

Enhancing Input Device Evaluation - Longitudinal Approaches

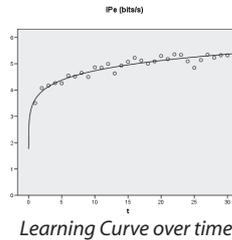
Human-Computer Interaction Group, University of Konstanz

CHI 2009 - Extended Abstracts on Human Factors in Computing Systems, Boston, USA, 2009.

For input device evaluation, longitudinal data collection is still the exception to the rule but it seems that during the last few years the need for such research methods has constantly grown. Longitudinal data could be defined as follows: "basically, longitudinal data present information about what happened to a set of research units [in our case the participants of a study] during a series of time points. In contrast, cross-sectional data refer to the situation at one particular point in time"

Key Advantages:

- Analyze learning issues
- Distinguish between learning of task and device
- Analyze change of strategies
- Higher ecologic validity



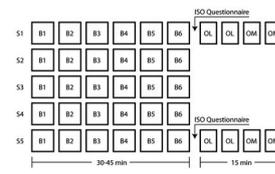
Participant conducting a multi-directional tapping test with a laser pointer device

Study 1 Design & Results

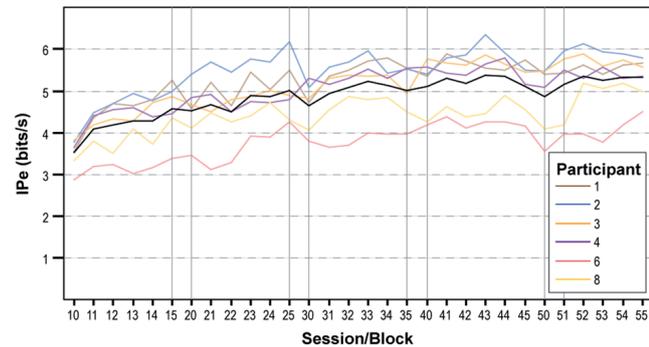
We designed our first study in a way to primarily analyze whether learning via practice is permanent and independent from the experimental task. While participants increased their performance about 2 bits/s during the five days, only 0.37 bits/s remained in the transfer task. This indicates that although the tasks were very similar (the transfer task being the easier one), it is very important to distinguish between learning of the device and of the task.

Key Features:

- Small number of participants (6)
- 5-days iterative lab experiment
- 30-45 minute sessions on each day
- Transfer task during first and last session



Schematical view on the experimental design 1



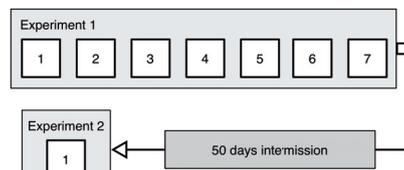
Learning Curve per participant - shows performance drops at the beginning of most blocks

Study 2 Design & Results

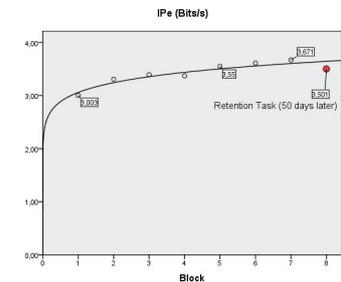
In our second study we wanted to analyze the performance of learning. Results showed that performance decreased during the 50 days timespan (0,16 bits/s). However the more interesting phenomena was, that the second experiment showed no performance differences between trained and novice users when the difficulty of the task increases.

Key Features:

- 12 participants
- 1st experiment: laser pointer practice
- 2nd experiment: trained vs. novice users
- 50 days retention time between experiments



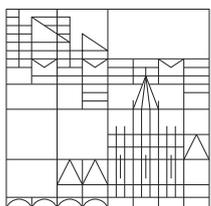
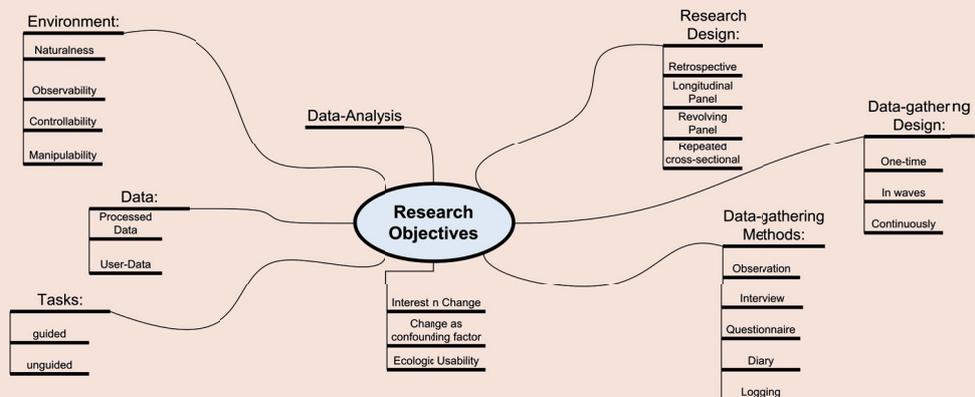
Schematical view on the experimental design 2



Learning Curve over time: performance drop after 50 days of retention phase

Future Work - A Taxonomy for Longitudinal Research in HCI

While many researchers acknowledge the need for more longitudinal research in HCI, according studies are still applied only occasional. Therefore we are working on a taxonomy for longitudinal research in HCI to define the field, support the discussion and facilitate the use of such approaches.



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