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Essay Topic 4

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Health Information System Design, Implementation & Evaluation

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Introduction

Today, there is literally a jungle of information systems supporting the healthcare industry. One of them is Health Information System, which has linked numerous stakeholders from a number of industries that are involved in the design, implementation and evaluation of the system. This is defined by "the landscape that enables us to examine and improve the delivery of healthcare services from the perspective of its major constituents (ie, patients and their families, clinicians, processes for delivering care, organizations, and patient populations) by using the information captured in Health Information System." (Sittig DF, 2002) This article will focus on the issues that will be used as criteria for the system design, benefit and cost in implementing such system and a general guide to evaluate the system. These are among the few main points for a Health Information System team to understand before designing and building such system.

Criteria for the System Design

A Health Information System is actually an information system (ie. a system of computer equipment, programs, procedures and personnel designed, constructed, operated, and maintained to collect, record, process, retrieve and display information) specific to the health care industry. (CEN, 2005) In short, a Health Information System can be referred as an integrated (to a greater or lesser degree) collection of a number of different Information Systems used in a healthcare context. Basically, Health Information System

covers the overall integration picture for all the clinical system applications using the aid of computer technology. To illustrate this, in the Intensive Care Unit (ICU) system, several sensors are connected to each patient's body and the processors monitor, analyse and record the data directly the electronic health records. This is a classic example of an integration of modules in Health Information System. Therefore, the concern has to be strategically planned for both developers and the end users.

In light of these situations, healthcare and computer professionals and consumers of health services need a framework for conceptualizing and understanding strategic system design. Two key dimensions of system integration maybe used to develop such framework; *Internal Framework*, that concerns within an organisation, while the *External Framework* concerns the interface with outside organisation and agency computer system, (as paraphrased from "Strategic IT Application in Healthcare", Ragbupathi and Tan, 2002). These explain the different disciplines staking in the health information management (the stakeholders) and they are vitally important, as there are different perceptions in designing such framework into a great scheme. As mentioned before, Health Information System is not diminutive project. In contrast, that it consists computerised patient records, document management, data warehouses, and intranet, which potentially enhance the information sharing and integration of system. Hence, in the framework design, a number of specifications have to be considered in detailed from the technical requirements, cost, benefit and legal issues.

Apart from that, designing and building a Health Information System is a difficult and time-consuming process. Moreover, the pressure and tendency towards tighter integration of information system, within and across organizations, is not particular to the health care industry. It is part of a much broader trend in the public and business organisations and need to be analysed accordingly. (Monteiro, 2003) From the business perspective, Health Information System is just another Enterprise Resource Planning system, but with a specific focus on the patient records and more detailed account consults.

Ideally, specific staffs are allocated to design such system and they consist of information technologists, business analyst and vitally important, the clinicians. Clinicians have a different set of professional values from the information technologists, who just focus on the architecture of the system. The clinicians are ultimately the end users of the system. (Mann, 2003) In a related article, Dr. Robin has illustrated a clinical encounter broadly encompasses any interaction between clinician and a patient requires an accurate clinical decision-making, within a hospital environment, clinical encounters that occur in outpatients clinics, A&E departments, wards, admission units or just over the telephones. These decision-makings will be recorded down. (Mann, 2003) In the Health Information System's environment, one of the primary functions of the electronic medical record is to support patient care. Therefore, these records also have secondary function; it acts as a legal record of care given. Coding and aggregation of data are monitored automatically by data quality indicators, which look for missing data fields and illogical groupings. On the other hand, this information system will also act a bridging gap to support healthcare provision. It will not be the only depot of information, but it also serves as a means of communication with other healthcare professionals and a source of data for secondary purposes.

Benefit and Cost in Implementing Health Information System

"Should your health organisation proceed with the Health Information System's design?" – this was pointed out by Richard Heeks in his article. (Heeks, 2004) In rational terms, the design should proceed, if its expected benefits are greater than its cost. On the other hand, if the expected costs outnumber the benefits, the design should not proceed. Perhaps, it should reconsider to redesign an alternative solution. Heeks defined a number of benefits of the implementation with a number of case studies, where they can be streamed and classified into many categories. Heeks has divided one of them into two classifications; task level benefits (ie. improvements to the cost or speed of data handling task) and health process level benefits (ie. improvement to the speed or quality of health management or health policy decision making and delivery.). (Heeks, 2004) Health Information System can also make the situation better in deeper, less tangible ways, improving the skill and knowledge of health professionals.

Therefore, in order to proof Heek's article, Dr Zubeeda Quraishy has done a case study on Health Information System of Indian's district in India. In 2001, the State Government in Andhra Prdesh (in collaboration with University of Olso, Norway) began introducing new information systems to support health sector reforms in rural districts, collecting reports and information on health performance indicators such as sterilisation, birth attendance, performance of the health workers and assisting resource allocation, staffs placement and health centre planning decision. (Quraishy, 2004) As a result, a number of core stakeholders and primary healthcare workers have benefited from such implementation. Apart from that, the Government will have at least a proper reliable monitoring system now when compared to the situation before the implementation. Furthermore, the system has also demonstrated a capacity to produce information that can be valuable for decision-making and has shown the value of an integrated map type interface into the Health Information System to aid with a better location understanding of health planning in the district. This project is progressing also due to the part of another set of stakeholders that are concerned in the system, such as University of Olso, IT Vendors and even the politicians to invest. (Quraishy, 2004)

On the other hand, although the benefits of the implementation of such project are often potential rather than real, the cost implementation is another issue to consider by both professionals. (Heeks, 2004) These costs involve the budget for the hardware system, application software and the infrastructure to build the Health Information System. Information system staffs as well as other staffs, like managers, administrators and healthcare personnel are part of the costs, in terms of their salaries and also their time spent. Apart from that, the training is part of a direct cost after the system is built and implemented. These costs will also include the installations, other operational costs and ongoing recurrent cost to run the system. Hence, it is important to focus a substantial learning curve, where practitioners have to have the literacy in using the system, performance data entry as well as information retrieval in order to ensure the implementation would be a successful phase. (Gurley and Rose, 2004) In addition, the more the health information infrastructure is linked to a numerous and different

stakeholders, services and purposes, the more the ethical, legal and social implications are likely to be raised since they have reached beyond privacy and protection of personal information. (Roy & Peladeau, 1998) A number of the implication matters are the privacy, security and confidentially, where they involve many aspects. (Rodrigues, 2000) Therefore, these issues should be taken seriously during the initial design phase by the developers.

General Guide for Evaluation in Health Information System

Today, enormous investment has gone into computerised hospital information systems worldwide and the estimated cost can reach up to US$50 million or more for each hospital. Yet, the overall benefits and costs have rarely been determined in detailed. It is also argued that the development of a framework for evaluation is necessary in order to successfully plan an evaluation, understand the implication of the results and make future predictions based upon them. In an article, to evaluate computerised hospital information system, Littlejohn and this team have designed an evaluation programme which compromised three separated programmes that are interlinked. In phases, they are an orientation study (where the aims of the study are to identify the expectations and aspirations of potential user to give designer a detailed illustration), creation of elevation framework (where the process of obtaining information through interview from the stakeholders) and lastly, designing the evaluation programme (where the priority of the projects is focused with specific outcome indicators and to provide technical advice). (Littlejohn, 2003) Therefore, these will provide a typology of possible reasons for the results of implementation, retrospectively summarizing the lessons learnt.

Hence, it is important to recognise that any framework developed for the Health Information System will be at best when it is evaluated. Apart from the programme mentioned before, the evaluation spreads into the understanding the complexity of the health process, culture, and expectations of both sides and in the context of fast managerial change.

Conclusion

In general, a health information system should focus their work in providing information and services to ensure the best outcome for the patient care. They should develop process to identify ways that a clinical encounter can be supported and act on the findings, with the concern of certain legal issues. This involves regular discussions with healthcare personnel. In conclusion, there is a strong argument for employing personnel with health informatics qualifications to oversee this process and to maintain a high standard at the management level of the hospital as these personnel will be involved in the initial stage of system design, implementation and evaluation stage.

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