

# ”Handle With Care”

## Promises and pitfalls of mHealth in developing countries

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## 1 Introduction

Information Technology has rapidly changed the way how people communicate in the last two decades. One of the most widely adopted modern technologies in both developing and developed countries are mobile phones. The fact that mobile phones have become more affordable has caused a massive increase in mobile phone usage. This in turn has led to the development of innovative ideas in nearly all domains.

One of the domains mobile technology is considered to be most disruptive is Health. According to the World Health Organization mobile health, mHealth, is defined as ”medical and public health practice supported by mobile devices”. It involves the use of voice and SMS functionalities as well as third and fourth generation mobile telecommunications, GPS and Bluetooth technology [7].

Especially in low- and middle-income countries (LMICs), where health care systems are facing major challenges and access to basic health care is limited, mHealth could lead to new (better) ways of providing health care. With the widespread use of mobile phones, even patients in the rural areas can be reached.

## 2 Potential of mHealth solutions

During her lecture on mHealth Ona Ilozumba stressed the fact that in LMICs access to basic health care and health-related information needs to be improved and the shortage of health care professionals needs to be reduced. mHealth has the potential to achieve these goals by allowing access to affordable and personalized care. Moreover, it allows for a more systematic way of collecting and storing (health) data which makes the sharing of medical knowledge easier.

An application called RapidSMS was created by UNICEF to monitor malnutrition rates. In this pilot study in Malawi, health workers submitted information about child nutrition via SMS and received instant feedback messages and advice if malnutrition was indicated [4]. What makes these kind of initiatives so promising is the fact that they not only reduce the delay in treatment, but allow for health interventions as well. Preventing instead of curing diseases could result in a major drop in costs. Besides the provided care, improvements in health literacy of both patients and health workers are of great value as well since a serious shortage of health care professionals is often present in LMICs.

Even though mHealth sounds promising, it has not yet fully lived up to its expected impact. This paper will investigate possible explanations and will give suggestions on how to move forward.

### 3 Social context and complexity

There are many ways in which mHealth can be applied. Ranging from text-messaging services that help patients correctly follow medical advice to more complex cloud based solutions for special home monitoring devices that for instance measure blood pressure. Nonetheless, despite the various forms that mHealth can take, not every approach may be applicable to every situation. In order to choose the right approach and ensure the success of the application, both limitations as well as opportunities regarding infrastructure and connectivity need to be taken into account.

For instance, Sub-Saharan Africa has one of the most underdeveloped infrastructures in the world. However opportunities can be found in mobile telephony phone since its coverage is very high [5]. Making use of the existing infrastructure in rural Africa rather than building a complete new one is proven to be successful by applications as Tabale and Foroba Blon [3]. Instead of focusing on 3G or 4G, these systems aim at connecting the 2G world. Because of these applications, people without access to the World Wide Web can now benefit from information exchange and knowledge sharing in the same way people with access already can.

It becomes clear from many ICT4D research that taking the context in to account in which a system is going to operate is of massive importance [3] [8]. However, ICT4D initiatives are usually designed in a university or corporate setting where developers may lack knowledge about the environment and the community in which the system will operate. Consequently, these settings are often out of touch with reality which makes the project more likely to fail.

Issues regarding context-based factors can be overcome by involving as many potential (local) users from the start. It is only then, for example, one can discover that in certain communities women do not own a phone, but rely on their husband for usage. When designing an mobile application for pregnant women, this is rather important to take into account. Another example can be found regarding the low literacy that is often present in rural areas. An application where its users have to read and write has a low chance of succeeding in these regions, whereas it could have a potential big impact if the application is voice-based.

### 4 Transdisciplinarity in mHealth

Besides the technical and environmental challenges of mHealth solutions, challenges regarding the involved stakeholders may arise as well. The lack of internationally established policies and standardized metrics makes it difficult to move towards upscale mHealth innovations. Moreover, issues concerning data privacy, user acceptance, governmental situation and financial resources already pose a challenge in the developed countries, but an even greater one in the LMICs. The mixture of public, private and non-profit organizations is hard to coordinate and reflects the need for transdisciplinarity in the development of mHealth applications.

At the moment, the most important players in the domain of mHealth are the payers, governments and regulators [6]. From these, the "payers", consisting of mobile operators, device vendors, software companies and pharmaceutical companies, hold the most power. Making these stakeholders believe in the benefits and impact of mHealth is therefore of great importance because mHealth innovations rely on their investments. Governments and regulators can encourage payers to invest by creating standard guidelines. Last years approved guidelines reduce the risk of non-interoperability among devices and are therefore considered a milestone in the mHealth industry [1] [2].

Together with improvements in care, mHealth comes with valuable insights in terms of data as well. Big data in health care will eventually lead to more efficient healthcare and better understanding of patient needs. However, lack of privacy and data protection laws, and therefore lack of accountability opens up the opportunity for powerful stakeholders, such as pharmaceutical companies, to conduct mass experiments. Even if there exist some privacy regulation, these regulations are often not applicable in a (health) developmental context. Regions in LMICs becoming a real life laboratory could potentially be a consequence if sharing data for research or humanitarian reasons remains unregulated.

With so many different stakeholders involved, it is of great importance that transdisciplinarity is integrated and everybody works together to achieve the overall goal instead of advocating their own interests.

## 5 Looking forward

It becomes clear that just because something is technological possible this does not guarantee success of mHealth applications. From a technological perspective an mHealth solution could function perfectly, however from a user perspective the application could fail to meet its purpose if the target group is not even reached. Besides taking existing social structures into account, it is important that mHealth projects keep a close eye on ongoing political debates. Changes in the political landscape could lead to new contexts in which the ICT needs to operate. Especially in mHealth, where so many different stakeholders are involved, communication is key. When mHealth solutions are build upon available health care facilities and existing infrastructure and include local context, socioeconomic conditions and cultural norms in their design, they are more likely to become a part of the daily lives of health workers and patients in LMICs. It is only then that mHealth can reach its full potential and have an impact on the health care industry.

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