Impact of MCT Practices on Health Care System: A Case Study

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Abstract

Mobile Communication Technology (MCT) has advanced manifold over the past few years and has established as a leading wireless communication medium. It has a distinct advantage of getting integrated with existing Information Technology environments at very low system requirements. The Text Messaging Services has been operational now for the last one decade and can be extremely useful in developing a reliable, low cost Enterprise Information System where small quantities of information are required to be disseminated over huge populace. This mobile communication oriented Information Systems have played a very important role in the Health care systems. The health care system includes a wide range of facilities and services delivered through institutions (e.g. hospitals, nursing homes) and non-institutions (e.g. doctors, dentists). These facilities and services are provided by local, state and federal governments as well as private individuals, businesses and organizations. In this paper we are proposing a very cost effective mobile communication based solution for the development of an efficient information system involving activities related to health care systems.

I. Introduction

Information and Communication Technology (ICT) is revolutionizing our day today life, our ways to interact with each other. Its application in health is described broadly as e-Health, which includes telemedicine, electronic medical records, and health information systems with decision support, mobile health and eLearning tools. E-Health has shown potential in facilitating a better health care delivery system, leading to better health and universal health coverage. It creates access, enhances quality, improves primary health care interventions and can act as a solution for situations where human resources for health are scarce. There is a wide variety of health systems around the world, with as many histories and organizational structures as there are nations. In some countries, health system planning is distributed among market participants. In others, there is a concerted effort among governments, trade unions, charities, religious, or other co-ordinated bodies to deliver planned health care services targeted to the populations they serve. However, health care planning has been described as often evolutionary rather than revolutionary.

Massive volume of information dissemination is involved in these health care systems across the globe, therefore development of an efficient information system is always considered as an important activity in this regard. The fact is that in India most of the health care systems have large number of outlets and the enrollment of such outlets in most of them goes in millions. These customers/Patients are registered with different outlets and in turn are customers of these enterprises where customer activity is spread throughout the year. At many times the enterprise also requires to acquire information instantly from the customers to process their need and similar activities but due to lack of efficient information systems the entire process is affected. The Proposed research is based on evaluating health care systems for the State of Jammu and Kashmir, India. In this paper the patients are named as customers so as to emphasize its relationship with the information systems.

II. Prevailing Information Systems

The development of the Information System is identical with its implementation through Information Technology using Internet as the communication backbone. The development of Internet provided a common and cost effective platform for different organizations to implement their need based Information Systems. The web based Information System provides excellent facilities for Information Reception, Storage, Processing and its distribution over the entire globe [Hohpe and Woolf].
In an Enterprise Information System (EIS) the customers form a vital component and require maximum support from the information systems. As a case study the health care system of Jammu & Kashmir, India is considered which has around Primary health centers (340), Sub district hospitals (87), District Hospitals (20), Tertiary hospitals (10), thus the total affiliated hospital numbering goes around 450 in the State of Jammu & Kashmir, India. The number of doctors working in these hospitals is around 3500 while as paramedical staff strength is around 30,000 and they are roughly treating around 30-40 lakhs patient referred as customers in this paper. The entire exercise every year involves a huge volume of data to be received from different source outlets processed centrally and disseminate to different constituent units of the system which include doctors, paramedical staff and above all patients besides other functionaries involving medical system of state referred as others concerned in this paper. In this paper customer related information system only is debated upon because other functionaries like staff is part of Human Resource Management which is managed by the state governance called as Secretariat in the state terminology. Customer (patients) across the state need to take different appointment consultation with doctors in turn with hospitals this includes consultation, surgeries, tests beside other activities like physiotherapies etc. Even today patients have to visit concerned hospital and determine the appointment based on the availability of specialist and number of patients waiting in the queue. It was observed that in order for the customer to get desired appointment he/she needs to visits the concerned hospital at least two-three times and after the desired consultation/treatment/tests he/she may require to visit again in order to get results/post-operative care etc. and yet again customer have to go through same process all over again. This is because the number of patients is increasing on yearly basis and infrastructure and human resources required by the hospitals has to developed accordingly.

III. Advantages of SMS based Information Systems
The dissemination of information through SMS has some distinct advantages over the web based and hence suits some areas where the content of information is small and requires to be received instantly. Advantages of using SMS based information system for some of the applications are directly related to the advantages of SMS itself. SMS is a highly mature communication tool and guarantees a high level of availability and quality of service [VassilDonev]. Some of the advantages of SMS are as listed below:

i) Growing popularity of mobile phones and availability of SMS capability on all mobile handsets means high reach for SMS based information. Similarly the delivery time in case of SMS is much less as compared to web based services thus making it ideal for alerts and notifications. Although service providers do not guarantee delivery time frame for each SMS, however, 95% of message delivery is almost instantaneous, International delivery allows information accessibility irrespective of the location of origin/destination of mobile user.

ii) The mobile phones are providing a two way communication system which is highly required in developing an interactive Information System. It does not also involve any additional training as is required for operating a web based system

iii) The mobile systems have the ability to identify the sender mobile phone number which ensures secured access and allows deployment of interactive workflow applications.

iv) The consumption of power for delivery and reception of information in case of SMS based systems is negligible as compared to if the same quantity of information is received through a PC on a web based system.

v) Single international standard for SMS allows use of same enabling software to send information over multiple mobile networks (for example GSM to CDMA and vice versa).

vi) Store and forward nature of SMS messaging allows messages to be stored in SMSC if the destination mobile phone is not reachable (either switched off or out of network). The message gets delivered when the mobile phone is reachable again (storage period in SMSC is limited by the maximum validity period setting of the service provider’s SMSC.

vii) The security issues related to a SMS based information are very less as the user in no case has any direct access with the data and no direct and continuous access with the database is possible.
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Accessibility, Operability and Affordability are the key characteristics of an Information System under discussion. In a geographically disadvantageous area of ours an information system based on mobile communication system presently meets these characteristics than any other alternative system.

IV SMS based System over Web based System

As per “Wikipedia, the free encyclopedia”, the number of internet users in India, 2011-12 are 119,749,712 while as number of users in India, 2011-12 are 864,720,186. It is very evident from the figures across the globes that there are many more mobile users as compared to internet users. Mobile phones are the devices of today and people across age groups irrespective of cast creed religion have made mobile phones part of their everyday life.

Mobile phones have cut across regions have established their supremacy in the means of communication, as such we propose architecture for communication based on SMS. In a mobile based system the information system is accessed by clients of different mobile service providers. On the other hand in a web based system the Internet simply functions as the carrier of data whereas in a mobile technology based system the service providers may add some more services and hence require to process the same. As an instance whenever a customer sends a request for obtaining is information, one of the service providers communicates it in its original form whereas the other one processes the information and associates audio content where ever applicable also with it. Before the decimation of the information the service providers broadcast the message to their subscribers along-with the short code and the keyword though which they can obtain their information.

V. Architecture of the Proposed System

In the proposed architecture all the basic information is stored in the databaseserver, this includes

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Doctors</th>
<th>Shifts</th>
<th>Patients/Doctors per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>JLNK</td>
<td>23</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>GMC</td>
<td>34</td>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>

Besides other compulsory information the patients can fix their appointment for the said doctor, in the specific hospital by sending an SMS, the response to this SMS can be either there is no availability for the said doctor for the specified hospital and along with the possible dates of appointment. The different service providers give their own short code through which their subscribers access for information. The customer writes the message using the following syntax:

String1 student_id_no String2

Where, the String1 identifies the Organization as the service providers provide facilities to many other organizations. It also contains the class name for which information is sought. The String2 identifies the activity and an example is given below:

APT-JLNK Dentist Ramesh 23/11/12

The “APT” part of the String1 establishes that customer wants appointment, while as “JLNK”, establishes the name of the hospital. The String2 contains “Dentist” which is the area of concern for the customer while as “Ramesh” is the name of the doctor and 23/11/12 is the date on which patient seeks appointment.
The service provider shall forward the message to the Server on a given global number. The request is processed and depending upon the query it is responded back accordingly.

VI. Conclusion

Mobile Information Communication Systems have a very important role to play when it comes to health services. Mobile phones have cut across regions have established their supremacy in the means of communication, as such we propose architecture for communication based on SMS. In a mobile based system the information system is accessed by clients of different mobile service providers. The two way communication with the Doctors and Patients using these communication services have made health care at the door steps of the common person. It is really provided solutions to the various problems that are faced by the public due to growing population and improper healthcare practices.

VII. References