Research Article

Mobile Applications Usability Principles and Criteria

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Abstract: The main goal of this study is to discuss mobile applications usability principles, for the last two decades an increasing interest can be observed for using smart phone and its variety applications, nowadays, most of people all over the world using mobile technology and mobile applications become embedded in different aspect of life, the s useful of mobile applications contributed to different range of users to perform a lot of tasks and duties with mobile anytime and everywhere, many facts have an influence in increasing of usage of mobile phone devices, the usability is one of this facts for the usability has been increasingly recognized as a major role of successful of the mobile applications. This study aims to investigate this important research area, it will focus on the mobile usability attributes and criteria and compare between mobile and desktop applications in term of usability and then discuss how usability has been measured and measurement criteria. The article will investigate mobile usability criteria and Human Computer Interaction theories (HCI) and ISO standards to satisfy the end users need and discuss the challenges that face mobile usability.

Keywords: Computer interface, mobile applications, software measurement, usability measures

INTRODUCTION

Advances in internet technology and mobile technology have enabled a wide range of applications to be developed and now people all over the world using internet application and mobile applications while they are moving anywhere and anytime, the rabidly development of the technology has influenced in the enhancement of different life aspects, governmental, education, economic, media, medicine and so forth. Recently, the internet and it technology that cover most of the world areas and the World Wide Web (www) contents that could help people all over the world to find verity type of information sources texts, images, videos ant time anywhere, using computers, laptops and tablets and smart phones which is provide easy and cheap access to the internet using the new generations of network (2G, 3G, 4G), in educational field a lot of educational organizations and universities concerned by systems that support educational issues and E-learning, smart phones device has been used as educational tools that has many applications for wide range of knowledge and learning information, in the early time of phone applications it was only few games application that was be able to run, but now thousands applications are available and a new terminology has been generated which as Mobile learning (M-learning) and now so many researchers are focusing on mobile learning and it has become well known area, which is defined as "combination of e-learning and mobile computing" (Deegan and Rothwell, 2010);" the intersection of mobile computing and E-learning (Ally, 2005)"," Extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" (Westgaard and Winkel, 1997). The mobile learning is combines two very promising areas-mobile computing and e-learning. M-learning will be one of the trusted and useful models of the future education strategy of learning. Recently, now a lot of research is going on to explore and supposing mobile devices to be more functional and effectiveness of providing better systems and educational environment.

Many development have been done to the mobile applications criteria, specially the mobile usability which has been focused more than other aspects for it is directly joined with the users satisfactions and it is defined by DIN (1998) as "the degree to which specified users can achieve specified goals in a particular environment, with effectiveness, efficiency and satisfaction" the usability in mobile applications is quite different compared with other devices like desktops, laptops, note pads, tablets, for mobile phone is specifications is less than the other in size in speed and input and output tools and the storage capacity.

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The usage of smart phones has an incredible influence in the all aspects of the society.

To have a good mobile learning and applications services we must have a good and easy user interface, the faceplate the contact between the application and users, as we mentioned before the mobile phones are fast communication tools in all aspects of life and it became user friendliness, for that the usability play an important role in increasing of mobile usage and it brings many benefits to the users and companies at the same time, for companies can increase the number of the phone users which will increase their incomes and users can use the application easily and with reliably and full of satisfaction.

The most of Human-Computer Interaction (HCI) techniques is providing an evaluating the system and how the usability is acceptable from the applications users, in HCI Many usability guidelines have been proposed and identified within mobile device applications.

This study will focus on mobile usability principles studies and it will discuss the many usability attributes and measurements and it is future and what will the future research will concern about and how the performance of usability will be evaluated.

USABILITY AND ACCESSIBILITY OF M-LEARNING

The mobile applications that are used in different aspects of life, such as M-learning and social applications and others are designed to be satisfied with the large number of users. The mobile usability is consider the second research concern next to security issues in the area of mobile applications (Buranatrived

and Vickers, 2002), The basic and the aim of the mobile applications developers is to get an acceptable applications that could satisfy the user's needs and usability, for that we found that the most software companies and the mobile manufactories are working to improve the usability tools and criteria of their mobile products to earn more people and increasing their companies incomes, the Human and Computer Interaction (HCI) techniques have been concerned since computer is invented, The "usability" is terminology that refers to a set meaning and of multiple concepts, such as execution, performance user satisfaction and learnability, a lot of past and recently researches proposed various techniques to produce high quality software. The term usability has different definitions one of the common definitions is ''The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use' (DIN, 1998), other definition is "usability means the measure of the quality the users experience when interacting with interface and applications" (Lee and Grice, 2004).

In each mobile application designed the developer must ensure that they will emphasis on the all usability criteria. The next section will discuss the usability attributes, to increase the importance quality factor that provides an interactive software system.

Usability attributes and criteria: The Usability has become a major role of determining the success and acceptance of computer software, the usability is become an important tool that effect on the competition of applications between the software companies and it control the purchasing of users and measuring the satisfaction and willingness of the users in the software
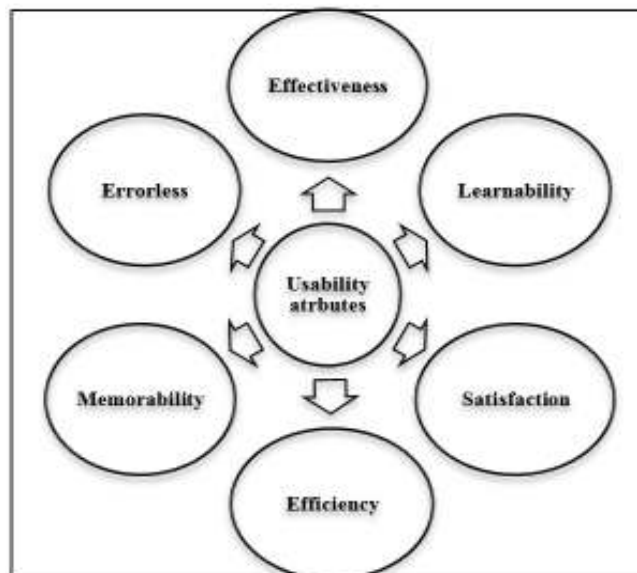

Fig. 1: Mobile applications usability principles and criteria

Fig. 2: The major usability measurement criteria

products, this usability has many attributes that must be taken when developing any application and specially for developing mobile applications (Fig. 1), these attributes are Efficiency, Satisfaction, Effectiveness, Learnability and Errorless, all of these attributes have strong impact on usability of mobile applications.

Efficiency is measuring of how the application is user's satisfied and is reliable and helpful to the users.

The effectiveness of the applications is how it is performed the specific tasks and how long it takes for processing each task is it solving the problem in easily and speedily. The Satisfaction measuring the percentage of users satisfied and this could be measured by users them self after using the applications. Learnability is the application is easy to understand and easy to use. Memorable is also one of the important attribute of mobile applications where its concern on designing the application to be an easy recall if this used from time to time and the last attribute is errorless the application must be errorless and the application users could perform the tasks without falling into any errors and it should have a low error rate. In addition to all above mentioned attributes, the components of usability also depends the application using context and the purposes for which usability criteria are being described. The all attributes are important and essential, but the most important attribute is satisfied, for this issue will control the commercial aspect of the software product. And it will gain more users for the application.

The all mentioned above attributes and criteria are important to the end users and it is reflecting on how the users will work with mobile applications and they can do the application tasks simply and efficiently and without any errors.

Mobile applications vs desktop: When we compare the mobile applications with the other applications such

as desktop applications, we will find that the mobile devices are portable and small and could be used anywhere any time and in deferent situation, the this vary of mobile devises such as smart phone and tablets when tit compared with desktop and other devises, result a big challenges in designing of mobile applications, these challenge are in many aspects such as the data entering tools where the data entering tools are big different and also display size and in resolution and portability of the mobile phone and the other component of the mobile devises such as memory size and the processor speed, all these issue must be emphasize when designing the mobile applications and these have direct effect in usability methods and criteria.

Usability measurements model: Mobile applications designing are complex and challenge full, for the mobile applications have a lot of functions and at the same time it need to be portable and light to be use anywhere anytime, Many works that done to evaluate the user interface (Kirakowski and Corbett, 1993; Gould and Lewis, 1985; Karat, 1997), the works of Gould and Lewis (1985) is consider one of the important works that highlights and recommended a lot of designing considerations, the recorded that we must but the understanding of potential users, the application developers and the bringing the design must be direct contacted with potential users and creating the design after discussions with potential users, designing trial version or prototype of the application and the changes according to the users feedbacks and the approved that will make the application user friendly, fixable, simple to use and easy to operate. The usability measurements is still continues to increase the users stratification, many researches are proposed and quantitative usability measures (Jokela *et al.*, 2006; Jokela and Pirkola, 1999; Baharuddin *et al.*, 2013), There is a lot of works that are available in literatures that evaluate the usability methods (Wixon, 2003; Kirakowski and Corbett, 1993; De Oliveira *et al.*, 2014; Albert and Tullis, 2013), the important there measure aspects that are shown in the Fig. 2, Which are effectiveness, satisfaction and efficiency. And other important evaluation techniques is Goal Question Metric (GQM)which is proposed by Van Solingen and Berghout (1999) and it became standard for software definition of measurement frameworks and there many works that disused in details the mobile usability measurements (Zhang and Adipat, 2005; Sánchez *et al.*, 2005), the usability of mobile phone on navigating websites are discussed and evaluated by Warsi (2011) and the improvement of the web usability using small display screens (Jones *et al.*, 1999), the work of Kjeldskov and Stage (2004) proposed many techniques for evaluation of mobile systems.

In other word the usability testing of desktop applications is used as guidelines for mobile applications testing with the traditional human-computer interaction methods, but not exactly same for there is some little bit different between mobile applications testing and the desktop applications testing and this must be taken as important issues when designing mobile applications we must consider the all environment and most possible situations of mobile as studied by Kim *et al*. (2002).

And the measurement will concern on essential part of the following the users for they will use and interact with the applications, the outcome of the application and context (users, tasks, functions, hardware, etc.) and after that measuring the application Effectiveness, Efficiency and Satisfaction.

Method usability measure:
Questionnaires: Software companies and developers have been investing in mobile application for the users of mobile is now increased and it and users need are also increased with the availability of this technology, there is a great work are done and still continue to improve the mobile applications and the mobile usability, to evaluate the mobile usability there are many method have been proposed (Zaharias and Poylymenakou, 2009), but the important evaluation method is the users themselves for they are the important factor of the determining of the usability tools and how they are satisfy with the mobile applications, the works that done by Zaharias and Poylymenakou (2009) focus deeply on using the questioners to evaluate and measuring the users satisfaction for questioners provide feedback from the point of view of the user whom the applications are built for them and it could provide a very quick decision to designers and administers, the questioners will focus on the following criteria Learning and Support, Visual Design of the Navigation tools, Accessibility, Interactivity, Learnability and how it motivate the users to Learn.

Challenges: Developing software applications have many stages and phases that is always need good analysis and understanding the all software surroundings to make the software product easy to use and has a good interface that could be easy to use and errorless, to provide and effective interaction design and usability criteria, there are many challenges that facing the mobile applications developers and companies, the end users of mobile applications need to be satisfied with the applications and this satisfaction is difficult to measure for the variety of application users and need many, usability testing to different range of people and diversity of them, to evaluate the system, also there are many criteria are need more concern from the researches such as the law of the mobile speed of the processors and the input tools and weight design is also consider as one of the challenge for it must be portable and small (Shen *et al*., 2009) and in the same time it must be usable and interactive, the software challenges are designing menus and icons and navigation.

CONCLUSION

The fast growth of the mobile technology and the verity of it is the applications that are available with different platform are increasing the using of mobile applications and also increased the researches to provide users with better usability tools. This study has highlighted some of the main aspects of Mobile learning and focus deeply on mobile usability criteria, it discussed the how mobile usability is going on and how it has been evaluated, it discussed and illustrated the overall achievement in the area of usability and it discussed many different issues of M-learning usability, design and evaluation and the usability measurement models showed how and also showed how the nature of mobile devices that portable and light and the wireless technology have a good influence to education and lastly we discussed some challenges that face M-learning evaluation and applications. The coming future will be focused on how to develop and enhancing the usability tools to get more satisfaction and gain more users to the specific.

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