Successful Health Information System Implementation

Kristiina Häyrinen
University of Kuopio, Finland

Kaija Saranto
University of Kuopio, Finland

INTRODUCTION

A Standish Group (1994) study showed that only 16% of all information technology projects come in on time and within budget. The situation is not better concerning health information systems. Many health information system implementations are less than completely successful (Berg, 2001; Giuse & Kuhn, 2003; Lorenzi & Riley, 2003). In this article, the health information system means "a system, whether automated or manual, that comprises people, machines and /or methods organized to collect, process, transmit, and disseminate" data that represent user information in healthcare (Kuhn & Giuse, 2001, pp. 275). What is successful implementation and whose success is measured? Successes can be measured in many ways. Delone and McLean have been finding out the success factors of management information system which are also applicable to health information system. The success factors are: system qualities, *e.g.*, the ease of use or time savings, information quality, *e.g.*, completeness or data accuracy, usage, *e.g.*, the frequency of use or the number of entries, user satisfaction, *e.g.*, user-friendliness or overall satisfaction, individual impact, *e.g.*, changed work practices or direct benefits and organizational impact, *e.g.*, communication and collaboration or impact on patient care. Furthermore, user involvement during system development, implementation and organizational culture have been identified as possible factors measuring the success. However, the need for further research to determine which attributes are the most useful ones in measuring success has also been revealed. (van der Meijden, Tange, Troost & Hashman, 2003).

The different phases in implementation process are, in general, user needs and requirements analysis (specification), system design, initial system implementation and testing (Ahmad, Teater, Bentley, Kuehn, Kumar, Thomas & Mekhjian, 2002; Schuster, Hall, Couse, Swayngim & Kohatsu, 2003; Souther, 2001). The system requirements analysis includes workflow analysis, and the initial system implementation includes the technical installation of the information system, integration of the information system to other information systems and users' training. Project management is an important factor in every phase of the implementation project.

The purpose of this article is to highlight the health information system implementation process from end-user perspective. Which factors are crucial in the implementation process from the point of view of the end-users? How does project management contribute to the implementation process, what is the role of the end-user in system designing and how does training effect the information system implementation?

BACKGROUND

The lack of financial support was the most significant barrier to successfully implementing information technology in healthcare from both clients' and vendors' perspective. The vendors' inability to deliver products, and difficulties in achieving end-user acceptance or use were the other barriers from the point of view of the clients. (HIMSS, 2002.) Costs are often underestimated because the cost of the software is only the beginning of other expenditures, *e.g.*, person-hours for training and support have been forgotten (Ash, Stavri & Kuperman, 2003).

The social and organizational issues, not only the technical ones, are the critical issues in the implementation of information systems. The health information systems do not effectively support the health processes, and terminology for the healthcare environment is needed. (Ahmad et al., 2002; Berg & Toussaint, 2003; Berg, 2001; Giuse & Kuhn, 2003; Kuhn & Giuse, 2001; Littlejohns, Wyatt & Garvican, 2003).

Human-computer interaction is also perceived as unsatisfactory. The human-computer interaction indicates the means by which humans interact with computers, *e.g.*, users enter and retrieve data. To optimize the design of the human-computer interaction, concepts are needed (Berg, 2001; Kuhn & Giuse, 2001). Technical issues, *e.g.*, integration with other information systems and the need for open systems are also issues which must be solved (Giuse & Kuhn, 2003; Kuhn & Giuse, 2001).

The reasons for failures were that the complexity of healthcare tasks and social and professional cultures of healthcare organizations was not taken into account and, furthermore, the education of the users was insufficient and the timing of the education was wrong (Littlejohns, Wyatt & Garvican, 2003). Lorenzi and Riley (2003) report that the failures of the implementation of the health information system can be classified into four categories: technical shortcomings, project management shortcomings, organizational issues and information explosion. The technical failures contain, *e.g.*, the old system maintenance and staff training. Project management issues are, *e.g.*, project management skills. Organizational issues are concerned with constant changes. Information explosion means that knowledge has increased exponentially and new technical tools have been developed to cope with the information. Berg (2001) notes that it is important to notice that the implementation is not only a technical installation, and also that the project is not only a technical project but also an organizational development project.

The three major reasons that a project will succeed are user involvement, executive management support and the clear statement of requirements (Standish Group, 1994). Doolan, Bates and James (2003) reported that the factors associated with successful implementation are unusually strong leadership, a clearly defined long-term commitment, clear focus on improving clinical processes and gaining clinical involvement and support improving productivity. Lorenzi and Riley (2003) included technical skills, project management skills and people and organizational skills to the success factors. The skills mean knowledge, experience and abilities in each area. Ahmad et al. (2002) stated that success factors are a continuous executive support, engagement of physicians, an effective implementation team, a consistent user-friendly interface and on-going user support.

User involvement during system development, implementation process and organizational culture may explain the failure of the information system. The attributes assigned to system development were the extent of user involvement, redesigning work practices and the reconstruction of content and technical limitations. Communication, training and technical support were attributes addresses to implementation process. Organizational aspects attributes were organizational culture, *e.g.*, control and decision-making, management support, professional values as well as support and maintenance. (van der Meijden, Tange, Troost & Hashman, 2003.)

THE ROLE OF THE PROJECT MANAGEMENT

A project approach is the most common way to implement health information systems. Project management is the process of planning for organizing and controlling projects. From the end-users' point of view, the objectives of health information system projects must make explicit, *i.e.*, improve patient care or efficiency. It is recommendable to set a stage for improvements, *e.g.*, reduce the number of phone calls or move manual files to on-line files. The objectives of the project must also improve workflows and work practice, in other words the hospital managements and also clinicians involved in the project must also upgrade their work performance. The implementation of information system must add value for the end-user. Clear objectives motivate the end-users for implementation. (Ash, Stavri & Kuperman, 2003; Berg, 2001; Berg & Toussaint, 2003; Doolan, Bates & James, 2003, FitzHenry & Snyder, 1996; Giuse & Kuhn, 2003; Littlejohns, Wyatt & Garvican, 2003; Lorenzi, Riley, Blyth, Southon & Dixon, 1997; Nikula, Elberg & Svedberg, 2000; Lechleitner, Pfeiffer, Wilhelmy & Ball, 2003)

The information system implementation process must be seen as an organizational change process (Anderson & Stafford, 2002; Berg, 2001; Lorenzi, Riley, Blyth, Southon & Dixon, 1997). Change management, which means "the process of assisting individuals and organizations in passing from an old way of doing things to a new way of doing things" (Lorenzi & Riley, 2003 pp.200), should be taken into account from the start of the implementation process. Organizational resistance always occurs during the implementation of new information systems. The change management is one reason why the leader has an important role in projects. (Lorenzi & Riley, 2003; Lorenzi, Riley, Blyth, Southon & Dixon, 1997; FitzHenry & Snyder, 1996) Furthermore, the implementation process itself requires effective leadership (Ash, Stavri & Kuperman, 2003;Lorenzi & Riley, 2003; Souther, 2001). Leadership is needed at multiple levels in organizations; high-level leadership was considered the single most important factor. It was demonstrated by the long-term commitment of resources. (Ahmad et al. 2002; Doolan, Bates & James, 2003; Littlejohns, Wyatt & Garvican, 2003). At the executive level, leadership is needed to promote a shared vision the purpose of health information system, which is e.g. to improve patient care. At the project management level, the leadership is needed to make practical, effective and