Chapter 4
Making Quality Control Decisions in Radiology Department:
A Decision Support System for Radiographers' Performance Appraisal Using PACS

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ABSTRACT

In the radiology department, radiographers' performance appraisal cannot be performed continuously due to time pressure and the lack of objective performance indicators. The authors conducted an empirical study where they assessed radiographers' performance based on objective performance indicators derived from data stored in the PACS and RIS. The study indicated that one is able to use the PACS-RIS environment as a Decision Support System (DSS) that delivers promptly objective indicators for performance appraisal purposes. Besides, the model of a DSS allows radiographers' continuous performance appraisal.

INTRODUCTION

Diagnostic imaging departments are becoming filmless; integrating Picture Archiving Communication System (PACS), Radiology Information System (RIS), Computed Radiography (CR), and many other digital imaging techniques are currently common practice in medical imaging due to the adoption of Health Level 7 (HL7) standard (Health Level 7, 2006). Despite its high cost, medical imaging digitization provides many advantages, such as improved productivity, better efficiency, and reduced radiation dose to patient (Crowe & Sim, 2005; Kimura, 1991; Lawrence, 2005; Mulvaney, 2002; Rogoski, 2003; Worthy, Rounds, & Soloway, 2003). The integrated

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PACS-RIS environment generates a vast amount of valuable data related to patients and users (e.g. radiographers, radiologists). Nevertheless, the capacity of this digital environment is not fully exploited yet; particularly in the domain of performance appraisal (Coates, 1996; Edmonstone, 1996; Fletcher, 1993; Gellerman & Hodgson, 1988; Grote, 2000; Johnson, 1991; Man, 2005; McGregor, 1972; Meyer, Kay, & French, 1989; Palmer, McElearney, & Harrington, 2004; Ryan, 2003; Wilson & Cole, 1990; Winstanley, 1980). Even though some propositions were made to enhance the quality in the radiology department, attempts were made to establish department wide quality indicators and dashboards (Abujudeh, Kaewlai, Asfaw, & Thrall, 2010; Kruskal, Anderson, Yam, & Sosna, 2009; Nagy et al., 2009) or scoreboards(Donnelly et al., 2010), or to measure the productivity of the imaging devices(Hu et al., 2011) or radiologists (Rubin, 2011); none has looked into the radiographers performance measurement and appraisal, and its relation to patient safety.

Appraising and providing feedback regularly is an advised practice (Boswell & Boudreau, 2000; Daft & Marcic, 2001) that aims to detect performance weaknesses as early as possible and to take corresponding corrective actions. However, two factors are hindering the establishment of policies enforcing frequent and ongoing appraisal: time and automation. Performance appraisal can be conducted under two modes one is evaluative and the other is developmental (Boswell & Boudreau, 2000). The evaluative approach is concerned with management problems, such as salary administration, promotion decision, and retention-termination decisions; therefore, it can be a source of anxiety and resistance of staff. On the other hand, the developmental approach is concerned with identifying individual training needs, providing performance feedback, determining transfers and assignments and identifying individual strength and weaknesses; and these aims are usually positively perceived by staff (Boswell & Boudreau, 2000). We take developmental and participative approaches in our performance appraisal project. We build on Handy's (Handy, 1993) argumentation for a developmental approach in performance appraisal, particularly staff needs of encouragement, direction and freedom. These needs fit well the leader managerial participative role suggested by Mintzberg (Huczynski & Buchanan, 2001). We believe that a developmental approach to performance appraisal is characterized by fairness, and leads to job satisfaction and help personal career development.

Currently, there is no computerized tool that allows calculating objective radiographers' performance indicators. The objective of our study we present in this chapter, were to investigate the ability of PACS-RIS to serve as a basis to develop decision support model for a continuous radiographers' performance appraisal, using objective performance indicators derived from PACS-RIS databases. We will show the results of a qualitative flexible design study that includes six interviews with PACS administrators and radiology departments' managers, and a case study of performance appraisal in a hospital in Toronto. We will then draw a model for a developmental performance appraisal module that can be added to PACS-RIS and serve managers and radiographers as a Decision Support System (DSS), in a Total Quality Management (TQM) perspective (Dowd & Tilson, 1996; Edwards, 1986; Hackman & Wageman, 1995). We suggest that this model adds a managerial functionality, particularly a decision support one, to the PACS-RIS environment; thus, expanding PACS-RIS use to the field of human resource management.

METHODS

In order to investigate the ability to use of PACS-RIS for human resource management; we have used a qualitative flexible design approach including (1) six individual semi structured inter-