**Implementation of Usability Evaluation in Mobile interfaces**

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# Introduction

The market for high-quality software systems is increasingly growing. However, amid substantial investments in software development, a wide variety of software systems was rejected. This is due to the system's lack of interaction and the software system's inability to execute its functions. The efficiency of a software system is influenced by usability, which is a product attribute. All software quality models take skill into account. It's a crucial aspect of creating effective interactive software applications. Usability is the most commonly used term in software engineering, and it describes the demand for and use of a software system.

Usability testing aims to see how well users can learn and use a product to achieve their objectives. It also refers to the degree to which users are happy with the operation. Practitioners obtain this data using a range of techniques, including surveying visitors about an existing site or planning a new one. The incorporation of the human-computer interaction (HCI) viewpoint into the systems development life cycle (SDLC) is crucial to the success of information systems (IS) and, by extension, companies (Bevan, 2001). Modern SDLC models, on the other hand, are focused on organizational rather than human needs. As a result, there is often a disconnect between meeting organizational needs and helping and enriching individual users.

Usability testing is critical at any stage of the mobile development process. Without any analysis and testing, it's unlikely that any designer will make a successful product [Reeves 2016]. Usability testing should begin at the beginning of the development lifecycle and continue throughout the entire development phase throughout the user-centered design (UCD) process. Albert (2013) affirms that Methods for usability testing can be modified and used in all phases of production, including planning, prototyping, constructing, and maintaining. Representatives from the target consumer community are interested in usability research techniques.

# Problem Statement

 Most of the software development teams fail to take into account the need to put into consideration the user interface design as one of the key tasks in software development to improve the user experience. Usability testing of mobile software applications is a new research field that poses several challenges due to the specific features of mobile devices, restricted bandwidth, wireless network unreliability, and changing context (environmental factors). Traditional usability testing standards and techniques for desktop applications might not be directly applicable to a mobile environment. As a result, it's critical to create and implement research methodologies that can assess the usability of mobile apps and web applications since most users use their hand-held devices to interact with both mobile and web technologies.

 User interface design principles are not adhered to throughout the software development process. Any interface's first and most critical task is to providing clarity. People must be able to identify an interface you've built, think about why they'd use it and understand what the interface is assisting them to interact with, foresee what will happen when they use it, and then effectively interact with it to be effective. Ideally, developers fail to understand that clarity inspires confidence and makes users continue interacting with the system.

 Notably, the interaction between humans and our environment is facilitated by interfaces. They can help us explain, illuminate, allow, display relationships, bring us together, separate us, manage expectations, and provide access to services. Lack of experienced user experience and interface designers is also a major contributor to the challenges in the usability of mobile, web, and desktop technologies. Interface design, like most design disciplines, is effective when people use what you've made. Design fails when people choose not to use it, just like a beautiful chair that is painful to sit in. As a result, interface design can be as much about creating a friendly atmosphere as it is about creating a useful artifact.

# Objectives

The following are the objectives to be achieved.

1. To give a general idea on recent studies on usability evaluation on mobile interfaces.
2. To conduct research to determine which subjects or areas are lacking in knowledge and which factors are being focused on.
3. To conduct research on areas that encompasses usability on mobile devices.

# Research Questions

* What are the principles used when implementing usability in mobile interface?
* What are the challenges encountered when implementing usability in mobile interface?
* What are the ways that can be used in evaluating usability in mobile interface?
* How can usability be enhanced in mobile interface?

# Research Methodology

The research methodology to be used is qualitative. Qualitative research studies can provide details about human behavior, emotion, and personality characteristics.

Data from qualitative studies describes the qualities or characteristics of something. You cannot easily reduce these descriptions to numbers as you can the findings from quantitative research; though you can achieve this through an encoding process. Qualitative research studies can provide you with details about human behavior, emotion, and personality characteristics that quantitative studies cannot match. Qualitative data includes information about user behaviors, needs, desires, routines, use cases, and a variety of other information that is essential in designing a product that will actually fit into a user’s life. The reason for using this methodology in the research study is because the study aims at identifying the behavior and characteristics of the users and users satisfaction as far as interactive systems are concerned.

**Strength of qualitative research**

* Issues can be examined in detail and in depth.
* Interviews are not restricted to specific questions and can be guided/redirected by the researcher in real time.
* The research framework and direction can be quickly revised as new information emerges.
* The data based on human experience that is obtained is powerful and sometimes more compelling than quantitative data.
* Subtleties and complexities about the research subjects and/or topic are discovered that are often missed by more positivistic enquiries.
* Data usually are collected from a few cases or individuals so findings cannot be generalized to a larger population. Findings can however be transferable to another setting.

# Project scope

Usability testing is critical at any stage of the mobile development. Without any analysis and testing, it's unlikely that any designer will be able to create a decent product. It should begin at the beginning of the development lifecycle and continue throughout the entire development phase throughout the user-centered design (UCD) process. Representatives from the target consumer community are interested in usability research techniques (Arhippainen & Tähti, 2003). Usability testing is important in the production process to produce a product that is successful and meets the needs of the end-user. In this project, we will evaluate the implementation of user interface and user experience on web and mobile application technologies.

The user-centered design (UCD) method is important for designing and creating highly functional websites. It explains the phases of the mobile development, with an emphasis on the consumer who will communicate with it and his requirements. Every phase of the mobile development process should include usability and usability testing. Planning is the first step in the mobile development process. It focuses on identifying user expectations and criteria for the new, undeveloped website, as well as understanding user needs, habits, and motivation. It also entails deciding the website's objective. Reeves (2016) emphasize the importance of including users in the design process as early as possible. Usability testing and defining user goals at this stage can help to prevent errors later on in the process and can also help to approximate the real user experience before the website is built.

The research on usability evaluation encompasses various areas of studies; user-interface composition, information display, user feedback conformation and control, navigation from one page to another, revealing hidden information based on screen size and users' needs, button and icon size as well as selection and data input mode.

# Mobile Interfaces principles to be evaluated

## User-interface composition.

Scrolling, notification, title bar, menus, lock screen, and ads are all examples of user-interface components. The menu method of retrieving information is a common alternative to the conventional method (Hoober & Berkman, 2011). It has a huge impact on overall cell phone satisfaction. Menus serve the primary purpose of allowing users to access preferred features of applications or devices. Menu analysis was done in the beginning on a variety of subjects.

## User feedback conformation and control

Users are continually surrounded by big data on their desktops. A variety of information display patterns assist users in filtering and analyzing related visual data. Users' conceptual models and the way they organize and process knowledge should be reflected ineffective patterns. Because of the small screen size, information display patterns have been a design challenge, and the feasibility of transferring desktop designs to mobile platforms has been questioned.

## Navigation between pages

On all platforms, a hyperlink is a common feature. It facilitates navigation and access to additional material by loading a new page or jumping to a different section of the current page. Navigation on a mobile device's tiny screen can be difficult. The majority of web navigation techniques support depth-first search.

## Selection and data input mode

The methods by which users interact with computer devices are referred to as input and selection. User input is obtained from major peripheral devices including keyboards and mice on desktops, and output is displayed across various channels. A touchscreen, on the other hand, serves as both an input and output device. Input methods have changed as a result; for example, mouse gestures have been replaced by touch gestures, and physical keys have been replaced by virtual miniature keys. Data entry on mobile devices has become more difficult as a result of this.

# Data Collection and Analysis

## Population Size

The population to be used for the research consists of population for the mobile users, mobile application developers and user-interface designers. The target population will be a sample of mobile users and applications developers who use mobile devices in most of their daily operations.

## Sample Population

The sample population will consist of 45 respondents’ i.e. thirty mobile users, ten mobile application developers and five user-interface designers. The data collection method will be done through questionnaires that will be distributes to respondents through emails, social media, etc.

# Conclusion

In conclusion, usability testing and evaluation for web-based applications and mobile applications differ and developers need to be aware to take into consideration the differences so that the products can be usable on both platforms. Web applications need to be responsive since they can be accessed using a personal computer or mobile device. Mobile applications do not apply the responsiveness principle as compared to web applications since they are accessed using the browser. User interface design principles need to be applied from the initial stages of software development up to deployment and usability testing should be thoroughly carried out. The process of choosing suitable usability attributes to test a mobile application is determined by the design of the software and the study's objectives. For both web and mobile application, the principles of user interface design must be applied to deliver a more usable system

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