

SWEN 422 Lecture 3

Dealing with research data 1

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Agenda

- Review of previous lecture
- Research data – why?
- NN/g's 3 dimensions of data collection
- Recording the data
- Other ways of knowing

Questions in HCI community

- “What counts as good research?”
- How do we know whether the advance is done well?
- Can we trust the findings?
- Do we know more now than we did?”

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Answering a question

- Example Question: **How should a user be notified when they are mentioned in a LinkedIn post, someone likes their post, or they get a new follower?**
- Ideal: Ask them – everybody!
 - [1 billion users](#)
- Reality: Tradeoffs (cost, time, effort)
 - Sample participants
 - Pick a method(s)
 - Collect and analyse data
 - Report the results

Study design



Critique!

Research data – why?

- “data generated during the research project” (Rudolph et al., 2015)
- We want to answer our question -> analyse
- We want to keep it for future research -> archive for reproducibility
- We want to make it available to others -> re-use as part of open science

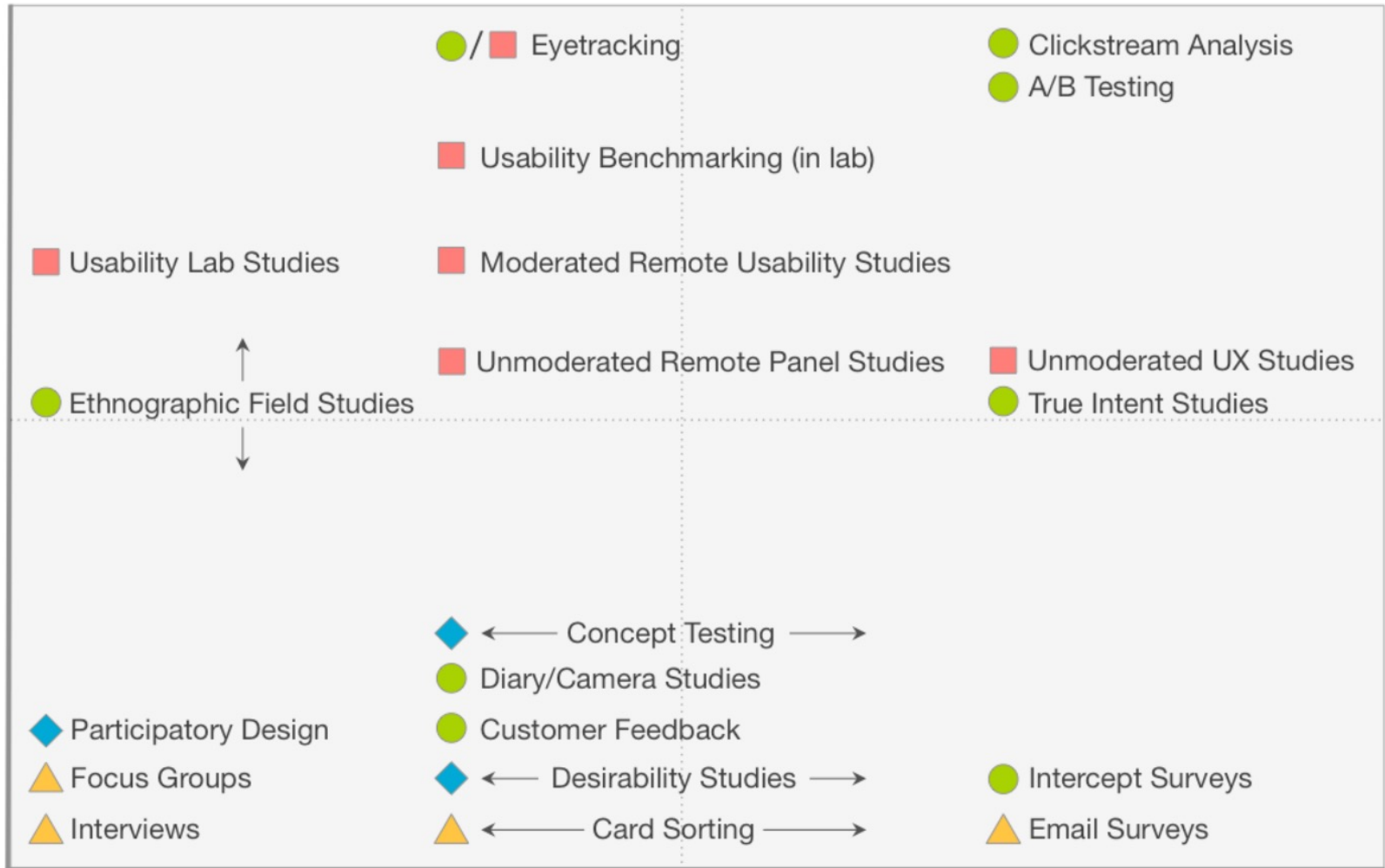
Considerations

- What is the situation in which the data are collected?
- What do the data consist of?
- What kind(s) of analyses are performed on the data to generate “knowing?”
- What kinds of questions can this method answer (and what not)?

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A LANDSCAPE OF USER RESEARCH METHODS

BEHAVIORAL



QUALITATIVE (DIRECT)

QUANTITATIVE (INDIRECT)

KEY FOR CONTEXT OF PRODUCT USE DURING DATA COLLECTION

● Natural use of product

■ Scripted (often lab-based) use of product

▲ De-contextualized / not using product

◆ Combination / hybrid

NN/g 3 dimensions of data collection

- Attitudinal vs. Behavioural
- Qualitative vs. Quantitative
- Context of Use

Attitudinal vs. Behavioural

Attitudinal

- What people **say**
- Self-reported data
- User's mental models, mental workload, emotions, engagement
- Card-sorting, focus groups, interviews, surveys, diary studies
- Adv: privacy
- Disadv: relies on honesty, recall, subjective

Behavioural

- What people **do**
- Naturalistic data
- Human activity captured through sensors, logging software, observer(!)
- A/B testing, eye-tracking, heatmaps, data mining, observation
- Adv: capture typical behaviour
- Disadv: lose context, people's goals unknown

Context of Use

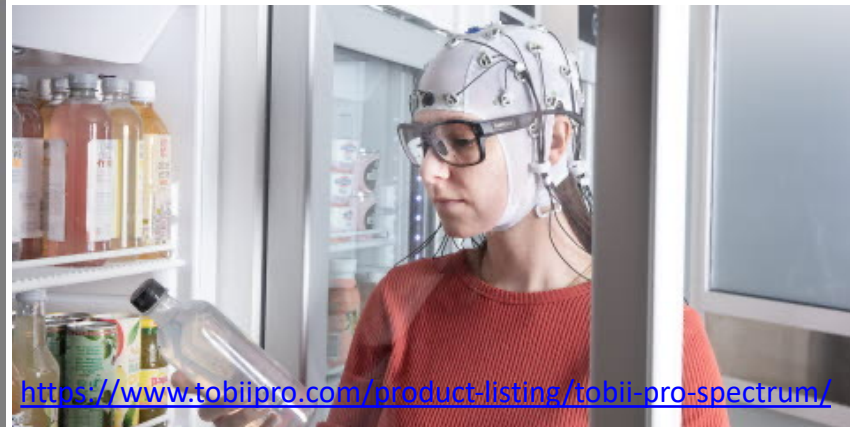
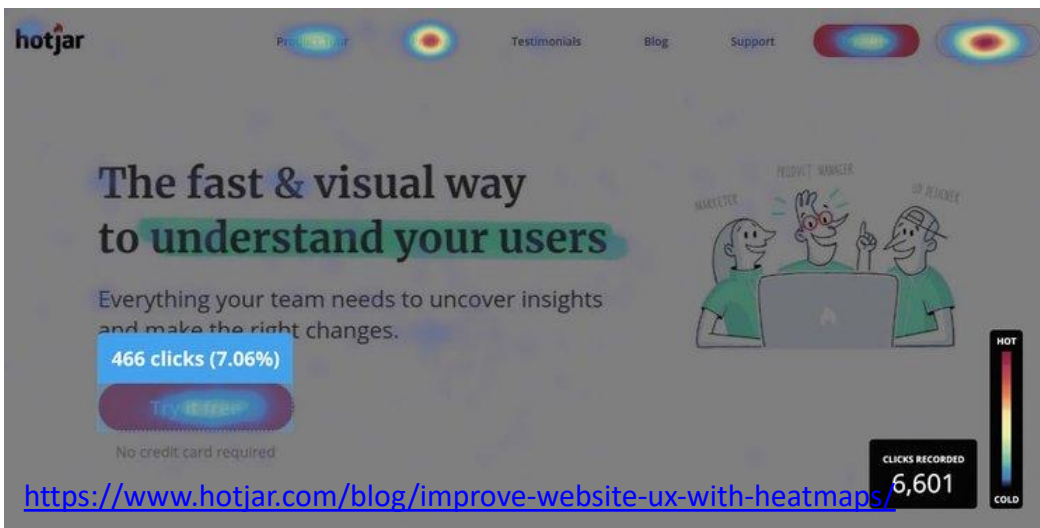
- **Natural** or near-natural use of the product
 - Minimise research interference
 - ↑ validity; ↓ control
- **Scripted** use of the product
 - Focus on on specific aspects/tasks
 - ↓ validity; ↑ control
- **Not using** the product during the study
 - Broader focus on cultural behaviours, user meanings
 - ↓ validity; ↓ control
- A **hybrid** of the above

Which method of data collection?

- Phases of product development ([NN/g](#))
 - Exploratory -> optimise -> assessment
- User-centred design
 - Understanding the problem -> specify requirements -> evaluate solutions
- Design Thinking ([empathizeit.com](#))
 - Discover -> define -> develop -> deliver
- Research stage
 - Identifying a topic -> systematic review -> studies/implementation -> evaluation

Recording the data

- Automated documenting
 - **Activity-logging software** – capture mouse actions, keystrokes, eye-gaze, body position



<https://www.tobii.com/product-listing/tobii-pro-spectrum/>

Recording the data

- Self-documenting
 - Online questionnaires/surveys
 - Online diaries
 - Work artefacts (emails, design documents, specifications, etc.)

Recording the data

<https://www.testingtime.com/en/blog/in-house-usability-tests/>



Manual documenting

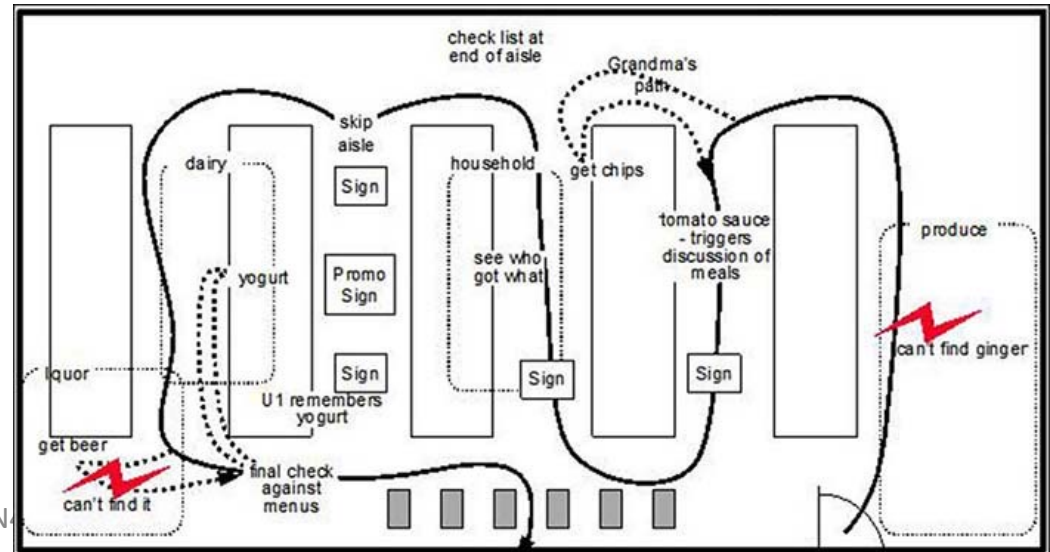
- Notes/sketches
- Audio/video – recording
- Photos

<https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/contextual-design>

<https://www.businessrelocations.co.nz/best-layout/>



SWEN



Activity

- Imagine you are a consultant who is employed to help develop a new garden planning tool to be used by amateur and professional garden designers. Your goal is to find out how garden designers use an early prototype as they walk around their clients' gardens. How would you collect data in this environment?

Based on the example by Preece, Jenny, et al. *INTERACTION DESIGN : BEYOND HUMAN-COMPUTER INTERACTION*, Wiley, 2015. *ProQuest Ebook Central*, <http://ebookcentral.proquest.com/lib/vuw/detail.action?docID=4901891>.
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Other Ways of Knowing

- Action Research
- Research through design
- Crowdsourcing

Action Research

- Knowing by doing
- Relies on engaging with a community (e.g. in the workplace, school, or hospital etc.) to solve a problem / improve
- Aims for sustainable change
- **Challenge:** to address the practical concerns of people as well as the academic goals of science
- **Data collection:** interviews, observations, photographs, focus groups...and many more!

Action Research

Gulliksen, J., Cajander, Å., Sandblad, B., Eriksson, E., Kavathatzopoulos, I. (2009) User-Centred Systems Design as Organizational Change: A Longitudinal Action Research Project to Improve Usability and the Computerized Work Environment in a Public Authority. *International Journal of Technology and Human Interaction (IJTHI)*, 5(3), 13-53.

Di Mascio, T., Gennari, R., Tarantino, L., & Vittorini, P. (2017). Designing visualizations of temporal relations for children: action research meets HCI. *Multimedia Tools and Applications*, 76(4), 4855-4893.

Olson, J. S., & Kellogg, W. A. (Eds.). (2014). *Ways of Knowing in HCI (Vol. 2)*. New York: Springer.

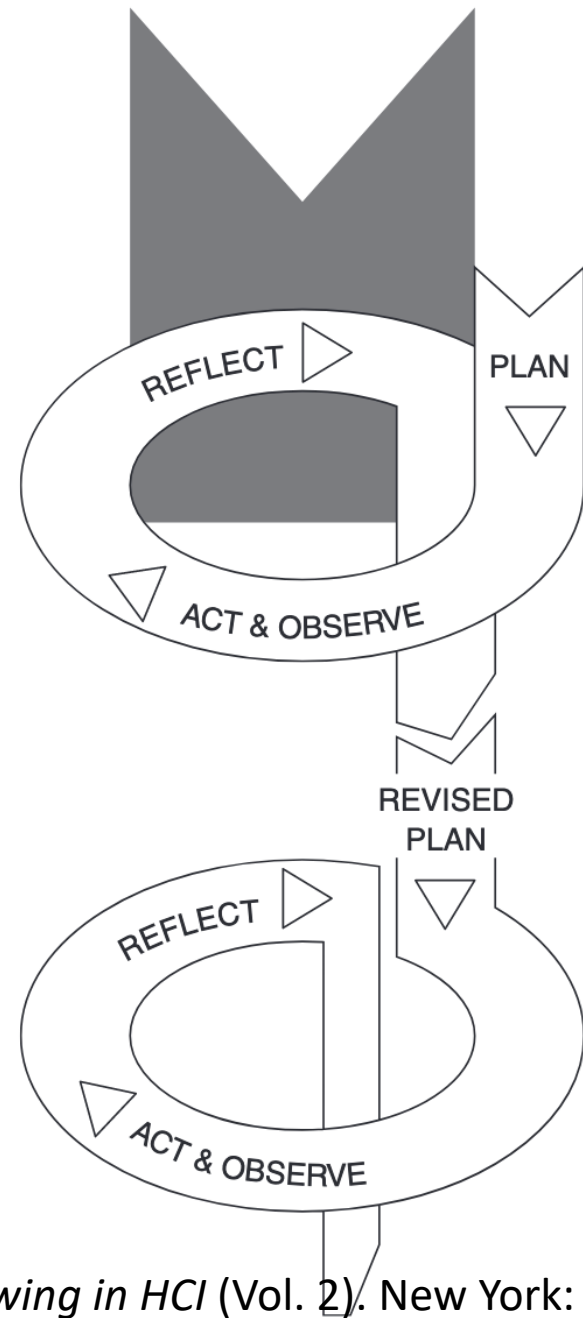


FIGURE 1.1 Kemmis and McTaggart's action research spiral

Research through design

- Views *design inquiry* as distinct from scientific or engineering inquiry (more like art, fashion, design)
- “a **reflective** practice ... of making and critiquing artifacts that function as **proposed solutions** (Rittel & Webber, 1973; Schön, 1983)”
- Asks “What could be?”
- Aims to create more pleasing and appealing ways to interact with things
- **Data collection:** interviews, observations, photographs, focus groups...and many more!

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Research through design

1. Select – new material, design opportunity
2. Design
3. Evaluate – Lab, field, showroom
4. **Reflect** and disseminate
5. Repeat

Ross, P. R., & Wensveen, S. A. G. (2010). Designing Aesthetics of Behavior in Interaction: Using Aesthetic Experience as a Mechanism for Design. *International Journal of Design*, 4(2), 3–13.

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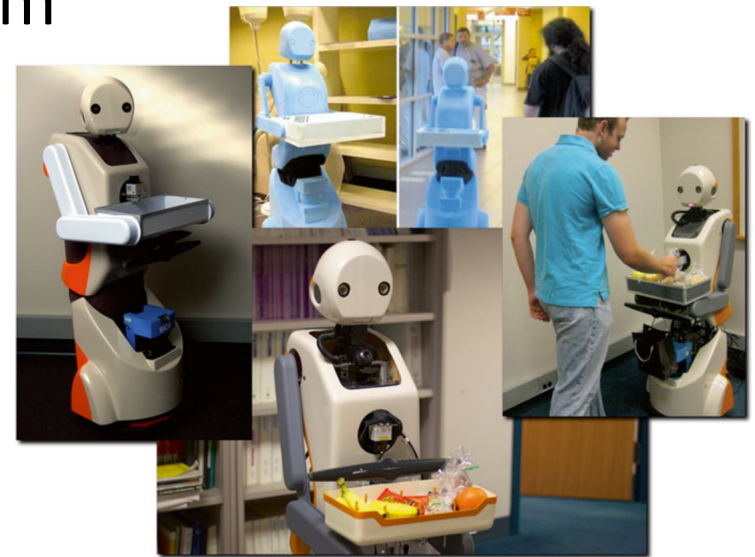


Fig. 7 (Clockwise from top) Exploring different physical forms in the context of use. person collecting the snack they ordered from Snackbot. Final design showing robot holding a tray of healthy and less healthy snacks. Nearly final version of Snackbot investigating color, arms, and tray

Crowdsourcing

- Large numbers of people doing small tasks
- Paid (MTurk) or unpaid (e.g. game, Wikipedia)
- Online crowds provide scale, diversity, availability, affordability
- Many different uses:
 - Training machine learning algorithms
 - Experiments
 - Online surveys
 - Analyzing images

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Crowdsourcing

- Are the tasks well suited for crowdsourcing?
- If it is a user study, what are the tradeoffs between having participants perform the task online versus in a laboratory?
- How much should crowd workers earn for the task?
- How can researchers ensure good results from crowdsourcing?

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Further reading

- Mixed methods:
https://www.researchgate.net/publication/228981159_Field_research_in_HCI_a_case_study
- Chapter 7 & 8 in Preece, Jenny, et al. *INTERACTION DESIGN : BEYOND HUMAN-COMPUTER INTERACTION*, Wiley, 2015. *ProQuest Ebook Central*,
<http://ebookcentral.proquest.com/lib/vuw/detail.action?docID=4901891>.
- Olson, J. S., & Kellogg, W. A. (Eds.). (2014). *Ways of Knowing in HCI* (Vol. 2). New York: Springer.