

Human-Computer Interaction

# Methods

**Introduction to HCI Methods**

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# What is HCI research?

# What is considered HCI research?

- >> Primarily *empirical* or *design-based* research (or both), but there are other, less common types of contributions
- >> **Empirical**: Understanding phenomena from direct and indirect observation or experience
- >> **Design-based** (aka design research, research through design): Understanding a design space by exploring it and designing (and often also developing and evaluating) solutions

# Types of HCI Contributions<sup>1</sup>

1. Empirical contributions
2. Artifact contributions
3. Methodological contributions
4. Theoretical contributions
5. Dataset contributions
6. Survey contributions
7. Opinion contributions

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<sup>1</sup>Wobbrock & Kientz (2016)

# Key Concepts in Empirical Research

*Who will we study?*

>> **Sample:** Which *individuals, groups, and interactions* to focus on?

*How will we study them?*

>> **Goals:** Representation or generalization?

>> **Context:** Where do we study phenomena?

>> **Data:** What type of data should we collect?

# Sample

**Definition:** A smaller, manageable version of a larger group that represents the characteristics of a larger population.

*Why do we bother with a sample? Because it is impossible to study everyone!*

**Types:** *random, purposive, snowball, convenience*

**Bias:** *Sampling bias due to self selection, experimenter bias*

**Issues:** *Research ethics, sensitive populations*

# Goals

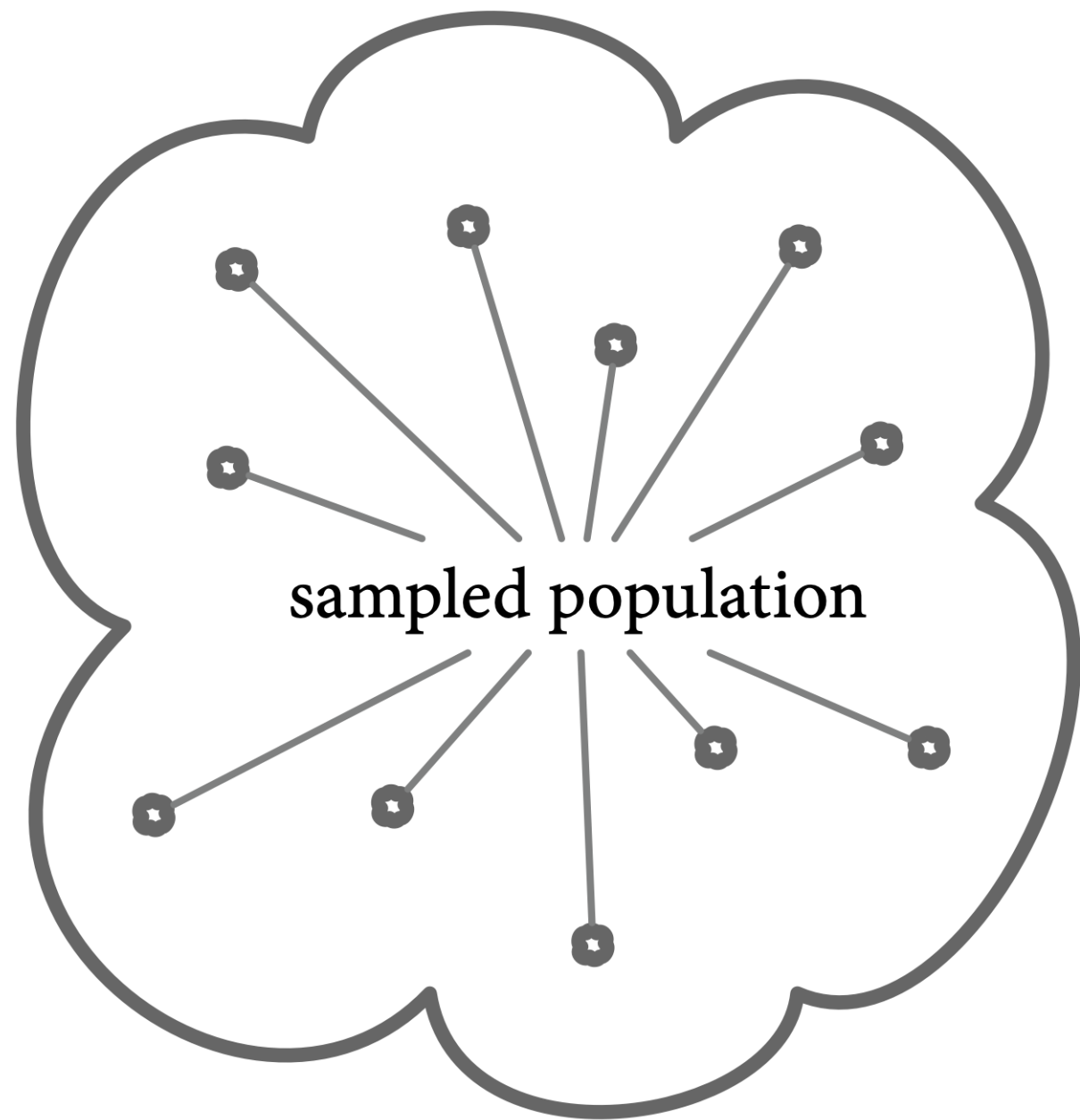
*What can I do with sampled data?*

**Representation:** How does particular actors affect particular situations under particular circumstances?

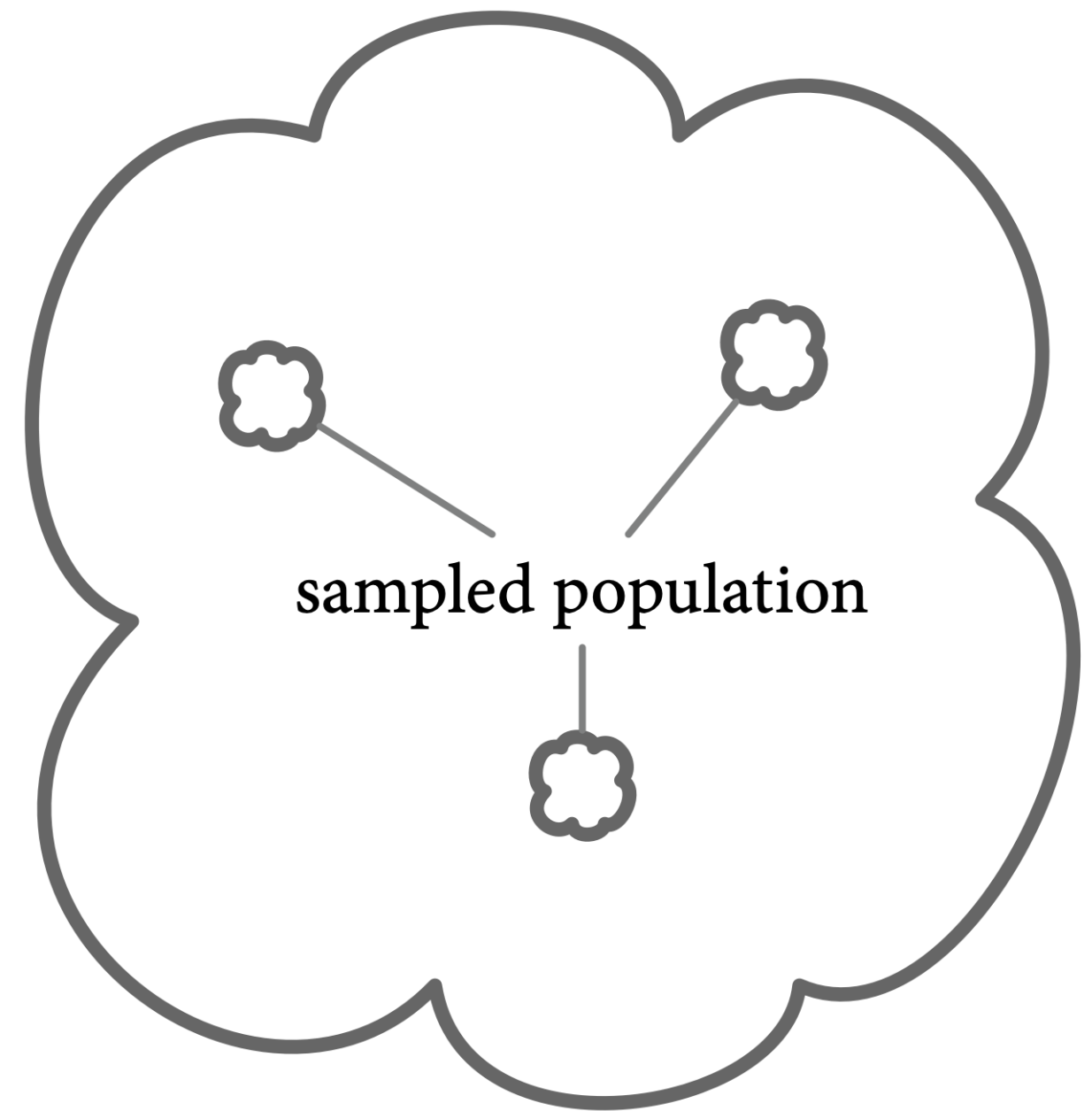
» In-depth understanding of phenomena from *small samples* but *detailed analyses* toward *theory generation*

**Generalization:** Are the findings from the sample applicable to the larger population?

» Hypothesis testing using *larger samples* toward *theory refinement*



larger population



larger population



# Context

*Where do we study phenomena?*

**Natural settings:** In the natural environment where phenomena occurs

>> *Observational studies involve no control*

>> *Field experiments involve limited control*

**Simulated settings:** In laboratory settings by simulating the circumstances that elicit phenomena

>> *Controlled experiments involve high level of control*

# Data

*What data should we collect?*

**Qualitative:** Rich, textual/multimedia data from observations, interviews

>> *Data:* Fly-on-the-wall/participant observations, interviews; *Analysis:* Qualitative coding, modeling, comparative analysis

**Quantitative:** Numerical data from questionnaires, surveys, task measurements, biometric measures

>> *Data:* Objective, subjective, behavioral measurements; *Analysis:* Statistical methods

# Key Concepts in Design-Based Research

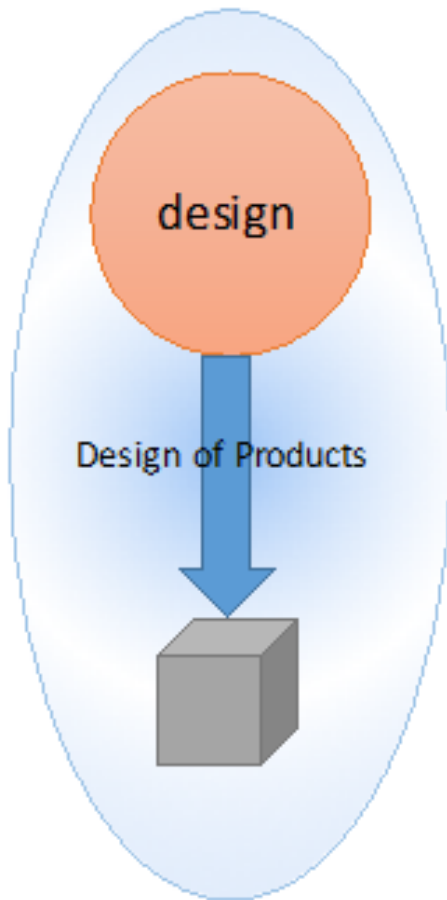
**Research for design:** Carrying out research to inform the design of a product or service.

*research → design*

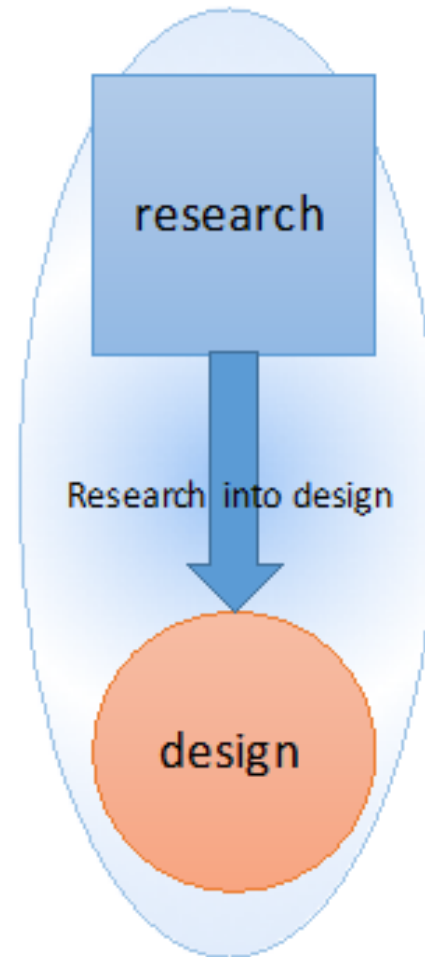
**Research through design:** Carrying out design to create knowledge about phenomena.

*design ≈ research*

# How should we think about design and research?<sup>2</sup>



conventional design creating products



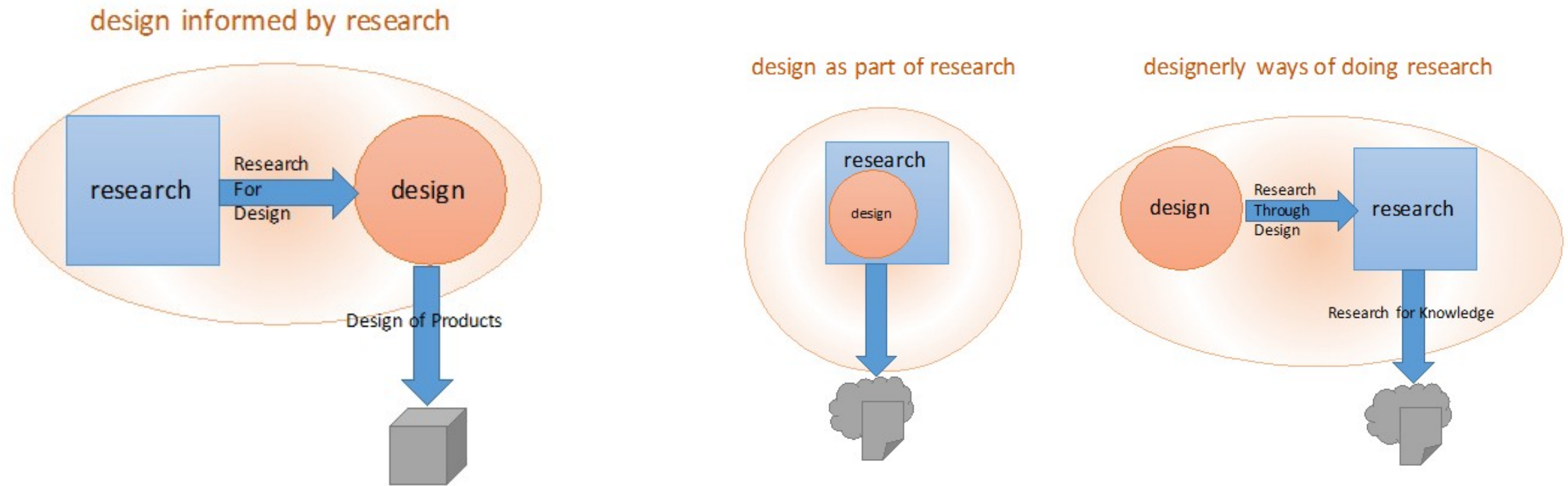
research about design methods



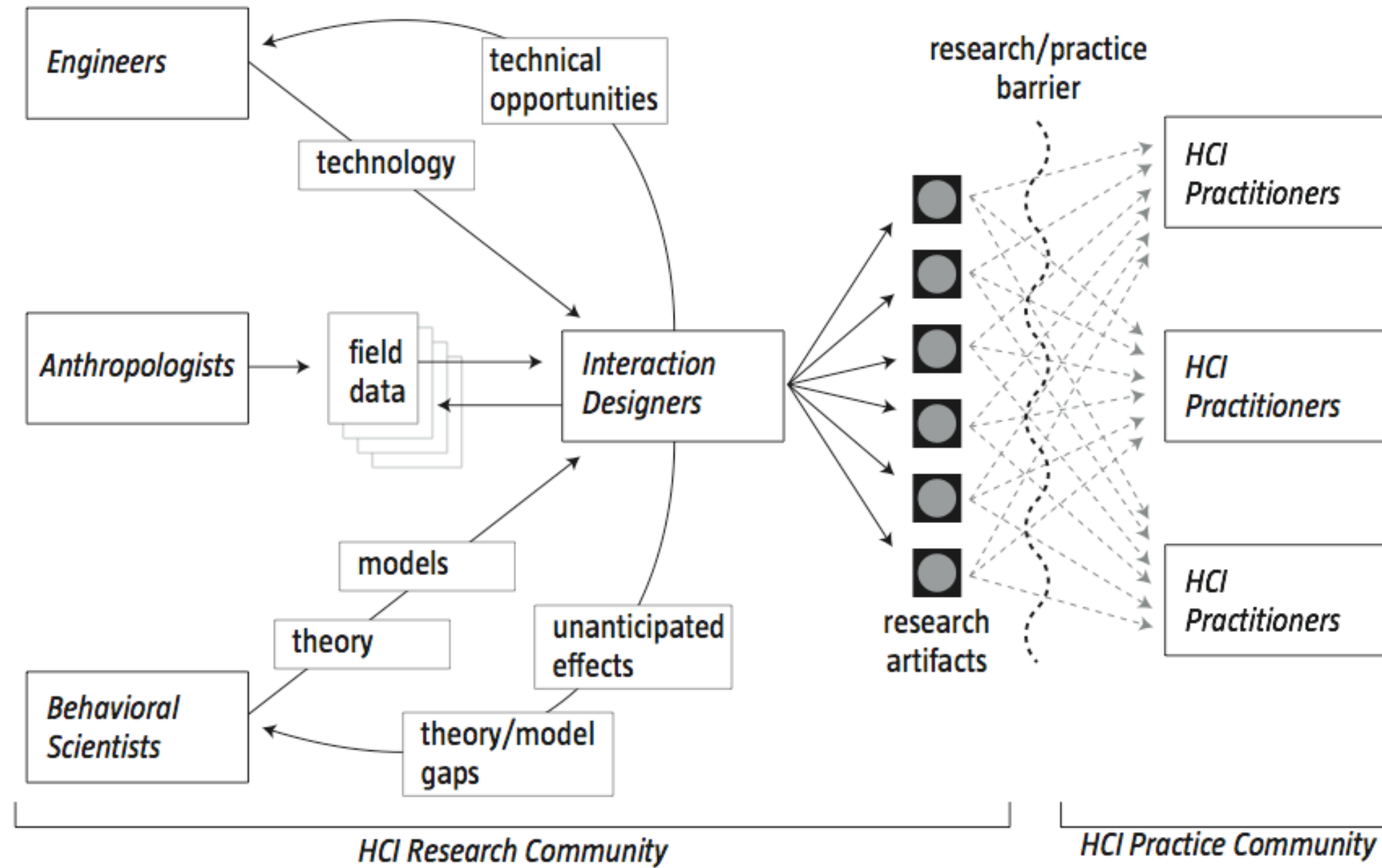
conventional research creating knowledge

<sup>2</sup>Stappers & Giaccardi, 2014

# What is the relationship between design and research?<sup>2</sup>



<sup>2</sup>Stappers & Giaccardi, 2014



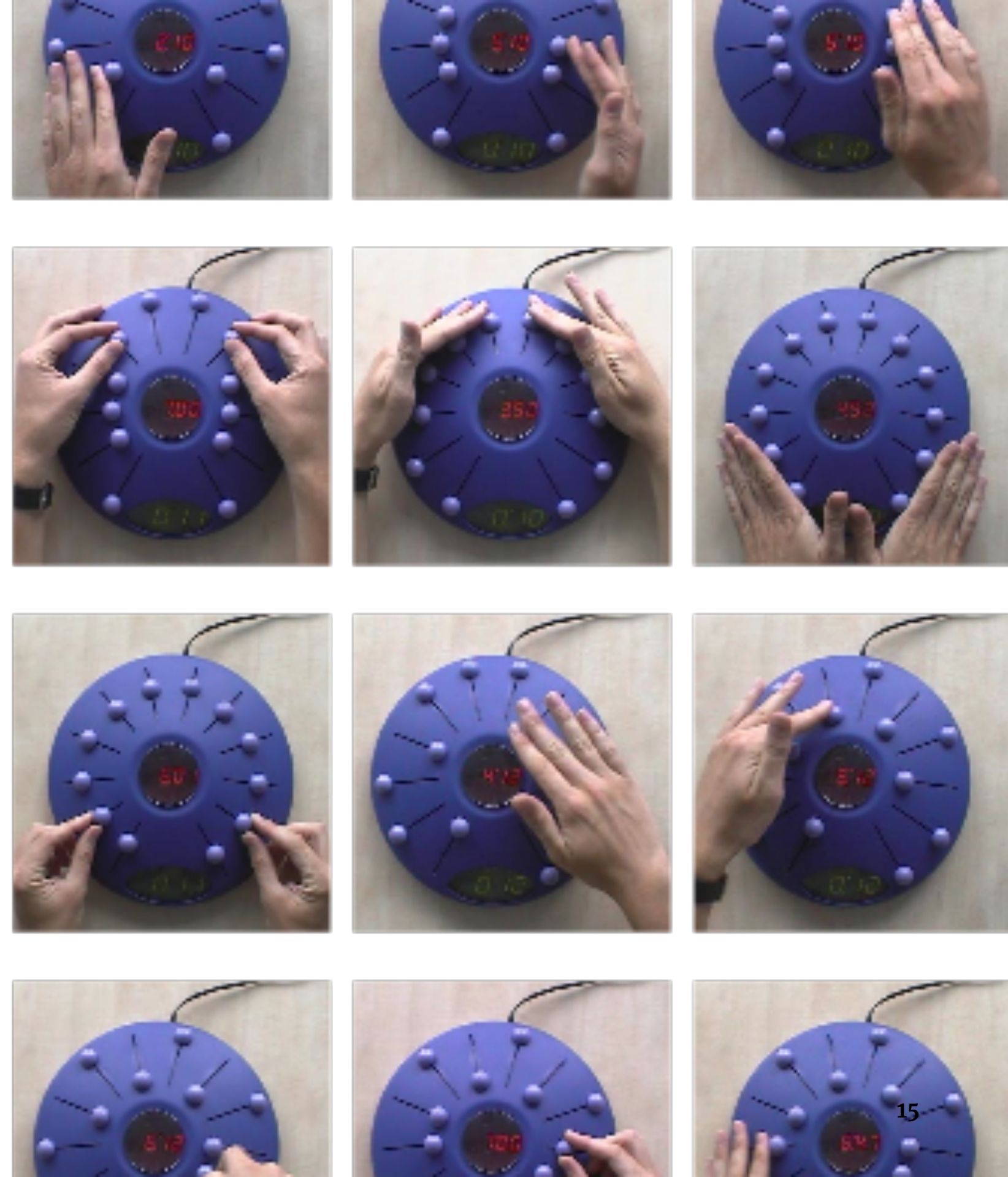
<sup>3</sup>Zimmerman et al., 2007

# An Example<sup>4</sup>

*How can products get information about how we feel from the way we interact with them?*

Wensveen (2005) designed/prototyped an alarm clock with sliders that a user could move with two hands to set a *mood* for the alarm.

Generated knowledge about how emotion can be expressed through tangible interaction.



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<sup>4</sup>Image source

# Hands-on Activity

HCI Research in 60 Minutes