



Development of Flexible Hospital Management Information Systems and End User Training Improve Hospital Performance

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Abstract. Hospital management is very challenging because of the many activities, services, transactions, and information flows. Data and information management also plays an important role in the provision of nursing services which can be improved by the role of information and communication technology, especially during the CoViD-19 pandemic such as current limiting human movement. With the hospital management information system (HMIS) based on the responsive web, it will improve service quality. This study aims to clarify what information and communication systems are available for nursing management in hospitals. The main finding is that many information and communication systems have been developed to support the management of hospital management information, but most of them do not meet specific needs. Many found incomplete information systems, there are also information systems that are too complex so that they are less efficient. The method used is to process qualitative data through questionnaires and quantitative to determine the success of the hospital in implementing the HMIS and conduct ongoing training for its end users. This study shows that End User training is very important for the successful implementation of HMIS. Likewise, a flexible HMIS is needed, which can meet the specific needs of each hospital.

Keywords: development · flexible · hospital management information system · training

1 Introduction

Hospitals are organizations where healthcare professionals provide complex care using special knowledge and equipment to meet patient care needs. Conventionally, hospitals consist of different clinical departments and functional units (Aas, 1997) [1], where the provision of care is a collaborative task including professionals from doctors, nurses, and health professional staff, as well as services regarding administration, rehabilitation, diagnostics, nutrition, maintenance and other patient support services (Sultz and Young, 2011). Hospitals can be described using Weber's (1978) thinking about bureaucracy in which authority, command, and power are central concepts. Hospitals usually have a hierarchical structure with clear roles and regulations. The distribution of power and

authority depends on placement in the hierarchy, and responsibilities are well defined for all members (Mintzberg, 2002; Virtanen and Kovalainen, 2006) [2]. An important factor that manages the sustainability of information systems is the availability of qualified and experienced personnel. These studies show that End User training is very important for the successful implementation of Hospital Management Information systems. Without users trained in their tasks, the chance of failure increases substantially.

2 Background

Systematic information management and the increasing role of information and communication technology improve the quality of care and reduce costs (Hillestad and Bigelow, 2005; Winter et al., 2011) [3]. Various information systems have been developed to improve information management and support organizational functions. There are Laboratory, Pharmacy and Radiology Systems; Clinical Data Repository System (CDRS); Service Delivery Order Entry System (SDOES); Nursing/Clinical Documentation system; Clinical Decision Support System (CDSS) and Image Archiving and Communication System (IACS) (Springmann, 2012) [4]. But information management and information system development in health service organizations are still recognized as areas that need improvement (Haux, 2006) [5]. Organizational design, information management, and technology are all important factors in improving the quality of health services in the future (Glickman et al., 2007) [6].

Information is needed in managerial decision-making when organizational goals are achieved through planning, implementation, and control (Thompson and Cats-Baril, 2003). This information is generally spread across different systems, managers can also receive inaccurate or unreliable information. Information management problems are caused by several factors.

- First, most clinical information systems are developed to support only one specific clinical task, such as diagnostic or drug administration, and there are usually challenges in communication between these different systems (Cantrill, 2010; Springmann, 2012) [7].
- Second, a large amount of information causes an excess of information (Wilson, 2001). Reasons for excess information in health care settings according to Hall and Walton (2004) [8]:
 - Increasing the availability of information
 - New and fast of information and communication technology
 - The nature of work is changing to become multi-professional
 - The active behavior of the end-user in finding information.

However, information overload may also depend on the ability to interpret information, not on the amount of information (Sutcliffe and Weick, 2008). Information technology can be used to reduce information overload and to support managerial decision-making (Thompson dan Cats-Baril, 2003).

- Third, there may be difficulties in managing or obtaining information needed for decision making (Hall dan Walton, 2004; Kontio et al., 2013) [9].

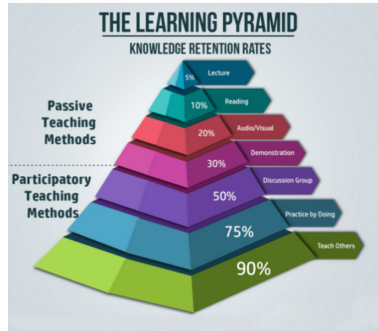


Fig. 1. Training/Learning Pyramid

The information needs of decision-makers in hospitals also depend on the placement of the organization and the area of responsibility that depends on the organizational structure. Information needs at different levels in hospitals vary accordingly (Lin et al., 2007) [10]. Their information needs usually concern patient care, available resources, administration, and management (Winter et al., 2011; Kivinen and Lammintakanen, 2013) [11].

3 Purposes

In general, the purpose of flexible HMIS and training in the context of implementing hospital management information systems is to improve employee performance which results in improved service quality. This study aims to determine whether flexible HMIS and human resource competency training can improve hospital employee performance.

4 Method

4.1 Training Type Analysis

Naturally, hospitals together with employees have the responsibility of developing Human Resources competencies. However, the hospital as an organization has the ability and greater strength to create a system/mechanism for developing staff competencies. The following is the training/learning pyramid as shown in Fig. 1.

There are many methods of developing staff competency, including the following:

- **INTERNAL TRAINING:** 1. Job readiness training, 2. Managerial/leadership training, 3. Technical/functional training, 4. Pre-retirement training, and 5. Outbound training
- **PUBLIC TRAINING:** 1. Seminar, 2. The workshop, 3. Course, 4. Professional certification, and 5. Professional conferences
- **INTERNAL LEARNING:** 1. On the job training, 2. Coaching, counseling, mentoring, 3. Job enlargement, job enrichment, job rotation, 4. Knowledge management, 5. Assignment, and 6. Internship



Fig. 2. Training/Learning Philosophy

- SELF-LEARNING: 1. E-learning, 2. Literatur, and 3. Pendidikan formal

Thus, it should be underlined that not all competencies must be achieved by training. And, again, keep in mind that training is not a one-stop solution. This means that not all problems with underperformance can be overcome by sending staff to take part in certain training. A lot of training was attended by staff, but the expected outcomes were not necessarily achieved. So much funding has been budgeted by hospitals to involve staff in various training, but staff performance and productivity may not necessarily be better. The following is the training/learning philosophy, as shown in Fig. 2.

4.2 Training Needs Analysis

For training to be effective and efficient, hospitals need to do several important things. The first important thing is to conduct a training needs analysis, then determine the type/method of training, and conduct a follow-up including an evaluation of the training that is held/attended. Not always a low company outcome comes from the competency gap. In analyzing training needs, hospitals need to review/identify problems in business constraints or competency gaps that have the potential to influence existing problems.

Constraints/internal hospital business problems can include implementation of new systems, procedures, programs; the development of certain service products; low employee productivity; and the low quality of employee services. In addition to these matters, several things become a potential source of the need for training/staff competency development.

5 Result and Discussion

The flexible hospital management information systems (HMIS) and Training in the context of implementing HMIS can be in the form of practical training or workshops. This type of training will be very effective because it is directly practiced on an ongoing system, which is under each part of the task so that data appears to flow along with the production of data and information produced.

5.1 Ways of Data Collection About Types and Training Needs

To be more targeted, accurate data is needed on what type of training is needed and whether the training is needed. Data collection needed in the analysis of employee training needs can be obtained from meeting with related work units, the questionnaire, interview, focus group discussion, documents and reports, performance appraisal data, and competency assessment report.

The information obtained from the data collection above is then managed to review staff training needs. Thus, management cannot simply wash their hands by “putting” their staff into training that is considered “necessary” only by managers. After the training has been carried out or followed, further follow-up must be done by assessing outcomes based on pre-determined indicators and conducting continuous monitoring and evaluation.

5.2 Analysis of HMIS Functional Needs

The functional requirements of the hospital management information system include user needs and process requirements. The type of user needs are as follows: Admin, Doctor, Nurse, Laboratory, Pharmacist, Accountant, and Patient.

The process requirements of each user are as follows:

- Admin (managing doctors, managing patients, managing nurses, managing pharmacists, managing laboratories, managing accountants, prescriptions, payments, blood banks, medicine, surgery reports, birth reports, death reports, room allocations, managing announcements, managing arrangements, and manage languages)
- Doctors (manage patients, manage appointments, manage prescriptions, see blood banks, manage reports, and see room allocations)
- Nurses (manage reports, manage patients, manage blood banks, and manage room allocation)
- Laboratories (managing blood donors, managing blood banks, and managing more diagnoses)
- Pharmacist (Manage drug categories, manage drugs, and prepare drugs)
- Accountant (manage bills and payments)
- Patients (see doctors, see recommendations, see appointments, see prescriptions, manage payments, and see blood banks).

Access rights for users vary according to their needs and authority. The rights of each user can be illustrated by the use case diagram, as shown in Fig. 3.

6. Glickman SW, Baggett KA, Krubert, CG, Peterson, ED and Schulman KA 2007 Promoting quality: the health-care organization from a management perspective *International Journal for Quality in Health Care* Vol 19 No 6 pp 341–48
7. Cantrill S 2010 Computers in patient care: the promise and the challenge *Communications of the ACM* Vol 53 No 9 pp 42–7
8. Hall A and Walton G 2004 Information overload within the health care system: a literature review' *Health Information and Libraries Journal* Vol 21 No 2 pp 102– 8.
9. Kontio E, Lundgrén-Laine H J, Korvenranta H and Salanterä S 2013 Information utilization in tactical decision making of middle management health managers *ComputersInformatics Nursing* Vol 31 No 1 pp 9–16
10. Lin L M, Wu JH, Huang IC, Tseng KH. and Lawler JJ 2007 Management development: a study of nurse managerial activities and skills *Journal of Healthcare Management* Vol 52 No 3 pp 156– 69
11. Kivinen T and Lammintakanen J 2013 The success of a management information system in health care – a case study from Finland *International Journal of Medical Informatics* Vol 82 No 2 p 9

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