

# *Improving information management in the Health Service: The role of information systems development*

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## **ABSTRACT**

The lack of adoption of health information management systems (IS) in the health services, as part of the drive to attain greater efficiency and productivity is the subject of many debates. Recent research suggests that, this lack of adoption is partly due the widely reported failures of costly health information systems projects, fragmented and complexity of systems and the lack of focus during the development stages. The resulting consequences are resistance to change, scepticism of new technology and hence lack of innovation in IS adoption within the health service. This paper examines ways in which these issues can be overcome, the role that information systems development can play in the health service to accelerate change. This will enable the health service and users deliver appropriate and responsive services that will improve better information management.

**Keywords:** *health service, information management systems.*

## **1. INTRODUCTION**

Recent studies suggested that, there is lack of adoption of Internet or web based health information systems (IS) as part of health services drive to attain greater efficiency and productivity (Gyampoh-Vidogah et al, 2006). According to ZYCKO, (2004) and Mangione, (2003) this is partly due to effects of the widely reported inadequacies of costly health information systems projects, fragmented and complexity of systems and the lack of focus during the development stages (Department of Health, 2002). The consequences are resistance to change, scepticism of new technology and hence lack of innovation in IS adoption within the health service (Doolin, 2004). Recent studies by John and Burch, (2007) remarked that, an important factor in the adoption of any new technology in an organisation is the management's perception that there may be no immediate benefits. Clearly, this has hindered the health service's ability to change the way it manages information. This is particularly true of poor information access, which is seen by many health care professionals at least in these cases as an obstacle to their daily operations. According to Gyampoh-Vidogah and Moreton (2005), often information is not analysed in a structured way by most organisations and the fact that, management do not re-think the critical areas of change to achieve success across organisations is a typical example. One of the main weaknesses of the health service information systems delivery is the lack of secure access to information centrally. For these reasons, this paper examines ways

in which these issues can be overcome and the role that information systems development can play in the health service to accelerate change as applied to a health care unit as a case study.

## 2. METHODOLOGY

A preliminary study based on literature and interviews was considered to investigate and address the problems. This method was selected because the goal of the research is not to achieve statistical generalisation at this point rather analytical generalisation (Yin, 1994). As such, users of the health services were interviewed. This case study approach was more revealing because the aim is to establish current practical and technical problems affecting information systems in the health service and the role that IS development plays in line with identifying different paradigms for managing information systems and technology (Anderson, 2003; Denzin and Lincoln, 2003). Finally, this study broadened the view of the information systems management since this pertains to a wider context of the National Health Service, which is of great relevance to public and private sectors of this study. Interviews were used for different purposes to help:

- Collate and gather facts about the procedures of information systems development in the units studied;
- Ascertain levels of understanding of users of the current systems; and
- Validate aspects of proposed system design to enable the new system to be implemented with confidence.

## 3. THE CASE STUDIED

The unit is a mental health sector comprising many users led by the programme director. At present the general mental health unit within the National Health Service (NHS) in the United Kingdom is not able to take advantage of existing information systems tools to enable the implementation of the state-of-the-art web based information systems. Attempts for users to access information from central repository from different locations have not been successful. As a consequence of this it was agreed that a web-based information systems for users be established.

### 3.1 Studying Reports

Reports were studied to obtain a clear idea of the policies and decisions of the mental health management units. Any improvements that had been made by key decision-makers during recent years were also revealed. By studying the reports, the interview was tailored to the mental health information systems. The report touched on the need to improve efficiency by collaboration with external partners and other consultants. These findings helped guide the range and depths of follow up questions after the initial interview.

### 3.2 Excerpts from Interviews

**Question:** What are the current problems facing the mental health sector regarding information management?

**Answer:** According to the regional leaders, the current sites available to the health services are not simple. This is because: (i) uploading, retrieving and storing information is not capable

enough; (ii) accessibility and visibility of the system is not good enough. (iii) The system is unable to archive information because of its fragmented nature; (iv) the software technologies used in developing the system is not dynamic; (v) most developers are unable to develop dynamic information systems management to reduce the fragmented systems and (vi) the most cost-effective methods for developing efficient web based information system cannot be quantified.

**Question:** What procedures are used when attempting to develop health information systems?

**Answer:** According to one senior manager responsible for communications, success of this aspect of health service policy depends on the availability of better tools needed for decision makers to make timely and informed decisions to process information and monitor service change elements.

**Question:** How do you operate in the sector and are there any technology training in place for using the current system to help capture, transfer and archive documents?

**Answer:** There are many web-based systems available. Some were developed in house while external software consultants developed others. Overcoming the technical challenges in monitoring service change elements using software components is a hurdle. Therefore, there is the need for research into web based information systems implementation. This will enable the process of developing web-based information management systems and technology to improve health service information systems management.

### 3.3 Key Requirements Based on Interviews

Based on the interpretation of the interviews, the requirements in terms of system features were identified as:

- an automated and dynamic template that is used to create standard visual templates that can be automatically applied to new and existing contents, creating one central place to change that look across all contents on a site.
- Easily editable content that is usually used to quickly edit and manipulate contents.
- Scalable feature sets that have plug-ins or modules that can be easily installed to extend an existing site's functionality.
- Web standards upgrades solutions to receive regular updates that include new features to keep the system up to current web standards.
- Workflow management the process of creating cycles of sequential and parallel tasks that must be accomplished in the system.
- Document management that provides the means of managing the lifecycle of documents from initial creation time, through revisions, publication, archive, and document destruction.

These features are now discussed in the context of the role information systems development, web-based in this instance for this unit can play to overcome the issues and problems identified.

#### **4. THE ROLE OF INFORMATION SYSTEMS DEVELOPMENT IN THE HEALTH SERVICE**

An information system according to Anderson, (2003) facilitates collaboration between different systems in an organisation. John and Burch (ibid) emphasised that information systems is an important and necessary resource in helping organisations meet efficiency targets. This means an information management system should therefore support the creation, management, distribution, publishing, and discovery of corporate information (Robertson, 2003).

Health information systems facilitate organisation, control, and publication of a large body of documents and other contents, such as images and multimedia resources within the health service. A web-based health information management system however is an information system development with additional features to ease the tasks required to publish contents to websites. This can be termed as a content management system which supports the creation, management, distribution, publishing, and discovery of corporate information (Robertson, ibid). Content management systems are therefore used for storing, controlling, versioning, and publishing industry-specific documentation such as news articles, operators' manuals, technical manuals, sales guides, and marketing brochures. A content management system is part of information systems development that supports the following features:

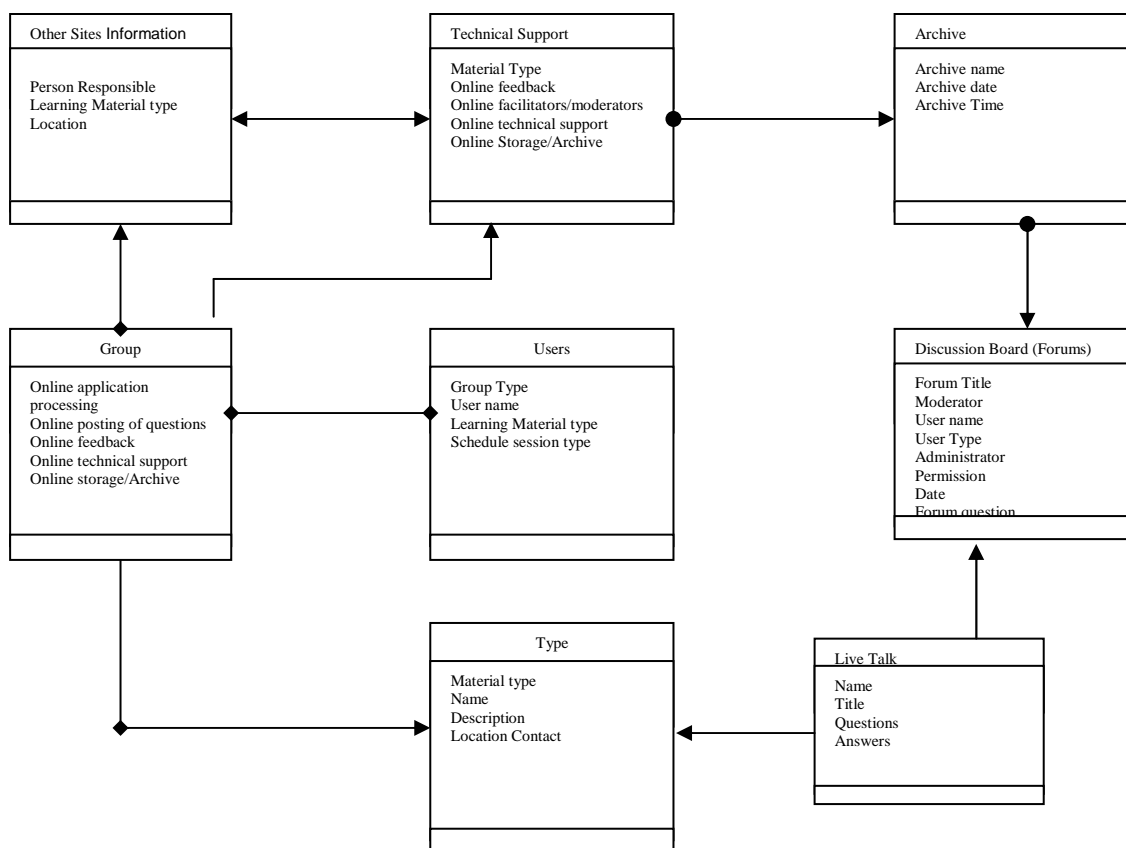
- Import and creation of documents and multimedia material.
- Identification of all key users and their content management roles.
- The ability to assign roles and responsibilities to different content categories or types
- Definition of the content workflow tasks, often coupled with event messaging so that content managers are alerted to changes in content.
- The ability to track and manage multiple versions of a single instance of content.
- The ability to publish the content to a repository to support access to the content. Increasingly, the repository is an inherent part of the system, and incorporates search and retrieval

#### **5. DISCUSSION OF INFORMATION MANAGEMENT SYSTEMS**

Literature review and the results of the preliminary studies suggest that, the functionality and interfaces of current sites to the health services of the unit is such that uploading, retrieving and storing information is not possible and the accessibility, simplicity, visibility of colours and robustness of the system is not good enough. This is because the current system is: (i) unable to archive information because the system is fragmented; (ii) there is no state-of-the art software technologies with the capacity to developers to develop robust system; (iii) IT managers are not able to develop efficient information management to reduce the fragmented systems. (iv) the most cost-effective methods for developing efficient web based information system have not been assessed. (v) better tools needed for decision makers to make timely and informed decisions and monitor service change elements is unavailable; (vi) overcoming technical challenges in monitoring service change elements using software components is a hurdle that has not been addressed.

This has necessitated research on web based information systems development use is needed to enable the process of developing an information management system and technology to improve health service information systems as a whole. This is evidently required because, Health information system as the core resource for the health service is not properly safeguarded and efficiently used. More importantly some resources and procedures for information systems management are inappropriate for each organisation (Department of Health, 2002). Although this issue has not been completely resolved, centralisation of e-health information and sharing of health care information across the health service have been pursued. The emergence of electronic repository in health care has raised another issue such as each citizen's right to privacy compared with the collective benefit to society when critical data on quality assurance and scientific research are shared by an array of users.

In view of the fact that interfacing and interoperability is necessary for information systems development, a structured way of describing the system with the view to ensure interoperability between its components is a priority (Ozkan and Erdogan, 2006; Gyampoh-Vidogah and Moreton, 2005; Booch, 1998). The main architectural view of the system will include: A functionality process architecture showing the key processes that are to be performed by the system as well as any relationships between these processes is depicted in figure 1 derived for one of the units of the Mental Health Service.



**Figure 2:** *Entity relationship of the process of the Mental Health Unit*

On the basis of this key architectural design of the web-based system recommendations for the development of the health information system were made.

## 6. RECOMMENDATION FOR HEALTH INFORMATION SYSTEMS

It was recommended that the health service unit in general should adapt the system that has been developed recently ([www.actiondre.org.uk](http://www.actiondre.org.uk), 2006) to improve their web based information systems. An open source software technology can be used to develop the system bearing in mind that an expert in such systems is highly recommended. This is because open source technologies are generally more secured and cost effective in this instance given the budgetary constraints. This will help overcome the technical challenges. In conclusion, IS development within the health service has come to stay and that organisation's within the health sector that embraces IS development will always take lead in delivering more effective care due to improvements in information management. Further studies are however being undertaken by the authors regarding ethical and legal issues affecting information systems development within the health sector.

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