

Usability Testing

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Abstract: Usability Testing is the process by which the human-computer interaction characteristics of a system are measured, and weaknesses are identified for correction. It is a process by which products are tested by those who will use the system. The need for a Usability Testing is someone who is a user of the design (who acts like a user), something to test (a design in any state of completion), and someplace where the user and design can meet and can be observed. Gathering Usability Testing Requirements is different from Functional Test Requirements because they are much loosely defined. Often many of these requirements are implicitly stated and requirements vary depending on the Business Domain of the system and its Target Users. Studying the user work profile could help the Test Team decide on how Usability Testing needs to be done. Usability Testing is a kind of a Quality Testing that assesses how easily the User Interfaces can be used.

Keywords: Usability, Testing, Bug, User, QA.

1. Introduction

Usability is the combination of fitness for purpose, ease of use, and ease of learning that makes a product effective. Usability testing focuses on determining if the product is easy to learn, satisfying to use and contains the functionality that the users desire.

An empirical study of a product's usability is by observing actual users doing real tasks with the product.

It involves –

- Real Users
- Real Tasks
- Specific Usability Goals/Concerns
- Observing and Recording the testing
- Data Analysis

It is a method used to evaluate how easy a website (or an application) is to use. The tests take place with real users to measure how 'usable' or 'intuitive' a website is and how easy it is for users to reach their goals.

The key difference between usability testing and traditional testing (bug testing, acceptance testing etc.) is that usability testing takes place with actual users or customers of the product. While the traditional testing might be undertaken by a testers (not real user's) , developer, designer or project

manager. Usability Testing removes any bias by collecting feedback direct from the end user.

2. Categories of Usability Testing

2.1 Comparative Usability Testing

Comparative usability testing can be used to compare the usability of one website with another. Comparative tests are commonly used to compare a website against peer or competitor sites, however it can also be used to compare two designs to establish the best user experience.

2.2 Explorative Usability Testing

Explorative usability testing can be used to establish what content and functionality a new product should include to meet the needs of its users before a new product is released. Users test a range of different services where they are given realistic scenarios to complete which helps to highlight any gaps in the market that can be taken advantage of and illustrate where to focus design effort.

2.3 Usability Evaluation

Usability Evaluation can be used to test a new or updated service either pre or post-launch. This usability test introduces users to the new design to ensure it is intuitive to use and provides a positive user experience. The aim of the usability evaluation is to ensure any potential issues that are highlighted and fixed before the product is launched [1].

Controlled Experiment involves a comparison of two products, with careful statistical balancing in a laboratory. This may be the hardest method to do “in the real world” but due to its scientific nature, it yields very accurate results [1], [2].

3. Types of Usability Testing

3.1 Hallway Testing

In Hallway testing, random people are asked to test the website rather than people who are trained and experienced in testing the websites. This method is effective for testing a new website for the first time during development.

3.2 Remote Usability Testing

We check the usability of a website using people who are located in several countries and time zones. Sometimes the remote testing is performed using video conferencing, while the other times the user works separately from the evaluator. Nowadays, there are various software available at a relatively low cost that allow remote usability testing to be carried out even by observers who are not usability experts. The click locations and streams of the users are automatically recorded. Any critical incidents that occurred while testing are also recorded, along with the feedback the user submits. It is a good method of testing because the tests are carried out in the normal environment of the user instead of a controlled lab.

3.3 Expert Review

An expert in the field is asked to evaluate the usability of the website. Sometimes the expert is brought to a testing facility to test the site, while the other times the tests are conducted remotely and automated results are sent for review. Automated expert tests are typically not as detailed as other types of usability tests, but their advantage is that they can be completed quickly.

3.4 Paper Prototype Testing

Paper prototype testing involves creating rough, hand-drawn drawings of an interface to use as prototypes, or models of a design. Paper prototypes can be used to conduct usability testing of any type of user interfaces like website, mobile application or software's. Paper prototyping is done before the development of code/any software.

3.5 Questionnaires and Interviews

Interviews enable the observer to ask direct questions to the users (apart from double checking what they are really doing). The observer can also ask questions by means of questionnaires. The advantage of questionnaires is that they allow more structured data collection.

3.6 Do-it-Yourself Walkthrough

The observer sets up a usability test situation by creating realistic scenarios. He or she then walks through themselves just like a user would. A variation of this technique is the group walkthrough where the observer has multiple attendees performing the walkthrough.

3.7 Controlled Experiment

4. Usability Testing Using Paper Prototypes

Paper Prototyping has been used for many years. In Paper Prototype testing different screens are sketched prior to testing. Use Cases are created and the users are requested to try and perform them by interacting with the prototype.

Advantages of Paper Prototyping

- **User involvement at an early stage**

It enables the involvement of developers, designers, users and other stakeholders very early in the design process, even before any design or coding has been implemented. Since the interface is built up step by step, it usually meets the expectations of all team members.

- **Cost-effective**

It is very cheap to implement and test (much cheaper than engaging a designer to create mock ups of the user interface or a developer to code a prototype). Additionally, paper is cheaper than the software that would need to be used to create simulations of design mock ups. Paper Prototyping is cost effective in long run because it identifies problems before any design or development has commenced.

- **Encourages creativity**

It encourages sharing of ideas across a multidisciplinary team at early stages.

- **No design or coding skills needed**

The prototypes are not coded as they are hand drawn on paper. Thus, eliminating the need of graphic designers.

- **Less resource consuming**

It requires less human resources than other prototyping and interface testing techniques.

- **Rapid evaluation and testing**

User interfaces can be quickly prototyped and tested. They also facilitate the quick introduction of modifications and refinements needed to address any usability problems that have been identified [3].

5. Usability Testing can be Implemented in two Folds

5.1 From a Design Viewpoint

Usability can be tackled by –

- It requires including actual users as early as possible in the design stage. If possible, a prototype should be developed.

- The screen reviews, standards should be documented i.e. screen layout, labeling/naming conventions etc. and must be applied throughout the application.

- Including provisions for usability within the design specification will assist later usability testing. Usually for new

application developments or custom application developments, the design team should have an excellent understanding of the business processes/rules/logic behind the system being developed. Include users with firsthand knowledge of same. However, although they design the system, they rarely specifically include usability provisions in the specifications.

- At the unit testing stage, there should be an official review of the system - where most of the issues can be dealt with more easily. The focus should be on how a user navigates through the system. More commonly though, the issues that are usually identified at this stage relate to the default or most common actions. For example, a system is designed to cope with multiple eventualities and thus, there are 15 fields on the main input screen - yet 7 or 8 of these fields are only required in rare instances. These fields could then be set as hidden unless triggered, or moved to another screen altogether.

- All the previous actions could be performed at an early stage if Prototyping is used. This is probably the best way to identify any potential usability/operability problems. It helps to solve usability problems before they get to the QA stage (thereby cutting the cost of rebuilding the product to correct the problem) by using prototypes (even paper prototypes) and other "discount usability" testing methods.

5.2 From a Testing Viewpoint

- Usability Testing should be added to the testing cycle by including a formal "User Acceptance Test". This is done by getting several actual users to sit down with the software and attempt to perform normal working tasks, when the software is near release quality. Normal working tasks because testers will have been testing the system from test cases i.e. not from a user's viewpoint. User testers must always take the customer's point of view in their testing. User Acceptance Testing (UAT) is an excellent exercise, because not only will it give you there initial impression of the system and tell you how readily the users will take to it, but this way it will tell you whether the end product is a closer match to their expectations and there are fewer surprises. (Even though usability testing at the later stages of development may not impact software changes, it is useful to point out areas where training is needed to overcome deficiencies in the software.

- Another option to consider is to include actual users as testers within the test team.

- The final option that may be to include user testers who are eventually going to be using it themselves and responsible for training and effectively "selling" it to the users.

6. Guidelines to follow for Usability Testing

The Usability Testing sessions are essential component of a project. Usability Testing offers to receive feedback from the people who will be using the website/software.

Steps to follow for Usability Testing

1) Choosing your Subjects

Choose the users or testers from the market research firms or agencies. Do not take testers from your own company, or friends and family. Make sure the market research firm does

not provide the name of the company or any other details that will judge the participant.

2) Before Usability Testing

Each participant/user selected must be put at ease. The Usability testing sessions provides artificial environment and for the most beneficial and informative results the users should feel as if they have worked on such functionalities. Ensure that the users know the type of tasks they will be expected to perform. The users should know that the tests are completely confidential.

3) Beginning Usability Testing

Before assigning the tasks to the users get them familiar with the environment. Share the website's name, URL, and ask for initial feedback on what they would expect from the site or what they would like the site to be. Let them look at the website each user will be testing. These few simple tasks will help the participant to understand that the usability testing is not difficult and perhaps most important.

4) Choosing Tasks

Decide the priority of tasks that are essential for the new website. It will be a good practice to ask the user to suggest the priority of tasks. This gives another indication of their expectations and requirements. It may also suggest new functionalities and priorities.

5) How to word Tasks

People tend to perform more naturally when they are provided them with scenarios rather than instructions.

6) Presenting Tasks

Assign only task at a time to a user. More than one task assigned may intimidate them or alter their approach to the test.

7) How to behave during the Usability Testing

It is essential to remember that it is the website that is being tested, not the user. Any feedbacks you get from any user are valuable and also make sure that the other users also know each other comments and feedbacks. You must stay quiet and out of sight during the test. All feedbacks you (observer) give must be neutral.

8) After the Usability Testing

After all the tasks have been completed, you should gather as much information as possible. Asking for overall impressions of the site will allow you to judge whether expectations have been met and whether the participant's view of the client or site has changed during the process. Always ask for suggestions as it provides insight into how the site can better support the user. Finally, ask the participant what they remember about the site structure and functions of the site. Clear recollection will confirm that the site is structured logically and help identify any labeling issues that you may have missed.

7. Categories of Usability Testing Tools

7.1 Heat Mapping

Heat mapping (or click mapping) tools record visitor clicks to create visual maps of user activity. It also includes eye-tracking simulators.

Examples –

1) Click density

It tracks visitor clicks to produce a click map showing the activities performed by the user. Clicks can be displayed as a heat map, click map, or hover map. Customization options include filtering by browser type and date-range, as well as a useful transparency adjustment to view the heat map more clearly.

2) Crazy Egg

It generates a variety of visualizations based on click activity, including a traditional heat map, simplified overlay, and “confetti” mode (allows you to dive deeper into visitor analytics) that lets you track clicks by source and other visitor metrics. Its reporting interface is very easy to use. Its core reports are powerful and well-designed.

7.2 Screen Recording

Screen recorders track individual visitors to your website to create a simulated video for each of those user sessions.

Examples –

1) ClickTale

It records individual visitor sessions and plays them back in a video format. The interface allows you to easily control the playback speed, flip through pages viewed, and see demographic information (country, browser, etc.) at a glance. The free plan is limited and only allows you to watch partial sessions for some visitors.

2) Clipxy

It captures and plays back individual visitors sessions (up to 10 for the free trial). The Clipxy playback interface is simple and very easy to use. Visitor screen resolution is easy to track in Clipxy and screens render accurately, making it easy to see how visitors with different browsers and screen sizes are interacting (or having difficulty interacting) with your site.

3) OpenHallway

It captures recordings of visitor’s sessions, but instead of capturing direct website visitors it lets you send out an invitation link to your own test subjects. Subjects attempt to perform a chosen task or answer a question in an unmoderated fashion, recording until they feel the task is complete. OpenHallway supports audio, so that test subjects can record their observations through a standard PC microphone.

4) Userfly

It captures individual visits in video format, including scrolling and clicks (on both clickable and non-clickable areas). A simple playback interface allows you to pause the action and flip through pages viewed by any particular visitor.

7.3 User Testing

User testing tools simulate traditional, task-based usability testing.

Examples –

1) Chalkmark

It allows you to upload a series of images and create pre-defined tasks. You invite users to participate (via a custom link) and Chalkmark guides them through the tasks, recording clicks to measure task completion. The results of this simplified user testing are presented as a heat map indicating where your users clicked to complete each step in the survey.

2) Usabilla

Usabilla is a web-based usability testing tool that allows marketers, analysts, designers and usability experts to collect visual feedback on their website in a quick way. Participants answer questions with points and notes on top of a webpage, mockup, or sketch. The results of a survey are analyzed and presented visually with charts and heat maps. Usabilla’s customers use these visual insights to improve their user experience and optimize their website. There are various pricing levels, but we can test up to 2 - 10 pages for a participants free of charge.

7.4 User Feedback

User feedback tools solicit direct feedback from your website visitors.

Examples –

1) 4Q by iPerceptions

It is a custom survey engine based on 4 simple questions, ranging from overall experience to task completion, plus room for an open-ended response. The 4Q survey appears as a pop-over window and is permission-based. You can customize questions and control the rate at which the survey is displayed to new visitors, minimizing interruption to the site.

2) Fivesecondtest

It allows you to upload a screen image to perform a simple memory test. Test subjects see your screen for 5 seconds and are either asked to list what they can remember or complete a click-based task (your choice). This emulates usability’s “5-second rule” and can help you better understand your site visitors’ first impressions.

3) Kampyle

It installs a feedback tab in the corner of your website that pulls up a pop-up survey. The survey assesses the visitor’s overall reaction and also presents choices to report bugs and give suggestions and compliments. On completion, the visitor can optionally submit their email address [4].

8. Advantages of Usability Testing

- We get direct feedback from the target audience to focus on the project.
- Internal debates can be resolved by testing the issue to see how users react to the different options being discussed.
- Issues and potential problems are highlighted by the users/testers before the product is launched.

- The business advantages of Usability Testing includes:
 - It increases the likelihood of usage and repeat usage.
 - It minimizes the risk of the product failing.
 - Users are better able to reach their goals [5].

9. Disadvantages of Usability Testing

Usability testing provides many benefits, but there are few disadvantages in using this methodology.

- Testing is not 100% representative of the real life scenario.
- It is mainly qualitative.
- The validity of test findings depends heavily on identifying the right target group [5].

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