

Mobile interactive messaging system for patients' in collaboration with health workers

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Abstract

Health issues in developing countries are becoming more serious day by day, as different diseases attack and infect people making the public health sector overwhelmed. This has made it difficult for health workers to accurately study the trend of different diseases in many cases, thus failing to analyze the way patients behave after being diagnosed. The number of people who possess mobile phones is increasing every year and this can help facilitate communication in different geographical locations that may hinder movement of the health workers. The initiative to introduce the use of interactive messaging system is for patients who wish to access health services such as doctoral appointments and consultations or need monitoring but are faced by challenges like; the time needed to make for appointments and consultations, patients monitoring and halving to travel for long distances to reach the facility.

Therefore the researcher designed and prototyped a mobile interactive messaging system that would enable patients to send their preliminary symptoms to the health workers in Kenyan public hospitals via SMS through mobile phones. With regard to the wide spread usage of mobile telephony today, the researcher chose to use the technology since she anticipated it would reach a large population. An interactive messaging system for patients' collaboration with health workers is a system that uses mobile phone technology that enables communication between patients and health workers. This system' will serve both the new and continuing patients. The health workers will monitor the progress of continuing patients, while the new patients send their preliminary symptoms to the health workers via SMS. All this information is stored in database residing at the health facility, which will serve as a reference point to the health workers as they respond to the messages received and patients will be able to effectively collaborate with the health workers without necessarily having to visit health facility.

Keywords: Interactive messaging, health workers, monitor, prototype and SMS

1. INTRODUCTION

In today's competitive world people are demanding and expecting faster delivery of services. The number of people who possess mobile phones is increasing every year and this can help facilitate communication in different geographical locations that may hinder movement of the health workers. Through mobile messaging technology, monitoring of patients is simplified along data collection making it further easy to analyze and evaluate patient information (Jongbae et al., 2005). Mobile technology gadgets, such as mobile phones, are effectively used by the patients after the health workers sensitize and train them about the software that is used in the monitoring and data collection processes. Implementation of different instant messaging already exists for platforms such as Pocket PC, PDA and mobile phones, however still having the same problems of mobility, (Roland et al., 2002). The software is installed on the mobile phones. There are many diseases that need the attention of health workers, whereby they have to keep in touch with the patients. These diseases include HIV/AIDS, Cancer of any kind, Diabetes and malaria, for example, for expecting mothers or pregnant women among many. The patients provide the difficulties they encounter. This demand dictates that organizations must put in place program and resources that increase speed and efficiency of executing their programs and services to help them to react faster to changing conditions. Public hospital is not an exception; it has a responsibility to offer speedy services to its patients (Coiera et al. 1996).

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With regard to the wide spread usage of mobile telephony today, the researcher chose to use the technology since the researcher anticipates that it would reach a large population. An interactive messaging system for patients' collaboration with health

workers is a system that uses mobile phone technology that enables communication between patients and health workers. This system serves both the new and continuing patients. The health worker monitors the progress of continuing patients, while the new patients send their preliminary symptoms to the health workers via SMS. All this information is stored in database residing at the health facility, which serves as a reference point to the health workers as they respond to the messages received (Roland et al., 2002). Therefore by the use of mobile phones, patients are able to effectively collaborate with the health workers without necessarily having to visit health facility.

1.1 Problem statement

Due to the fact that there are limited health facilities in Kenya, the few that are available like public hospital are faced with congestion and long distances; hence the patients do not receive the required services effectively. Mobile interactive messaging system for patients' collaboration with health workers has the potential to solve aforementioned problems especially when seeking doctoral appointments.

1.2 Objective of the study

1.2.1 Main objective

To design a prototype mobile interactive messaging system that enables patients to send their preliminary symptoms to the health workers via SMS through mobile phones.

1.2.2 Specific objectives

1. To investigate the existing system with the aim of identifying requirements for the new system.
2. To design a system that curbs the congestion and reduce on time and cost spent by patients to travel to various hospital frequently.
3. To implement the mobile interactive messaging system for patients' collaboration with health workers.

4. To evaluate mobile interactive messaging system for patient to enable remote access to medical services and useful services from the hospital.

1.3 Description of the system

Due to the ease and wide use of short messaging services, the system is highly anticipated to be of very great help to the public hospital which serves patients from various part of the country. As a result of establishment of the system, collaboration of patients with health workers would be made easy and faster regardless of the physical distance from the hospital.

This is regarded as cost effective and time saving bearing in mind that one does not have to travel to the hospital and at the same time system is anticipated to reduce the congestion at the hospital.

The system acts as a reference point for the schools and the community.

2. Related work

According to Jung- Jin Yang (2005), the research focuses on building an agent- based system for confirming user appointment through callback URL. It involves the use of SMS on the mobile phones in order to reduce the failing appointment and the loss from such failures. The research also introduces method to avoid the system from degradation from the excessive accesses per try. The similarity of this research to the proposed system is that it deals with SMS notification for purposes of reminding an appointment.

According to (Wanda et al 2006) many health care services are now delivered in outpatient settings where patients receive care then return home. During such care patients assume significant responsibility for monitoring their own health status, managing recovery and communicating with clinicians from home. Further they say that patient regularly coordinate with multiple providers and interact with the health information system. Instant messaging has proved itself as an effective tool for not only streamlining corporate communication needs but also as a popular social tool; (Karen et

al., 2006). Families use it to communicate daily activities and it also gives people an interactive platform. SMS has been used for years in Europe and Asia and USA and is beginning to be used in other developing countries (Robert., 2005). While it is relatively difficult to enter text in a mobile phone than it is on a computer, mobile text messages are being used in learning process. Sharing information and technical (Sheila et al., 2008) exchange can reduce on the amount of time it takes to launch a solution and reduce the associated costs. Organizations continue to use trial and error when it comes to utilizing mobile technologies in their work. Mobile technology initiatives in this field are still emerging (Sheila et al. 2008). Mobile solutions, as with any other ICT project, need to be appropriate to their environment to have impact, and be responsive to local needs and conditions. Many positioning systems use the most common GPS. For example, wireless handset is a sort of cellular phone commonly used to provide communication system with more features, such as voice activated dialing, a WAP browser, and two-way text messaging (Kim et al.,2006). Many purpose built and off-the-shelf systems don't work in all scenarios providing quick positioning in emergency situations (Ali et al.,2009). It uses wireless application protocol (WAP) as the system to connect to the Internet through a mobile phone (Kim et al.2006). Through accessing the mobile web from mobile phones or PDAs, the use of wireless application protocol is good for the implementation of the system, in order for the patients to access health information and at the same time be monitored. In such a case duplication of patient information and data becomes very difficult.

2.1 Monitoring

Application of wireless technologies to promote mobile information technology, using packet switched networks is the key in promoting monitoring of health centers so as to give the patients the required attention. Monitoring is effected by sending messages to patients such that they reply by sending answers to the health workers' questions or reply by giving health workers the details on how they fell after diagnosis or before

diagnosis. The system will also give options to patients to assert their situation at that time or over the period they last met the Doctor (Price et al., 2006).

2.2 Mobile Messaging Framework

The coming of the wireless application technology (WAP) and 3G mobile communications network, including the Wi-Fi, has increased the use of mobile communications, thus increasing the need for mobile information technologies. The use of mobile messaging technology to monitor patients and analyze their data is the key to managing patient health data. In the system the researcher considers that all patients have cell phones that can facilitate them with communication via Internet. Mobile wireless phones are the most popular mobile wireless technology used mainly as personal communication tool (Kim et al. 2006).

Patients must have the registered number from the health center which they can use to send symptoms on how they feel when they are sick or how they are feeling after diagnosis. The initial data of the patients is taken and they are given a health access key or number to use.

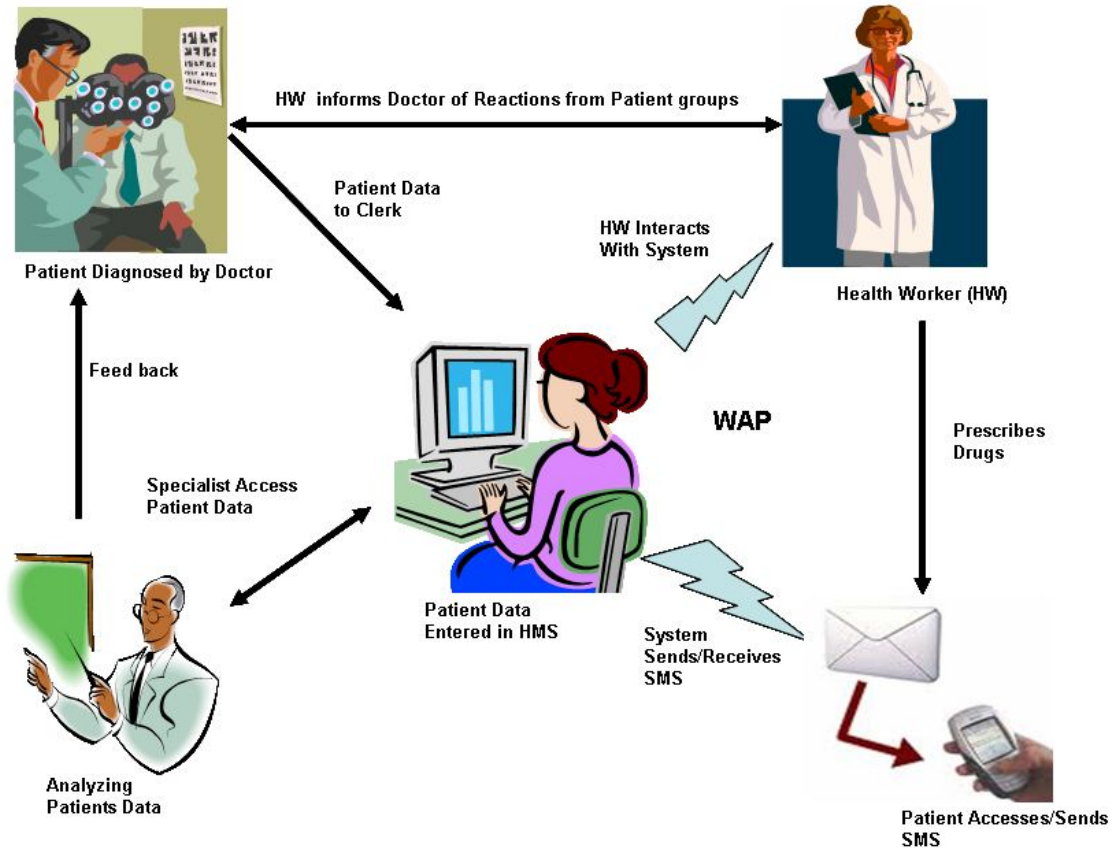


Figure 1: Mobile Messaging system

The health management system (HMS) used for the mobile messaging technology is powered by wireless network technology. The HMS collects patient information from the replies made so that they can be analyzed to evaluate the performance of each patient group. The analysis relies much on the collected and evaluation made is communicated to the patients and then they are given the actual days to visit the health facility for another check up (Wanda et al 2006).

3. Research methodology

The researcher used mixed methods research with qualitative, quantitative and field experiments.

3.1 Area of the study

The investigation was carried out in most of the public hospitals in the country.

3.2 Population of study

A sample was used to give a whole representation of a population in every aspect. Therefore the sample targeted some members of the ICT department, the doctors in the hospitals and few patients.

3.3 Research instruments

Data-collection techniques were used to gather information. These techniques allow the researcher to systematically collect information about the objects of the study. The researcher was systematic in the collection of data since, if data are collected haphazardly, it would be difficult to come up with required prototype software. The following data collection methods were used to help in the problem investigation.

3.4 Analysis of Data Collection

Data gathered was organized and analyzed systematically using quantitative data, frequency tables and figures with the aid of statistical package for social scientists (SPSS).SPSS was used due to its wide set of variable options that include editing, deleting, adding variables at various stages of analysis and testing various relationships.

After data collection, the information was formulated using qualitative analysis. The tool that was used to analyze data was descriptive statistic of frequency analysis. The results obtained after the analysis was the basis of the development of the mobile messaging interactive system for patients in collaboration with the health workers.

4. Discussion

The researcher used a mobile messaging technology to enhance monitoring and analyzing of patient data. Patients sent their information to the health workers system to be diagnosed by the doctors. Patient information is shared between health workers to get better drug prescriptions. The patient data is given to the data clerk to enter in the health management system.

Since patients are the one to send their details and symptoms, then the doctor in charge examines the health management system powered by wireless application

protocol, WAP, sends SMS to all patients who have sent their information in the system. The system groups patients depending on the ailments registered at the health facility, making it easy to make follow-ups on the patients. Each patient uses their personal phone numbers to access personal health data via SMS. Health workers interact with the system often to retrieve patient information, in order to find out their complaints and reactions. Further specialist, who are doctors in this case, also access patient information, they analyze them and give feedback to the doctors concerned. Patients also get drug prescriptions from the health workers which they may purchase at the nearest drug shop in case there is need. Since WAP supports web-based applications, computers can also be used to access information through SMS. But, there are some problems that patients brought across. One was a suggestion from the user side who was a patient suggested that the researcher should include a delay or snooze message to signal that the line is busy or the network is down that the message will be received and dealt with later. In that case, the issue of the message arrival signaling came up. The suggestions showed that more control with different signaling types would be useful.

5. Conclusion and Future Work

The researcher has discussed about enhancing patient monitoring and analyzing their data as collected through mobile information technologies. The use of mobile messaging technology by public hospitals is to monitor patients irrespective of their geographical location. The mobile interactive messaging system is used to manage patient data and facilitate messaging which the patients use to access and reply to information that is requested by the health workers in different public hospitals. The health workers use groups to monitor different patients at the same time. To make a first step in this direction a messaging system prototype was designed for collaboration between patients and health workers. Both the patients and health workers in the hospitals had limited time available for the researcher study, yet the researcher was able to validate that computer mediated messaging can be useful in supporting health

collaboration. The researcher analyzed that this system of communication using wireless mobile technology makes monitoring and evaluation of patients' health performance much easier and efficient. The feedback of the test persons suggests a more effective, convenient and reliable information distribution improving their collaboration.

In future we intend to implement this system into an application for mobile information technology services for the health sector. Also the researcher will extend the scope of our observations and develop a general support system to realize a non-intrusive, situation-aware, context-enabled plan manager through SMS.

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