LFE Medieninformatik ◆ Prof. Dr. Heinrich Hußmann (Dozent), Alexander De Luca, Gregor Broll, Max-Emanuel Maurer (supervisors)
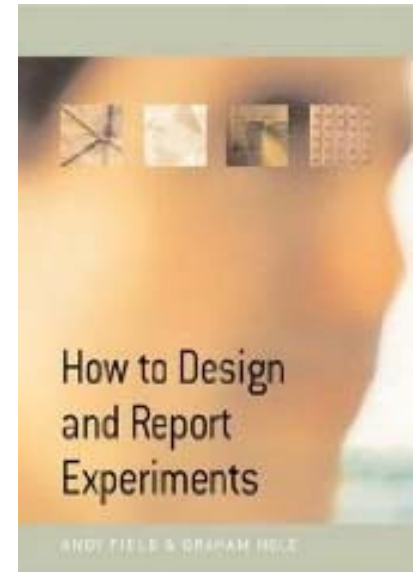
Praktikum Entwicklung von Mediensystemen mit Android

User Studies and Evaluation

LUDWIG-
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MÜNCHEN

General Information

- Lightweight introduction to user studies
- More information from:
  - Andy Field, Graham Hole. How to Design and Report Experiments.
  - MMI-script
- User studies for different stages of the development process
  - Ideas and concepts
  - Designs
  - Prototypes, implementations
  - Products in use

What do we want to measure?

- Quantitative user studies
  - ➢ Measure performance
  - ➢ Generate statistical data
  - ➢ Verify hypotheses
- Qualitative user studies
  - ➢ Get "non"-measurable feedback
  - ➢ General insight
  - ➢ Find problem areas, conceptual errors, missing functionality

Procedure

- Determine the goal(s) of the user study
- Design the experiment(s)
  - ➢ Create scenarios and tasks
  - ➢ Decide about measurement of metrics
  - ➢ Prepare questionnaires
  - ➢ Recruit subjects (5 – 100000000000)
- Run the study
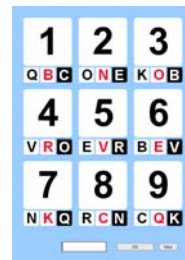- Analyze measured data and questionnaires
- Summarize and present the results

- **Or: Start again**

Goals

- Purpose of the study
- Find out what you want to evaluate
  - ➢ Testing different ideas and designs
  - ➢ Usability of application features
  - ➢ Evaluation of user acceptance
  - ➢ Analysis of application performance
- (Definition of hypotheses)
- Goals greatly influence the further design of the user study

Do people understand it?

Is it secure?

Is it easy to use?

Designing the Experiment(s) I

- Outline the setup of the study
  - ➢ Introduction
  - ➢ Optional training
  - ➢ Order of tasks (randomized?)
  - ➢ Order of questionnaires
- Investigator can use the outline as guideline for the study
- Create scenarios and tasks
  - ➢ Background for testing items of interest
  - ➢ Fully / partially covering the features of an application
  - ➢ Write down task descriptions for the subjects

Designing the Experiment(s) II

- Decide about measurement of metrics
  - ➢ Quantitative measurement of test-specific metrics
  - ➢ Examples: task completion time, number of errors …
  - ➢ Means: code, video (analysis), stop watch, etc.
- Prepare questionnaires
  - ➢ Qualitative assessment of features usability, user acceptance …
  - ➢ Background questionnaire about age, gender, education/job
  - ➢ Different questionnaires for different tasks and scenarios
  - ➢ Final questionnaire to compare items that were tested separately
  - ➢ Use predefined choices (e.g. Likert-scales) and open questions

Inspiring Examples

- IBM Post-Study System Usability Questionnaire (PSSUQ)
  - ➢ Standardized questionnaire for usability evaluation
  - ➢ 19 questions, Likert-scales
  - ➢ Measurement of user satisfaction with system usability
  - ➢ Customizable web questionnaire: http://hcibib.org/perlman/question.html
- SUS – System Usability Scale
  - ➢ Quick and dirty questionnaire for usability evaluation
- Nasa Task Load Index (TLX)
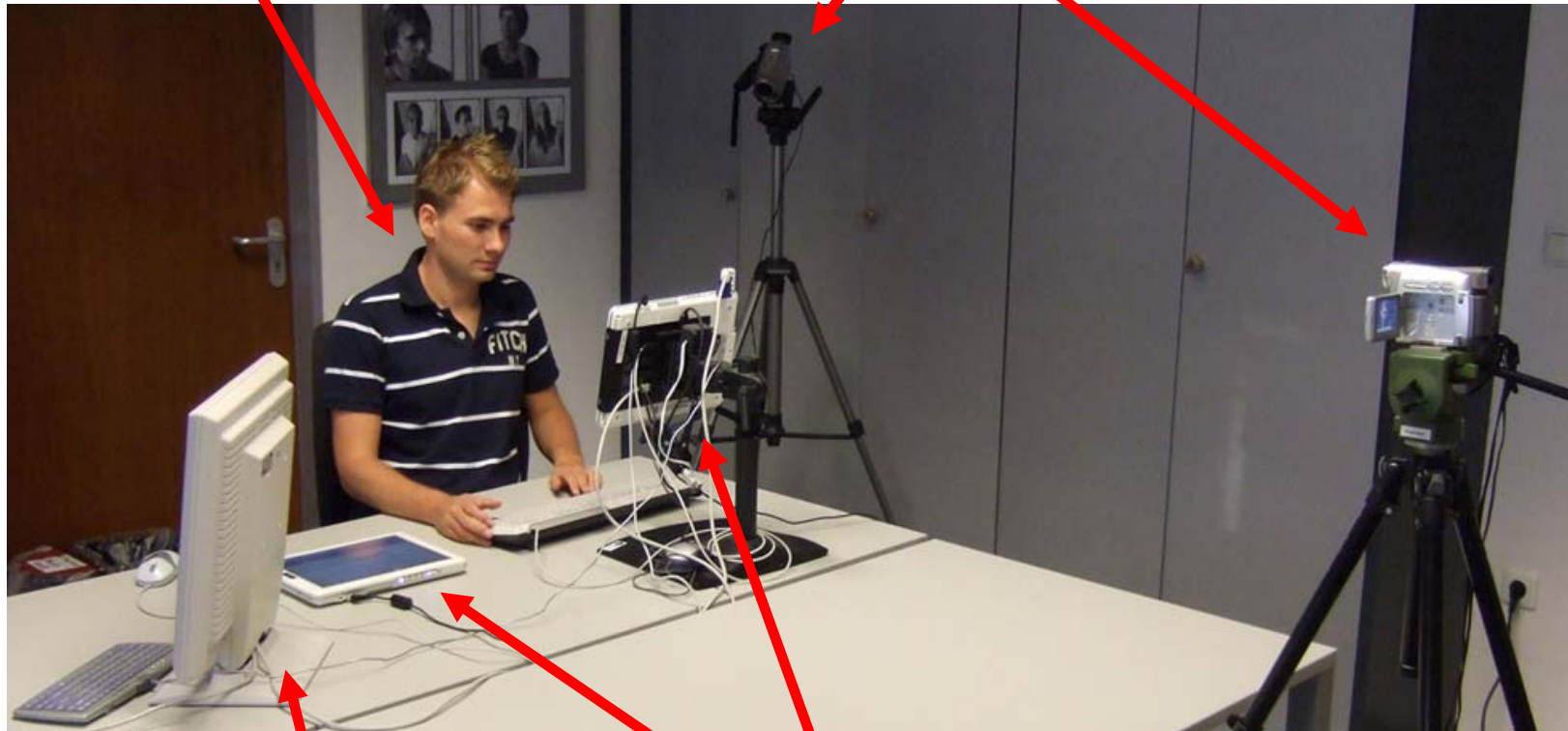 - ➢ Assessment of workload score

Running the Study

- Run the study according to the outline/script
- Assign different people to different roles
  - ➢ Investigator, documentation, …
- Encourage thinking aloud
- Document comments, problems, etc.
- Support subjects in case they don't know what to do
  - ➢ Give hints instead of solutions ("Why don't you try …?")

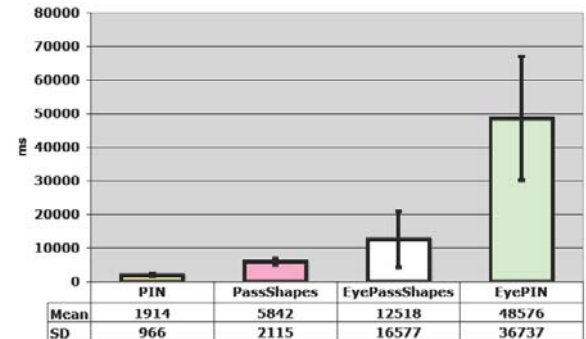# Exemplary Study Setup

Participant/Victim

Collect Data

Logs

Prototypes

Analysis and Summary of the Results

- Quantitative data, e.g. time, number of errors
  - ➤ Calculate mean values and standard deviations, e.g. with Excel
  - ➤ Create diagrams for presentation

	PIN	PassShapes	EyePassShapes	EyePIN
Mean	1914	5842	12518	48576
SD	966	2115	16577	36737

- Qualitative data, e.g. from questionnaires
  - ➤ Mean values and standard deviations from scales; diagrams
  - ➤ Summary of individual answers; report trends
  - ➤ E.g. demographic data:

  "We recruited 24 volunteers to participate in the study. The average age was 28 years, the youngest participant being 15 and the oldest being 57. 18 of them were male, 6 female."

Optional: Writing a Paper

- Many conferences offer different means for publication
  - Full / short paper
  - Work in progress, posters
  - Demos
  - ...
- Suitable conferences for publication
  - Ubicomp 2010
  - MobileHCI 2011
  - NordiCHI 2010
- Please contact us, if you want to submit sth. and need help

Timeline

Date	Topic/Activity
29.04.2010	Introduction and Overview of the Android Platform
06.05.2010	Implementing a User Interface
13.05.2010	*Christi Himmelfahrt*
20.05.2009	Storing, Retrieving and Exposing Data
27.05.2010	Brainstorming, Application Design
03.06.2010	*Fronleichnam*
10.06.2010	Project Presentation
29.07.2010	**Final Presentation, End of Practical**

Questions?
Have Fun!