



THE UNIVERSITY OF  
MELBOURNE

v1.1

# Ethnography in Ubiquitous Computing

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**Mobile Computing | 17-Sep-2019**

COMP90018 - Mobile Computing Systems Programming

***"I don't believe in teaching. One learns by looking. That's what you must do, look."***

***- Francis Bacon***

1. Ethnography: definition and aspects
2. Ethnomethodology
3. Application in Ubiquitous/Mobile Computing

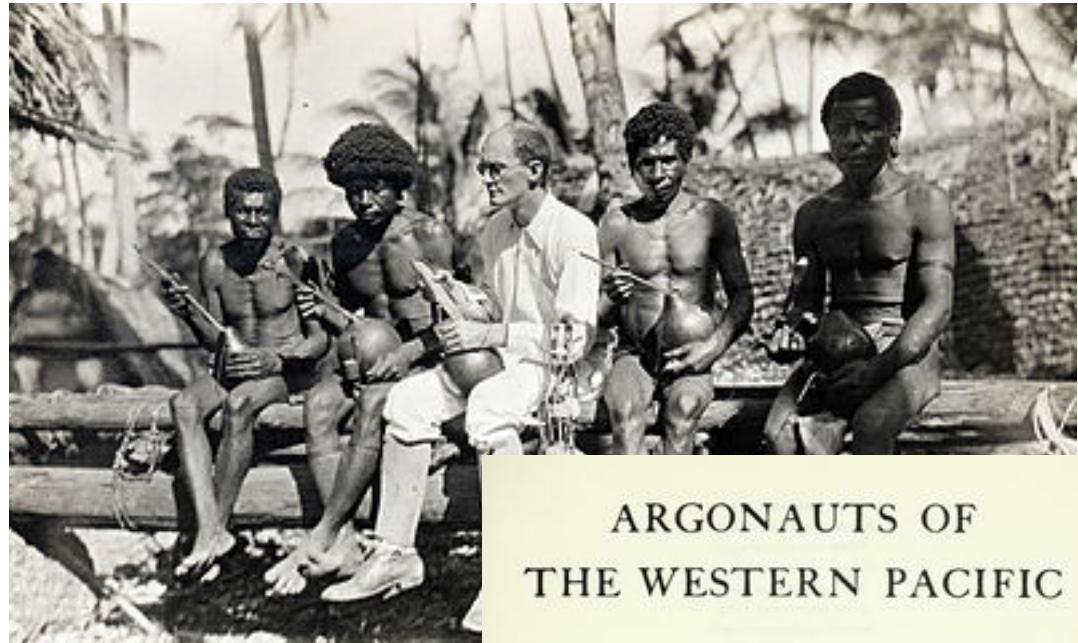
## Learning Outcomes



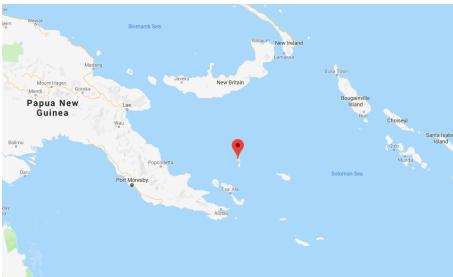
**What is the role of the mobile phone in teenagers' everyday life?**

# Bronisław Malinowski

1884-1942



## ARGONAUTS OF THE WESTERN PACIFIC



*An Account of Native Enterprise  
and Adventure in the Archipelagoes  
of Melanesian New Guinea*

BY

BRONISLAW MALINOWSKI  
Ph.D. (Cracow), D.Sc. (London)

- “way of seeing” (Wolcott, 1999)
- Origins in social anthropology
- Qualitative orientation to research
- Detailed observation of people in naturally occurring settings
- Sensitizing to the settings and people studied
- Something that one must go out and do
- Generates requirements for systems development

## Ethnography

# (a) Definition

**Method** of sociological analysis that examines **how individuals negotiate everyday situations.**

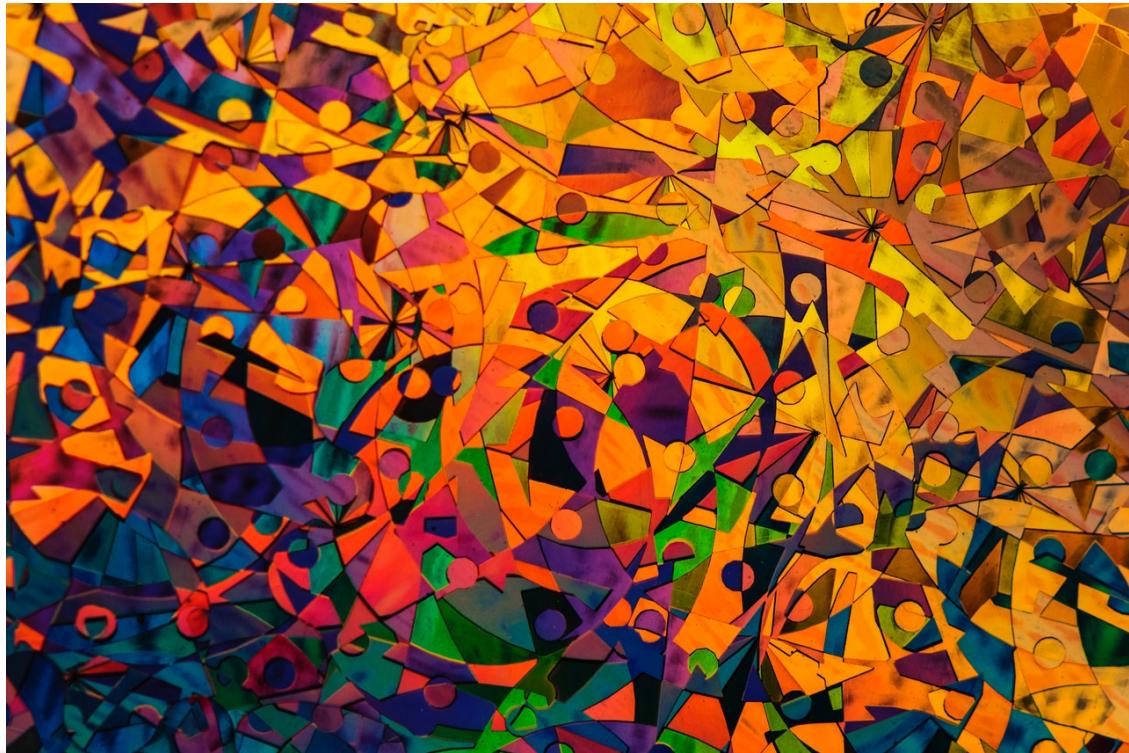
**Ethnomethodology**

- **Observations**  
gain a deep familiarity  
with people and their  
practices
- **Interviews**  
inquiry and discussion
- **Participation**  
immersion in context

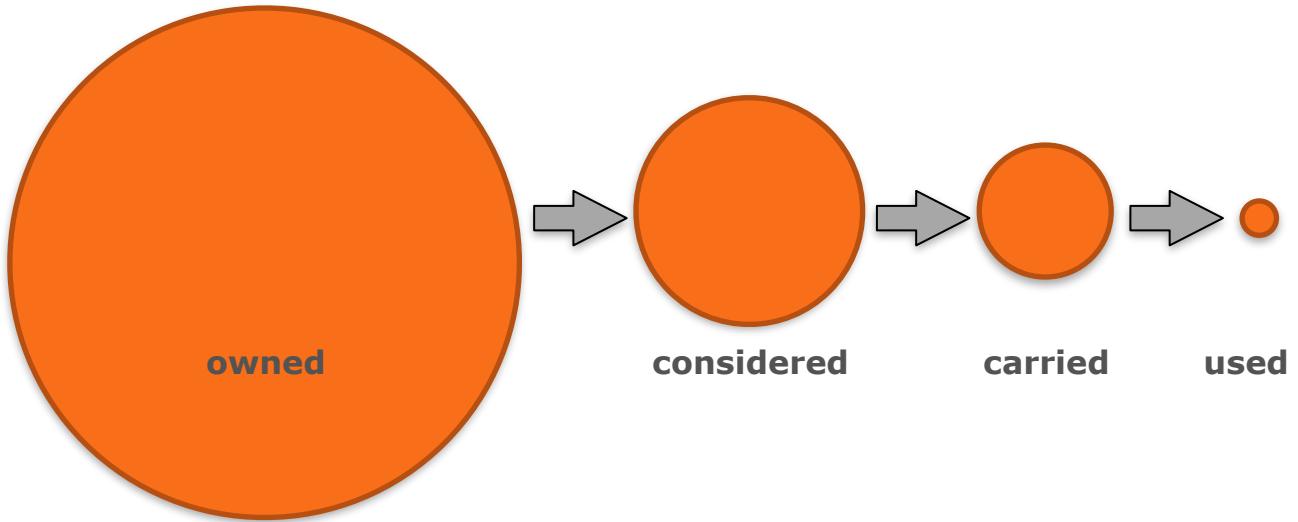


## Methods of Ethnography

- **Pattern**  
recurring behaviours  
and regularities
- Are subject to  
**interpretation**
- Rendering the  
ordinary  
extraordinary



# Patterning



**What do you carry?**

## **Self-actualization**

desire to become the most that one can be

## **Esteem**

respect, self-esteem, status, recognition, strength, freedom

## **Love and belonging**

friendship, intimacy, family, sense of connection

## **Safety needs**

personal security, employment, resources, health, property

## **Physiological needs**

air, water, food, shelter, sleep, clothing, reproduction

Keys  
Money &  
Mobile phone

# **Maslow's Hierarchy of Needs**

## **Self-actualization**

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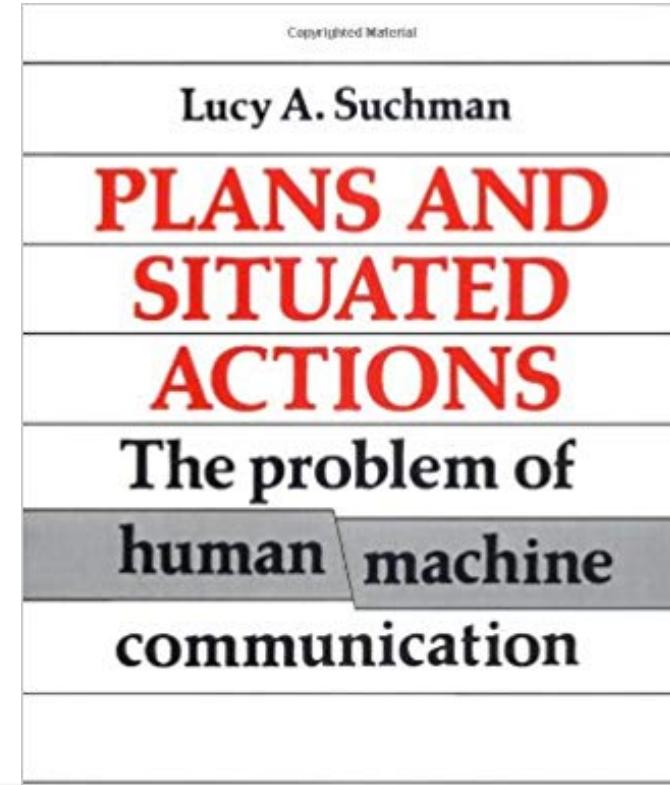
# Transcending Time & Space

How do you make 100%  
sure to never forget  
anything again?



## Centers of Gravity

- Introducing a sociological and ethnographic sensibility to HCI
- People's interactions with technology are highly influenced by particular settings.



## Situated Action

- Researcher watches user in a natural setting
- One-on-one interaction
- Discussion of activities
- 4 principles
  - **Context:** natural setting
  - **Partnership:** collaboration between user and researcher
  - **Interpretation:** researcher shares interpretations
  - **Focus:** steering the interaction towards a relevant topic

## Contextual Inquiry

1. Research undertaken under greater  
**time constraints**

2. **Interpretive** character:  
ethnomethodology

3. Focus on **specific** interactional  
features of a **setting**

4. Orientation toward how technology  
can be **designed**



## Ethnography in Ubicomp: Characteristics

- Questions about **validity** and **generalizability**
- **Subjectivity**
  - Strong interpretative character
- Are **technologists** sufficiently equipped to conduct this type of research?
- Are **anthropologists** equipped to examine in-situ technology use?



## Ethnography in Ubicomp: Critical Acclaims

1. Studying new settings to **inform design**

2. **Evaluating** the use of newly designed systems in the real world



## Ethnography in Ubicomp: Goals



## Co-Design Study (ICT4D): Current Deployment in Cape Town, South Africa

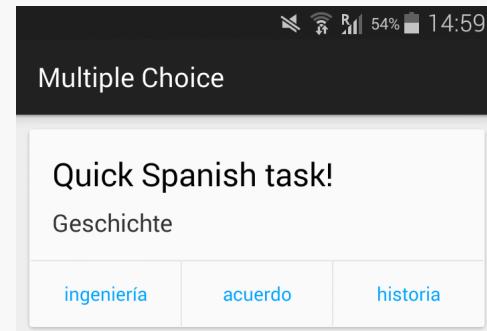
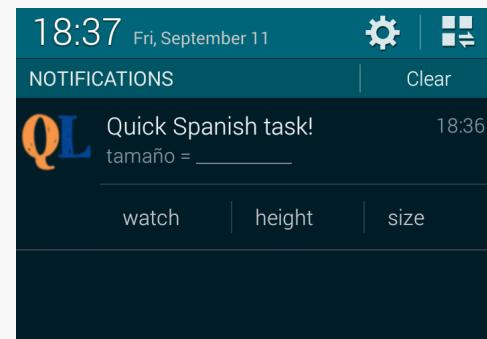
Collection by Gary Marsden  
UCT, South Africa



**ICT4D**

# Technology Usage Amongst the Un/Under-Employed

- How **phone usage** differs
  - Sporadic connectivity
  - Shared devices
  - Peer-to-peer sharing
- **Challenges** with demographic
  - Restricted Data Plan
  - Mobility
  - Prioritization



## ▪ Planning fieldwork

- Investigating **sites** (home or office)
- What types of **people** inhabit these settings?  
(Knowledge workers, young/aged, families,...)
- Evaluation of **at technology?**  
(Deployment, access)
- How to **record** different types of interactions  
(Interviews, observations, video recording)



# Design-Oriented Ethnography

- **Hypotheses**
- Initial hypothesis **not mandatory**
- Aim is to **openly investigate**
- **Circumstances** will **change** the focus/trajectory of the research
- Ethnography not a means to find resolution, but an exercise in **opening up new avenues or possibilities**



## Design-Oriented Ethnography



# Where are you?

- **Sampling and Generalization**
- **Who** are my participants?
- **How many?**
- **How long** to spend in the field?
- How **representative** is my sample for the general population?
- Ethography is less concerned about representativeness, but more with **commonsense reasonings**, social **patterns**, and **rituals**.



## Design-Oriented Ethnography

- **Access to Participants**
- Find 2 or 3 people willing to participate
- Ask for introductions to friends or colleagues  
**(Snowballing Method)**
- Help people **feel at ease**



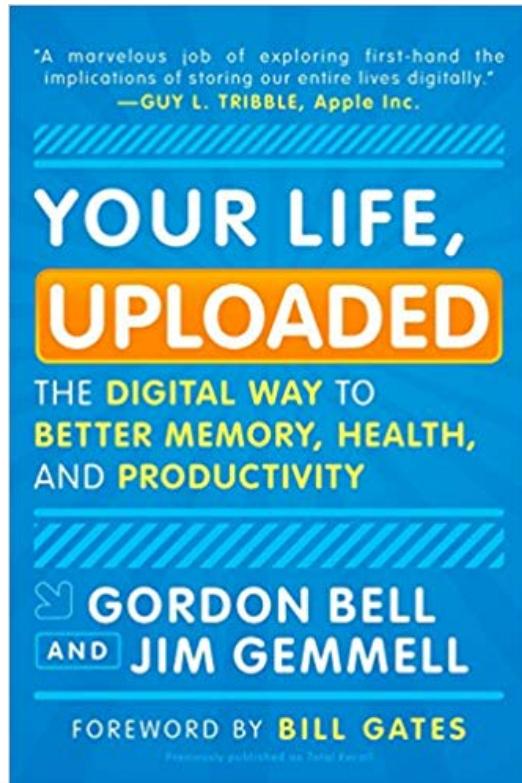
## Design-Oriented Ethnography

- **Participants needed?**
- Not in any formal sense
- **Observation** of a setting
- Ethnographers taking on a role  
**(Participation)**



## Design-Oriented Ethnography

- **Gordon Bell**
- Inspired by Vannevar Bush's Memex
- Exploration of Lifelogging technologies
- Uncovered all kinds of issues
  - Storage
  - Linkage
  - Data retrieval
  - Privacy



## Auto-Ethnography



Please fill in this microblog.

<http://go.unimelb.edu.au/jb8r>



# Jobs to be done



**Design a Device or App for the Whereabouts of  
your friends and family**



## Fallacies: Observations and Patterns

A blacksmith's hammer is shown in mid-air, having just struck a long, glowing red-hot metal bar that lies across an anvil. Sparks are flying from the impact point. The background is dark, making the bright metal and sparks stand out.

**Scientists want to understand  
cause and effect**

*When metal is heated it  
expands*



Photo by Rich Niewiroski Jr.: <http://projectrich.com/gallery/>



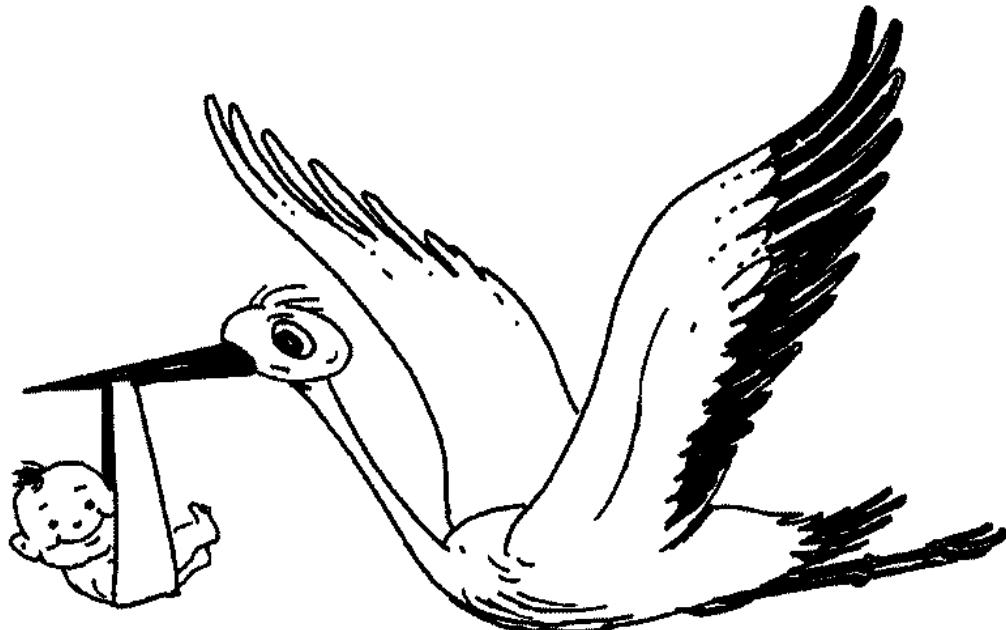
**Test a hypothesis**

*"My keyboard is  
faster than yours"*



## Potential Approach: Observation

# Do storks cause babies?



# Do storks cause babies?

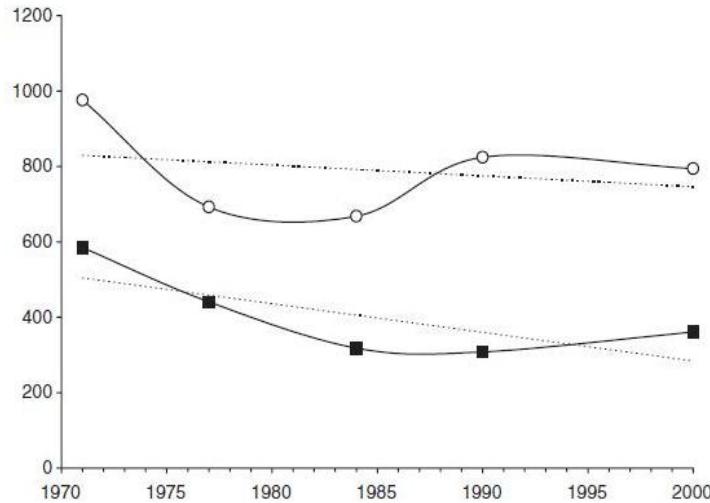


Figure 1. Storks and the birth rate in Lower Saxony, Germany (1971–2000). Open circles show yearly birthrates in hundreds in Lower Saxony. Full squares show numbers pairs of storks in Lower Saxony. Dotted lines represent linear regression trend ( $y = mx + b$ ).

Jaminet, 2012

Country	Area (km <sup>2</sup> )	Storks (pairs)	Humans (10 <sup>6</sup> )	Birth rate (10 <sup>3</sup> /yr)
Albania	28,750	100	3.2	83
Austria	83,860	300	7.6	87
Belgium	30,520	1	9.9	118
Bulgaria	111,000	5000	9.0	117
Denmark	43,100	9	5.1	59
France	544,000	140	56	774
Germany	357,000	3300	78	901
Greece	132,000	2500	10	106
Holland	41,900	4	15	188
Hungary	93,000	5000	11	124
Italy	301,280	5	57	551
Poland	312,680	30,000	38	610
Portugal	92,390	1500	10	120
Romania	237,500	5000	23	367
Spain	504,750	8000	39	439
Switzerland	41,290	150	6.7	82
Turkey	779,450	25,000	56	1576

Table 1. Geographic, human and stork data for 17 European countries

Matthews, 2000

# Do storks cause babies?

Storks Deliver Babies ( $p = 0.008$ )

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**KEYWORDS:**

*Teaching;*  
*Correlation;*  
*Significance;*  
*p-values.*

*Robert Matthews*

Aston University, Birmingham, England.  
e-mail: rajm@compuserve.com

**Summary**

This article shows that a highly statistically significant correlation exists between stork populations and human birth rates across Europe. While storks may not deliver babies, unthinking interpretation of correlation and *p*-values can certainly deliver unreliable conclusions.

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◆ INTRODUCTION ◆

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Introductory statistics textbooks routinely warn of the dangers of confusing correlation with causation, pointing out that while a high correlation coefficient is indicative of (linear) association,

association between storks and the concept of women as bringers of life, and also in the bird's feeding habits, which were once regarded as a search for embryonic life in water (Cooper 1992). The legend lives on to this day, with neonate-bearing storks being a regular feature of greetings cards celebrating births.

*Matthews, 2000*

# Causation versus Correlation

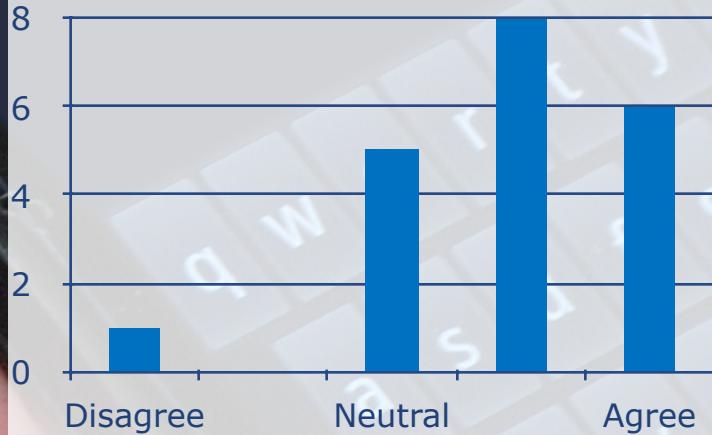
- Birthrate and number of storks **correlate**
- Explanation 1: storks cause children
  - For example, the myth is true and storks bring babies
- Explanation 2: children cause storks
  - For example, the crying of babies attract storks
- Explanation 3: a third unknown aspect causes both
  - For example, the village environment is more friendly to storks and families that desire children.
  - Called **Tertium Quid**



**often not sufficient**

## Potential Approach: Observation

## The keyboard is easy to use



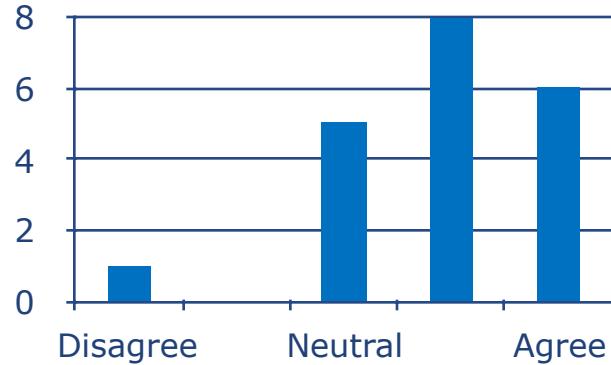
**Test a hypothesis**

*"My keyboard is faster than yours"*

# Isolating the Cause

- Participants rated the system easy to use, because
  - they actually found the system easy to use?
  - they wanted to support you in your research?
  - they were overwhelmed by the system's novelty?
  - The Tokyo Ramen Show took place last weekend?
  - ...

**The keyboard is easy to use**



**Mere observation will **not** help to find the answer!**



- Experiments are (probably the only reliable) means to find the answer
  - They can **isolate cause and effect!**
  - Knowing cause and effect allows informed design

## Experiments

1. **Ethnography** is investigative and exploratory
2. Be open to the study following **new trajectories**
3. Scope the field work tightly, but leave room for **alterations, broadening, and deepening**
4. Select type and number of **participants** with the aim of observing and detailing **how** a setting is organised rather than trying to generalise to large populations
5. Consider alternatives to recruiting participants, such as **observations** or **auto-ethnography**
6. If you want to isolate cause and effect, you will need **experiments**

## Summary

- Paul Dourish. 2006. Implications for design. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '06), Rebecca Grinter, Thomas Rodden, Paul Aoki, Ed Cutrell, Robin Jeffries, and Gary Olson (Eds.). ACM, New York, NY, USA, 541-550. DOI=<http://dx.doi.org.ezp.lib.unimelb.edu.au/10.1145/1124772.1124855>
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## References and Further Readings