NEED FINDING FOR ASSISTIVE TECHNOLOGIES

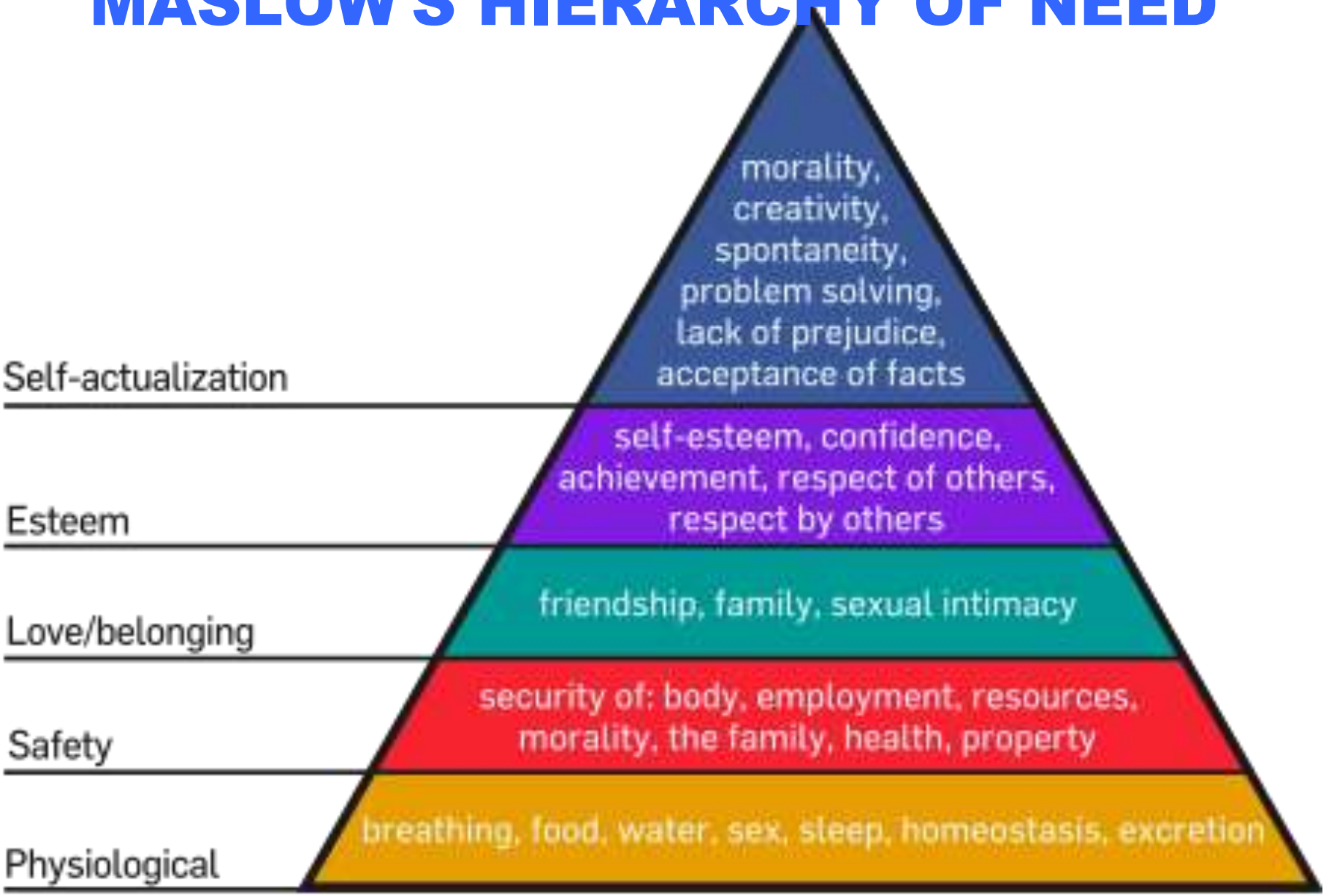
Today

Lecture: Need finding – what, why and how

Exercise: Exploring techniques for need finding

Discussion: Your ideas, your questions

MASLOW'S HIERARCHY OF NEED



A.H. Maslow, *A Theory of Human Motivation, Psychological Review 50(4) (1943):370-96*

WHAT DO WE NEED TO KNOW ABOUT NEEDS?

Needs

- Self-Actualization
- Esteem
- Love & Belonging
- Safety
- Physiological

Capabilities

- Mobility
- Manipulation
- Perception
- Cognition
- Expression

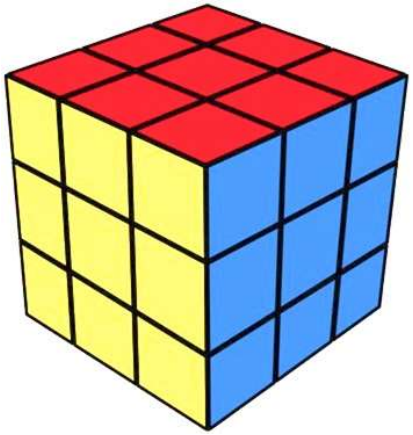
WHAT DO WE WANT TO KNOW ABOUT OUR USERS?

Goals

- What does the person want to do or have?

Values

- What are the important qualities or attributes of the thing they want or the way they achieve it?



Capabilities

- What abilities, skills or resources can the person bring to the situation?

Constraints

- What kinds of limitations, deficits or blocks are at work in the situation?

NEED FINDING THROUGH USE STUDIES IN DESIGN

LEARNING THROUGH ITERATIVE DESIGN

- **Need finding up front is crucial for defining focus of conceptual design**
- **But design decisions in the earliest part of the process occur when everyone knows the least about what is really needed**
- **Iterative design with use studies along the way helps refine need finding**

Gerhard Fischer, Understanding, Fostering, and Supporting Cultures of Participation, *Interactions,* May + June 2011, pp. 42-53.

EARLY USE STUDY TECHNIQUES

- Interviewing
- Observing
- Prototyping

INTERVIEWING

What do you want to know about the user?

- **Goals**
- **Values**
- **Capabilities**
- **Constraints**

Avoiding leading questions

Asking them to show as well as tell

INTERVIEWING

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- Collect information directly from user
- Getting their perspective, how they feel about it

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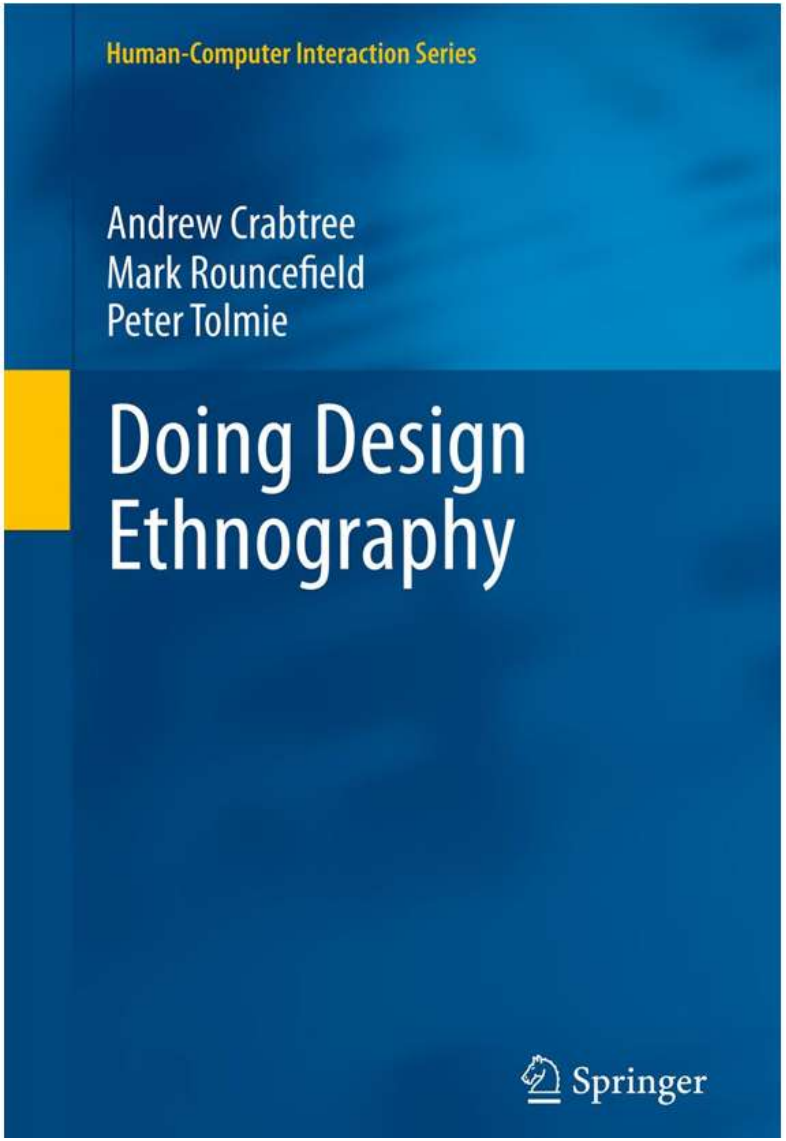
- Time and skill intensive
- Careful generalizing
- What people say often different than what they do

OBSERVING


Human-Computer Interaction Series
Andrew Crabtree
Mark Rouncefield
Peter Tolmie
Doing Design Ethnography
Springer

OBSERVING

Observing *actual* activity

- **Approximate to design target**

  Immerse in context

  Shadow, record, review

  Rich description of activity

- **Resources used to accomplish**
- **Hindrances that get in the way**

ETHNOGRAPHIC OBSERVATION

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- Rich understanding of user's need
- More immersive, contextual, includes user and environment

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- Time and skill intensive
- Careful generalizing
- Hard to project into future situations
- Limited access to disabled population

TEMPORARY DISABILITY IN EVERYDAY ACTIVITIES

Sometimes hard to imagine designing at scale for disabilities

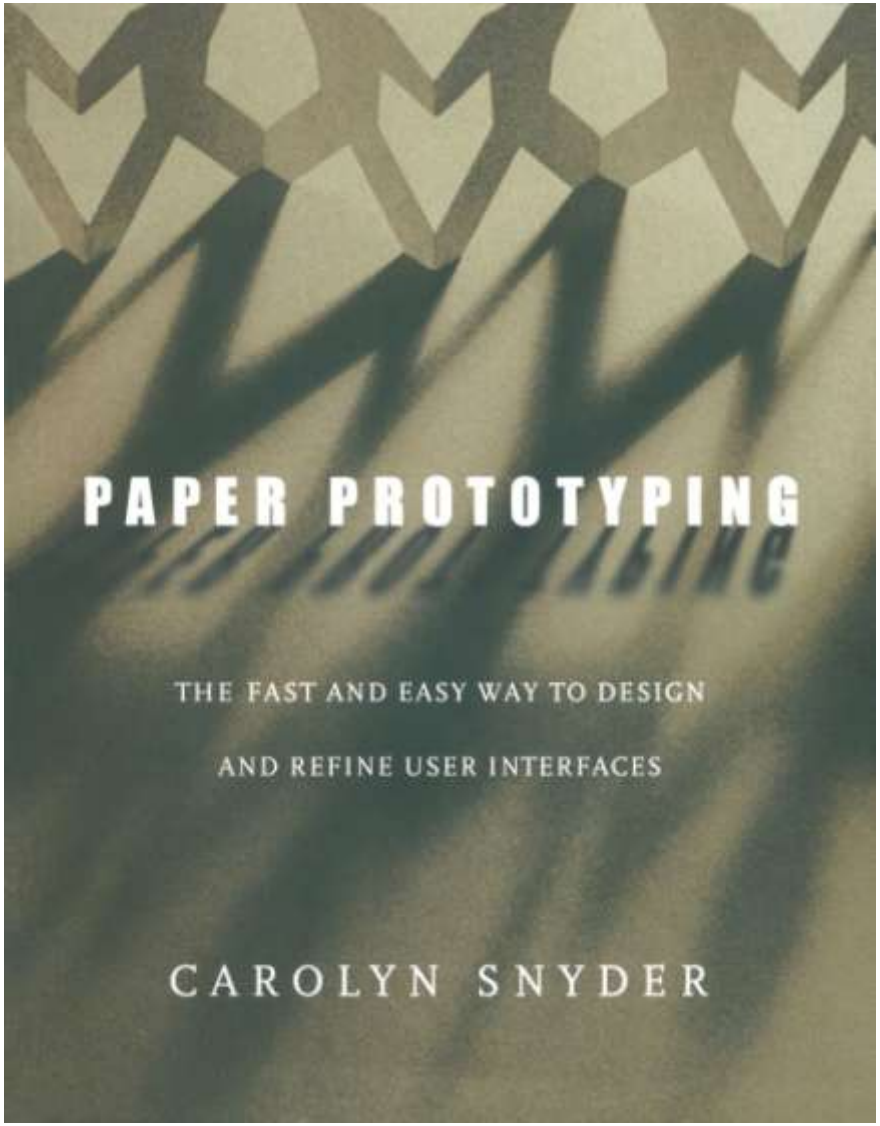
Hard to get extended access to disability situations

What are everyday situations of temporary or simulated disability?

PROTOTYPING

- **Quick, conceptual prototyping**
- **Simulate User Experience (UX) through ready-at-hand props**
  - Hand-drawn sketches, props
  - Small-scale models
  - Wizard of Oz

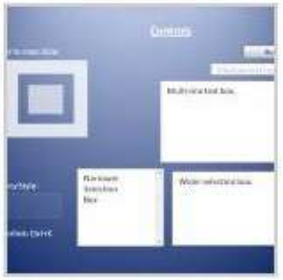
PAPER PROTOTYPING



PAPER PROTOTYPING

- **About saving time to get user feedback without building working prototype**
- **Quickly identify points of complexity**
- http://www.quora.com/prototypes-models-sims/Video-+-Paper-Prototype-Restaurant-Touchscreen-Tablet-Menu-v1

DIGITAL PROTOTYPING



PowerPoint

Web

Second Life

WIZARD OF OZ (WoZ)

An Iterative Design Methodology for User-Friendly Natural Language Office Information Applications

J. F. KELLEY
IBM Thomas J. Watson Research Center

A six-step, iterative, empirical human factors design methodology was used to develop CAL, a natural language computer application to help computer-naive business professionals manage their personal calendars. Input language is processed by a simple, nonparsing algorithm with limited storage requirements and a quick response time. CAL allows unconstrained English inputs from users with no training (except for a five minute introduction to the keyboard and display) and no manual (except for a two-page overview of the system). In a controlled test of performance, CAL correctly responded to between 86 percent and 97 percent of the storage and retrieval requests it received, according to various criteria. This level of performance could never have been achieved with such a simple processing model were it not for the empirical approach used in the development of the program and its dictionaries. The tools of the engineering psychologist are clearly invaluable in the development of user-friendly software, if that software is to accommodate the unruly language of computer-naive, first-time users. The key is to elicit the cooperation of such users as partners in an iterative, empirical development process.

Categories and Subject Descriptors: D.m [**Software**]: *software psychology*; H.1.2 [**Models and Principles**]: User/Machine Systems—*human factors*; I.2.1 [**Artificial Intelligence**]: Applications and Expert Systems—*natural language interfaces*; I.2.7 [**Artificial Intelligence**]: Natural Language Processing—*language parsing and understanding*; I.6.3 [**Simulation and Modeling**]: Applications; K.6.3 [**Management of Computing and Information Systems**]: Software Management—*software development*

General Terms: Experimentation, Human Factors

Additional Key Words and Phrases: Natural language, limited context, naive user, discretionary user, iterative design, simulation, user-friendly, ease-of-use, empirical grammar, task analysis, engineering psychology.

WIZARD OF OZ (WoZ)

- **Simulating interaction behavior through human impersonation**
  - Human remotely driving computer screen / experience
  - Acting out skits

WIZARD OF OZ

http://www.quora.com/prototypes-models-sims/Prototyping-for-Elmos-Monster-Maker-iPhone-App-1

PROTOTYPING

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- Enables quick, cheap design iterations
- Approaches actual usage
- Learn from usage experience

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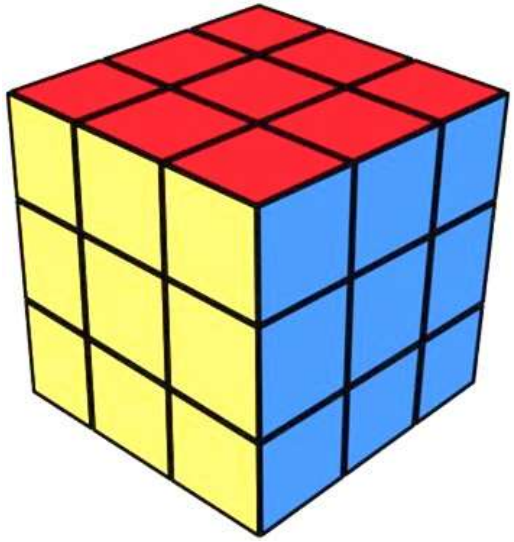
- Low fidelity
- Limited interaction (garden path)

EXERCISE: FIND TECHNIQUES YOU COULD USE TO LEARN MORE

For this exercise…

- Form small groups now
- Quickly share with your group the 2-3 project area you are interested in
- As a group, pick one that everyone can talk about today



BRAINSTORM: WHAT TECHNIQUES COULD YOU USE ?

For this user and this problem…

- **How can you LEARN about their: goals, values, capabilities, constraints?**
- **What QUESTIONS would you ask? How would you ask them? Who could you talk to?**
- **What kinds of OBSERVATIONS could you make? Where and how?**
- **What could you make or BUILD that would help you learn more?**

20 minutes

Brainstorming

Defer Judgment

Say Yes!

Save analysis for later

Go for quantity

Fluency - lots of ideas

Flexibility - lots of *different* ideas

Get radical

Encourage wild, eccentric ideas

Easier to tone down than pump up

Leapfrog

Build on others' ideas

Let yours go into the mix

WRAP UP: SHARE YOUR IDEAS

Top items from your group today…

On one sheet of paper:

- **Top two QUESTIONS you want to ask**
- **Two kinds of OBSERVATIONS to make**
- **One thing you would BUILD to learn more**

RESOURCES

- hci.stanford.edu/courses/dsummer/handouts/NeedFinding.pdf
  - **What to do in Need Finding**
- hci.stanford.edu/courses/cs247/2012/readings/dschool-observing.pdf
  - **Observant Observing**
- hci.stanford.edu/courses/agile/handouts/Interviewing-observing.pdf
  - **Interviewing and Observing – Agile Aging**
- hci.stanford.edu/courses/cs447/docs/NeedFindingCribSheet.pdf
  - **Need Finding Tools**

Six Things to Remember when Observing What People Do

hci.stanford.edu/courses/cs447/docs/NeedFindingCribSheet.pdf

1.

Cast aside your biases, listen and observe

Let subjects tell their own story, and listen for the things that elicit emotion, cause them concern or frustration.

"If you want to find out what people really need, you have to forget about your problems and worry about their lives."

2.

Note the contradictions between what people say and what they do

Opportunities for innovation lie within the disconnect between action and words.

3.

Listen to people's personal stories

Let them relate their successes and failures.

Stories encompass the implicit rules that govern and organize peoples lives and reveal what they find normal, acceptable and true. They reveal moral codes, sources of pride, shames, shoulds and should-nots.

4.

Watch for "work arounds"

People make do and work around the shortcomings of products and situations.

In everyday life, we all come up with "work arounds," clumsy or clever, that we usually are totally unaware of.

You must take note.

5.

Distinguish between needs and solutions.

Needs open up possibilities, solutions constrain them.

If you start with a solution then you may overlook the possibility of coming up with an entirely new and revolutionary product or service.

6.

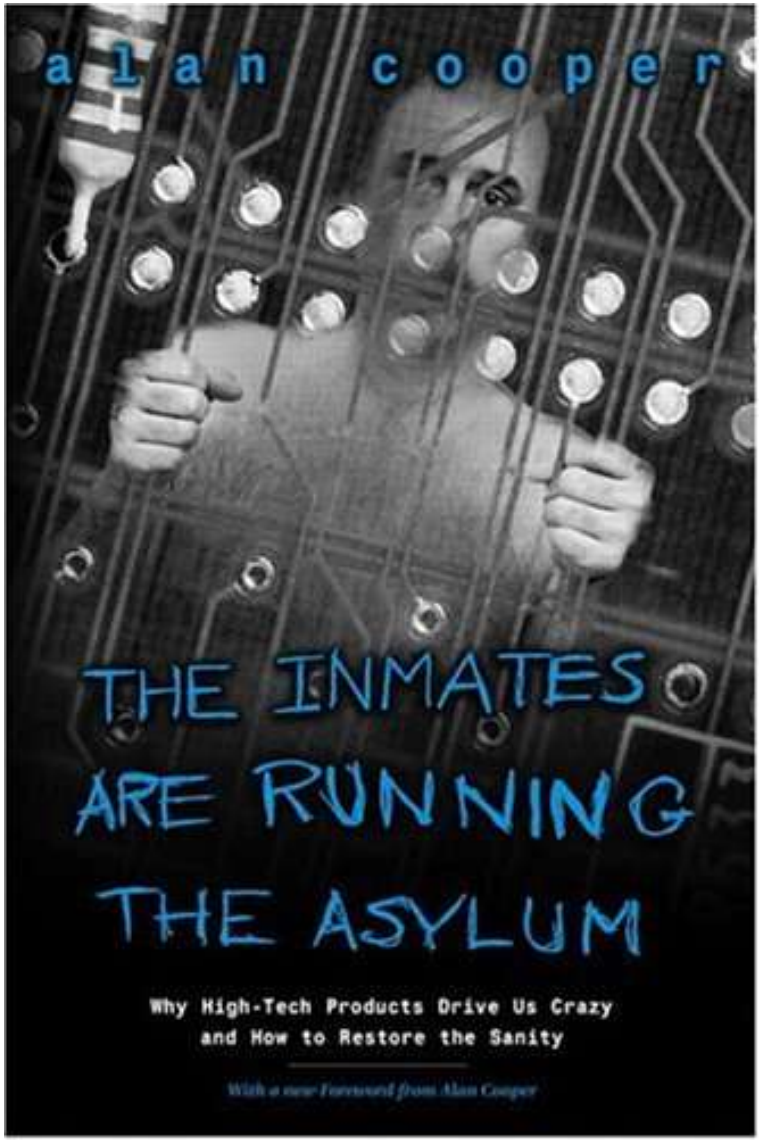
Look beyond the obvious.

Your research may seem so routine and familiar that you feel there is nothing new to be learned.

Boredom and frustration easily set in. Stay alert.

The epiphanies and insights emerge from the nuances.

PERSONAS



http://www.aegis-project.eu/index.php?option=com_content&view=article&id=63&Itemid=53

PERSONAS

- **Archetypal representation of users**
- **1-2 page description + picture, drawn from research**
  - Goals
  - Behavior patterns
  - Skills
  - Attitudes
  - Environment
  - Base on real people
  - Make them ‘lifelike’ (names, pictures)
  - Stick on the walls and *talk* to them
  - Do this literally

Age:	63
Marital status:	Single
	Lives in sheltered housing
Education:	College
Job:	Retired
Impairment:	**Multiple Sclerosis**
	memory loss - reduced dexterity

meet Peter Vandezande...

Peter suffers from short term and long term memory loss and from muscle weakness and spasms in is arms and legs due to Multiple Sclerosis. He stopped working at the age of 34 because of his medical condition, MS. Peter is single and lives in a sheltered house. Peter relatively enjoys his stay in the sheltered housing, which is located in a green and relaxing environment. He likes his little chats with the other inhabitants and when he is not in any of the social areas, he usually searches more information about one of his many interests. He reads a lot about his condition so he realizes that, as time passes, his mental health will deteriorate. However, Peter remains optimistic and is determined to make the most of the time he has left.

technology use

Peter owns a desktop PC which he has setup in his room in the sheltered housing. His desktop used to be his sister's, but she gave it to him as she bought herself a laptop. The pc is running Windows XP which Peter likes; he knows his way around and has all his favourite icons enlarged and close by.
Peter likes general surfing and he especially enjoys helping people who want to obtain information on MS. From time to time he visits the website of his favourite football team, made in Flash. He finds it really disappointing that this website is hard to navigate because of the lack of keyboard support. Peter has difficulties with handling the mouse due to muscle weakness in his hands and occasional spasms in his arms.

Peter has a regular cellphone that he mainly uses for calling friends and relatives. His sister programmed his buttons so he could use the speed dialling option. He has a list of all the names and corresponding speed dials taped to his coffee table. Texting takes too long due to his condition. From time to time he uses the calendar functionality, to remember appointments he makes with some of his co-habitants.

designingwith people.org

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- People Introduction
- Pandora
- Chris
- Josie
- Fred
- Denise
- Peter
- Susan
- Nancy
- Katie
- Emily
- Vision case studies
- Hearing case studies
- Mobility case studies
- Dexterity case studies
- Cognition case studies

People

Meet real people who represent a range of capability

In this section you can meet ten real people drawn from the Helen Hamlyn Centre for Design's user network. They are not fictional characters – they are real individuals with differing degrees of functional loss across the spectrum of capability. They speak about their lives, their challenges, their relationship with design and the impact that poor design has on them.

Their stories demonstrate that when designers engage directly with real people then there is a richness of information that cannot be obtained through more indirect design research methods alone, valuable though these can be.

Vision	Hearing	Mobility	Dexterity	Cognition
Pandora	Josie	Denise	Susan	Katie
Chris	Fred	Peter	Nancy	Emily

http://designingwithpeople.rca.ac.uk/people

PERSONAS

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- Makes the user real
- Prompts user research exercise
- Documents what learned about user

-

- Fictional abstraction
- Indirect understanding of user
- Focuses on user, not complete context