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RESEARCH ARTICLE

Research Study on Importance of Usability Testing/ User Experience (UX) Testing

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Abstract— *This paper gives the information regarding Usability testing. How user interacts with the system testing? Usability means the software's capability to be learned and understood easily and how attractive it looks to the consumer. Usability Testing is one of the black box testing technique. Usability testing tests features of the software like: How easy it is to use the software? How easy it is to learn the software? How convenient is the software to end user? Usability is the measure of a product's potential to fulfil the requirement user. In information technology, the term usability used in terms to software applications and Web sites, but it can be used in terms of any product that is employed to accomplish a task (Some of the examples are, a car dashboard, a toaster, or an alarm clock). Some outcomes used in determining product usability are user interface, visual consistency, and a clear, defined process for evolution. This paper we discussed Usability, Usability testing process, Usability Testing Components, evaluation methods, User experience importance, advantages and disadvantages of Usability testing.*

Keywords— *Usability Testing, Usability Testing Components, evaluation methods, UX Importance*

I. INTRODUCTION

Usability testing is a method by which users of a product are asked to perform certain tasks in an effort to measure the product's ease-of-use, work time, and the user's perception of the experience. Usability testing can be done officially, in a usability lab with video cameras for observations, or informally, with paper mock-up of an application or Web site. Many changes are made to the application or site based on the findings of the usability tests. Whether the test is official or unofficial, usability test participators are encouraged to think aloud and voice their every judgement. Usability testing is best used in conjunction with user-centred design, a method in which a product is designed according to the needs and specifications of users. User Experience is everything that happens to your users when they interact with your business or organisation via application or online communications, your website. It includes everything they watch, hear and do as well as their emotional reactions.

II. AIM OF THE STUDY

- To Study the concept of Usability Testing and its merits
- Understand what is the Usability testing process
- To know Usability testing components
- Knowledge on Usability evaluation methods and its advantages and disadvantages
- To know the User experience importance

III. RELATED WORK

Software development organizations consist of marketing, design, project management, development and quality assurance team. It is important for the many teams within the organization to understand the benefits and limitation of incorporating various usability testing methods within the software development life cycle. Some reasons for poor usability include effort prioritization conflicts from development, project management, and design team. The part played by the usability engineer is to get involved as the heuristic judge and facilitate the development and design efforts are based on usability principles and at the same time adhering to the project time period. Two approaches for usability inspection methods consist of user experience testing and expert review or more commonly known as Heuristic Evaluation (HE). This paper focuses on understanding the strength of HE as a methodology for defect detection. The results show the strength of the HE as a usability testing methodology in capturing defects and prioritizing design efforts and development. The results also increase the need for integrating traditional heuristics with modified heuristics customized to the domain or field of the project being tested such as E-Government.[1]

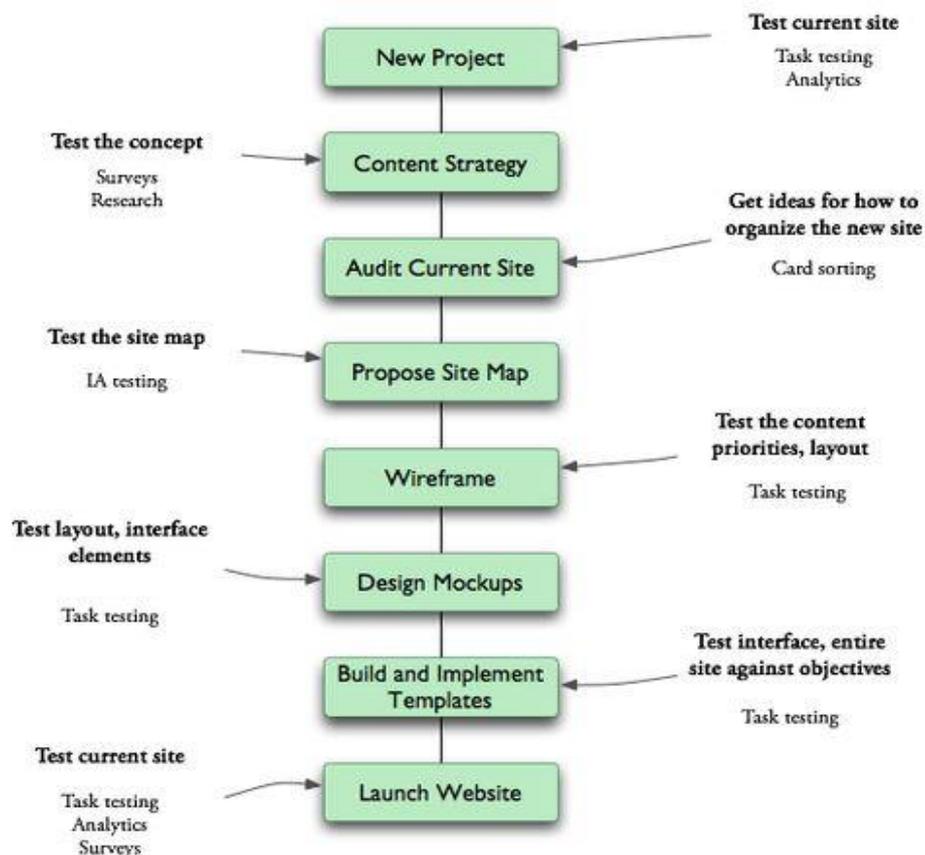
Describes an innovative methodology developed for usability tests of the IEEE PCS Web site that combines heuristic evaluation and task-based testing. Tests conducted on the PCS Web site has evaluated whether the site facilitated members' ability to find information and participate in discussions, as well as developers' are capable to find, contribute, and manage administrative information on the site. The distinctive social characteristics of Communities of Practice (CoPs) provide context for tailoring design heuristics for informational Web sites that serve the needs and interests of CoP members. The discussion gives important on technical communication principles that apply not only to evaluating the effectiveness of the PCS Web site design but also to all centralised technical communication products and media that increasingly demand user participation.[2]

Here Proposes a usability testing method that alters a given usability testing method to make it less costly and time consuming for the investigator. The usage of user-centred methods is stimulated and a combination of two centralised methods suggested. Future this method is combined with other techniques to additionally detect the state of satisfaction within the participant. User based features like emotions, opinions, cognitive and conative effects are therefore are considered. A method for the joint analysis of all data gathered is proposed.[3] More automated system testing could be instrumental in achieving these goals and in recent years testing tools have been developed to automate the interaction with software systems at the GUI level. However, there is absence knowledge on the usability and applicability of these tools in an industrial setting. This study analyses two tools for automated visual GUI testing on a real-world, safety-critical software system is developed by the company Saab AB. The tools are compared based on their characteristics as well as how they support automation of system test cases that have previously been presented manually. The time to develop and the size of the automated test cases as well as their execution times have been evaluated.[4] Usability testing is necessary to be performed by software development companies to determine whether their products are usable or unusable. It is equally important for the end-

users companies running usability studies as well. This paper represents the development of Usability Management System (USEMATE), an automated system as an alternative solution to assist usability tester or practitioner to run usability testing more efficiently and effectively. The main objective of USEMATE is to improve the current systems which are paper-based, require manual score calculation using excel and manual response time recording into a web-based management system. The tools used for the development compromise Adobe Photoshop CS2, Adobe Dreamweaver CS3, Apache Web Server, and a personal computer (PC). The modules and usability criteria included and the approach used in the development of this automated system were replicated from a case study on usability testing of a webpage conducted earlier. USEMATE is envisaged to be able to minimize the lengthy working hour and energy needed to manage the usability testing process from phase to phase.[5]

Usage of traditional UT techniques which are not sufficient and suitable with the growing complexity of websites & constraints faced by usability practitioners. For a sample, the Lab Based Usability Testing (LBUT) is expensive and has lesser coverage than Exploratory Heuristics Evaluation (EHE) while the EHE is subjected to false alarms. A hybrid usability methodology (HUM) comprising of LBUT and EHE is offered. Six experiments involving EHE and LBUT were performed at the early, in-between and future stages of the SDLC of websites, during which the best relative performance of each method were measured using the dependent variables followed by the design of a HUM. To prove the HUM, four case studies were conducted, during which remarkable improvements were observed in website effectiveness and efficiency. Based on the findings, HUM is a realistic approach for usability practitioners and also provides stakeholders a validated situational decision making framework for usability testing strategies taking into account real world constraints.[6]

Usability Testing Process



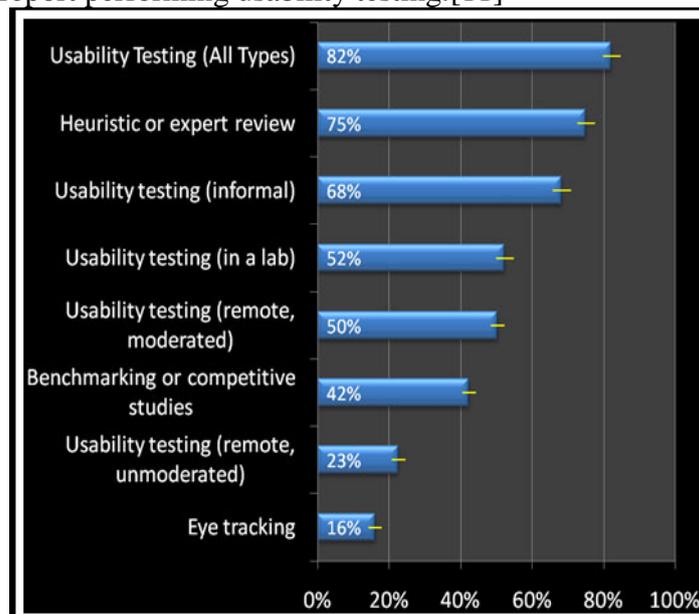
When to Work on Usability

Usability plays a role in each stage of the design process. The resulting need for many studies is one reason I recommend making individual studies fast and with low cost. Here are the main steps:

1. Before starting the new design, test the old design to recognize the good parts that you should keep or emphasize, and the parts which puts users in trouble.
2. Unless you're working on an intranet, test your competitors' designs to get in minimum cost data on a range of alternative interfaces that have similar characteristics to your own. (If you work on an intranet, read the intranet design annual to learn from other designs.)
3. Conduct a field study to see how users behave in their natural habitat.
4. Make paper prototypes of one or more new design ideas and test them. The minimum time you consume in these design proposals the better, because you'll need to improve them all based on the test results.
5. Refine the design ideas that test best through many iterations, gradually moving from minimum accuracy prototyping to maximum accuracy representations that run on the computer. Test every iteration.
6. Inspect the design relative to established usability guidelines whether from your own earlier studies or published research.
7. Once you decide on and implement the ultimate design, test it again. Tenuous usability problems always creep in during implementation.[10]

Usability Testing & Expert Reviews:

Not surprisingly, some form of usability testing dominates the methods used by UX professionals with 82% of respondents reporting they perform lab, remote or non-formal usability testing. Expert reviews are close second at 75% (which includes Heuristic Evaluations and Cognitive Walkthroughs). Specialist study and usability testing are being used together by 71% of respondents and over 95% of respondents who report performing an expert review also report performing usability testing.[11]



IV. GUIDELINES TO SUCCESSFUL USABILITY TESTING

1. Start early. When you find problems early in the design process, you economize time and money that would have gone into taking the product down a poor pathway.
2. Select issues that uncover problems if they exist. Don't shrink from disputable issues. Those issues are exactly what usability testing is good at resolving.
3. Select user tasks that uncover the huge problems. As you consider what to ask participants to do during the usability test, focus on tasks that: are critical, are done frequently, have serious consequences if done incorrectly, you or managers, planners, developers, writers are tensed about
4. Find participants who really represent users, mostly users you are concerned about. If what you learn isn't believable – because the users aren't like the people the product is meant for – developers may not act on what you learn.
5. Watch and listen meticulously. Be alert, not only to the problems participants are having, but to the likely causes of those issues. Listen for the words participants use when they can't find what they exactly need. The design may be using the wrong terminology. Watch where participants look for products on a web page. The page design may be misinterpreting participants.
6. Help the designers and developers to see that uncovering problems is not a sign of failure. No one does a perfect job the at first time only. Users always surprise us. It's much better to find out about the problems with a some users in a usability test than later when the design is being reviewed and is out there in the marketplace. [7]

V. USABILITY TESTING COMPONENTS

Usability testing includes the following five elements:

1. **Learnability:** How easy is it for users to accomplish basic tasks the first time they encounter the design?
2. **Efficiency:** How fast can experienced users accomplish tasks?
3. **Memorability :** When users return to the design after a period of not using it, does the user recollect how to use it effectively the next time, or does the user have to start learning everything? As newly.
4. **Errors:** How many errors do users make, how critical are these errors and how easily can they recover from the errors?
5. **Satisfaction:** How much does the user like using the system?[8]

VI. USABILITY EVALUATION METHODS

Evaluation Method	Advantages	Disadvantages	Evaluation Method	Advantages	Disadvantages
Think aloud protocol Testing	<ul style="list-style-type: none"> • Less expensive • Results are close to what is experienced by users 	<ul style="list-style-type: none"> • The Environment is not natural to the user 	Interviews Inquiry	<ul style="list-style-type: none"> • Good at obtaining detailed information • Few participants are needed • Can improve customer relations 	<ul style="list-style-type: none"> • Can not be conducted remotely • Does not address the usability issue of efficiency
Remote Usability testing Testing	<ul style="list-style-type: none"> • Efficiency, effectiveness and satisfaction, the three usability issues, are covered 	<ul style="list-style-type: none"> • Additional Software is necessary to observe the participants from a distance 	Cognitive walkthrough Inspection	<ul style="list-style-type: none"> • Good at refining requirements • does not require a fully functional prototype 	<ul style="list-style-type: none"> • Does not address user satisfaction or efficiency • The designer may not behave as the average user when using the application
Focus groups Inquiry	<ul style="list-style-type: none"> • If done before prototypes are developed, can save money • Produces a lot of useful ideas from the users themselves • Can improve customer relations 	<ul style="list-style-type: none"> • The environment is not natural to the user and may provide inaccurate results. • The data collected tends to have low validity due to the unstructured nature of the discussion 	Pluralistic walkthrough Inspection	<ul style="list-style-type: none"> • Usability issues are resolved faster • Greater number of usability problems can be found at one time 	<ul style="list-style-type: none"> • Does not address the usability issue of efficiency

[12]

VII. USER EXPERIENCE IMPORTANCE

To what extent the User Experience so important?

For many years, hugely successful companies like Google, Twitter, eBay and Amazon have identified that the User Experience has a direct impact on their bottom line. These companies did not succeed by chance. They continuously test each aspect of their business with real users to ensure high levels of customer satisfaction.

That's because on the internet, the customer is king. At any point your visitors can decide on to leave your website and go elsewhere - usually to a opponent. We have all experienced this when we've visited a website that was slow or buggy or simply made it difficult for us to achieve our objectives.

Common sense tells us that if your users can't find information easily or have trouble buying your products they will quickly leave your website and shop elsewhere..

And they won't come back.

The "2011 User Experience Buyer's Guide" by E-consultancy identified that a good User Experience:

- Maximizes Sales and online conversions.
- Improves brand perception
- Improves Google search rankings
- Reduces customer disfavor and churn
- Reduces the costs of development and support[9]

Steps to Usability Testing

- Step 1: write down the Usability-Test (With Tasks that Actually Work) :Create 5 tasks you want the user to execute. Write scenarios for every task. List follow-up questions you might want to put in.

- Step 2: Discover Participants of All Sizes (Sort of): Discover people that fit your target audience. Discover people with a variety of experience. Discover people that will hate your product.
- Step 3: Perform the Usability Test (In less than or equal to 60 Minutes): Perform a dry run. Differ the tasks and keep the tests in the 15-30 minute range. Do not guide the user. Ask questions. Let them talk. Record the sessions with some kind of screen recorder and take notes. Record the results on a range of pass/fail.
- Step 4: Evaluating the Results (By Reading the Tea Leaves): Look for patterns. Highlight comments that can make your site better. Remember results are subjective, so discuss them with the team. Combine testing with other data collection methods. Test your assumptions again.

VIII. ADVANTAGES AND DISADVANTAGES OF USABILITY TESTING

Advantages:

- Discovers the real demands and tasks of the user early in the design process.
- Balances graphics design with operations.
- Provide well defined evidence for design recommendations.
- Minimizes costs by anticipating and eliminating potential user roadblocks.
- Show notable cost savings through user productivity.
- Provide a competitive benefit and satisfaction.
- Provide more follow-on business due to convinced and fulfilled customers.
- Decreases user conformation time and errors.
- Decreased customer support costs.
- Increased user productivity

Disadvantages:

Usability testing provides many benefits, but there are a few demerits in using this procedure, which should be noted. Firstly, testing is not 100% representative of the actual real situation, e.g. a mother will not have her two young children running around like she might had at her house. Also, usability testing is mainly categorical or approximate, so does not provide the large samples of feedback that a questionnaire might, but the feedback can be approximate and estimated.

IX. CONCLUSIONS

Usability plays a role in each stage of the design process. Usability testing to the end user or the customer: Better quality software, Software is effortless to use, Software is more readily accepted by users, less time is required to learn for new users. Usability test can be modified to cover many other types of testing such as functionality testing, system integration testing, smoke testing, unit testing etc. Usability testing can be very economical if planned properly, yet greatly effective and beneficial. If proper resources (experienced and creative testers) are used, usability test can help in giving solutions all the problems that user may face even before the system is finally released to the user. This may result in high performance and a standard system.

Usability testing can help in discovering potential bugs and potholes in the system which generally are not visible to developers and even escape the other type of testing. This paper we discussed Usability, Usability testing process, Usability Testing Components, evaluation methods, User experience importance and advantages and disadvantages of Usability testing.

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