

# ESSENTIAL UX METRICS TO BE CONSIDERED WHEN DESIGNING M-HEALTH APPLICATIONS IN ORDER TO PROVIDE POSITIVE USER EXPERIENCES

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## ABSTRACT

Currently within the developing world, there are many ongoing projects and pilot studies in the healthcare sector. However, there is a tendency of developing the m-health (mobile-health) applications without looking into factors that can lead into positive user experiences. More complications arise in that there is no agreed standard of measuring the user experience of a particular product. In this working paper, we propose core user experience metrics that are essential and should be considered when designing m-health applications especially for the public sector within the developing world as a result of the unique challenges that has grappled the developing world. Other metrics may be incorporated, but in this working paper we discuss metrics that should be core in order to assist in alleviating the project failures hence provide positive experiences to various stakeholders thereby enhancing the services delivery by use of m-health applications. The contribution of this paper is towards the metrics that have been identified to be used when designing m-health applications.

## KEYWORDS

User experience, m-health, ICT, metrics, developing nations

## 1. INTRODUCTION

In the developing world there is currently a lot of pilot e-health projects that are focusing on maximising the use of more mobile phones within the healthcare sector. Generally various m-health applications that are currently applied in the healthcare sector are used for education and awareness, remote data collection, remote monitoring, communication and training for healthcare workers and in diagnostics and treatment (UNFOUNDATION, 2009), in order to provide services that are extremely needed within the public sector of the developing world. It is therefore important provide positive user experiences when designing the various m-health applications.

## 2. PROBLEM

In this paper we focus on proposing metrics that may be used when coming up with m-health solution within the developing world and therefore preventing project failures of m-health projects. Therefore the following questions arise; how can positive experiences be provided to the hospitals in the developing world through

the various m-health applications? And additionally, what metrics of the user experience should be included in the m-health applications to provide for positive user experience and therefore prevent project failures? This paper will apply explorative research methodology as the researchers want to determine and explore the existence and use of user experiences in an m-health domain. This falls within the Human Computer Interaction domain but also has implication for the e-health and m-health domain.

### 3. THE USER EXPERIENCE

ISO (2008) defines user experience as “A person’s perceptions and responses that result from the use or anticipated use of a product, system or service”.

On what metrics should be included to provide good user experience, various authors describe the components of UX differently. However, majority of the authors are keen to point out that the component of a good user experience involves usefulness, a service or a product being usable and desirability of a particular product is also important (Armano(2007) ;Rubinof (2009); Garette as quoted by Dalton(2009); Sharp, Preece (2007) and Morvile (2004)).

Further Garrett as quoted by Dalton (2009) states that other components to be included are connectivity and the fact that a product should be controllable by the user. Morvile(2004) also include in components such as findable, accessible, valuable and credible. Rubinof (2009) fourth component is branding while Armano’s (2007) fourth component is sustainability. Other components according to Sheldon, Elton, Kim and Kasser (2001) include autonomy, relatedness, competence, influence, security and stimulation.

### 4. PROPOSED STANDARD UX METRICS THAT SHOULD BE INCLUDED IN M-HEALTH APPLICATIONS

We therefore propose the metrics as shown on figure 1 to answer the research questions as discussed in section 2 of this paper. All the metrics as discussed in section three might be important but we find that the following are a good foundation when implementing m-health or e-health applications.

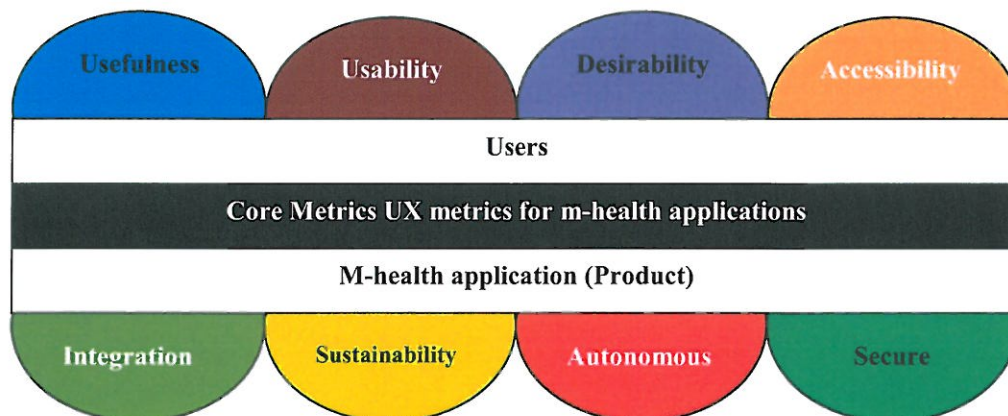


Figure 1. Core Metrics UX metrics for m-health applications

#### 4.1 Usefulness

M-health applications should ensure that the products provided are performing the tasks that are needed therefore fulfilling the expectations of the user’s. This therefore provides the user with a positive user experience and not frustrations enabling them to continue using a particular product. Products should be able to include all the functionalities that the users intend them to have.

## **4.2 Usability**

A product is said to be usable when it is easy to use and learn, provides satisfaction to the user, and does not require a lot of memory to use. In short it covers a lot of the common usability features which are designed and evaluated in order to fulfill user's needs for all the patients, nurses, doctors or other m-health stakeholders to safeguard against the user's rejection of the product as a result of frustrations.

## **4.3 Desirability**

Norman (2002), state that a product should go beyond providing only technical capabilities, but that it should also provide more attributes to the user in order to provide a positive user experience, by enabling the user to fulfill some of the higher order needs that a user requires. An m-health application therefore should meet all the requirements that users needed but also enable them to carry out certain tasks past the user's expectations.

## **4.4 Accessibility**

The field of health is a very complicated field since it has got various stakeholders with diverse tasks and backgrounds. Therefore the m-health applications should be designed in such a way that includes the diversification of the stakeholders that are to use a particular product, enabling the application to be available to all at any time.

## **4.5 Integration**

The first thing to do will be to first observe how the hospitals services are integrated e.g. There needs to be a larger picture of surveying the landscape of the hospitals especially within the public sector. This is because of the referrals that take place at the primary level, district, provincial and national hospitals. This therefore creates a relationship within the hospitals in relation to the services that are provided. In providing a good user experience on the m-health applications, the designers should therefore ensure that there is an integration of services at all the hospital levels through the proposed m-health applications.

## **4.6 Autonomous**

The m-health services provided should be autonomous. This ensures that all the stakeholders at different levels of the hospital can access them and use them at any time if need be, regardless of the time and locations of the m-health stakeholders.

## **4.7 Sustainability**

Keeping in mind that there is limitation in resources within the developing world, the m-health application should then be sustainable both to the users and to the hospitals. The design of m-health applications should be done in such a way that they are sustainable at the community/ primary level, district level, provincial level and at the national level. This ensures that a ground work has been done based on various resources available and a roadmap to achieve the resources in place thereby ensuring that the application being developed by various parties are feasible. The users are also not met with different styles of services at different levels, enabling them to enjoy the services being provided. In addition no one wants to have and embrace a service today and be disappointed the next day to lack of it.

## **4.8 Security**

No one would like to use services that are insecure. The design of the product should ensure that the m-health applications that are provided to various stakeholders are secure. This enable all the stakeholders to encourage the use of the various services offered without fear. Additionally it prevents failure of use of

various m-health projects since there is among the users in regard to the reliability of the m-health application.

## 5. FUTURE WORK

- What are the general factors that affect user experiences in mobile usage?
- What is user experience framework that is required for m-health applications?

## 6. CONCLUSION

This is an exploratory study suggesting the metrics that can be used when designing for m-health applications. If these metrics are included during the design of m-health applications then a positive user experience could be achieved thereby enhancing service delivery to various hospitals and preventing some failures of m-health implementations. Further research will be done on the areas recommended on the future research.

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