

USABILITY AND QUALITY TESTS IN SOFTWARE PRODUCTS TO ORIENTED OF USER EXPERIENCE

Halil Arslan

Engineering Faculty, Computer Engineering, Cumhuriyet University, Sivas, Turkey
harslan@cumhuriyet.edu.tr

Ahmet Gürkan Yüksek

Engineering Faculty, Computer Engineering, Cumhuriyet University, Sivas, Turkey
agyuksekc@cumhuriyet.edu.tr

Mustafa Lemi Elyakan

Detaysoft, Sivas, Turkey
mustafa.elyakan@detaysoft.com

Özkan Canay

Adapazarı Vocational High School, Computer Technologies, Sakarya University, Sakarya, Turkey
canay@sakarya.edu.tr

ABSTRACT

During the recent years, due to the development of information and communication technologies, users are faced with software products with different structures, functions and designs in terms of many services provided by the internet environment. Accordingly, user expectations are constantly changing and developing applications with only technically perfection are not sufficient for product success. In addition, differentiated product designs have led to the emergence of the concept of usability in accordance with the user's experience and need to determine how functional designs are. All these developments add value to the software products at the point of usability and user satisfaction. In this study, basically menu hierarchy and navigation maps datas were obtained by using analytical tools such as Optimal Workshop, Optimizely and Visual Website Optimizer in the enterprise application. By analysing the obtained data, the hierarchical structure, completion grade and duration of the tasks have been evaluated. In consequence of the analysis studies with the tasks assigned to the users, the users have been determined through the success/failure rates and completion times of each tasks. As a result, the product design has been designed to be focused on the user by assessing usability problems.

Keywords: User Experience, Quality Oriented Design, Usability Tests

INTRODUCTION

User needs have become part of the software and interface development process in conclusion of the rapid development of information technologies over time and the increasing dependence on computer in all fields of the society (Battleson, Booth, & Weintrop, 2001). Many web sites in the web are getting to reach for a dimension by serves countless areas. Consequently it's been needed to work on the availability of web pages. Software usability testing is an important methodology that enables ease of using the applications by evaluating intuitive considerations of the target crew (Black, 2015). The realization of usability tests facilitates the identification of problems on applications and allows for continuous improvements. Jacob Nielsen claims in his study which called "Designing Web Usability" that a site with the best usability will always win competition among other websites (Nielsen, 1999). It's proving the fact that of the usability related with popularity on the web site. But doesn't guarantee the success of the web site (Spool, Sconlong, Schroeder, Snyder, & DeAngelo, 1997). The Honeycomb Model that determines the value of Morville's website and aggregates user experience to seven separate components has been presented in Figure 1 (Morville, 2004).

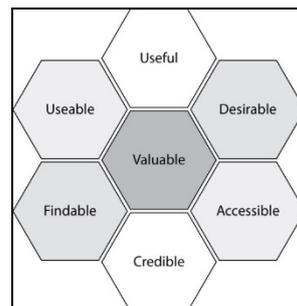


Figure 1: Honeycomb Model

Useful:

In the honeycomb model, it's been emphasized that the first and the most important thing to create value for the website is the usefulness. Websites has been deemed worthwhile to meet any problem or needs for website visitors (Morville, 2004).

Usable: The Standart ISO 9241-11 has been defined “a product can be used by certain users in an effective, efficient and satisfying way to achieve certain objectives within a given usage context (Leventhal & Barnes, 2007).

Desirable: It's about how the design of the product influences the user experience. The first impression and image that the website creates in the eyes of the users is one of the important elements that make the product more powerful and preferable among users (Morville, 2004).

Accesible: With the proper design and development of websites, internet users are able to obtain information and improve their ability to perform certain functions. Accessing the desired content and directing it to the site are factors that determine the preference of the sites.

Findable: Ability of users to perform their operations on a system in a short time depends on the hierarchical navigation structure. In spite of the problems on the interface, system should be designed so that the users can try different solutions by making sudden decisions and continue their operations.

Credible: Products and services offered by the company, especially the company itself need to make a reliable impression in the eyes of the users.

Valuable: Developed products represent the benefits that are provided both to the companies and to the users who use that product. Products offered to the users without value are probably lose importance over time.

In Jacob Nielsen’s usability model (Nielsen, 1994), “System Acceptability” is used as part of five different dimensions. Social acceptability in the model shown in Figure 2; all legal and ethical issues, the comparability and trustworthiness of products, usefulness; refers to the benefits of providing users with content depending on the usability of the web pages. Usability in this model consists of five factors; easy to learn, efficient to use, easy to remember, minimum error rate and satisfaction.

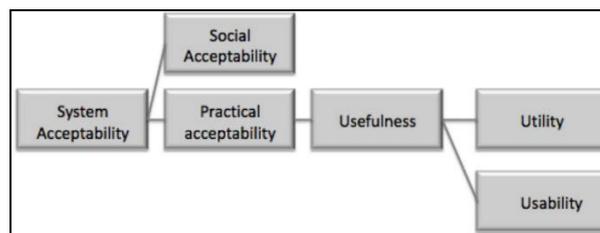


Figure 2: Nielsen's Usability Model

METHOD

Usability has been defined as easy of use, learnability, productivity, mindfulness, error prevention and user satisfaction (Nielsen, 1994). According to the International Standardization Organization, usability has been represented as; The time spent in achieving the specified goals (Efficiency), and the dimension of acceptable levels of users' systems, by means of the use of a system (Efficiency-Effectiveness) (Bevan, Carter, & Harker, 2015). Usability testing methods have been performed to evaluate any system according to the opinions and thoughts of users, to design easier systems and to increase user satisfaction level. Different types of problems can be observed through the application of usability tests and applications or web sites with user-friendly interfaces can be developed as a result of the findings (Rubin & Chisnell, 2008). There are three different classification methods to measure the usability of system including effectiveness, efficiency and satisfaction (Bevan et al., 2015). The tests conducted are aimed at improving these three criteria.

Usability Tests

Products developed to serve a certain purpose in the direction of user needs and expectations are generally used by one or more users. The main key point in the product development process is to ensure that users reach their goals with as little error rate and maximum satisfaction level as possible about the product offered to them. Designing an effective and quality user interface is crucial to increase user satisfaction level. User interfaces are sum of design decisions that are effective for users to use a product (Bağış, 2002). When developing interface designs, the goal is to achieve user-product integration, resulting in a smoother, more useful and more efficient product (Bağış, 2002). The evaluation of the usability of the interface designs has been made in two different ways, intuitive and real user tests. The testing and implementation of interface designs on a intuitive assessment are often made based on the knowledge and experience of experts (designers). When the experience is inadequate, the design is assessed according to ergonomic approaches, standarts and usability criteria (Bağış,

2002). Another method used in the evaluation of interface designs is the tests made with real users. In this method, the performance of the design can be obtained by evaluating the interactions of the users with the interface designs. Although a product is well designed, all of the variations that may occur during its use may not have previously thought (Bağış, 2002). In this point, user testing is often used as an evaluation criterion for uncovering these errors and the user's product approach. User experience testing is conducted to measure users' behavior when using a particular product. These tests are commonly used on a given system to determine what features are unnecessary and how well they work on application interfaces while performing certain tasks assigned to them. To provide a better experience for users, many different types and functional test methods are used in the execution of usability tests. These test methods are such as eye tracking, tree test, first-click test, A/B test, etc. In this study, tree and first-click tests were applied in determining the usability problems that occurred in the interface and when the menus used in the application were not hierarchically set correctly and the users performed the pre-determined tasks on the designs, the focuses and clicks on the screen were obtained and the designs belonging to the first area were obtained. As a result of these test methods, user-oriented interfaces have been created.

1. Tree Test

The tree test is a method used to measure findability of menu items on any website or mobile application (Kantar, 2015). The test results obtained from the users are used as a result of determining the accuracy of the navigation structures depending on the hierarchical structure of the system.

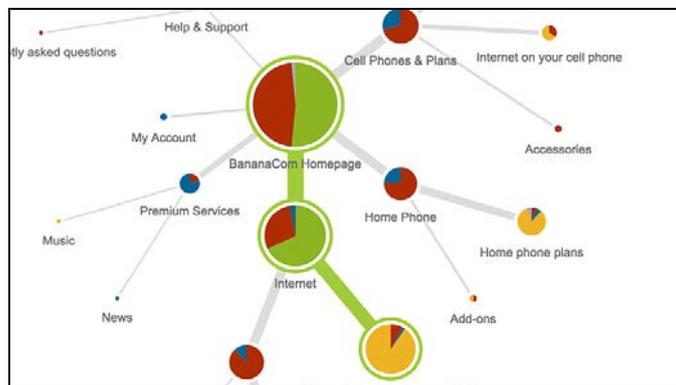


Figure 3- Tree Test Sample (“Tree Testing Tool - Optimal Workshop”)

2. First-Click Test

By performing the first-click test, the first object or region's click-through map data has been obtained on the application interfaces in the direction of the tasks assigned to the user. The purpose of this test is to determine the real behavior of the users and prepare the basis for the creation of new design plans.



Figure 4- First-Click Test (Jessica Torres, 2012)

APPLICATION AND FINDINGS

Usability tests such as tree and first-click were carried out on BNet application developed in Dedaysoft (“Dedaysoft - BNet”). BNet is an application that enables the personnel in the company to communicate with each other and to follow and manage the works, plans and daily activities of the personnel. The findings obtained on the basis of the tests performed are expressed on the following images.

1. Tree Test

The purpose of applying the tree test on the BNet application is that the application has a lot of subcategories and screen displays depending on the presence of several modules that perform different functions. In Figure 5, the findings of the navigation map data of the task “Where would you like to reach under the task of your colleagues that you have already taken?” has been expressed in the following image. The test was performed with 10 people and 5 of the test users couldn’t search for the task under the “Personal” menu. 3 of the remaining 5 people searched under “Quick Access” and 2 others in the “Shortcuts” menu.

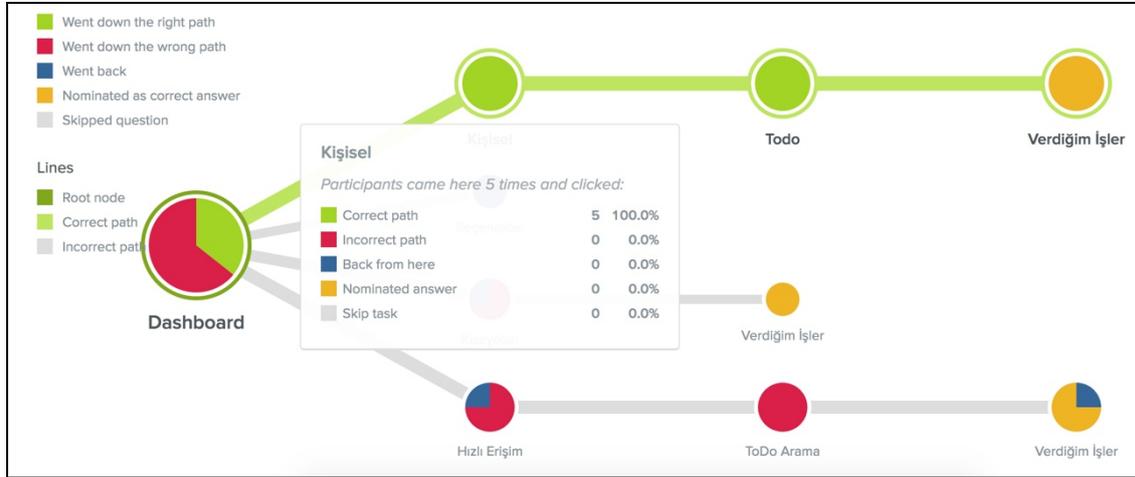


Figure 5: Findings of the tree test

As shown in the Figure 5, the most important factors to be considered in tree test studies are correct path, incorrect path and back from here. Correct path; the user’s moves in accordance with the menu hierarchy that designer’s/designers’ set up, incorrect path; the user’s relative navigation within the different menu items, while returning is the rate at which users leave after clicking on the main tree menu. 50% success rate and 50% error rate were obtained as a result of the test applied. Success rates are aimed to achieving consistently high results in order to give users a better experience. This study suggests that different variations should be designed to achieve higher success rates in menu hierarchies when the behavior of users is taken into consideration.

2. First-Click Test

By performing the first-click test on the application, it’s possible to determine the behavior of the users regarding the interface design. The findings of the task “Where did you first click on the application to view any user’s plan activity or work?” are described in Figure 6. The test was performed with 10 users and 7 test users were found to click on region specified area on the interface with 70% success rate. The remaining 30% showed that they could complete the task by clicking on different areas.

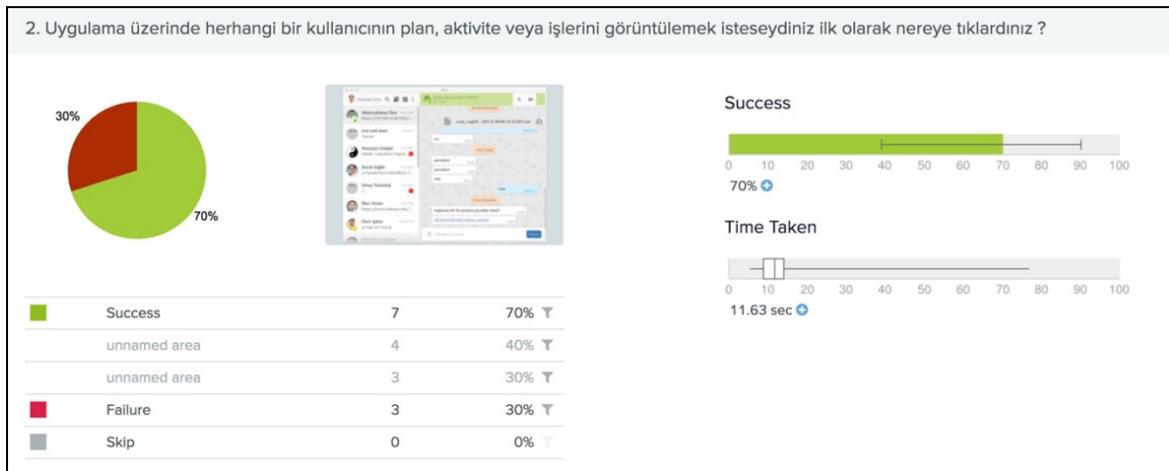


Figure 6: Results of the first-click test

In Figure 6, the first click test performed by the users shows that the users first click maps on the screen on different prototypes have designed for application.

CONCLUSION

Due to the increasing number of products depending on the developing technologies, studies on usability and user experience gain importance. User experience helps determine whether a product is functional and usable. Since usability testing is costly and time-consuming to implement, manufacturers often don't spend time on these tests or they only focus on product designs by resorting to intuitive methods. In this study, a number of test methods have been applied to evaluate the usability of interface designs to improve the quality and user satisfaction level of software products have been developed. The analysis of the data obtained from the tests performed by the users revealed how the design problems affect the use of the software products and the development of different approaches and variations in the design studies was provided. The goal of implementing these tests is to develop software products that are user-focused and appealing to the target audience and that are easy to use with minimal effort and time.

Several of the commonly used testing methods have been implemented to expose usability problems of software products in the study and to produce new solutions to these problems. Better results than intuitive methods can be obtained because analysis of data can be performed analytically in real users tests. A/B or multivariate testing methods can be applied separately from the first-click or tree test to ensure that the design and functionality of the software products being developed and it's development achieves better results.

ACKNOWLEDGEMENT

This study is the result of the studies carried out within the scope of Detaysoft R&D Center. Thank you for testing environment and support.

REFERENCES

- Bağış, A. (2002). Arayüz Tasarımlarının Karşılaştırmalı Değerlendirilmesinde Kullanılabilirlik Yaklaşımı. *Makine ve Mühendisliği Dergisi*, 522(25–31).
- Battleson, B., Booth, A., & Weintrop, J. (2001). Usability testing of an academic library web site: a case study. *The Journal of Academic Librarianship*, 27(3), 188–198.
- Bevan, N., Carter, J., & Harker, S. (2015). ISO 9241-11 revised: What have we learnt about usability since 1998? In *International Conference on Human-Computer Interaction* (pp. 143–151).
- Black, S. W. (2015). Current Practices for Product Usability Testing in Web and Mobile Applications. Detaysoft - BNet. (n.d.). Retrieved December 28, 2017, from http://www.detaysoft.com/cozumler/b_net
- Jessica Torres. (2012). Free Resources For A/B Testing Your Landing Page | Get Stuck In Traffic. Retrieved December 27, 2017, from <http://getstuckintraffic.com/free-resources-for-ab-testing-your-landing-page/>
- KANTAR, S. (2015). *User Experience Design: Optimization of Video on Demand Interface*. Fatih University.
- Leventhal, L., & Barnes, J. (2007). *Usability Engineering: process, products and examples*. Prentice-Hall, Inc.
- Morville, P. (2004). User Experience Design. Retrieved December 28, 2017, from http://semanticstudios.com/user_experience_design/
- Nielsen, J. (1994). *Usability Engineering*, Morgan Kaufmann Publishers. Inc.--1993.
- Nielsen, J. (1999). *Designing web usability: The practice of simplicity*. New Riders Publishing.
- Rubin, J., & Chisnell, D. (2008). *Handbook of usability testing: howto plan, design, and conduct effective tests*. John Wiley & Sons.
- Spool, J. M., Sconlong, T., Schroeder, W., Snyder, C., & DeAngelo, T. (1997). Web Site Usability:“A Designer’s Guide User Interface Engineering”. 800 Turnpike St. Suite.
- Tree Testing Tool - Optimal Workshop. (n.d.). Retrieved December 28, 2017, from <https://www.optimalworkshop.com/treejack>