

Lecture 12: Evaluation (part 2)

Overview

- DECIDE framework
- Usability testing
- Basic experimental design
- Field studies

Based on material from:

Sharp, H., Preece, J. and Rogers, Y. (2019). *Interaction Design Beyond Human-Computer Interaction*. 5th Ed. Sussex: John Wiley & Sons Ltd.

Learning Outcomes

- Explain the DECIDE framework
- Explain how to do usability testing
- Outline the basics of experimental design
- Describe how to do field studies

1) DECIDE: a framework to guide evaluation

- Determine the *goals*
- Explore the *questions*
- Choose the evaluation *methods*
- Identify the *practical issues*
- Decide how to deal with the *ethical issues*
- Evaluate, analyze, interpret and present the *data*

Tutorial 7

each step:
explain &
relate
to our
prototype

Ultimate goal

user xp
&
usability

1.1) Determine the goals

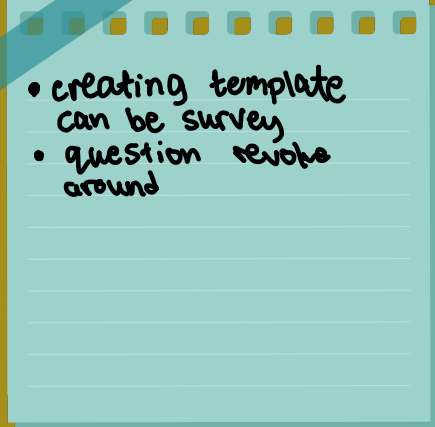
expert → group 5
&
user

- What are the high-level goals of the evaluation?
- Who wants it and why?
- The goals influence the methods used for the study
- Goals vary and could be to:
 - identify the best metaphor for the design
 - check that user requirements are met
 - check for consistency
 - investigate how technology affects working practices
 - improve the usability of an existing product

derive set
of q for
each respective
user type

1.2) Explore the questions

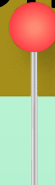
- Questions help to guide the evaluation
- The goal of finding out why some customers prefer to purchase paper airline tickets rather than e-tickets can be broken down into sub-questions:
 - What are customers' attitudes to e-tickets?
 - Are they concerned about security?
 - Is the interface for obtaining them poor?
- What questions might you ask about the design of a cell phone?



- creating template can be survey
- question revolve around

1.3) Choose the evaluation approach methods

- The evaluation method influences how data is collected, analyzed and presented
- E.g. field studies typically:
 - Involve observation and interviews
 - Involve users in natural settings
 - Do not involve controlled tests
 - Produce qualitative data



Can be quantitative data
also

1.4) Identify practical issues

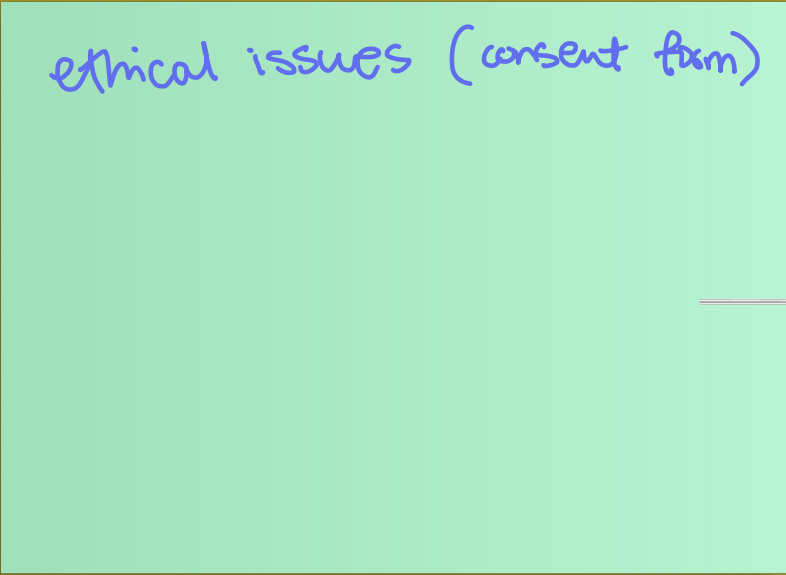
- For example, how to:
 - Select users
 - Find evaluators
 - Select equipment
 - Stay on budget
 - Stay on schedule

Challenges:
put in the details

Finding users
mentality during ramadan

1.5) Decide about ethical issues

- Develop an informed consent form
- Participants have a right to:
 - Know the goals of the study
 - Know what will happen to the findings
 - Privacy of personal information
 - Leave when they wish
 - Be treated politely



ethical issues (consent form)

1.6) Evaluate, interpret & present data

- Methods used influence how data is evaluated, interpreted and presented
- The following need to be considered:
 - Reliability: can the study be replicated?
 - Validity: is it measuring what you expected?
 - Biases: is the process creating biases?
 - Scope: can the findings be generalized?
 - Ecological validity: is the environment influencing the findings?



method: interview
try to adapt one & talk
ab it

Key points

- Many issues to consider before conducting an evaluation study
- These include: ^①goals of the study; ^②involvement or not of users; ^③the methods to use; ^④practical & ethical issues; ^⑤how data will be collected, analyzed & presented
- The DECIDE framework provides a useful checklist for planning an evaluation study

2. Usability testing

- Involves recording performance of typical users doing typical tasks
- Controlled settings
- Users are observed and timed
- Data is recorded on video & key presses are logged
- The data is used to calculate performance times, and to identify & explain errors
- User satisfaction is evaluated using questionnaires & interviews
- Field observations may be used to provide contextual understanding

2. Usability testing (cont)

- Goals & questions focus on how well users perform tasks with the product
- Comparison of products or prototypes common
- Focus is on time to complete task & number & type of errors
- Data collected by video & interaction logging.
- Testing is central
- User satisfaction questionnaires & interviews provide data about users' opinions

2.1) Experiment & Usability testing

- Experiments test hypotheses to discover new knowledge by investigating the relationship between two or more things – i.e., variables  *independent*
dependent
- Usability testing is applied experimentation
- Developers check that the system is usable by the intended user population for their tasks
- Experiments may also be done in usability testing

2.2) Usability testing & Research

Usability testing

- 1 Improve products
- 2 Few participants
- 3 Results inform design
- 4 Usually not completely replicable
- 5 Conditions controlled as much as possible
- 6 Procedure planned
- 7 Results reported to developers

Experiments for research

- Discover knowledge
- Many participants
- Results validated statistically
- Must be replicable
- Strongly controlled conditions
- Experimental design
- Scientific report to scientific community

2.3) Usability lab with observers watching a user & assistant



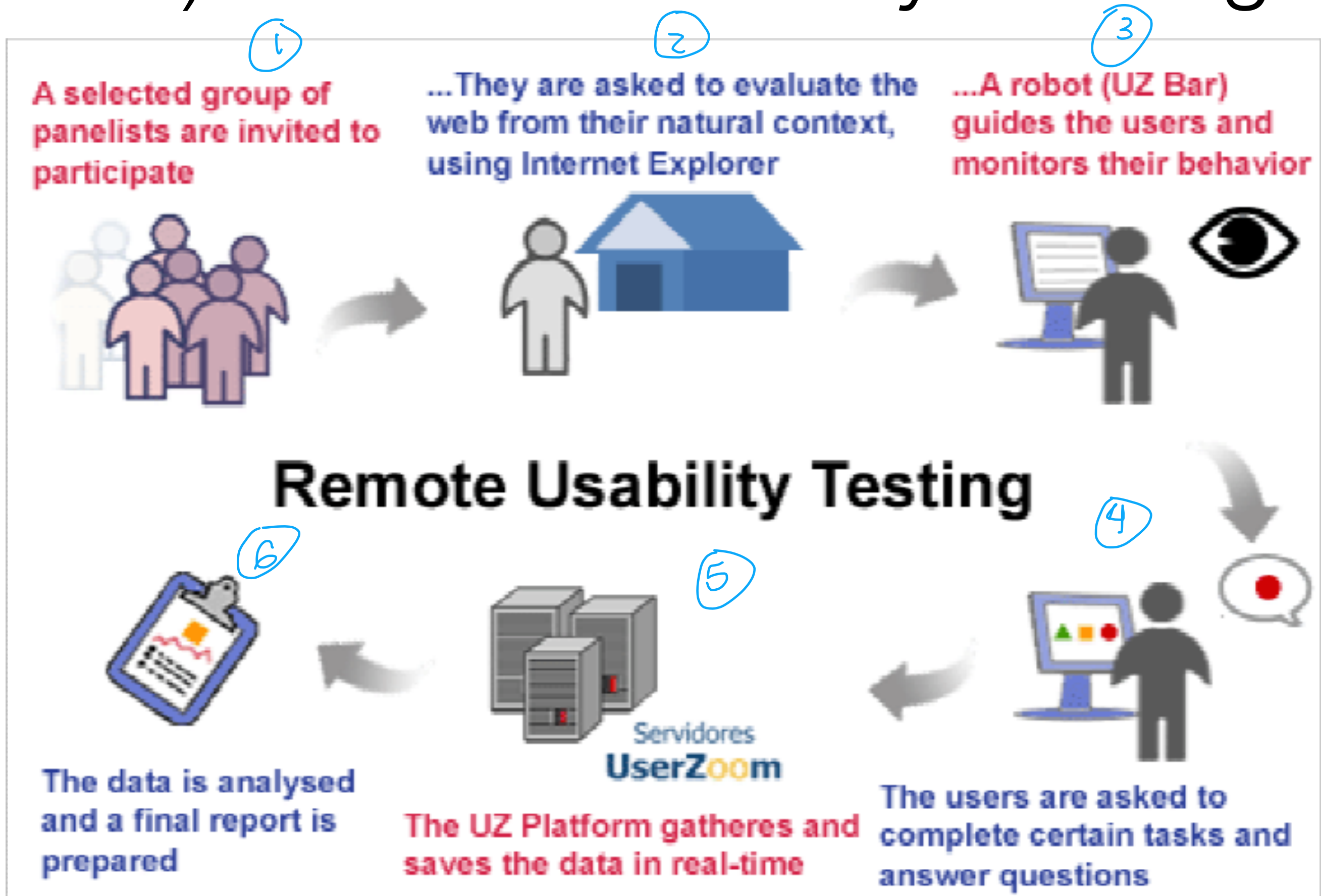
2.4) Portable equipment for use in the field



Tobii Glasses Mobile Eye-Tracking System



2.5) Remote Usability Testing



2.5) Testing conditions

- Usability lab or other controlled space
- Emphasis on:
 - selecting representative users
 - developing representative tasks
- 5-10 users typically selected
- Tasks usually last no more than 30 minutes
- The test conditions should be the same for every participant
- Informed consent form explains procedures and deals with ethical issues

2.6) Some type of data

- Time to complete a task
- Time to complete a task after a specified. time away from the product
- Number and type of errors per task
- Number of errors per unit of time
- Number of navigations to online help or manuals
- Number of users making a particular error
- Number of users completing task successfully

2.7) How many participants is enough for user testing?

- The number is a practical issue
- Depends on:
 - schedule for testing
 - availability of participants
 - cost of running tests
- Typically 5-10 participants
- Some experts argue that testing should continue until no new insights are gained

3. Experiments

- Test hypothesis
- Predict the relationship between two or more variables
- Independent variable is manipulated by the researcher
- Dependent variable depends on the independent variable
- Typical experimental designs have one or two independent variable
- Validated statistically & replicable

3.1 Experimental design

- Different participants (between subjects) - single group of participants is allocated randomly to the experimental conditions
- Same participants (within subjects) - all participants appear in both conditions
- Matched participants (pairwise) - participants are matched in pairs, e.g., based on expertise, gender, etc

3.2 Different, same, matched participant design

Design	Advantages	Disadvantages
Different	No order effects	Many subjects & individual differences a problem
Same	Few individuals, no individual differences	Counter-balancing needed because of ordering effects
Matched	Same as different participants but individual differences reduced	Cannot be sure of perfect matching on all differences

4. Field Studies

- Field studies are done in natural settings.
- “in the wild” is a term for prototypes being used freely in natural settings
- Aim to understand what users do naturally and how technology impacts them
- Field studies are used in product design to:
 - identify opportunities for new technology
 - determine design requirements
 - decide how best to introduce new technology
 - evaluate technology in use

Key points

- Usability testing takes place in controlled usability labs or temporary labs.
- Usability testing focuses on performance measures, eg. how long and how many errors are made when completing a set of predefined tasks. Indirect observation (video and keystroke logging), user satisfaction questionnaires and interviews are also collected.
- Affordable, remote testing systems are more portable than usability labs. Many also contain mobile eye-tracking and other devices.

Key points

- Experiments aim to test hypotheses by manipulating certain variables while keeping others constant.
- The experimenter controls the independent variable(s) but not the dependent variable(s).
- Field studies are evaluation studies that are carried out in natural settings to discover how people interact with technology in the real world.
- Field studies that involve the deployment of prototypes or technologies in natural settings may also be referred to as 'in the wild' studies.
- Sometimes the findings of a field study are unexpected, especially for in the wild studies that explore how novel technologies are used by participants in their own homes, places of work, or outside.