Usability Testing

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- 13 years Nokia Telecommunications / Nokia (Siemens) Networks
  - SW Engineer, Product Manager, Usability Consultant, Customer Quality Manager, Senior Specialist Requirements Engineering, Senior Specialist Usability
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About Idean

www.idean.com

Idean combines into **one seamless flow**

- **user and market research**
- **innovation and design**
- **desirable User Experiences**

Headquartered in **Finland, operating globally**

We are **40+ professionals**

You will find us where

digital products, services, media and interactions

meet **real people**

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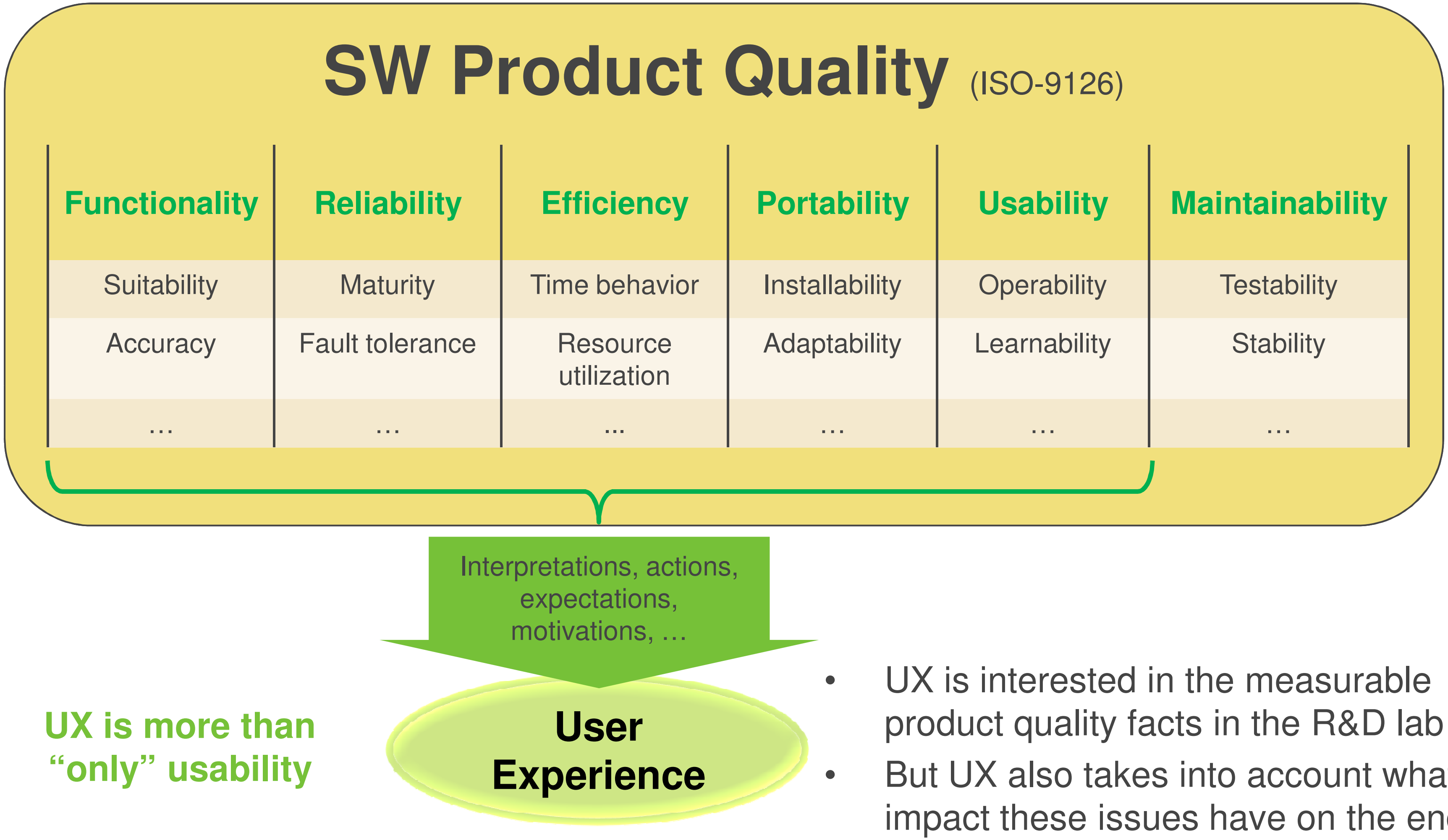
About Usability

UX and Product Quality 1(2)



SW Product Quality (ISO-9126)

Functionality	Reliability	Efficiency	Portability	Usability	Maintainability
Suitability	Maturity	Time behavior	Installability	Operability	Testability
Accuracy	Fault tolerance	Resource utilization	Adaptability	Learnability	Stability
…	…	…	…	…	…

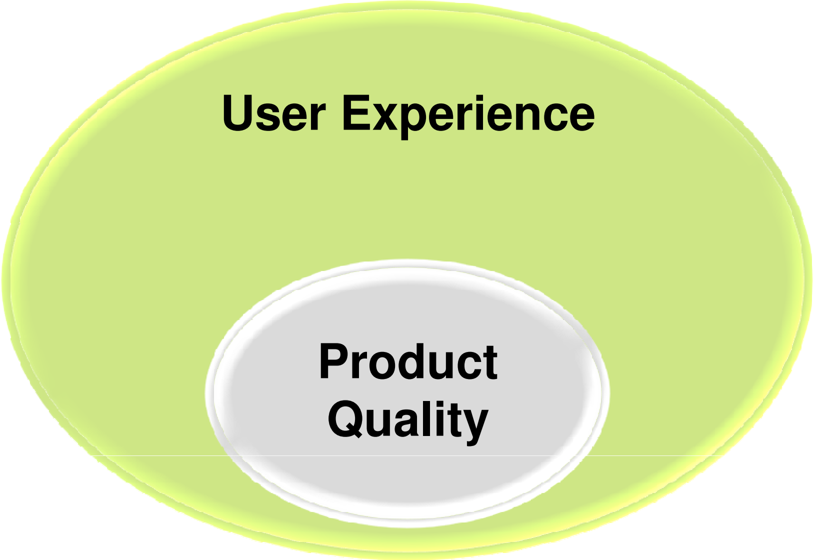
Interpretations, actions, expectations, motivations, …

User Experience

UX is more than "only" usability

- UX is interested in the measurable product quality facts in the R&D lab
- But UX also takes into account what impact these issues have on the end user experience

UX and Product Quality 2(2)



- Product quality is important for the user experience
  - It’s often under high scrutiny in the “R&D lab”

- The crucial point for User Experience is when the **real end-users** use the **final product** in the **real environment**

Most important methods

- Contextual research
  - Often expensive, but thorough
  - Best done in the beginning of the project as a input for design
  - Focus on real world users doing their real tasks in real environments
- Usability inspections (heuristic evaluations)
  - Cheap and fast
  - Finds a lot of low priority problems
  - High-priority problems might be left unnoticed, unless inspectors are familiar with user's environments and their real goals
  - Good for finding obvious usability problems before user testing
- User testing
  - Best done often, with different tasks and user groups
  - Sometimes expensive
  - Usually produces most valid results
  - Remote / online usability testing for web pages

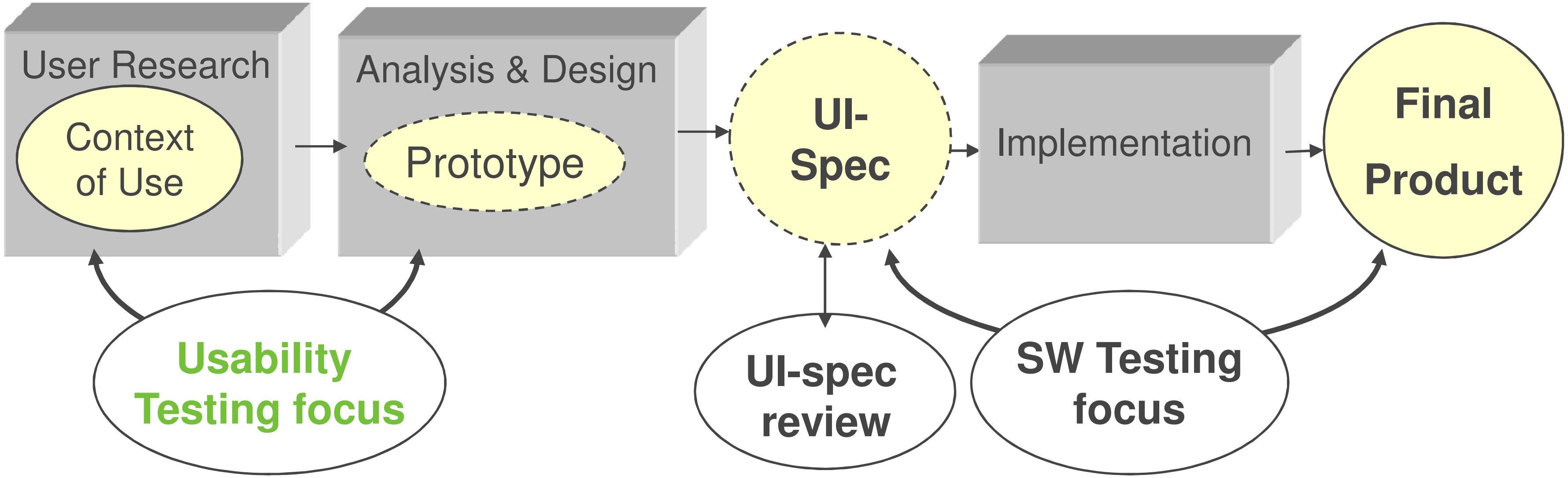
Objectives for Usability Testing

- Main objective: To evaluate the usability of the product or prototype to support user interface design

- Usability testing can also be used to
  - verify usability requirements
  - get user feedback for the next release(s)
  - learn about the context of use of the product: user goals, needs, tasks, etc.
  - iterate: to identify new user and usability requirements
  - getting user confirmation for design decisions (and design arguments)
  - selling product ideas and concepts

- NOTE: although software bugs can be discovered this is not an objective for usability testing

Usability Testing vs. SW Testing



- Fit-for-Use
- Correspondence
- Intended iteration
- Evaluating product as-a-tool
- low cost usability fixes
- identify & set usability & UI requirements

- Bugs
- Correctness
- Undesired integration
- Verifying product as-it-is
- high cost usability fixes
- verify requirements

- **If you are told that a problem in a product is a feature, not a bug…**

-> You know that the product has a usability problem!

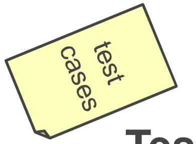
Overview of a usability test session

Test User(s)
- 1-2 persons per session
- not involved in the design

Moderator
- conductor of the whole test session
- interaction with the user during the test

Recording equipment
- audio or video

Product
- a finalized system or a prototype
- tested fully or partially
- paper or computer-based



Observers
- 2-3 persons per session
- observe and learn
- keep in the background
- write notes

Test cases
- the most critical deliverable for the test
- copies for all participants
- copies for all test users

Planning

1. Planning: Set test objectives

- Identify the critical usability drivers in the product or it’s design
  - usability issues that can effect success of the product
  - controversial design problems or solutions
  - problems that the users have been complaining about in previous releases
- Set your test objectives in more detail
  - high-level design concepts...
  - basic and/or critical tasks are covered...
  - specific functionality or graphical design of the system...
  - intuitiveness, learnability, efficiency, layout, consistency, ...
  - views, buttons, menus,...
  - navigation
  - information
    - important for documentation, e.g. evaluating how intuitive is the Table of Contents

1. Planning: method definition 1(2)

- The methods depend heavily on the test objectives. Examples:
  - **Objective: intuitiveness and learnability**
    - 1-2 users at a time
    - think-aloud protocol -method
    - interaction with the moderator
    - paper-prototype OK
  - **Objective: efficiency**
    - 1 user at a time
    - minimal interruptions by the moderator
    - measuring error and success rates
    - has to be a working system
    - performance measurement - method
  - **Objective: information design**
    - a terminology questionnaire
    - software on computer or information on paper or both
- Combine usability testing with other methods
    - e.g. interviews before, during or after the usability test
    - co-discovery method (more than 1 user), question asking protocol

1. Planning: method definition 2(2)

- Define what recording equipment will be used
  - a tape recorder
  - video camera
  - writing notes
  - a combination of the above

Electronic recording equipment

PROS

• easy to demonstrate observations and events

• events can be shown to non-participants

• good backup and support for analysis

• nothing is missed and everything can be recalled

CONS

- taking care of all the equipment, especially when travelling

- users can be annoyed about being recorded

- permissions to record are needed

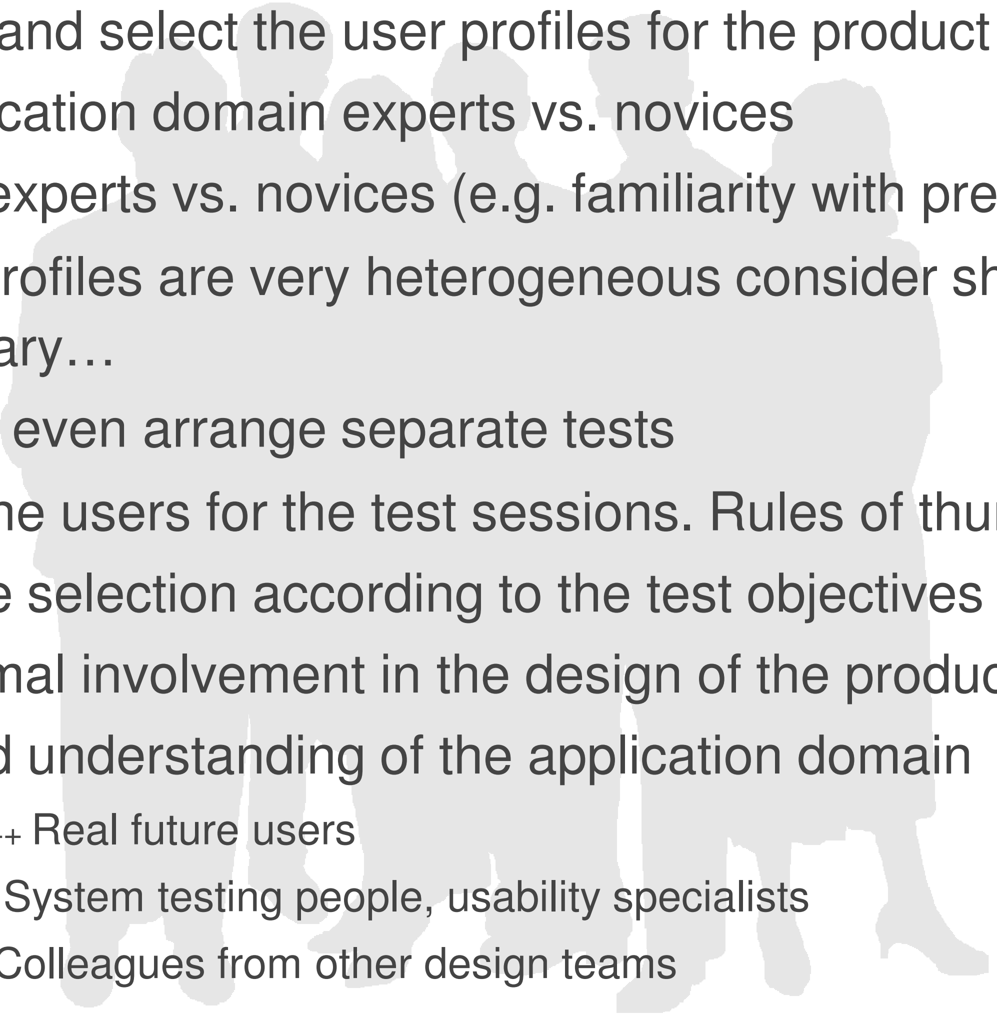
- N hours of tape -> 3xN hours of analysing the tape

- Note: when using recording equipment: you often have to write notes anyway in case of malfunctioning equipment

1. Planning: tested product

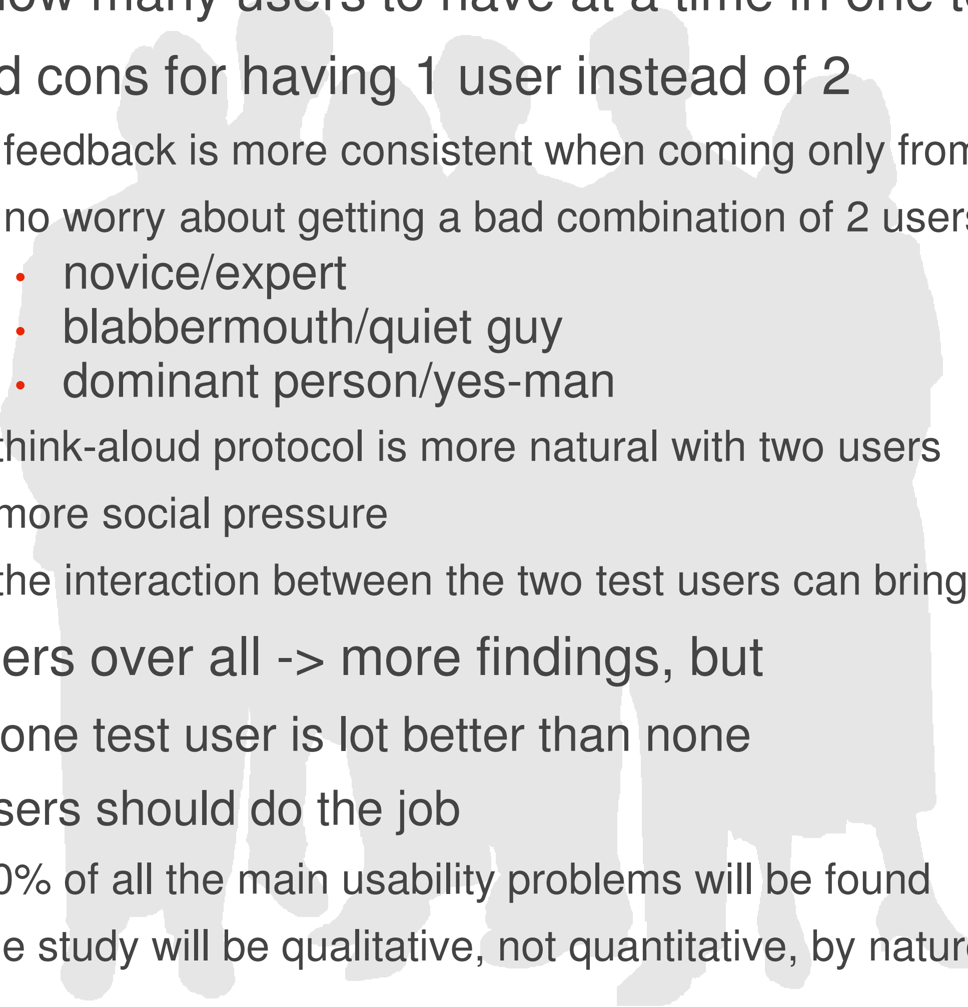
- Use a finalized product
  - a beta-version for early trials
  - a version for pilot customers
- Design a prototype
  - computer-based
  - paper-prototype
- Documentation
  - independently, stand-alone
    - descriptions
  - together with a product
    - instructions (e.g. out-of-the-box)
    - on-line helps
- What to test?
  - The whole product
  - Only selected parts of it

1. Planning: Recruiting 1(2)



- Identify and select the user profiles for the product
  - application domain experts vs. novices
  - tool experts vs. novices (e.g. familiarity with previous releases)
- If user profiles are very heterogeneous consider should their test cases vary…
  - … or even arrange separate tests
- Select the users for the test sessions. Rules of thumb:
  - Make selection according to the test objectives
  - Minimal involvement in the design of the product
  - Good understanding of the application domain
    - +++ Real future users
    - + System testing people, usability specialists
    - - Colleagues from other design teams

1. Planning: Recruiting 2(2)



- Define how many users to have at a time in one test session
- Pros and cons for having 1 user instead of 2
    - + feedback is more consistent when coming only from one person
    - + no worry about getting a bad combination of 2 users
        - novice/expert
        - blabbermouth/quiet guy
        - dominant person/yes-man
    - - think-aloud protocol is more natural with two users
    - - more social pressure
    - - the interaction between the two test users can bring out more insights
- More users over all -> more findings, but
    - even one test user is lot better than none
    - 4-8 users should do the job
        - 70% of all the main usability problems will be found
        - the study will be qualitative, not quantitative, by nature

1. Planning: test roles and responsibilities

- The moderator
  - The host of the whole usability test
  - Should have good knowledge about
    - 1) test objectives and social psychology of usability testing
    - 2) the application domain and the product
- Observers
  - Should have knowledge about
    - 1) the application domain and the product
    - 2) test objectives and usability testing in general
  - NOTE: Too many observers can create commotion and take a lot of space
- Prototype
    - Paper-prototype: who will act as the system logic, the moderator?
    - Computer-based prototype: who take care of network connections, installations etc.
- Who will take care of the recording equipment?

1. Planning: General guidelines

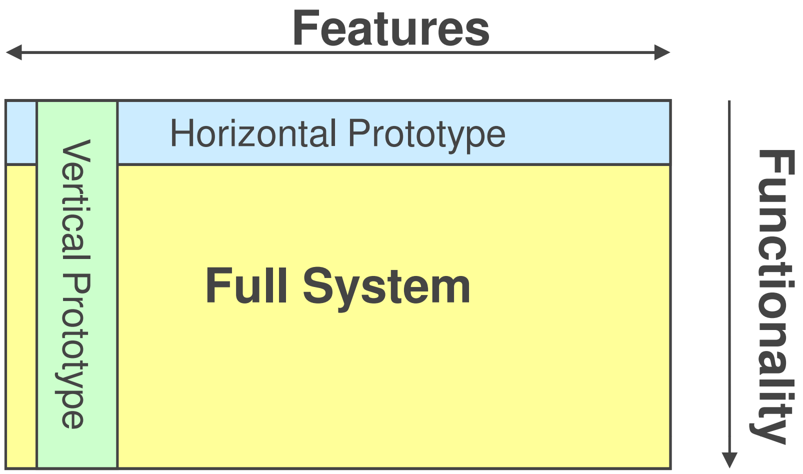
- Plan and make reservations well in advance
  - there might be all in all 5-10 people involved
  - Make travel plans, reserve resources, rooms, test labs, equipment etc.
- Rule of thumb: no more than 2 hours per each test user
  - test users and observers eventually start to wear off
  - test users will be away from their everyday work
- Plan also the events that take place after the test sessions
  - Analysis and reporting workshop?
    - Have it ASAP after the usability test -> Friday is not the best day to arrange a usability test
  - Briefings sharing the results?
  - More test users -> more findings -> more analysis and reporting to do

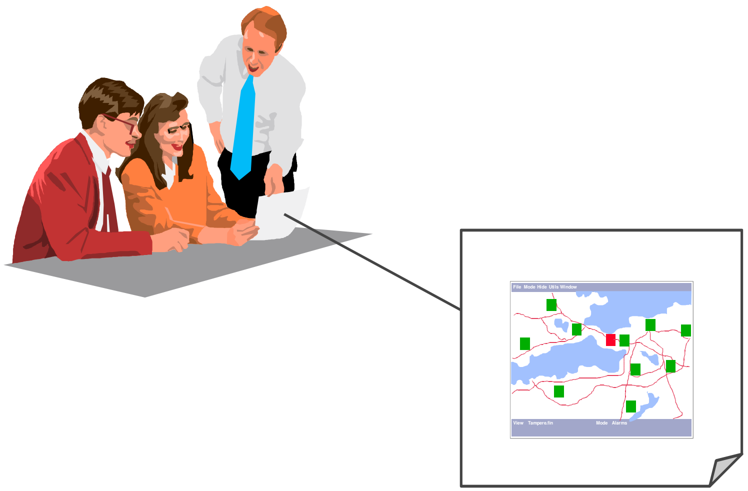
1. Planning: Pilot test

- To discover all naive usability problems
- To review the test cases
  - Can the test cases be understood?
- To test the whole usability session
  - You'll look more professional in the later tests, especially important when doing tests with potential customers
  - Does the prototype work as expected? Does the data make any sense?
  - Are the roles during the test session clear?
- To learn how to use the recording equipment
- If you pilot with you'll have a forgiving audience for any problems

Preparation

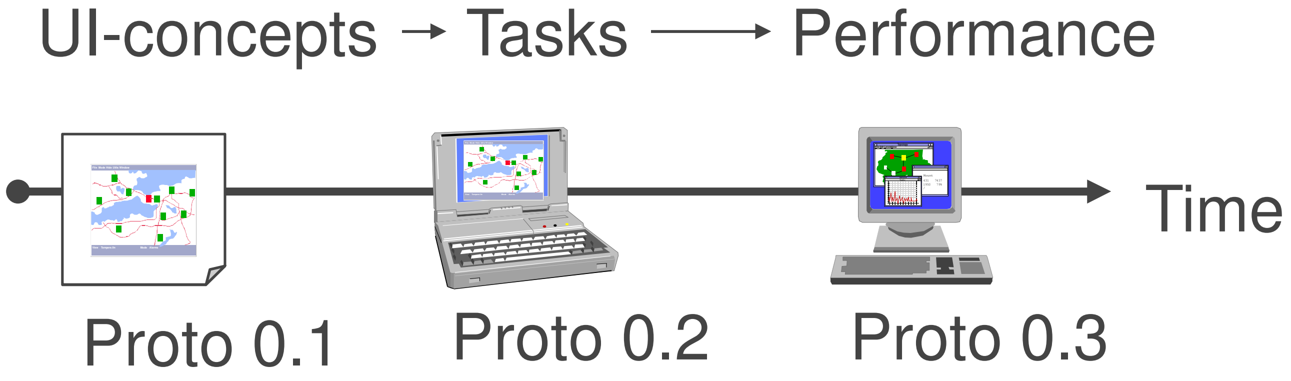
2. Preparation: Designing a prototype 1(2)





- **Prototype:** A <u>representation</u> of all or part of a product that, although limited in some way, can be used for <u>evaluation</u>.
  - horizontal: e.g. all menus designed but no functionality available
  - vertical: only two menus available but with full functionality
  - a combination of both
- **Paper-prototyping**
  - Someone acts as the system logic -> programming is not always necessary!

2. Preparation: Designing a prototype 2(2)



- **Low-level prototypes**
  - + evaluate UI-concepts before anything else
  - + big potential impact on design
  - + evaluation of alternative solutions
  - + cheap iteration
  - - plenty of preparation work
    - creating individually all possible views
  - - crucial usability issues missing?

- **Finalized product/prototype**
  - + Feedback is more detailed and realistic
    - performance, online help, aesthetics…
  - + impressive
  - + good for verifying usability requirements
  - - user expects it to
    - be ready tomorrow
    - work perfectly
  - - plenty of implementation work
    - minor impact on design
    - high ego-investment

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2. Preparation: Writing a test case 1(2)

- The test cases must
  - Focus on the test objectives
  - Reflect realistic and meaningful user tasks and goals
- Make the first test cases easy ones
  - We want that the test user gets a comfortable start
- Prioritise the test cases
  - In case you run out of time you know which test cases can be skipped
- It helps to have a logical order for the use cases
  - You can build later test cases on lessons learnt in previous ones
- Use cases are good input for the test cases
  - But do not use them as such, use cases can be too guiding and abstract
- Be careful with the terminology in test cases
  - Use natural language: refer to the user’s real-life tasks
  - Avoid suggesting UI items
  - Prefer writing in the test user’s mother tongue, if possible

2. Preparation: Writing a test case 2(2)

- Prepare realistic data for the test cases
  - test scenarios: the input data for the test cases match to reality
  - user goals: the goals in the test cases have true value to the user
- Considerations for writing a high-level user task to test cases
  - One long test case
    - + high-level user goals are more meaningful goals to the test user
    - + good for application domain experts
    - + get better visibility over the test user's own steps and logic
  - Many short and detailed test cases
    - + isolation of usability issues to be tested
    - + isolation of user problems
    - + breaks for relaxation, discussions and refining notes
    - + chances for prioritising test cases
    - + supports those test users who are not familiar with the application domain
  - NOTE: a textually short test case can take a long time to perform

2. Preparation: Test case example1

Example of one test case:

...

5) A home subscriber has called your support personnel to complain about random calls dropping. You want to determine the possible causes. Here's the subscriber's IMSI: 123456789123456.

- **Start a HLR trace for this subscriber**.

6) ...

The test case scenario

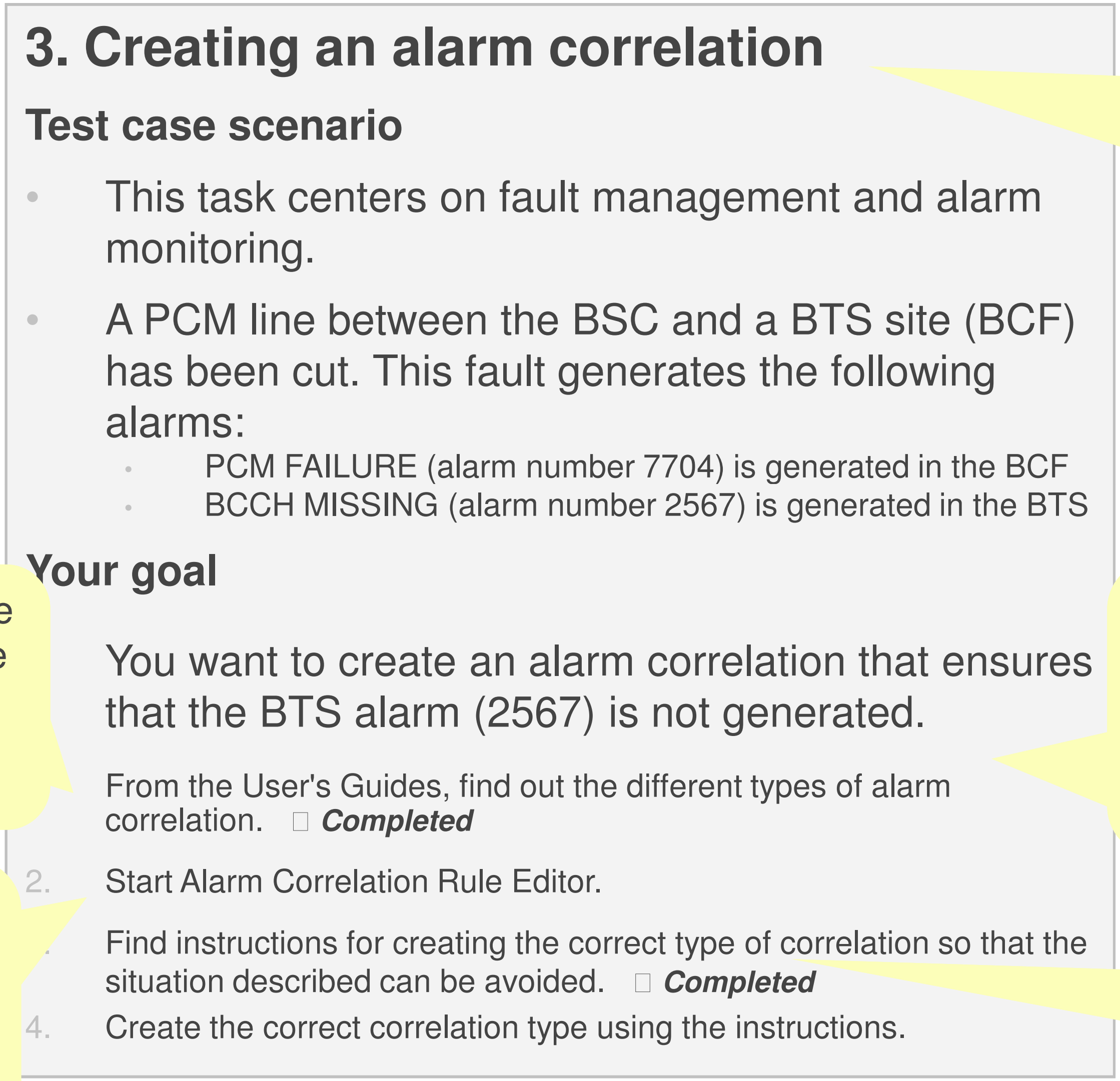
- realistic situation set-up and "data input" for the test case

The test case goal

- the "output" of the test case
- in the format of a task or need
- explains what needs to be done, not how
- unambiguous: anyone can tell when it is fully completed

2. Planning: Test case example2

In this test case online documentation is tested both with and without the product.



3. Creating an alarm correlation

Test case scenario

- This task centers on fault management and alarm monitoring.
- A PCM line between the BSC and a BTS site (BCF) has been cut. This fault generates the following alarms:
  - PCM FAILURE (alarm number 7704) is generated in the BCF
  - BCCH MISSING (alarm number 2567) is generated in the BTS

Your goal

You want to create an alarm correlation that ensures that the BTS alarm (2567) is not generated.

From the User's Guides, find out the different types of alarm correlation. □ ***Completed***

2. Start Alarm Correlation Rule Editor.

. Find instructions for creating the correct type of correlation so that the situation described can be avoided. □ ***Completed***

4. Create the correct correlation type using the instructions.

Both number and real name are used for reference (instead of only ‘Task 3’).

Detailed steps are used only to force the user to go to Online documentation.

System terminology is mentioned only because it is not in the focus of the test objective.

Natural language is used – no guidance for how to start Online Help.

Check-box is used to clarify when the user has completed a step.

2. Preparation: the test environment 1(2)

- If you do not have a usability lab think about your alternatives
    - book a meeting room
    - use a lab of your own or some external company
    - do it in the user's workplace
- Set up computer connections
    - Will backup solutions be needed?
    - Do we have a Plan B if connections fail?
- Prepare any optional test equipment
    - any recording equipment
    - a video projector? (showing the actions on a screen)
    - permissions to record?

2. Preparation: The test environment 2(2)

- Design the test environment. There must be enough space for
  - all participants
    - the moderator and observers must have good visibility to what is happening
    - the test user needs to feel comfortable
    - any movement during the test case can be disturbing
  - the equipment
    - computers, recorders, etc.
    - spreading out and managing the paper-prototype
- Peaceful place, time and mind
  - do not disturb others
  - do not be disturbed
  - no hurry home or to any appointments
  - away from everyday activities
- Realistic environment
  - for some working environments noise and interruptions are realism!

2. Preparation: Product data and props

- Prepare realistic data for the product
  - the amount of data
    - e.g. how many network elements will be managed in real use
  - the consistency of the data
    - the data in the product must match to the data in the test cases
  - prepare how to restore the data in the product between test sessions

- Prepare items that are needed to complete a prototype
  - e.g. menus or fields on yellow post-its
  - screenshots from other products
  - helps, error messages and manuals if needed
  - pencils to substitute the keyboard and mouse for paper-prototyping
  - some users might want to use a ruler or a pen to keep trace of the proceeding of the test case

The test session

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Planning: Test session agenda

- Reserve about 1,5-2h hours for each test
  - Introductions & coffee
  - Non-disclosure agreements
  - Explaining the test setup
  - Pre-test interview
  - Warm-up task
  - Test tasks
  - Post-test interview
  - Thank you & incentives
- Reserve about 30 minutes time between each test user
  - Resetting software, saving files, preparing video equipment

3. The test session: Introductions 1(2)

- Starting words
  - Welcome...
  - Why are we doing this Usability Test?
- Introducing the participants
  - Only shortly, no indication of involvement in design
- Overview of the test session
  - What is going to happen during the next 2 hours
- Introduction the application domain and/or product
  - The what's - not the how's
  - Depends on the test objectives
  - Does the user have a suitable level of application domain information – not too much, not too little. Is training needed?
  - It is always a tricky questions to decide how much to reveal about the product

3. The test session: introductions 2(2)

- Create a friendly atmosphere
  - We observe the product, not the user
  - No specific number of test cases to be completed
  - Tell that some tasks can be difficult (even if they aren't ;)
  - "The prototype is by no means ready, there can be sw bugs"
- Instructions to the test users
  - Subjective opinions expected
  - Encourage for negative feedback
  - Explain the ideas of the selected methods
- If needed, collect user profile data
  - Data that might explain the observations and feedback
  - Last check that there aren't surprises in the user's background
  - Optional: filling in a User Profile Form

3. The test session: Main steps

Test cases are gone through one by one:

1. Ask the test user to read through the test case
2. Has the user understood the test case?
    - “Do you have any questions about the test case?”
3. The user can start the test case in her own pace
4. After each test case anyone can make clarifying questions

- Leave sufficient time between test sessions
    - to get ready for the next test session
    - to have a short break
- Show the same interest in your final test user as in the first one
    - the same user problems appearing is an important finding

3. The test session: Moderator tasks 1(2)

- Responsibilities
  - Takes care of the well-being of the test user(s)
  - Takes care that the test objectives are achieved
  - Takes care that the discussion does not slide to implementation issues
  - Takes care that the usability test keeps to the planned schedule

- During the test session
  - Avoids hasty assistance -> the product should be self-explanatory
  - Decides when to interrupt the test user
  - Improvises if something unexpected happens
  - Is conscious about both the users and her own body language
  - Uses clarifying open-end questions
    - What do you think you have done so far? What would you like to do next?
    - What kind of hints would help you now?
    - Look at this on the screen. What do you think it is? What do you think it does?

3. The test session: Moderator tasks 2(2)

- Can be very busy conducting the test session
  - It can be difficult to write notes

- Helps the user out only if
  - It is obvious that the test user will not find her way through the test case
  - Other objectives of the test are at jeopardy

3. The test session: Observer

- Responsibilities: keeps trace of
  - actions that differ from expected
  - situations of hesitation
  - user comments and questions
- During a task
  - Should be very busy writing notes
  - Sticks to observations, not interpretation
  - Avoids disturbing the test user
  - Avoids non-verbal communication that can be misinterpreted
    - sighs, yawns, laughs
- After the task
  - Makes open-end questions
- Mind-set
  - Be forgiving to user and application problems
  - Not the right time to discuss implementation issues
  - Leave deeper analysis to the analysis workshop
- If you are the designer of the product
  - Avoid ego-investment: do not make excuses for product problems

3. The test session: closing the session

- Thank the user's for time they have spent with us
- Have a discussion with the user
  - Ask how did the users feel about doing the test
  - What is the overall impression of the product
    - Would the test user want to use the product for real use?
  - Clarify any unclear issues
    - Unclear to you or the user
    - Show solutions to any unsolved user problems
- Optional
  - Demo undiscovered functionality and ask opinions about it
  - have a closing interview
  - go through the test cases
- Give a company present

Analysis and Reporting

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4. Analysis and reporting: Objectives

- Objectives for analysis and reporting
  1. To have a common understanding about
     - What happened
     - Why it happened
     - What are the pros and cons of the product
  2. To identify and prioritise user problems that require changes to the product
  3. To share the findings with the development team
  4. (To define initial solution suggestions)

- Out-of-scope of usability testing
  - detailed UI design
  - project management issues for prioritising and doing the fixes

4. Analysis and reporting: sources for findings

- Observations
  - User comments
    - During the test
  - Non-verbal communication
    - Hesitations
    - Scratching one's head
- Interviews
  - Getting replies to questions during and after the tasks
- Questionnaires
  - Holistic, formal and measurable approach

- NOTE: Findings can be both positive or negative ones
  - Positive -> things that need to be kept
  - Negative -> issues that need fixing

4. Analysis and reporting

- Complete your own notes ASAP after the test session
  - Many important issues are memorized only in your head
  - After 2 days you'll forget 40% of what you noticed
  - It can be surprisingly hard to interpret your own notes

- Notes can be completed individually
  - Writing additions to the your paper notes
  - Type up your comments directly in electronic format
    - it is later easier to consolidate your notes to other's notes
    - use the 'Usability test findings' -template

- Notes can be completed as a team
  - Arrange a analysis and reporting workshop ASAP after the test sessions

4. Analysis and reporting: Final Report

1. Project overview
2. Executive summary of findings
3. Main findings
   1. <Your own title about usability topic or design issue>
   2. <Your own title about usability topic or d issue>
4. Other findings
5. Questionnaire results
   - User profiles, satisfaction surveys
6. About the usability test
   1. <Copy paste the plan>
   2. Test cases, etc

An overview of the results of the test: "What are the main concerns and recommendations".

Give credit to any positive findings.

Explaining the findings in detail and provide the evidence for the finding.

Other noteworthy findings can be listed and user statements can be documented.

Use this chapter to plan the test.

What, when, who, how (what methods),..
.

4. Analysis and reporting: Sharing the results

- Our main objective is not to run a usability test but to support UI-Design
- Take care that the test results are shared among all stakeholders inside the development team
  - Product Managers, UI-Designers, Information Designers, SW engineers...
  - After that it is up to the development team to decide what corrective actions will take place and when
- A Usability Test Report is easy to share by email
- Recommendation: arrange a briefing for all stakeholders
  - to make sure that the results are notices and understood
  - to clarify and demonstrate any unclear issues
  - to emphasise the user point of view in future product design decisions

Summary

Usability Testing: Summary

An effort to simulate realistic use
of a product (prototype)
to evaluate
one or more factors
about the usability of the product
by studying the actions and feedback
of unbiased test users

Real work can be complex and users vary -> 100% perfect test is impossible.

To get an impression instead of giving one (cf. demos).

Quality of use:
- Fit-for-purpose?
- Fit-for-use?
- Not: sw bugs

A representation that can be used for evaluation.

Test objective is important!

Not involved in design.

Test arrangements and observation skills have strong influence.

The pro and con: subjective satisfaction.

Common pitfalls

- The most critical findings were left out from test scope, and were not reported
  - Installation, how system fits to user's environment
- Prototype is not designed for usability testing
  - Content does not look real
  - User goals / scenarios cannot be finished
- Users cancel or arrive late
  - Expect about 20% of users to cancel
- Schedule is too tight
  - Leave at least 30 minutes of time between test sessions
- One huge usability error dominates the testing
- Test focuses too much on first time use
- Test tasks are not relevant for users
- User give 'wrong' kind of feedback
  - E.g. users don't focus on interaction, but on graphical design
- Too long questionnaires

Thank You!

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- Useful links
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