Chapter 7.8
A Quality Assurance Approach to Healthcare:
Implications for Information Systems

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ABSTRACT

Despite decades of research, healthcare information systems have been characterised by cost over-runs, poor specifications and lack of user uptake. A new approach is required which provides organisations with a reason to invest in this type of software. W Edwards Deming argues that quality is not an entity but derives from using feedback, iteratively to seek improvement to processes, in order to increase productivity and to make better use of resources. The authors propose that supporting this form of quality assurance (QA) using information systems (IS) has the potential to deliver a return on investment. An object-oriented analysis, where healthcare is viewed as the delivery of interdependent processes to which Deming's form of QA is applied, results in a class model of data types that has some useful characteristics. It is able to store data about medical and non-medical events; to save descriptions of procedures and to represent the QA process itself. With software based on the model, organisations will have a memory of previous attempts at making improvements as well as data about feedback from patients and staff to drive future change. A critical research in information systems (CRIS) analysis of this model proposes a number of criticisms deriving from theories about rationality; concepts of technology; politics and hidden agendas, as well as the social consequences of technology. The view that QA is a standardised, ongoing conversation about the important characteristics of a process pre-empts many of these counter arguments. The CRIS critique also highlights the need to ensure that development is in harmony with the needs of the many stakeholders in healthcare IS. These concepts lead to new directions in healthcare IS research. The class model needs to be tested against clinical and non-clinical use-cases for its viability not only as support for QA but also as an electronic patient

record. A standard terminology is required for processes and for how objects from the model should be used to represent them. The model predicts that user interfaces will have to collect more detailed data than hitherto. Also use of the software should be tested in controlled trials to demonstrate whether the required improvements in quality not only benefit the patient but also the organisations managing their care.

INTRODUCTION

The primary aim of W. Edwards Deming's approach to QA is to improve productivity by avoiding re-work, thereby making better use of man-hours and machine-time (Deming, 1990e). The effect is a reduction in the costs of manufacture of good product. The method requires an organisation continuously to seek improvement to processes as a result of systematically obtaining feedback. We propose that the delivery of health care can be modelled as a set of interdependent procedures and that there is every reason to apply Deming's ideas, even though they were developed for manufacturing industries.

What are the implications for healthcare information systems and their fundamental data structure - the electronic patient record - of being designed to support Deming's form of QA? By drawing on the theories that underpin his approach, the meaning of QA in the context of healthcare is examined and a generic class model that supports the process is developed, using object-oriented analysis.

If an information system is created using our set of classes, what factors will influence its success? A step back is taken and a judgmental eye cast on the model from the perspective of CRIS. We argue that even when a completely different interpretation of the nature and purpose of QA and healthcare IS is adopted, there remain good arguments to support our approach. Having outlined our concepts, we conclude by proposing new directions for research.

BACKGROUND

Why Invest in Health Information Systems?

Reviews of individual health information systems for the management of patients with chronic diseases are positive (Dorr et al., 2007) as are those of computer based nurse documentation (Ammenwerth et al., 2001). There is agreement that the overall costs and benefits have rarely been fully assessed (Herbst, Littlejohns, Rawlinson, Collinson, & Wyatt, 1999; Shekelle, Morton, & Keeler, 2006) but none-the-less Shekelle (2006) states that:

"Despite the heterogeneity in the analytic methods used, all cost-benefit analyses predicted substantial savings from [Electronic Health Record implementation.] The quantifiable benefits are projected to outweigh the investment costs. However, the predicted time needed to break even varied from three to as many as 13 years."

This conclusion is open to question because an understanding is required of how different research methods influence results (Moehr, Anglin, Schaafsma, Pantazi, & Grimm, 2006; Wyatt & Wyatt, 2003; van't Riet, Berg, Hiddema, & Sol, 2001). Consequently some authors have suggested the need for a broadly accepted, standard evaluation framework (Rahimi & Vimarlund, 2007; Ammenwerth, Graber, Herrmann, Burkle, & Konig, 2003; Ammenwerth et al., 2004).

An overview of academic medical informatics (Jaspers, Knaup, & Schmidt, 2006) suggested that:

"The computerised patient record ... is playing a growing part in medical informatics research and

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