HUMAN-COMPUTER INTERACTION

HCI RESEARCH METHODS

Professor **Bilge Mutlu**
Computer Sciences, Psychology, & Industrial and Systems Engineering
University of Wisconsin–Madison

CS/Psych-770 Human-Computer Interaction

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METHODS COMPONENT OVERVIEW

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METHODS COMPONENT

Building a "toolbox" of research methods

- Planning
- Conducting
- Writing

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EMPIRICAL RESEARCH

HCI research is founded on "empirical" principles

Definition of "empirical:"

> "Relying on or derived from observation or experiment."
>
> — American Heritage Dictionary

TRADEMARKS

Emphasizes systematic observations of a sample of

- Individual behavior
- Interactions
  - Among people, between people and objects

Uses varying degrees of "control"

- Allows for descriptive or comparative research
- Maintaing reliability, validity
  - Will come up repeatedly through the semester

Uses specific "designs"

BASIC CONCEPTS

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WHAT IS A SAMPLE?

A subset of a population

- The general population is too large to measure
- Collecting data from a smaller sample, called "sampling"
- Make generalizations on population from the sample

Examples of sampling

- Random sampling — for controlled experiments
- Purposive sampling — for "representational" studies
- Snowball sampling — used to reach particular groups
- Convenience sampling — for assignments in this class

EXAMPLES OF SAMPLING

- Any population of concern
  - Sensitive populations
  - Ethical considerations
    - Principles of responsible conduct of research — you will learn more in this week's assignment
- Sampling bias
  - Self selection — e.g., online and phone-in polls
  - Experimenter bias — e.g., convenience sampling

RESEARCH DESIGN

Depends on the goals of the investigation

- Goal-based categories
  - Generalization vs. representation
  - Control-based categories
    - Limited control or uncontrolled studies
    - Fully controlled experiments
- Data-based categories
  - Qualitative vs. quantitative

Affects design, measurement, data format, analysis

GOALS

Representation

In-depth understanding of phenomena — how particular actors affect particular situations under particular circumstances

Mainly used for generating theory

Uses small samples

Generalization

Testing hypotheses — How findings from a small sample can be generalized to a larger population

Mainly used for testing thin slices of theory

Uses relatively large samples

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CONTROL

Fully controlled experiments

All aspects but the manipulated aspect are controlled — a true experiment

Field experiments

Limited control in a naturalistic setting — e.g., studies in public

Observational studies

No control on any aspect of the phenomenon

Surveys, archival research, cohort study, etc.

DATA — MEASUREMENT

Objective measures

Comparing measurements against an objective standard — e.g., knowledge test

Subjective measures

Individual and relative evaluation — e.g., liking

Behavioral measures

Measuring how people behave instead of report

DATA — MEASUREMENT

Qualitative measures

- Fly-on-the-wall observations
- Participant observations
- Open-ended interviews

Quantitative measures

- Questionnaires, surveys
- Biometric measures — e.g., eye-tracking
- Task performance

DATA — ANALYSIS

Quantitative data analysis

- Statistical methods — e.g., counting, t-tests, analysis of variance, time-series analysis

Qualitative data analysis

- Interpretations, comparative analysis, modeling
- Qualitative data can also be quantified
  - Coding, counting, comparing...

EMPHASIS ON WRITING

Research ≈ Journalism

- Goal is to create a plausible story
- Selective reporting
- Open to interpretations
- The editor can say "no"

Research ≠ Journalism

- Time span — months-old vs. days-old news
- Rigor — systematic process, documentation of observations
- Experimentation, intervention
- Generalization

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THANKS!

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