

# P. PORTO

**TESTES E PERFORMANCE WEB**

TECNOLOGIAS E SISTEMAS DE INFORMAÇÃO PARA A WEB

**POLITÉCNICO  
DO PORTO  
ESCOLA  
SUPERIOR  
DE MEDIA ARTES E  
DESIGN**

## M08 – USABILITY TESTING

TSIW 2023/2024



## AGENDA

1. Usability Testing Essentials;
2. Usability Testing;
3. Planning for Usability Testing;
4. Preparing for Usability Testing;
5. Conducting a Usability Test;
6. Analyze the Findings;
7. Automate Tests with Selenium.

## USABILITY TESTING ESSENTIALS



## 1. USABILITY TESTING ESSENTIALS

- With usability testing, we get to see what people actually do — what works for them, and what doesn't — not what we think they would do or even what they think they would do if they were using your product;
- When usability testing is a part of design and development, the knowledge we get about our users' experience supports all aspects of design and development.

## 1. USABILITY TESTING ESSENTIALS

- Focus on the user, not the product;
- Essential definitions;
- How and why conduct small studies;
- How and why conduct large studies;
- Balance your goals and your budget;
- Get buy-in for usability testing.

## 1. USABILITY TESTING ESSENTIALS

### Focus on the user, not the product

- When you focus on the user and not the product, you learn what works for your users, as well as what does not work, what pleases, what puzzles, and what frustrates them;
- You understand your users' experience with the product and can determine if the design matches their expectations and supports their goals;
- Usability testing gives you access to your users using your product to perform tasks that they would want to do, matched to goals that are realistic for them.

## 1. USABILITY TESTING ESSENTIALS

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## 1. USABILITY TESTING ESSENTIALS

### Essential definitions

- **Usability:** “The extent to which a system, product or service can be used by specified users to achieve specific goals with effectiveness, efficiency and satisfaction in a specific context of use” (ISO, 2018);
  - **Specified Users:** not just any user, but the specific ones for whom the product is designed;
  - **Specified Goals:** these specific users have to share the goals for the product, meaning that the product’s goals represent their goals;
  - **Specified context of use:** the product has to be designed to work in the environment in which these users will use it.

## 1. USABILITY TESTING ESSENTIALS

### Essential definitions

- **Effectiveness and efficiency:** mean that product supports the user's need to achieve a goal with accuracy (effectiveness) and speed (efficiency). Also means that the product supports the user in a way that is better than the current way in which the user works;
- **Satisfaction:** measuring satisfaction is all about the user's perception of satisfaction. Is the user satisfied with the display of information? Is the design pleasant? Is the overall experience positive? Satisfaction may be one of the most important measures of usability. Because satisfaction = desirability, satisfied user's can ignore some effectiveness and efficient issues.

## 1. USABILITY TESTING ESSENTIALS

### Essential definitions

- **Usability testing:** the activity that focuses on observing users working with a product, performing tasks that are real and meaningful to them;
  - **Formative testing:** usability testing performed while the product is in development, with a goal of diagnosing and fixing problems; typically based on small studies, repeated during the development;
  - **Summative testing:** usability testing performed when the product is nearly finished or finished, with a goal of establishing a baseline of metrics validating that the product meets requirements, generally requires larger number of participants for statistical validity.

## 1. USABILITY TESTING ESSENTIALS

### Essential definitions

- **User experience (UX):** is the umbrella term that encompasses all aspects of a product and the user's engagement with it. It includes usability testing, but also many other research tools.
- **User-centered design (UCD):** is the process of building insights about users' experience through usability testing and other forms of user research into product development through an interactive design process.

## 1. USABILITY TESTING ESSENTIALS

- Focus on the user, not the product;
- Essential definitions;
- **How and why conduct small studies;**
- How and why conduct large studies;
- Balance your goals and your budget;
- Get buy-in for usability testing.

## 1. USABILITY TESTING ESSENTIALS

### How and why conduct small studies

- Small usability testing studies are now commonly recognized as an effective means to understanding users' goals, motivations, and engagement with the product;
- Are typically informal and are often repeated during stages of product development (formative testing);
- Their value comes from providing the development team with a list of findings to analyze and fix, then conducting another small study to see whether the fixes worked;
- Small studies don't provide metrics or statistics, but the list of findings that results from small studies provides great insights to developers that can be put into action right away.

## 1. USABILITY TESTING ESSENTIALS

### How and why conduct small studies

- To get good results from small usability studies, you need to incorporate the following:
  - **Establish the user profile:** when you are planning a small study with 5 or 6 participants, you need to pick on subgroup of the user population, create a profile of this user, and make this the basis for recruiting study participants. You will no be able to represent all users with only 5 or 6 participants, so this is one of the most important stage of planning small studies;
  - **Create task-based scenarios:** in small studies you need to give you participants specific tasks to perform. These tasks are embedded within scenarios, which are realistic descriptions framed around user's goals.

## 1. USABILITY TESTING ESSENTIALS

### How and why conduct small studies

- **Use a think-aloud process:** a think-aloud process is one in which you encourage the participant to share his or her thoughts with you while working with the product;
- **Make changes and test again:** small studies typically shows you where the problems are, but not necessarily what the solutions are. A follow-up study can test the solutions to see if they work.

## 1. USABILITY TESTING ESSENTIALS

- Focus on the user, not the product;
- Essential definitions;
- How and why conduct small studies;
- **How and why conduct large studies;**
- Balance your goals and your budget;
- Get buy-in for usability testing.

## 1. USABILITY TESTING ESSENTIALS

### How and why conduct large studies

- Most large studies are summative, with testing done a product is fully developed;
- These studies require a large number of participants because the results are generally used to produce metrics, such as average time on task, completion rates, error rates, optimal navigation path, and other metrics;
- In some cases, large studies can be performed during the product development:
  - When you are testing large, complex systems, and you want to understand the user experience for many different subgroups;
  - When you are testing systems or features that require strong confirmation of high usability, such as those involving personal risk or injury if not properly used;
  - When management will not be convinced by small studies.

## 1. USABILITY TESTING ESSENTIALS

### How and why conduct large studies

- **Use the same tasks or different ones:**
  - Large studies give you quantitative data that can be reported differently from small studies, which focus on qualitative findings;
  - If a large study follows one or more small studies, it can use the same set of tasks and scenarios from early studies, or it can focus on specific features or processes that are now fully developed and integrated within the product. If you use the same tasks, you can measure improvements in user experience by comparing findings on the same task to those from prior studies.

## 1. USABILITY TESTING ESSENTIALS

- Focus on the user, not the product;
- Essential definitions;
- How and why conduct small studies;
- How and why conduct large studies;
- **Balance your goals and your budget;**
- Get buy-in for usability testing.

## 1. USABILITY TESTING ESSENTIALS

### Balance your goals and your budget

- Planning for usability testing is always influenced by the need to weight the issues of time and money against the desired outcome of a usability study;
- If the desired outcome is to make progress by uncovering problems and fixing them and the budget for testing is small, then the premise behind small studies holds true: better to test something than nothing;
- If, however, your product is complex, your user base is large, and you have the time and budget to test with big numbers, then you will want to test with multiple users representing multiple subgroups.

## 1. USABILITY TESTING ESSENTIALS

- Focus on the user, not the product;
- Essential definitions;
- How and why conduct small studies;
- How and why conduct large studies;
- Balance your goals and your budget;
- **Get buy-in for usability testing.**

## 1. USABILITY TESTING ESSENTIALS

### Get buy-in for usability testing

- You might think that the benefits of usability testing would be so well understood and appreciated by now that everyone would see the need to do it early or often:
  - Get to know your stakeholders;
  - Engage your stakeholders in your research from start to finish;
  - Advocate for more (and early) usability testing throughout product development;
  - Make the case for cost-justifying usability testing.

## USABILITY TESTING



## 2. USABILITY TESTING

- Basic equipment;
- Specialized equipment and software;
- Lab testing;
- Field testing;
- Remote testing.

## 2. USABILITY TESTING

### Basic equipment

- Usability testing is easy and affordable because it doesn't require a fancy lab, expensive equipment, or even a dedicated room for testing;
- These days, usability testing can be performed here, there, and anywhere;
- Usability testing can start with a few basics with the chance to add on, as needed;
- Usability testing equipment has gotten smaller, cheaper and more efficient to use;
- These days, you can perform testing with a laptop and the software that you use everyday;
- As for space, you don't need more than a conference room to reserve for testing days;
- Observers can be connected with collaborative meeting software such as zoom.

## 2. USABILITY TESTING

### Basic equipment

- **Basic List:**

- Laptop for logging events;
- Laptop for the participant in testing situations;
- Video camera (built-in or external);
- Microphone (built-in or external);
- Assorted cables to connect all components;
- Reliable internet connection.

## 2. USABILITY TESTING

### Basic equipment

- **Optional add-ons:**

- Mouse and full-size keyboard to support ease of use for the participant;
- Software to support recording and editing video;
- Software to support team logging and tagging for quick team analysis.

## 2. USABILITY TESTING

- Basic equipment;
- **Specialized equipment and software;**
- Lab testing;
- Field testing;
- Remote testing.

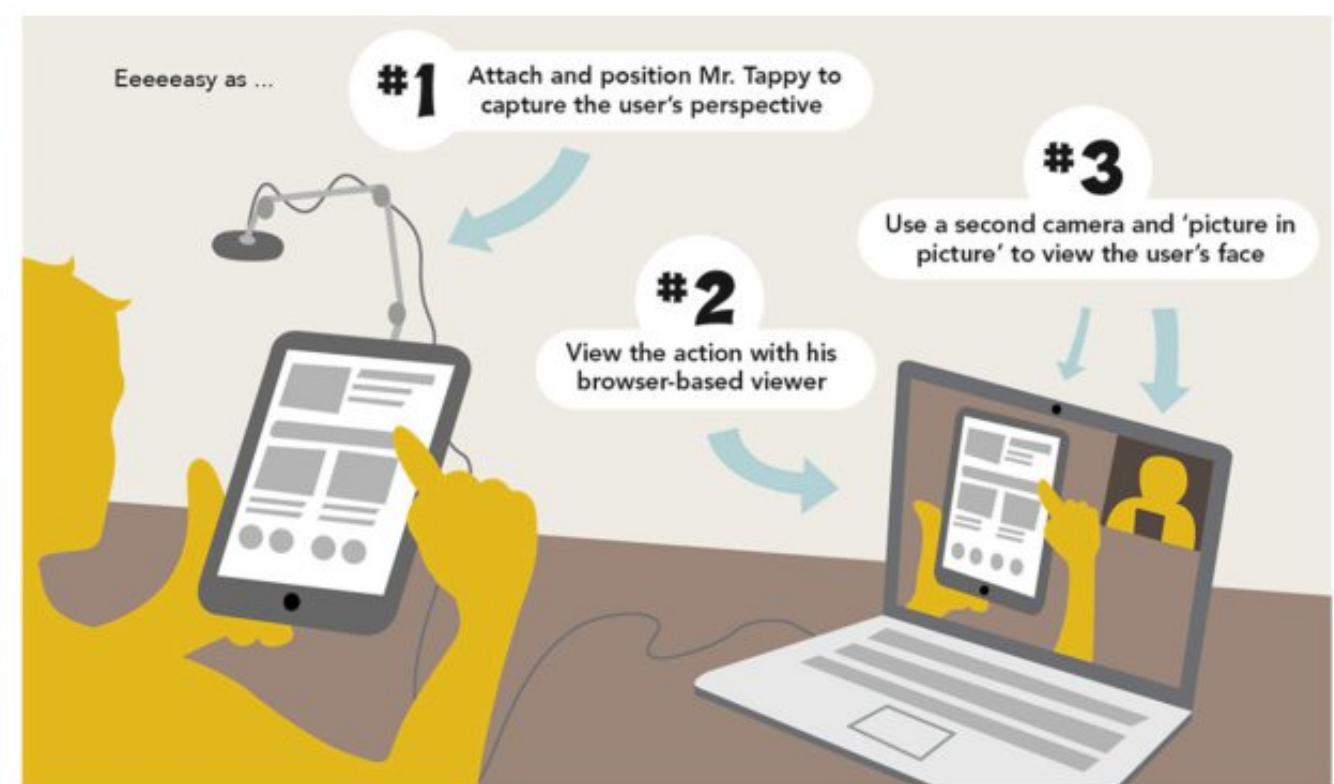
## 2. USABILITY TESTING

### Specialized equipment and software

- In addition to the basic equipment requirements and the optional add-ons for usability lab, you might want to add specialized equipment and software to support testing needs and goals;
- Two commonly used types:
  - Equipment and software for testing mobile devices;
  - Equipment for eye tracking.

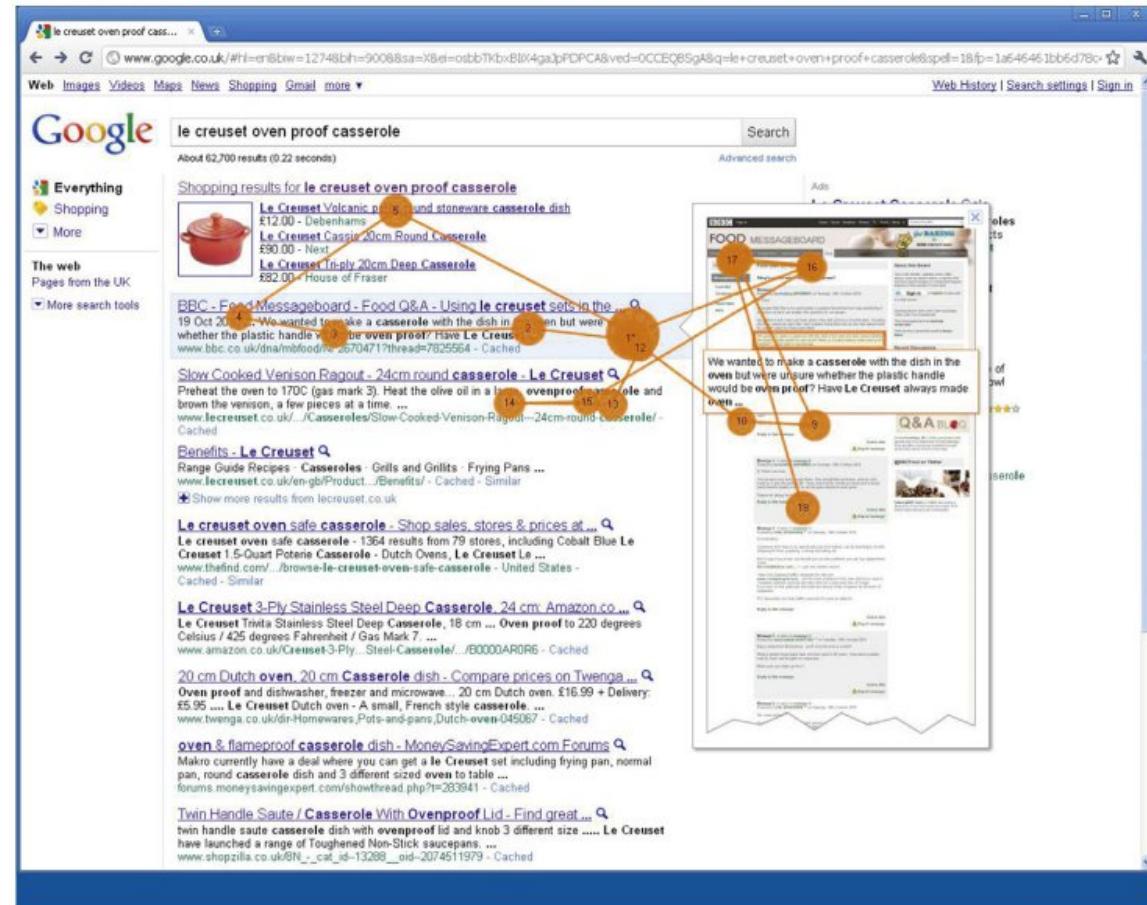
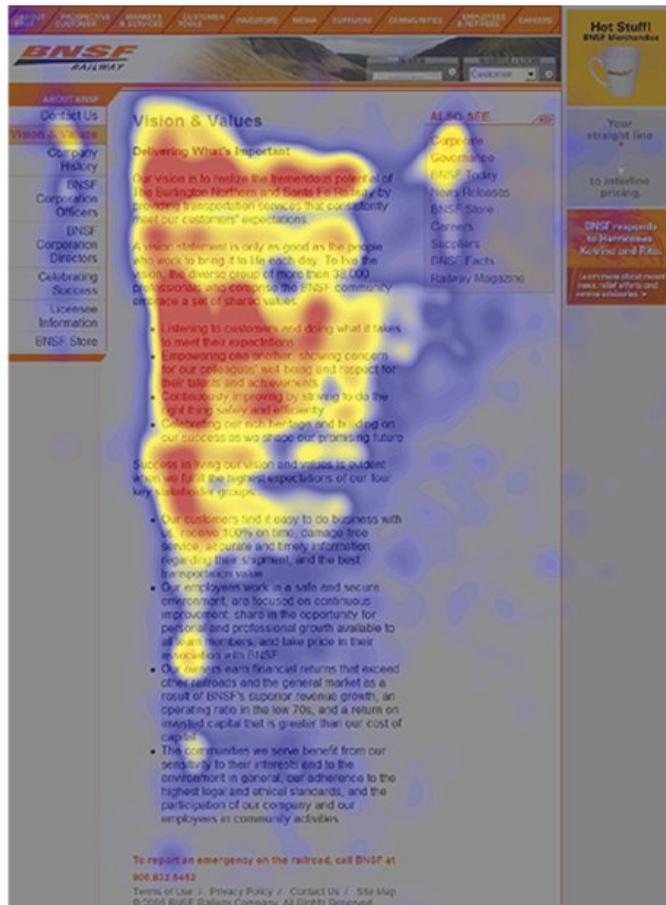
## 2. USABILITY TESTING

### Specialized equipment and software



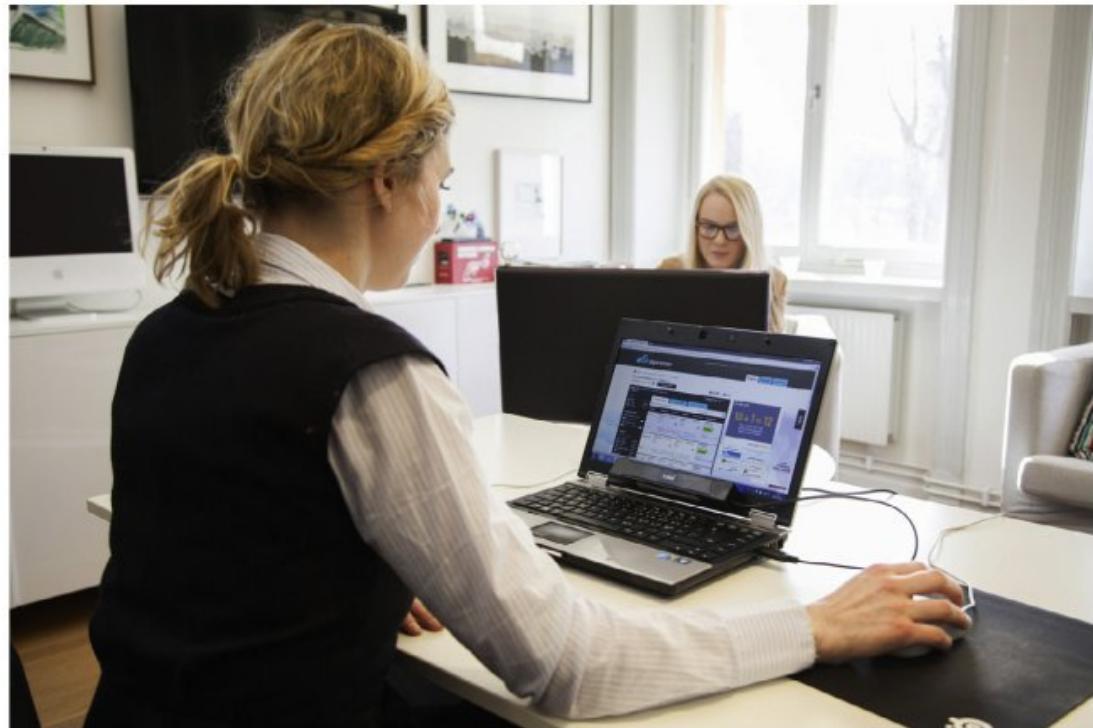
## 2. USABILITY TESTING

### Specialized equipment and software



## 2. USABILITY TESTING

### Specialized equipment and software

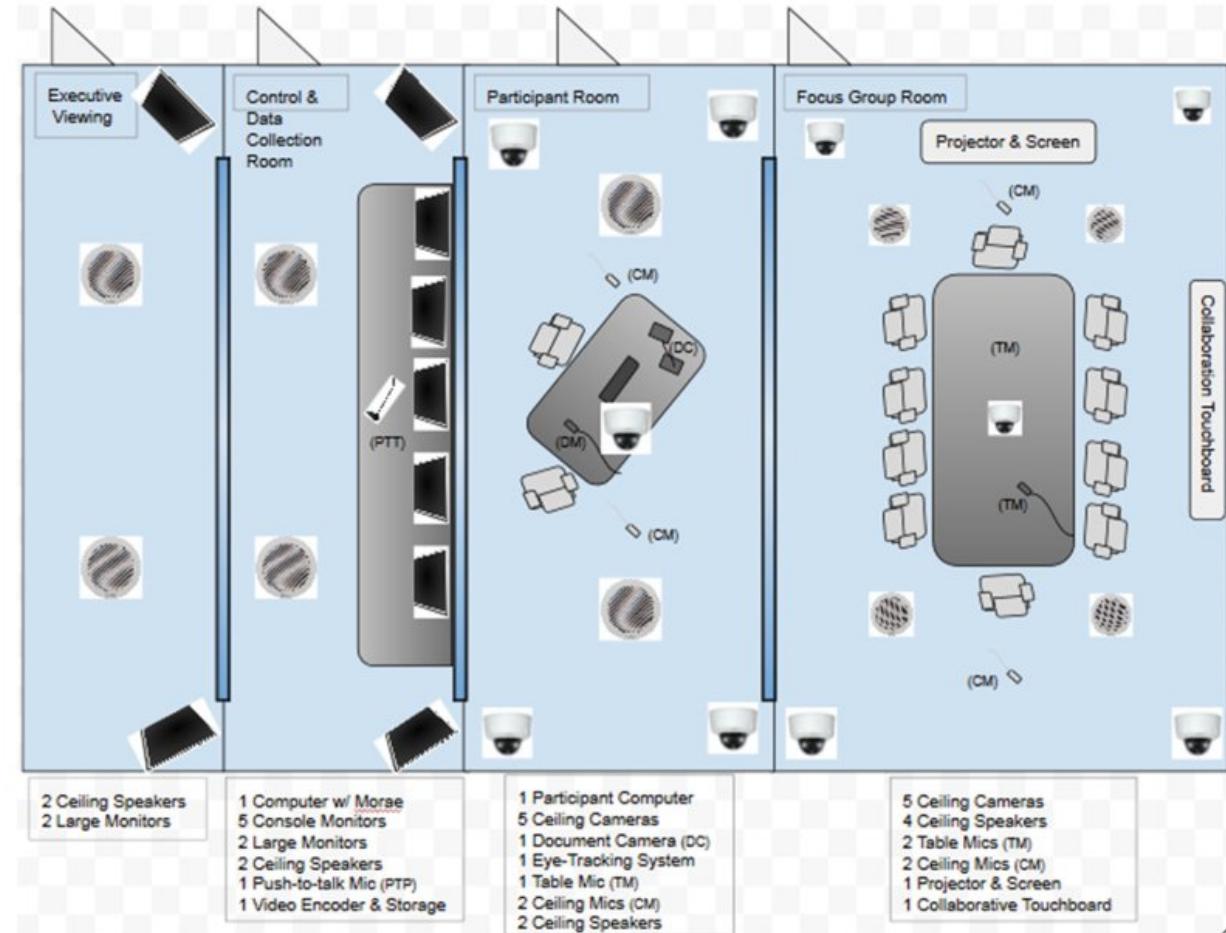


## 2. USABILITY TESTING

- Basic equipment;
- Specialized equipment and software;
- **Lab testing;**
- Field testing;
- Remote testing.

## 2. USABILITY TESTING

### Lab testing



## 2. USABILITY TESTING

### Lab testing

- **Advantages:**
  - It's there when you need it, saving the trouble of locating a space for testing, rounding up the equipment and supplies;
  - It demonstrates an organization's commitment to usability testing;
  - As a physical presence, it can be maintained and upgraded;
  - It can be designed to create the ideal testing environment.

## 2. USABILITY TESTING

### Lab testing

- **Disadvantages:**

- It's an artificial environment. It is not the real-world context in which your user would likely be engaging with the product;
- Because it is a lab, the participant may be nervous;
- Because it is a lab, you lose the contextual cues of the user's real environment and that can have an impact on user experience;
- May influence the user's behaviour, positively or negatively.

## 2. USABILITY TESTING

- Basic equipment;
- Specialized equipment and software;
- Lab testing;
- **Field testing;**
- Remote testing.

## 2. USABILITY TESTING

### Field testing

- **Advantages:**

- You get to see and learn about the context of use of your product in the office or home context which gives you an understanding of the workspace (lightning, hardware, internet connection, etc...) and the artifacts that support users in their tasks such as sticky notes on user's monitors;
- You get to see and learn about the context of use of your product in the “wild” context which gives you an understanding of the impact of noises and distractions and the effect of conditions such as visibility in bright, natural light, dark and so on.

## 2. USABILITY TESTING

### Field testing

- **Disadvantages:**

- Cannot control the environment, so it is difficult to get reliable data on timed tasks;
- Cannot remove yourself from the environment;
- Might not be able to hold user's undivided attention, due environment distractions;
- Cannot test the product with as many users, since the company you are visiting may ne unwilling to allow it;
- It is more expensive due additional costs;
- More data than you would get in lab test because you have also to analyze the environment data.

## 2. USABILITY TESTING

- Basic equipment;
- Specialized equipment and software;
- Lab testing;
- Field testing;
- **Remote testing.**

## 2. USABILITY TESTING

### Remote testing

- Remote usability testing provides opportunities to learn from users wherever they are;
- Methods for remote testing are expanding rapidly, as are the terms people use when they talk about remote testing;
- Moderated testing means having a moderator “present” when the testing takes place;
- Moderated testing is synchronous;
- Unmoderated testing means using a web-based application to conduct the testing without a moderator;
- Unmoderated testing is asynchronous.

## PLANNING FOR USABILITY TESTING



### 3. PLANNING FOR USABILITY TESTING

- Schedule the test meeting;
- Producing the test plan.

### 3. PLANNING FOR USABILITY TESTING

#### Schedule the test meeting

#### 1. Establish test goals:

- Test goals focus on what you want to learn about your users' experience with the product at the point in development where you will be testing;
- It is different establish test goals for the first usability test or for a follow-up usability test.

#### 2. Determine how to test the product:

- ***What to test:*** based on where the product is in development;
- ***Where to test:*** based on consideration of options for lab testing, field testing, testing remotely, or some combinations;
- ***How to test:*** based on resources, timing, and your goals.

### 3. PLANNING FOR USABILITY TESTING

#### Schedule the test meeting

#### 3. Agree on user subgroups:

- You can a study with five participants and get excellent results as long as the users are all from the same subgroup;
- If you have time and budget to test with 10 participants, you can identify two possible subgroups or possibly even three;
- The more participants you plan to recruit the more subgroups you must define.

### 3. PLANNING FOR USABILITY TESTING

#### Schedule the test meeting

#### 4. Define the characteristics of a subgroup:

- Some characteristics that typically generate differences among subgroups:
  - Software: familiarity with the type of product and product, technical skills, etc...
  - Job category: job title and type of work relevant to your product;
  - Websites and web applications: internet usage profile, browser preferences, usage of competitor websites or applications;
  - Mobile devices and mobile applications: type/version of mobile devices used; device usage profile; use of competitor apps.

### 3. PLANNING FOR USABILITY TESTING

#### Schedule the test meeting

#### 5. Focus on user motivation:

- For all subgroups, matching user motivation to study goals is the most important factor in deciding who to recruit;
- Without this real motivation, participants in the study are likely to treat the tasks as exercises that have no real meaning for them.

### 3. PLANNING FOR USABILITY TESTING

#### Schedule the test meeting

#### 6. Mix some characteristics within a subgroup:

- You can mix in a number of characteristics within a subgroup, while still maintaining consistency among the critical factors you have been identified. Some examples are:
  - Age;
  - Gender;
  - Education;
  - Language;
  - Ethnicity;
  - Disabilities;
  - Economic factors.

### 3. PLANNING FOR USABILITY TESTING

#### Schedule the test meeting

#### 7. Combine characteristics in a user profile:

- It won't be necessary to include all the characteristics you listed in your user profiles, but it will be necessary to decide what's most relevant to your study, based on your goals.

#### 8. Determine participant incentives:

- Because you are asking people to take time of their busy lives to help you understand their experience with your product, you need to compensate them for their effort;
- This is a tricky subject, though, because you want to make the incentive feel like a thank-you gift and not a bribe.

### 3. PLANNING FOR USABILITY TESTING

#### Schedule the test meeting

#### 9. Draft the screener for recruiting participants:

- The screener is the document that will be used to recruit participants;
- Whether you do the recruiting yourself or use a recruiting agency, you will want to get stakeholder buy-in on the specifics of the screener so that whoever is doing the screening is working from an approved document.

### 3. PLANNING FOR USABILITY TESTING

#### Schedule the test meeting

#### 10. Create scenarios based on tasks that match test goals:

- Scenarios need to feel real to your participants:
  - Use the language for the user, not the product;
  - Put the tasks into a context of use that matches the user's world;
  - Give the user a goal, not a list of steps to complete;
  - Say as little as possible to present the goal;
  - Reduce unnecessary exposure of a user's personal details.

### 3. PLANNING FOR USABILITY TESTING

#### Schedule the test meeting

#### 11. Determine quantitative and qualitative feedback methods:

- Performance and preference data are quantitative when the findings can be counted and measured against benchmarks;
- Performance data are based in measurements such as time on task, number of errors, success or failed tasks, etc...;
- Preference data are based on participants' rated responses on questionnaires;
- Observations and user comments provide qualitative feedback.

### 3. PLANNING FOR USABILITY TESTING

#### Schedule the test meeting

##### 12. Set dates for testing and deliverables:

- Setting the dates for testing may depend on the time needed for recruiting participants, the availability of the core team members, the availability of the lab or other space, the status of the product you want to test, and the time required for the deliverables.

### 3. PLANNING FOR USABILITY TESTING

- Schedule the test meeting;
- Producing the test plan.

### 3. PLANNING FOR USABILITY TESTING

#### Producing the test plan

- No matter how much buy-in you get for everything you have planned for your usability study you will need to document it;
- Is the record of the decisions made about what to test, how to test, who to recruit for testing, and so forth;
- Without this document, individual memories may vary, decisions may become blurred, and the outcome from testing could be challenged;
- The test plan puts everything in writing.

## PREPARING FOR USABILITY TESTING



## 4. PREPARING FOR USABILITY TESTING

- In your planning meeting, you began your preparations for testing;
- You created or assigned due dates to complete the screener and the scenarios;
- You also determine the feedback mechanisms you will use to gather qualitative and quantitative feedback;
- Now is time to prepare for testing. This preparation includes the following:
  - Recruiting participants (yourself, recruiting company, online recruiting company, online testing platform);
  - Assigning team roles and responsibilities;
  - Developing checklists for key team roles;
  - Writing the moderator's script (for in-person testing or for remote testing);

## 4. PREPARING FOR USABILITY TESTING

- Preparing or using other forms (video consent form, special consent form when testing with a minor, non-disclosure agreement, observer form);
- Creating questionnaires (pretest questionnaire, posttask questionnaire, posttest questionnaire);
- Using standard posttest questionnaires;
- Creating or using qualitative feedback methods (product reaction cards, interview);
- Testing the test (conducting the walkthrough, conducting the pilot);
- Managing all this test preparation.

## CONDUCTING A USABILITY TEST



## 5. CONDUCTING A USABILITY TEST

- Setting up for testing;
- Being an effective and unbiased moderator;
- Logging observations.

## 5. CONDUCTING A USABILITY TEST

### Setting up for testing

- Your test doesn't begin with the arrival of the first participant;
- Depending on your test situation – in your own lab or a space you have reserved or when testing remotely – you need to start setting up or confirming the setup for your test sessions;
- You should confirm that the product is ready for the participants;
- If you are testing remotely, you want to check that the collaborative meeting software is set up correctly to share your screen or to give screen sharing for the participants.

## 5. CONDUCTING A USABILITY TEST

- Setting up for testing;
- **Being an effective and unbiased moderator;**
- Logging observations.

## 5. CONDUCTING A USABILITY TEST

### Being an effective and unbiased moderator

- Although everyone on the team has an important role to play in achieving a successful outcome from testing, the moderator has the pivotal role;
- The moderator is the person who directly interacts with the participant;
- Getting this interaction right is essential to creating a positive experience for the participant and obtaining reliable results from the test;
- To be an effective moderator, you need to not only make the participant feel comfortable at the start and throughout the session, but you also need to avoid biasing the participant through your body language, your comments, and your questions.

## 5. CONDUCTING A USABILITY TEST

- Setting up for testing;
- Being an effective and unbiased moderator;
- **Logging observations.**

## 5. CONDUCTING A USABILITY TEST

### Logging observations

- One of the critical roles on the core team is that of the logger;
- The logger may take note informally in MS Word or MS Excel, or the logger may log findings using logging software;
- Whether the logger uses codes to set up in planning or a free-form style of logging, the logger's role is to capture the key findings, generally organized by scenarios, so that the log can be used in the findings meeting and in the subsequent analysis of the findings.

## ANALYZE THE FINDINGS



## 6. ANALYZE THE FINDINGS

- What did we see?
- What does it mean?
- What should we do about it?

## 6. ANALYZE THE FINDINGS

### What did we see?

- **Gather input from everyone:** if you have invited observers to contribute to the analysis of the findings, you want to get their input first;
- **Collect the top findings and surprises:** to gather input from everyone, ask them, one at a time, to share their top positive finding, top negative finding, and top surprise;
- **Choose your organizational method:** to organize the process of sorting the findings into categories, you can choose the top-down approach – starting with categories or codes – or bottom-up approach – starting with individual findings, clustered into groups, then labeled by grouping.

## 6. ANALYZE THE FINDINGS

- What did we see?
- **What does it mean?**
- What should we do about it?

## 6. ANALYZE THE FINDINGS

### What does it mean?

- Making sense of the findings is far easier said than done;
- It is not always obvious as to why something happened or what it means;
- You need to consider who should be involved in the analysis, as well as what process you should use;
- Determine who should do the analysis: the more eyes, ears, and brains at work on problem detection, the better the outcome;
- Collate the findings: it is needed to collate the findings from each participant to present the results of your study.

## 6. ANALYZE THE FINDINGS

### What does it mean?

- Present quantitative data: if your study focused on obtaining metrics to match business goals, you will want to present quantitative data. Quantitative data are findings that can be measured in numbers and can be validated from the findings;
- Many usability studies are formative, conducted during product development to diagnose and fix problems, others are summative conducted at or near the end of product development to obtain metrics to confirm achievement of goals for the product;
- Size matters when it comes to presenting findings as statistics to increase the confidence lever.

## 6. ANALYZE THE FINDINGS

### What does it mean?

- In addition to analyzing the findings from the logs, you also want to analyze the participants' responses from the posttask and posttest questionnaires:
  - Quantitative responses – response to questions or statements, using a rating scale, in which the participants select the rating from a range of options;
  - Qualitative responses – comments, options, and perceptions expressed in response to open-ended questions.
- A rich source of qualitative feedback, and one that can often be more reliable and revealing than responses from open-ended questions on questionnaires, comes from the comments participants make while they are thinking out loud.

## 6. ANALYZE THE FINDINGS

- What did we see?
- What does it mean?
- **What should we do about it?**

## 6. ANALYZE THE FINDINGS

### What should we do about it?

- It is important to analyze the findings, count the number of times each finding was experienced by participants, categorize the findings by type, compare or contrast them with other data sources and finally categorize them by impact on user experience, which means assigning them a severity rating;
- You can rate findings by:
  - Frequency of occurrence;
  - Impact of the problem on user experience;
  - Persistence of the problem.

## 6. ANALYZE THE FINDINGS

### What should we do about it?

- Some examples of severity rating:
  - Cosmetic;
  - Serious;
  - Catastrophe.
  - Low;
  - Medium;
  - High.
- Cosmetic problem;
- Minor problem;
- Major problem;
- Catastrophe.

## 6. ANALYZE THE FINDINGS

### What should we do about it?

- Another way to categorize the findings is by the scope of the problem within the interface;
  - Global findings: finding that reflects an issue on design or implementation that occur throughout the product;
  - Local finding: only occurs in one place such as a simple screen or page of a website.
- Now that you have completed your analysis of the issues and ranked them by severity it is time to make recommendations on how – and when - to fix the problems that has been identified;
- The recommendations need to be specific and actionable.

## AUTOMATE TESTS WITH SELENIUM



## 7. AUTOMATE TESTS WITH SELENIUM

- Selenium is an umbrella project for a range of tools and libraries that enable and support the automations of web browsers;
- It provides extensions to emulate user interaction with browsers, a distribution server for scaling browser allocation, and the infrastructure for implementations of the W3C WebDriver Specification that lets you write interchangeable code for all major web browsers;
- **WebDriver**: uses browser automation APIs provided by browser vendors to control browser and run tests;
- **IDE**: is the tool you use to develop your selenium test cases;
- **Grid**: allows you to run test cases in different machines across different platforms.

## 7. AUTOMATE TESTS WITH SELENIUM

### WebDriver

- Drives a browser natively, as a user would, either locally or on a remote machine using Selenium server;
- Marks a leap forward in terms of browser automation;
- Refers to both the language bindings and the implementations of the individual browser controlling code;
- Is designed as a simple and more concise programming interface;
- Is a compact object-oriented API;
- It drives the browser effectively.

## 7. AUTOMATE TESTS WITH SELENIUM

### WebDriver – Getting Started

- Install Selenium Library:

[https://www.selenium.dev/documentation/webdriver/getting\\_started/install\\_library/](https://www.selenium.dev/documentation/webdriver/getting_started/install_library/)

- Install Browser Drivers:

[https://www.selenium.dev/documentation/webdriver/getting\\_started/install\\_drivers/](https://www.selenium.dev/documentation/webdriver/getting_started/install_drivers/)

- Script example:

[https://www.selenium.dev/documentation/webdriver/getting\\_started/first\\_script/](https://www.selenium.dev/documentation/webdriver/getting_started/first_script/)

- Full documentation: <https://www.selenium.dev/documentation/webdriver/>

## GO LIVE EXAMPLE

