Implementing an Emergency Department Information System:
An Actor-Network Theory Case Study

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ABSTRACT

Information and communication technologies (ICT) are increasingly used in healthcare settings. Despite their technical robustness, their implementation has not always been straightforward. This is a case study of the implementation of a clinical information system for patient registration and tracking in the busy emergency department (ED) of a large English NHS University Hospitals Trust. By adopting an Actor-Network Theory (ANT) approach, the authors explore the complex intertwining of people and machines in the local setting as they negotiate the success of the project. Based on the analysis of 30 semi-structured interviews with clinical and administrative staff and, of relevant policy and project documentation, the authors demonstrate how the technologically-mediated transformation of healthcare practices is not a fixed and linear process, but the interplay of various fluctuating, performative and co-constitutive technical and social factors.

Keywords: Actor-Network Theory, Emergency Department, Implementation, Information System, National Health Service

INTRODUCTION

Information and communication technology (ICT) is becoming an integral part of the provision of healthcare (Beun, 2003), particularly as healthcare organisations struggle to improve effectiveness, efficiency and costs of their operations (Sicotte et al., 1998). In fact, most health systems around the world have come to link the need for 'best practice' (Hovenga, 1998) with overall organisational efficiency and effectiveness. Such orientations undoubtedly require outcomes linked to information systems so as to assign criteria and measures of success. Health information systems aim to contribute, from an supposedly patient-centred approach, to a high-quality and efficient patient care (Dick et al., 1997), and to improving public health, treatments and outcomes (Clark & Findlay, 2005). They aim to improve clinical practice while supporting and enhancing administrative and managerial aspects of the delivery of care. They play a part in decision-making and can facilitate research, evaluation, training and planning (van Bemmel & Musen, 1997). They are also considered to be reliable means of communication among health care professionals and institutions since they are capable of providing a platform for shared, multidisciplinary and continuous care (Iakovidis, 1998).

However, whether their implementation in clinical practice is successful or not is not straightforward or absolute. From the users and beneficiaries, middle and top managers to governmental officials, each group has its own personal and professional interests that come into play during their interactions and all have a role in the system's fate. They come to the negotiating table with their own 'views' about technology: with their own information needs (Lyons et al., 2005), assumptions, expectations and knowledge about the nature and the role of the new technological artefacts with which they are expected to interact daily (Griffith, 1999). On the other hand, the information system will alter, work tasks and information flows, as well as relations among those professionals (Dykstra, 2002) who get access to the system (Royal College of Nursing, 2004). Social, economic and political interests empower the attempts by these groups to gain control over this access. In effect, these factors affect (in)directly the shape, use and ultimately the functioning of the system (Berg, 2001). Fundamental changes in practices, responsibilities and even professional identities (Karsten & Laine, 2006) occur, sometimes beyond the developers' expectations (Safran et al., 1998). This means that the implementation of large-scale information systems in healthcare organisations is complex and 'socially negotiated' (Berg 2001).

From the above, it becomes apparent the complexity that characterises information systems of this scale makes it even harder to assign proper criteria and parameters of success (Berg, 2001). For example, a success might be defined in terms of budgets, by how often or by how many it is used, whether it is appreciated, or by the durability of the system. Success, then, can be characterised as a system that has convinced the relevant parties of its value and power to generate new, more effective, structures and routines as well as ways of delivering care that could not otherwise happen.

What is needed is a new approach that can acknowledge and handle the system's social existence beyond its material substance; the way systems shape organisations, while being shaped according to the meanings that each stakeholder ascribes to them. An approach is needed that can follow, from the design of a technological system to its actual use, how social relations are formed. These relations are not stable but fluctuate constantly. Based on this understanding, we can then examine how these unstable social relations inevitably produce conflicts and contradictions that are incorporated into relationships and practices of professions and organisations. These are capable of producing new, or altering existing, power relations. Greenhalgh et al., who systematically reviewed the Electronic Patient Record (EPR) literature (2009) and evaluated the UK NHS National Programme for Information Technology (NPfIT) (2010), have concluded that recursive, *sociotechnical* approaches in implementation studies of healthcare information systems could offer deeper insights into the complexity, dynamism and instability involved in their adoption and use.

For this study, we draw from the field of Science and Technology Studies (STS) and on the work of Actor-Network Theory (ANT) (Latour, 1987) to examine the implementation of an Emergency Department Information System (EDIS) in one of the largest Emergency Departments (ED) in the UK. Since late 2004, this system tracks patients and their waiting times. It is also being used to extract information about bottlenecks and to improve the operations of this ED. ANT offered us a method that considers both human and non-human actors when examining the way in which a technology is devised and deployed. It concentrates on the processes that occur before, during and after implementation and how a vision of the usefulness of a particular technology was turned into an actual artefact.

The research questions were:

1. How was the technological innovation initiated? Was the source of ideas internal or external to the organisation?
2. How was the implementation process supported? What kind of negotiations took place?

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