Chapter 18
A Socio-Technical Analysis of Barriers to Implementing a Clinical Information System in a Nursing Home

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ABSTRACT

In this chapter, the authors aim to identify key barriers affecting the implementation of a clinical information system (CIS) in a nursing home from a socio-technical perspective. The data collected through field observations and semi-structured individual interviews were analyzed using the immersion/crystallization approach based on the Sittig-Singh healthcare socio-technical framework (HSTF). Three categories of implementation factors encompassing the eight HSTF dimensions were identified: infrastructure-based factors, process-based factors, and outcome-based factors. The authors extended the HSTF by proposing two additional dimensions: advocacy, promoting the articulation and influence of changes in the system and subsequent outcomes by CIS stakeholders, and adaptability, ensuring the ability of the system to adjust to emerging needs. This chapter expanded prior research and identified barriers related to why the nursing home CIS was abandoned. A knowledge base and recommendations are offered herein as a guide for future implementation strategies and policies in CIS initiatives.

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INTRODUCTION

Clinical information systems (CISs) are technology-based information systems developed to collect, integrate, and store clinical information to assist in the management of health care. Compared with traditional paper-based approach, the CISs allow caregivers to acquire and process the clinical information more efficiently and easily (Alexander & Wakefield, 2009; Baril, Gascon, & Brouillette, 2014; Handler, Sharkey, Hudak, & Ouslander, 2011; Institute of Medicine, 2001; Liu, Castle, & Diesel, 2010; Patrick, Barach, & Besiso, 2017), thus improve the quality of care provided in healthcare organizations and reduce costs and time incurred during the workflow. Despite the potential benefits of CIS to organization, the implementation of CISs continue to pose difficulties. One main reason for the implementation failure is the intended users of the system, such as nurses and physicians, did not use the technology or they did not use it following recommended practices to achieve maximum value out of the technology (Liu & Castle, 2008). Without user support and acceptance, a CIS cannot be well integrated with the work system (Karsh, Holden, & Or, 2011; C. Or, Wong, Tong, & Sek, 2014) and its implementation may even disrupt the current workflow, which further affect the quality and safety of care to patients (Vogelsmeier, Halbesleben, & Scott-Cawiezell, 2008).

Thus, targeting the key barriers to implementing CISs is of critical importance for system developers, researchers, and health care providers. One strategy for barrier identification is to use socio-technical (ST) theory, as it provides a way to understand the interrelations of various elements of a work system. As assumed by the ST theory, the implementation of CISs can be successful if the social and technical aspects of an organization can fit well. Based on this assumption and guided by a healthcare specific ST framework (Sittig & Singh, 2010), this chapter aimed to explore the key barriers to implementing a CIS in a Hong Kong nursing home through a qualitative method.

BACKGROUND

Understanding the interrelations between technical and social aspects, as emphasized by the socio-technical (ST) theory (Berg, Aarts, & van der Lei, 2003; Edwards, 1972), offers researchers, system developers, and health care providers a means to explore why the implementation of a technology fails. Up to now, many conceptual models derived from the ST theory have focused on the interrelations among system elements. For example, Edwards (1972) developed the SHEL model discussing four elements: software, hardware, environment, and liveware. Carayon et al. (2006) built the Systems Engineering Initiative for Patient Safety (SEIPS) model to emphasize the interactions among people, technology, environment, tasks, and organizations. Under the context of health informatics, Berg et al. (2003) suggested to put more attention on the interaction between technology and its social environment if wanting to better understand health information technology (HIT). Later, Harrison, Koppel, and Bar-Lev (2007) proposed the Interactive Socio-Technical Analysis (ISTA) framework which highlighted the complex-, emergent-, inter-relationships between the HIT, clinicians, and workflows within healthcare system. Nevertheless, as pointed by Sittig and Singh (2010), previous socio-technical models did not "*break down the technology dimension into individual components to enable researchers to dissect out the causes of particular HIT implementation or use problems, or to help identify specific solutions*". Based on these findings, Sittig and Singh (2010) developed a comprehensive 8-dimensional healthcare socio-technical framework (HSTF) for studying HIT in complex adaptive healthcare systems. Based on previous studies (Sittig &