading question
 - “Why is CSCI 5839 your favorite class?”

Dealing with bias

- How are our informants biased?

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Biased to please us
Biased to look good
Different to insiders vs. outsiders
Don't know prospective behavior

Dealing with bias

- How are our informants biased?
 - Fear of judgment / don't want to look dumb, incompetent
 - Response and non-response biases
 - Confusion around definitions (social media?)
 - Education / interpretation of information
 - Conformity w/ societal standards
 - Want to please the researchers
 - Your biases come through here
 - Use of scales... don't use extremes
 - Don't want to be negative

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Biased to please us
Biased to look good

Different to insiders vs. outsiders
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Informant biases

- How are our informants biased?
 - Power dynamic
 - Limited perspective
 - Sampling bias / self selection
 - Upbringing / culture
 - Agenda / political bias
 - Squeaky wheel / extreme users / Yelp effect
 - Pleasing the researcher
 - Hawthorne effect
 - Participants don't want to look bad / incompetent
 - Inertia / what people know is good enough

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Biased to please us
Biased to look good

Different to insiders vs. outsiders

Don't know prospective behavior

Interviewing tips

- Allocate enough time (don't rush)
 - Be ready to move forward or skip something
- **Listen;** don't talk over informant
- Watch your body language and nonverbal behaviors

→ **Having a script can help with all of these**

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

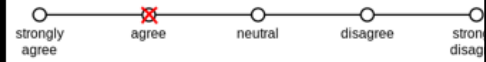
33

Designing closed-ended questions

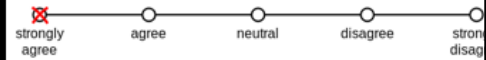
- Response scales
 - Likert scale most common (agree/disagree)
 - Important questions: how many points, is there a middle option?
- Can statistically analyze these (but consider them ordinal scales; nonparametric analysis)

Example Likert Scale

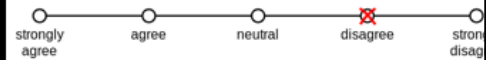
1. Wikipedia has a user friendly interface.



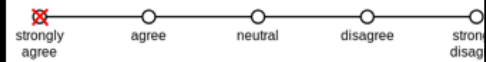
2. Wikipedia is usually my first resource for research



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?

Strongly
dislike

Dislike

Neutral

Like

Strongly
like

1

2

3

4

5

Is the class fun or boring?

Very fun

Fun

Neutral

Boring

Very
boring

1

2

3

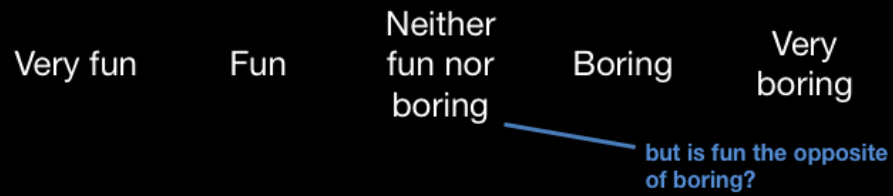
4

5

37

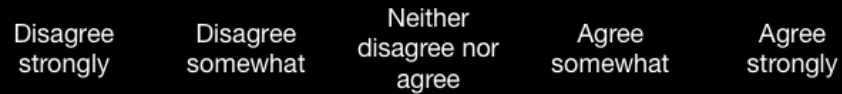
You might want to do this intentionally...
But can you tell which you're getting?

How to label scales?



- One solution is to use agreement scales
- NB: Numbering the steps is optional (in general)
- Most important part is consistency

This class is boring.



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Sometimes you might want to do this! But be clear about what you want...

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

SUS

Useful for
clients who
like numbers,
and for
comparisons
between
systems

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				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 unnecessarily complex.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I thought this 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 be able 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 were well integrated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I thought there was too much inconsistency in this system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would imagine that most people would learn to use this system very quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I found this system very cumbersome/awkward to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt very confident using this system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I needed to learn a lot of things 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:

Adpted from www.measuringux.com/SUS.ppt

NASA TLX

- Overall measure of cognitive load, difficulty, effort
- Often used in more demanding tasks (e.g. texting while walking)
- Less useful for general usability assessment

NASA Task Load Index

Hart and Staveland's NASA Task Load Index (TLX) method assesses work load on five 7-point scales. Increments of high, medium and low estimates for each point result in 21 gradations on the scales.

Name	Task	Date
<p>Mental Demand How mentally demanding was the task?</p> <p>Very Low Very High</p>		
<p>Physical Demand How physically demanding was the task?</p> <p>Very Low Very High</p>		
<p>Temporal Demand How hurried or rushed was the pace of the task?</p> <p>Very Low Very High</p>		
<p>Performance How successful were you in accomplishing what you were asked to do?</p> <p>Perfect Failure</p>		
<p>Effort How hard did you have to work to accomplish your level of performance?</p> <p>Very Low Very High</p>		
<p>Frustration How insecure, discouraged, irritated, stressed, and annoyed were you?</p> <p>Very Low Very High</p>		

From Wikipedia

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

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

Michele A. Williams¹, Erin Buehler¹, Amy Hurst¹, Shaun K. Kane^{1,2}

¹Information Systems Department
University of Maryland Baltimore County (UMBC)
Baltimore, MD 21250 USA
{mawilliams, eri4, amyhurst}@umbc.edu

²Department of Computer Science
University of Colorado
Boulder, CO 80309
shaun.kane@colorado.edu

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 the neck and a camera that could be clipped to a bag's strap.

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

2. RELATED WORK

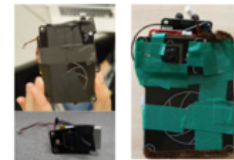


Figure 4 - Activity #2 Final Designs (Left: Group 1; Right: Group 2). Both groups created near identical designs with a camera and touchpad; Group 1 detached the camera to put on glasses, however.

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