

# Verifying Usability In Mobile Applications

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**Abstract:** Nowadays, utmost of the world is now heavily using smartphone applications, and this is increasing year after year so we will focus our research paper on the smartphones. Usability is the degree to which something is able or fit to be used. There are many mobile applications have burdens in usability, for example: Increased ads, unpleasant colors, difficulty registering, and speed of the program. In which that leads to a small number of users and aversion to users of this application. One of the suggested solutions to solve this problem is to build a process model based on the measurement of the most important requirements and attributes for the usability to find the lacks and areas of strength and weakness in this application in order to analyze it and get rid of any weaknesses. Initially, the most important required requirements in building applications are studied to become usable, then the process model will be designed and applied to more than one mobile application and results analysis. It is expected that if this process model is implemented, it will eliminate or reduce vulnerabilities in any mobile application.

**Index Terms:** Software Measurement, Human Computer Interaction, Mobile usability, Smart clients, Empirical study, Non-functional testing, Quality factors.

## 1. OVERVIEW

In our modern technology era, we always look forward to the ease of things. The nature of people or things looks to the theory of facilitation or simplification of matters. The world now depends on facilitating the services and providing the available means for that. Who among us now does not use the smartphone or even does not use smartphone applications? Usability is one of the important quality standards for mobile application and from which we will derive our scientific research on this basis. In the end, this paper says that Usability is a quality system followed by international mobile companies and large, reliable applications. In the figure below we recognize that usability testing is an important non-functional testing giving that more quality to the mobile application by enhancing reliability.

## 2. INTRODUCTION

### 2.1 Background

Initially, our goal is the mobile application and the methodologies in which the mobile application and tools used are built. The ISO 9241-11 defines usability as the “extent to which a product can be used by specified uses to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. Others look to usability as a “function of the context in which the product is used...It is a property of the system: it is the quality of use in context” [2]. There are some definitions must know: TOCHI: ACM Transactions on Computer Human Interaction, HCI: Human-Computer Interaction, IJCHI: International Journal of Human-Computer Interaction. The communication between human and mobile application is called HCI and the paper will focus on it. The importance of usability in mobile applications:

- A. Objectivity: Being direct and efficient is the minimum you expect from the software. Therefore, it is important to make sure an application performs well for the task for which it was designed. A good example is Google Chrome: its navigation bar, integrated with the search engine, is the only item we see when you open it – minimalist and functional [3].
- B. Efficiency: The first thing to consider in terms of usability is that an application must be effective and efficient. This means you have to give the user what they are looking for quickly and easily. An application must meet the needs in the shortest time possible, without requiring the user to have great knowledge of their use or require a long learning process [4].

Here is some background information that our research paper used in and we will inform you about next sections.

### 2.2 Problem statement

The problem in this paper is how we measure the usability in mobile applications, what are the factors that affect the usability of mobile applications, and how do we reduce or significantly reduce this problem in mobile applications. One of the proposed solutions is to create a process model that enables us to reduce the difficulty of using these applications and will detail this later.

### 2.3 Goal & objectives:

The main goal is to build the process model to verify usability for mobile applications and to achieve this goal we have the following objectives:

### Why Usability Test?



Figure1: Usability testing 101 [1].

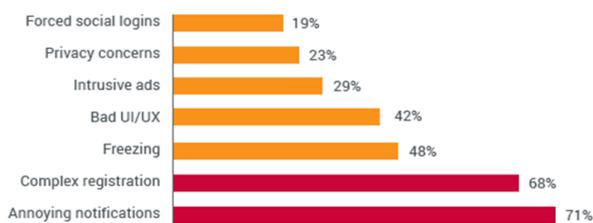
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- I. To investigate the usability model in specific for mobile application.
- II. To design a process model for verification usability in mobile application.
- III. To evaluate this process model.

## 2.4 The idea before that

The idea before that is the survey made by Appiterate in October 2015. The researcher Dave Hoch says that 52% of users enable push messaging on their mobile devices. At the same time, annoying notifications are said to be a reason to uninstall a mobile application [5].

Top 7 reasons why people uninstall mobile apps?



Source: Appiterate Survey as % of all respondents. Each participant mentioned three reasons

Bar chart figure2: Top 7 reasons why people uninstall mobile apps [6].

As in the bar chart above, it concludes survey or votes that 19% of users do not prefer the social logins. 23% do not prefer privacy concerns. 29% do not prefer Instructive ads. 42% do not prefer the bad user interface. 48% do not prefer freezing. 68% of users do not prefer complex registration. 71% of users do not prefer the annoying notifications. In my opinion as a researcher, I have found that commercials are the biggest challenge in picking the mobile applications.

## 2.5 OUTLINES

So, have finished this chapter and the next chapters will determine the requirements that we will be using. So, in chapter two, study the most important related works of ours. In chapter three, we will tailor the proposed process model which contains the author's amendment from the original version. In chapter four, we are going to test our process model in some applications we have chosen. In last chapter, conclude our work, paper to be done and suggest the future work based on the paper.

## 3 RELATED WORKS

Baharuddin, R., Singh, D., & Razali, R. (2013). They address the issue (make usability evaluation for mobile application is difficult) by proposing a set of usability dimensions that should be considered for designing and evaluating mobile applications. The dimensions are illustrated as a model that considers four contextual factors: user, environment, technology, and task/activity [7]. Shitkova, M., Holler, J., Heide, T., Clever, N., & Becker, J. (2015, March). They gave instructions for mobile app developers about usability. They applied two case studies in their paper: the development of a mobile application and a mobile website [8]. Hoehle, H., Aljafari, R., & Venkatesh, V. (2016). They conceptualize mobile

application usability, develop and validate an instrument to measure the same. To conceptualize mobile application usability, they analyze Microsoft's mobile usability guidelines and defined 10 constructs representing mobile application usability [9]. Hussain, A., Mkpjojogu, E. O., Jamaludin, N. H., & Moh, S. T. (2017, October). Their paper reports on a usability evaluation of Lazada mobile application, an online shopping app for mobile devices. The evaluation was conducted using 12 users of ages 18 to 24. Seven (7) were expert users and the other 5 were novice users. The study objectives were to evaluate the perceived effectiveness, efficiency, and satisfaction of the mobile application [10]. Hussain, A., Mkpjojogu, E. O., Jama Isse, A., & Mohammed, R. A. (2018, September). They study about evaluation of the mobile usability of a car grab application. The application is used in South East Asia to assist commuters seeking for transportation services. Their evaluation was carried out at university Utara Malaysia (UUM) using twenty student participants as users [11]. Shikhrakar, S. (2019, August 2). He collects the steps for the usability testing and make it as a figure illustrated below. The figure shown the steps and sub steps in details.

Usability Testing Steps



Figure3: Steps for Usability testing [12].

Annas, C. (2020, March 31). She gave a benefit of a usability testing. She classifies seven Steps to Run an Effective Usability Test. She takes an idea and plans for a next test generation [13].

## 4 PROPOSED PROCESS MODEL

We make this study as in figure4 below. First, you have to choose the mobile application you want to try, testing and run it. After that, we make a process model to start that testing. Next, if we find it usable, then perceive the report documents and enjoy using it. By the way, you can rate it. If it is not usable, we need to find the problems and faults. Next, if it is fixed, then you can recommend it to others and enjoy it. Otherwise, do not use it. Finally, you can do the testing process again for other mobile applications.

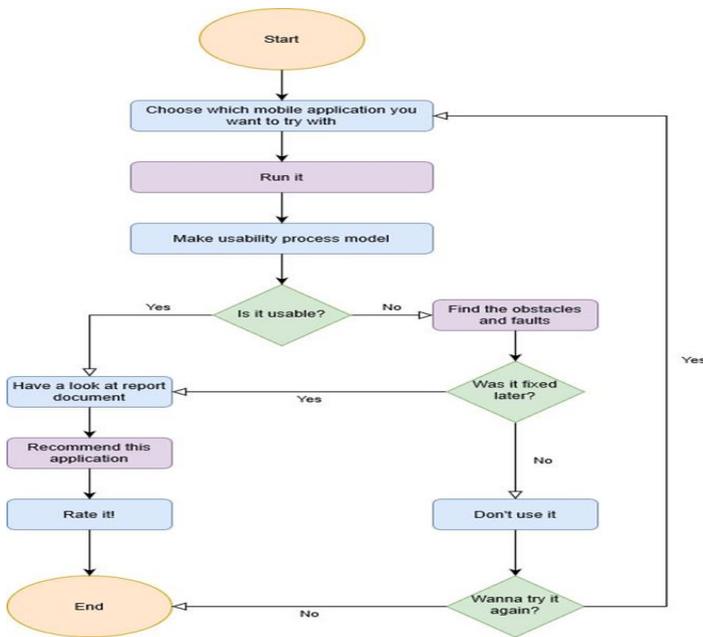


Figure4: Proposed process model flowchart.

The professor and I discussed the proposed process model and reached that the following: Firstly, we give an idea about usability testing and why we should do that type of testing? Because some of the design errors caused by the programmer may not be felt until after a while. The paper will explain our process model that based on the figure 3 by adding some important steps for that. In the proposed usability process model, we developed. We add beta testing involving black box testing which include reliability and consistency. This step become the change to the developer for improving the mobile application by checking the observation on that application. Finally, release the application without any problems or errors.

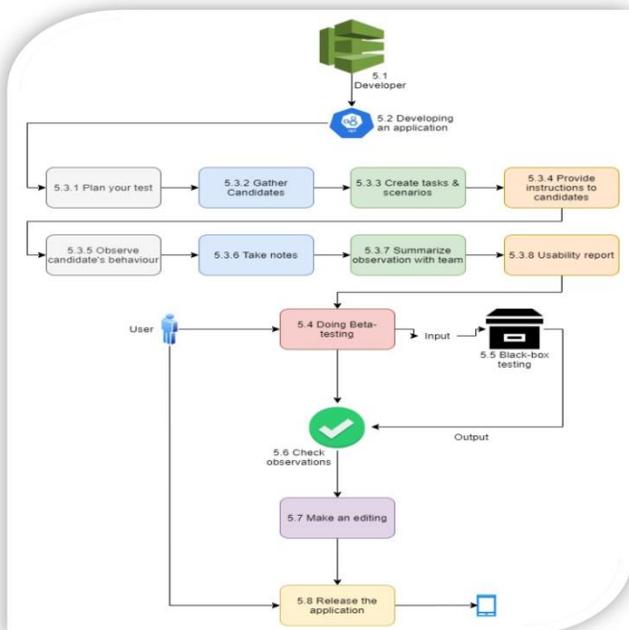


Figure5 (depending on figure3): Proposed usability process model.

### 5 EVALUATION

As there are non-functional requirements for example: usability, performance, security, and reliability. Although, there is non-functional testing such as usability testing. There could be have number of participants, testing times, choosing participants, locations of testing and making reports for that. These are the evaluation methods we used in the table below.

Table1: Evaluation methods.

Participants	10 or more
Testing	Early on during design stages or when the product is nearly complete
Number of rounds of Testing	Usually one or two dues to expense
Time spent on each round	1 or 2 days of tests, a week to prepare a report on problems
Choosing participants	Carefully recruit people who are like your target audience. 1 or 2 people that are not your targeted group is recommended as well
Where do you test?	Meeting rooms or anywhere convenient
Who watches?	Your team. (But full days of off-site testing results in few people wanting to take part)
Who identifies the problems?	Usually, the person running the tests
Reporting	Someone prepares the report of all the problems in at least a week. Usually, the designer is the one responsible for reporting.
Primary purpose	Identify as many problems as possible then categorize them and rank them by severity

### 6 CONCLUSION

This study concludes in conclusion that presents a new idea to our readers that verifying usability in mobile applications. It is important to say that the usability is one of the main fundamentals in the evaluation of the mobile application. Planning the testing is more practical for the developer and better for the user. Usability testing is a non-functional testing that checks non-functional aspects of a software application. It is designed to test the readiness of a system as per nonfunctional parameters which are never addressed by functional testing. It is a significant as much as a functional testing. It is worth noting that some developers do not take the usability as a subject of interest to them, so we write about this area. We drew a flow chart expressing the research

methodology of the plan followed in the application of the process model. Have seen some interesting related works and have worked out the most popular phrases and expressions. We did a process model in cooperation with the professor, review it and check it, taking the rules and foundations into consideration. The study took two to three applications to test them.

### Future work

Our future work will be the application of usability in Windows and Mac operating systems instead of mobile or smartphones and I am going to determine a mechanism for that and hope this topic will satisfy you.

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