Current Topics in Media Computing and HCI

S02 Experimental Research: Writing a Review

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http://hci.rwth-aachen.de/cthci
Expected Until Now

- Finished A01 (submission deadline tomorrow, 6:00 AM - 11:00 PM)
- Read Methodology Matters
- Understand the different parts of an experiment protocol: context, hypothesis, variables, design
Quick Review of Experimental Research Concepts
Basic Experimental Designs

Between-groups design

Within-groups design

Manipulate A

Manipulate B

A

B
Basic Experimental Designs

• Between-groups design
  • Each subject only does one variant of the experiment
  • There are at least 2 groups to isolate effect of manipulation:
    • Treatment group and control group
    + No practice effects across variants
  • Good for tasks that are simple and involve limited cognitive processes, e.g., tapping, dragging, or visual search
    - But: requires more users

• Within-groups design
  • Each subject does all variants of the experiment
  + Fewer users required, individual differences canceled out
  • Good for complex tasks, e.g., typing, reading, composition, problem solving
    - But: practice effects may occur
The main problem with within-groups design (or mixed design) is that order effects reduce the internal validity of the experiment.

- **Internal validity**: the extent to which you can say that no other variables except the ones you are studying caused the measure result.
Order Effects

• Within-groups design

• The behavior may be influenced by experience that occurred earlier in the sequence

• **Carryover effects**: changes caused by the lingering aftereffects of an earlier treatment condition.
  
  • E.g., testing the first condition causes users finger to hurt, degrading their performance in the second condition

• **Progressive error**: changes that are related to general experience in the study but unrelated to specific treatments
  
  • Practice effects and fatigue
  
  • E.g., the experiment takes too long overall
• Use every possible order of treatments with an equal number of individual participants

• Latin Square
  • Each condition appears at each ordinal position
  • Each condition precedes and follows each condition one time

• Example: six treatments: A, B, C, D, E, F

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From DIS1
Learning Curve

- **Learning curve**: relationship between experience (or time) and performance
- Rapid raise at the beginning, followed by a plateau
- In general, start measuring when the learning effect is gone!
Exercise #1

• For text entry research, describe one reason to choose a
  • Within-group design
  • Between-groups design
Experimental Design in Text Entry Research

• Usually preferred: within-group design
  • Minimizes confounding effects from the behavioral differences between participants
• Sometimes, we need a between-groups design
  • E.g., when testing whether a keyboard favors users with right-handedness over those with left-handedness
Writing a Review
Criteria for a Good Paper

• Contribution: What new insight does it bring to the field?
• Benefits: What can one learn from this / do with this?
• Novelty: Prior publications?
• Validity: Are the claims properly backed up?
• Applicability: How good does the paper match the likely audience?
• Format: Readability and clarity
Structure of a (CHI) Review

- Overall rating: 1: definite reject – 5: definite accept
- Short summary of the contributions and benefits
  - “This paper presents… (who) will benefit from (what)”
- Concerns
  - Originality
  - Validity
  - Clarity
- Suggestions for improvement
- Reviewer’s expertise: 1: no knowledge – 4 expert
Exercise #2.1

- Read the abstract, introduction, and conclusion of the paper:
  - **Augmented Reality in Hierarchical Micro-Navigation**
- In a group of 2-3 write your own summary (~abstract) of the paper
- “Briefly summarize the paper and its contribution to new interactive technologies. Briefly state how the work was validated.”
“This paper compares various types of hypothetical navigation aids for a hierarchical navigation task (finding targets in a box).

The problem is sufficiently motivated, and I can imagine specific industrial scenarios where this is useful. The paper is well written, and there is clearly care put into the construction of the figures. I have two major concerns with the paper as presented.”
The paper describes a study on simulated (or mocked-up) AR aid for micro-navigation, to help people find an object in a hierarchy of containers. It compared four visual aids for navigation including two types of route knowledge and two types of survey knowledge. The study concluded that survey aids are less efficient than route aids for the task proposed.
Reviewing Checklist

• Recommending accept
  • Convince yourself that it has no serious defects
  • Convince the editor that it is of an acceptable standard, by explaining why it is original, valid, and clear
  • List the changes that should be made before it appears in print
    • Where possible: indicating not just what to change but what to change it to
  • Take reasonable care in checking details, e.g., mathematics, formulas, and bibliography

From Writing for Computer Science (Zobel, 2004)
Reviewing Checklist

• Recommending reject
  • Clearly explain the faults and, where possible, discuss how they could be rectified
  • Indicate which parts of the work are of value and which should be discarded
  • Check the paper to a reasonable level of detail

From Writing for Computer Science (Zobel, 2004)
Reviewing Checklist

• Always do the following in either case
  • Provide good references with which the authors should be familiar
  • Ask yourself whether your comments are fair, specific, and polite
  • Be honest about your limitations as a referee of that paper
  • Check your review carefully as you would check one of your own papers prior to submission

From Writing for Computer Science (Zobel, 2004)
Exercise #2.2

• In the paper *Augmented Reality in Hierarchical Micro-Navigation*

• In the same group, highlight the parts that warrant originality, validity, or clarity concerns

• Each team should be prepared to talk about 1-2 concerns

• We will provide you with the actual review and the accepted paper on L2P
What You Need To Do Now

- You will find A02 on L2P tom.