RESEARCH ARTICLE

Support for Healthcare Systems in South Africa Healthcare Centre

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Abstract

Information technology plays a vital role in healthcare centres because it enables the healthcare professionals to perform their day to day activities in order to deliver quality service to patients.It is a requirement that the healthcare systems should be always up and running for healthcare professionals to perform their duties. It is unacceptable for patients to stand in long queues to receive the service they require. Technology is there to assist and simplify the way things are done in the healthcare. A hard working team is required to keep those systems up and running at all times. Healthcare professionals with the use of technology can help to save the patients' lives. Hence life is precious.

Keywords: *Information Technology (IT), Information Communication Technology (ICT), Healthcare Systems.*

Introduction

Technology plays a vital role in our lives on a daily basis as well as in every industry. People make use of computers, mobile devices such as cell phones, I-pads, laptops and etc. Whilst on the other hand industries implement systems to enable it to carry out its business daily to remain competitive. Healthcare is definitely one of those industries that make use of technology to improve and save countless lives all around the world.Increasingly, hospitals are using medical technology like mobile devices on the job, physicians can now have access to any type of information they need such as drug information, research and studies, patient history or records within few seconds. Developed countries have taken an initiative of modernising their healthcare systems by using technology to improve healthcare system by reducing costs, increasing patient safety and improving quality of care [1].

Mobile technology provides a wide range of functionality including remote diagnostic monitoring, data collection, information dissemination and public education and alerts systems through the use of intelligent handsets called Smart- phones [2]. Healthcare is undergoing a paradigm shift, moving from 'Industrial Age Medicine to Information Age Healthcare' [3]. It is a move from the traditional to modern way of working. This 'paradigm shift' is shaping healthcare systems [4] and transforming the healthcare patient relationship

[5]. Doctors make use of modern equipment to within private practices and hospitals to connect with patients and doctors thousands of kilometres apart through telecommunications. Patients now have an opportunity to hold video conferences with physicians in order to save time and money, instead of travelling to another geographic location or sending health information instantaneously to any specialist or doctor in the world. Another example is of the internet which has changed the way the public engage with health information [6]. People are able to know what is happening in other countries through the use of internet. Knowledge transfer and sharing is also possible through this media. The benefit of combining the technology and medical practice innovation makes it possible for the medical industry to improve the quality of life.As a result, the credibility of the healthcare system is determined by the reliability of health professionals and the systems they use.Thus, wins the trust of patients.

Literature Review

The healthcare industry is one of the world's largest and fastest growing industries. According to [7] this industry consumes over 10 percent of gross domestic product (GDP) of most developed nations, healthcare can form an enormous part of a country's economy. The health care industry is striving to reduce costs and increase productivity just like any other industry. As a result this put

healthcare IT professionals under pressure to introduce the most effective combinations of new technology to realise these improvements [8]. Posits that such technology is leading to the design of new electronic healthcare services that improve people's health and well-being but also extend beyond the individual towards sustainability of our society.

Technology has become the driving force within the healthcare industry in terms of storing and disseminating medical information between health professionals and patients.It avails quick and fast access of medical data to all the stakeholders through internet and the developing countries may take advantage of it [2].This enables healthcare professionals to perform their duties efficiently and effectively. As a result productivity increases and patients no longer have to wait too long in queues. This is achievable through putting healthcare systems in place.

Healthcare Systems

A good healthcare system delivers quality services to all people, when and where they need them. ICT infrastructure is the essential to achieving this transformation, enabling clinical information to be passed securely and quickly between practitioners and medical instructions communicated clearly and quickly using electronic means for increased patient safety(Various Companies, 2009).The exact configuration of services varies from country to country, but in all cases requires a robust financing mechanism, a well-trained and adequately paid workforce, reliable information on which to base decisions and policies, well maintained facilities and logistics to deliver quality medicines and technologies.

The expansion of ICT solutions and the implementation of e-health projects offer many opportunities for the improvement of existing and largely obsolete business models and their transformation in the direction of increasing added value for all stakeholders within the healthcare system [9].

It is a known factor that healthcare service is essential for all countries. It is vital for countries to develop healthcare systems toprovide emergency care to both medical practitioners and patients at all times.Such systems include the use of internet, cell phones and other communication devices to gather health data, delivery of healthcare information to doctors, researchers and patients [2]. These systems also entail real-time and direct provision of health services. Such

technology helps improve clinical outcomes and contribute to better public health monitoring and education. According to [10], ICT has helped in bridging distances and providing access to clinical knowledge, specialized expertise and health services thus saving lives and costs. It has also provided access to clinical information, Telemedicine, Online Discussion groups and other tools. Faults caused by healthcare systems may result in causing serious harm to patients and even death. Therefore, systems reliability plays a vital role in order to provide safe and effective care.

Systems Support

Support/maintenance is the last phase of the systems development life cycle (SDLC). It occurs once the system is implemented into production. After the implementation, customers begin to use the developed system and that is when the actual problems come up and needs to be solved from time to time. Just like any other product that is in the market, systems require care to keep operational. This process where the care is taken for the developed product is known as support/maintenance [11] posit that the use and support phase involves keeping the system up and running and constant updates.   There are personnel dedicated specifically for the support of IT systems and are known as technical support or end user support.   They are responsible for solving issues on the production system, installing patches and ensuring that the system is always available for end users.   According to [12] PC technical support was identified as one of the 10 hottest jobs in the IT field. This is an indication of how important it is for organisations to have this kind of skill.

Software can be developed for a variety of purposes, the three most common being to meet specific needs of a specific client/business (the case with custom software), to meet a perceived need of some set of potential users (the case with commercial and open source software), or for personal use (e.g. a scientist may write software to automate a mundane task). Embedded software development, that is, the development of embedded software such as used for controlling consumer products, requires the development process to be integrated with the development of the controlled physical product. System software underlies applications and the programming process itself, and is often developed separately.

IT Impact in Medicine

The South African health sector faces many challenges, such as epidemics, historical issues,

and factors that impact directly on the digital divide between developed and developing countries. Rural communities in particular are compromised by lack of infrastructure, services and expertise, limited resources, low literacy levels and professional isolation [13]. Adoption and implementation of E-Health solutions is often delayed when underlying problems are not resolved. For instance:

According to [14] some of fundamentals of e-health solutions are improved access to healthcare, improved quality of care, illness prevention and health promotion, and better efficiency (i.e. better healthcare for the same or lower costs). However, the healthcare sector does not fully benefit from these fundamentals due to delays in reaching agreement on best practice and processes. In South Africa, there appears to be no uniform healthcare approach, let alone a system that can be truly proffered as a proven template for reform that enables by means of technology. Yet the recognised benefits of reform and automation go hand-in-hand.

The lack of standardisation and integration between health information systems are major barriers to the full realisation of the benefits of e-health solutions. When systems are integrated and there is a standard way of keeping and updating patient records, only one entry is necessary for each patient. Thus, duplication of diagnosis and patient history is avoided; medical errors reduced and costs saved.Further challenges in providing access to healthcare services are due to geographic distribution, as much of the population resides in rural areas. One way to keep information in one place is to implement a card system. A 'smartcard' can be read electronically when a patient goes to a hospital or clinic [14].Some rural hospitals have little or no access to technological resources, a major barrier to implementing solutions [15].

Utilisation of IT Systems

ICTs are changing rapidly, as are businesses surrounding their implementation [16]. The need to develop and organise new ways to provide efficient healthcare services has thus been accompanied by major technological advances, resulting in a dramatic increase in the use of ICT applications in healthcare and e-health. With interoperable systems, data can be exchanged and stored automatically rather than re-typed into the system each time. This will free up time for health professionals to do more patient direct care. This applies to all kinds of data used in healthcare: care plans, laboratory results, therapeutic procedures, medication administration, care provided, health records, billing, etc. Giving

health professional's faster access to patients' data allows better diagnosis, better quality treatment and care, and better patient safety. Interoperability between systems reduces administrative costs through a reduction in manual data capture, duplicate efforts and in the workload for both clinical and administrative staff. Systems built on the same data exchange standards and using open access technologies are easier to integrate, reducing the implementation costs of new IT solutions in hospitals and the health network.

Clinics are linked to district hospitals and, from a technology perspective, the transfer of information between the two needs to be considered. The DOH (2010:18) envisions the strengthening of the District Health Information system (DHIS) and the progressive design and implementation of an appropriate electronic health record (EHR) system as being pertinent in this regard. Historically, patient medical records consisted of handwritten notes, typed reports, and test results stored in a paper-based filing system [17]. ICT healthcare reduces the adaptation time of the solution to the hospitals and other healthcare providers (e.g. primary care centres, laboratories) relying on existing IT infrastructure and requiring less maintenance/technical support from the vendor assisting coordination of care across hospitals and other care settings [18].

Findings

Thusano (not real name but pseudo name) is a non-profit organisation which assists people with chronic diseases such as cervical cancer, HIV, TB and others. It is situated in Johannesburg and consists of branches around seven provinces of the Republic of South Africa.The organisation has healthcare systems in place which helps the medical professionals to do their jobs efficiently and effectively daily. Patients also have access to their medical information and receive short message service (SMS) as reminders for appointments.

Stage 1: The in-house IT support department was setup in order to provide services to Thusano and its branches at all times. The services rendered includes maintaining the IT infrastructure, backup services, monitoring hospital systems, software installations, identifying, diagnosing and fixing problems onsite or remotely. The other duties include providing fast reaction support desk, scheduling routine engineer visits and providing emergency technical support when required.

Developing an IT support department in-house certainly has its benefits. With the right

background and continued training, the support team is able to build up in depth, specialised knowledge of the organisation's particular IT set up and systems. If they are based on site, the IT support team will also be available to solve problems quickly and efficiently.However, IT support training costs money. Indeed, to stay current in the ever-changing world of technology

the staff will need to undergo constant training and sit regular exams.

Stage 2: The relevant skilled resources were recruited following the human resource procedures (jobs advertised through various media) short listings made and candidates interviewed). The structure was as follows:
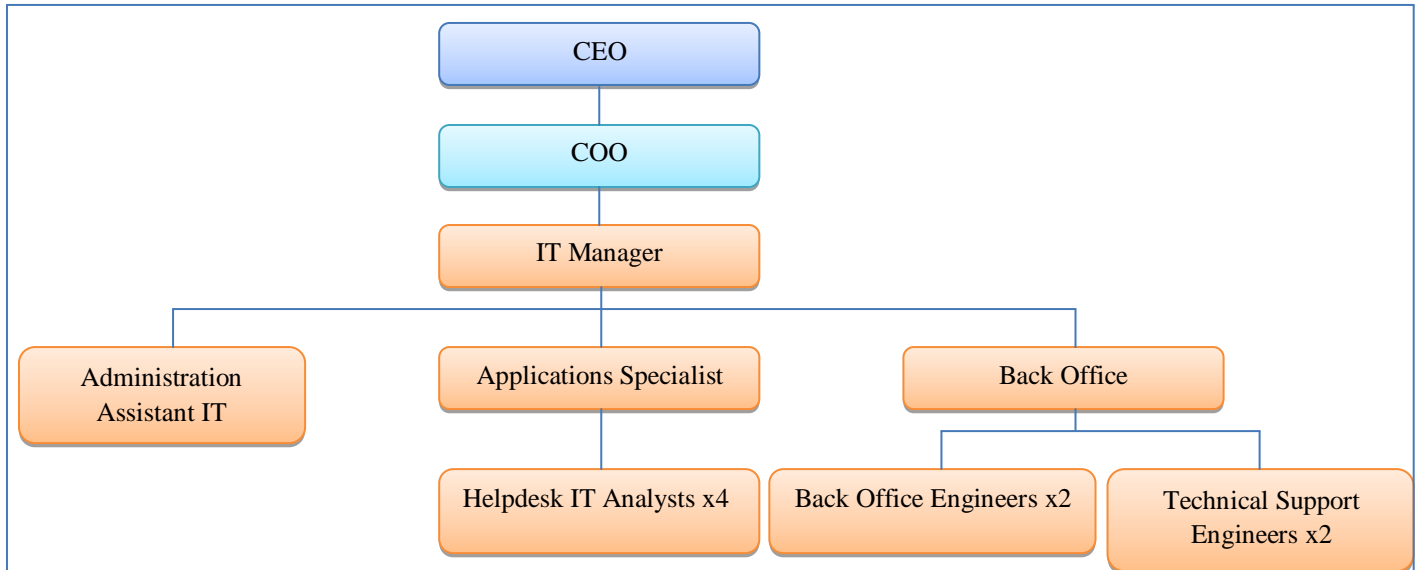

Fig. 1: IT Support Structure

The above staff members are expected to provide services promptly and professionally. They have to ensure that absolute peace of mind is provided to healthcare professionals in order to serve their patients properly.

Although it might sound counterintuitive and costly to employ two engineers to do one thing, its proponents insist that it actually saves money and time. The practice reduces costs and increases innovation by forcing engineers to think through their decisions early. In case of the engineer wanting to go on holiday or being sick the other one can continue providing the required services. This concept originates from "pair programming" where two developers sit in front of one computer. One programmer drives, typing out actual code, while the other observes and guides the driver, catching mistakes and suggesting high-level strategies for completing the task. Two minds combined are better than one mind. The goal is to keep the service available at all times.

Stage 3: Duties of the IT Support Staff includes:

IT Manager oversees the entire department and reportsto the managing director. Provide expert counsel and guidance to senior management on information technology and its impact across the full range of business strategy, programs, products and services, and operational issues. Forge strong relationship with key business leaders across the organisation. Demonstrate

decision making skills concerning Information Systems policies, processes and procedures, with a proven track record of completing tasks and/or project within budget and on schedule. Develop short- and long-term vision and strategic plans in alignment with and support for the organisation's strategies and goals, business plans, opportunities, products, and operating requirements and efficiencies.

Ensure performance to all elements such as cost, schedule, budget, scalability and agility as they relate to the existing plan and forecast; continuously improve unit cost performance while introducing new IT functionality and innovation. Ensure that the organisation has the infrastructure to meet its global needs; maintain knowledge of state of the art information technology, voice and data network communications, as well as emerging technologies. Direct the continuous and secure operation, administration and maintenance of the corporate computing and networking infrastructure, including information security and privacy, disaster recovery, and business continuity. Assure that the most appropriate IT security measures are in place. Define and execute security programs in policy, network access, data access, privacy, vendor and auditing environments.

Provide cost effective management, rationalization and simplification of the

organisation's portfolio of systems and projects; establish and enforce IT policies, best practices, strategic and tactical decision-making processes, systems and technology portfolio and lifecycle management, program and project management development standards, methodologies, and the like. Create effective partnerships and negotiate advantageous agreements with external service providers and hardware and software vendors. Compiles monthly IT report, supervise technical staff daily and weekly IT procedures and reports directly to COO.

Administration Assistant IT is responsible for managing filing system and archives, coordinating manager's contact lists, calendars and appointments, maintaining minutes IT meetings, letter writing, obtaining information from a computer, photocopying and maintaining records, dealing with clients over the telephone, collating information, updating spread sheets, managing smart view, stationery ordering and mail logging and distribution, preparing supplier payments(Invoices, Quotations, Payment requisition), welcoming and routing visitors appropriately. Preparing supplier payments (Invoices, Quotations, Payment requisition) Welcoming and routing visitors appropriately. Taking and relaying messages, arranges meetings, keeps diary, and see to supporting the sites. Orders, controls and allocate stationery according to minimum and maximum stock levels. Manages inventory registers allocated files collection of time sheets. Ensure completion of leave forms and submit them to the HR Department. Compile daily statistics.

Application Systems Specialist performs operations, configuration and maintenance on production systems. They are responsible for problem tracking, management and reporting as well as internal server maintenance. They also manage and handle healthcare professional's queries and support questions related to the systems they use. Implement, monitor and maintain the system, including servers, healthcare systems, internet connections etc. They must have previous experience with My SQL databases, Linux based systems.

Helpdesk IT Analyst is responsible tosupport helpdesk daily operations and complete responses to end-users to include, but is not limited to, answering phones, entering Helpdesk client support tickets, and prioritizing Helpdesk client support tickets.Troubleshoot computers, create

users profile, setup PCs, laptops, emails, fax to email, new equipment and software, create access tag, pin code. Monitor the length of time customers and for the prompt resolution of all problems brought to the attention of Helpdesk. Ensure daily task lists are completed and reports completed. Respond to questions from users and recommend corrective services to address customer complaints. Perform service requests and act upon incidents received in trouble ticketing system, delivering within SLA and adhering to case management and quality guidelines. Provide world class customer service to the organisation. Also provide a monthly report of IT assets requested.

Back Office Engineer is responsible for planning the project in order to accomplish its goals or produce the products required within constraints such as time, cost and agreed quality standards. Make an effort to understand the technology being used in order to understand and question requests coming from specialists and technical staff and to evaluate what is reasonable or possible. Continuously monitor progress in terms of the status of the plan and the budget and report back to the IT manager via weekly or other progress reporting and by organising and managing status meetings. Identify where and when management of issues and risks or accommodating altered requirements will involve extra time or extra resources and where efficiencies can be made.

Manage ISP for all Internet mail filtering and being the back office for third party e-mail software on all Smart Phone devices that connects to our exchange environment as well as providing second line support on the organisation's network. Troubleshoot, manage and resolve network and back office related calls. Facilitate and maintain user access to legacy systems. Maintain desktop and server operating systems and applications. Provide on and off side support to users identification and resolution of systems problems. Provide line support whereby the users support report software, hardware and network problems.

Identifying problems and bringing them to the Manager's attention with sufficient lead time to avert crises. Identify, log, analyse and manage potential and actual issues and risks, taking corrective action by tackling day-to-day issues head on and reviewing how more serious issues and risks might impact on scope, schedule, quality and cost. Monitor productivity of call center agents and generate reports.

Technical Support Engineer is responsible to maintain desktop and server operating systems and applications. Facilitate and maintain user access to legacy systems, set-up new equipment and software. Install and commission new computers\laptops. Provide line support whereby the users support report software, hardware and network problems. Provide on and off side support to users identification and resolution of systems problems. Manage and configure network infrastructure. Support communication with local and remote users. Configure, maintain and provide support for all network components. Provide support and adequate warnings for new viruses. Repair hardware and software components. Liaise with suppliers for warranty and on and off site repairs. Carry out preventative maintenance and upgrade both hardware and software where required.

Stage 4: Performing IT Support Team

Thusano has a very small team which had a responsibility ofrendering a service to its branches all over South Africa. Those branches consist of health professionals (doctors, nurses, pharmacists) and general workers such as maintenance personnel and cleaners. Due to the small capacity of the team, the team members had to learn the duties which were out of their scope in order to minimise the team workload.This exercise up-skilled the team to a point whereby team members were able to multi-task and perform above what is expected of them. The team turned out to be high performing due to having the same vision, knowledge sharing and serving customers with diligent.

When users experiences any problems with regards to their computers or systems they use they log calls using the call system. Such calls are prioritised amongst the team and assigned to relevant parties to resolve. The team would attempt to resolve the difficult (those that requires the vendor) before escalating them to the vendors. This is an indication of self-determination and wanting to serve the customer the best of one's ability. The health professionals require working systems in order to deliver the outstanding service to their patients. The IT support team had to ensure that the network, servers, computers and systems are up and running at all times for health professionals to render an outstanding service to their patients.

The IT manager's work was much simpler because he had a dedicated team which ensured that things are in order at all times. The reports he received from the team made it easier for him to report the COO. The feedback from the health professionals from various branches was a positive one. This kind of feedback when communicated back to the IT support team made them realise that they are doing an outstanding job. It also encouraged them to want to come to work daily and face day to day challenges. The IT manager also made it possible for the team further their studies in order to be up to date with the latest technology.

With the help of the IT support team the health professionals were able to help cure the patient instead of causing more injury or discomfort, provide the right services to the right people only when they really need them, consider the patient's preferences and requests in every health care decision regarding diagnosis and treatment, provide treatment quickly, reducing waits and sometimes harmful delays, target the application of resources (staff, supplies, equipment) to maximise resource use and avoid passing on costs to the patient and ensure that every patient receives the same standard of care regardless of gender, ethnicity, geographic location and socioeconomic status.

Conclusion

ICTs present a large, unexploited potential for transforming governance and transparency in the health sector in Africa to achieve "more health for money spent" and thereby improve the efficiency of health spending, both domestic-and donor-financed. The introduction of a full functional in-house ICT department within the health sector has proven to be more effective as follows:

Though limited in quantity and rigour, there is evidence emerging that ICTs can address challenges of maternal and child health and infectious diseases in rural Africa. Hundreds of m-health interventions to date have been piloted across the continent, for a variety of purposes including remote consultation, patient data management, referrals, supply chain management and health worker training. Some countries, like Rwanda, have implemented a comprehensive national eHealth System, including programmes for tracking patient records, monitoring infectious diseases, managing drug and supply chains, telemedicine communications with health professionals in distant areas and eLearning and training for healthcare workers. With the proper telecommunications infrastructure and committed leadership, such strategies could facilitate new business and service models. For this reason, countries are experimenting with different types of applications.

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