HUMAN-COMPUTER INTERACTION

HCI RESEARCH METHODS

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CS/Psych-770 Human-Computer Interaction
METHODS
COMPONENT
OVERVIEW
METHODS COMPONENT

Building a “toolbox” of research methods

Planning
Conducting
Writing
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
- Maintaining reliability, validity
  - Will come up repeatedly through the semester

Uses specific “designs”
BASIC CONCEPTS
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
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