

# An Information System's Contribution to Work Satisfaction: Differing Perspectives between Doctors and Nurses

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## **Hypothesis:**

Information systems are currently being deployed in health care systems worldwide, and they have the potential to change how clinicians store data about patients, and how they access and update specific information. Emergency departments are high-volume, high-acuity clinical areas that collect, collate, and interpret large amounts of information in relatively short periods of time in order to commence treatment as quickly as possible. Computerised information systems have enormous potential to assist in the management of information in these busy units. This paper examines whether medical officers and nursing staff value different facets of an emergency department information system in relation to work satisfaction.

## **Background:**

Despite being an information-intensive discipline, the health care system is prone to tremendous inefficiencies because of inadequate communication infrastructure and practices (Coiera and Toombs 1998). Rifkin (2001) asks health professionals to consider the modern day irony of emergency clinicians having an easier time accessing a patient's bank account (using their automatic teller machine card) than they would finding critical medical history, as information about medical conditions, electrocardiograms, response to previous treatment, current drug therapy, and identified drug allergies are typically stored on paper and often inaccessible in emergencies. The current Australian health care workforce is hoping that the not too distant future will bring them access to lifelong computerised patient record, and their access to patient information will no longer be limited by environment (ward, unit, department) or time (after hours, weekends) boundaries. As current health service environments implement clinical information systems, they expect clinicians to integrate more and more information from more and more diverse sources, and convey this information to more and more people (Westby and Atencio 2002).

Whilst clinical information systems uncover tremendous potential to ameliorate patient care and influence the development of a culture focused on safety, they also bring about changes in other domains such as workflow (Ball et al 2003). In most organisations, the largest information repository resides in the heads of the people who work there (Coiera 2004), and consequently, the value of any clinical information system can only be evaluated with reference to the social context in which it is used and those who use it (Coiera 2000). Callen et al (2006) indicate that an important factor in the safe and efficient use of a clinical information system is the synergy that exists between the technology, the user, and their work. Patient care remains the central focus of medical officers and nurses, and any introduction of technology into their work environment must strengthen and expedite the work flow rather than detract from it. Technology transfer theories highlight the importance of addressing the perceived usefulness (Davis 1993) and relative advantage (Rogers 2003) of the system by the users. Given that both health professional groups focus on different responsibilities within patient care, it is assumed that their opinions on how an information system contributes to work satisfaction would differ.

## Methods:

A cross-sectional correlational survey design was used, with data collected from the population (n=303) of medical and nursing clinicians from five New South Wales metropolitan public hospital emergency departments (ED). These five EDs had all used the same Emergency Department Information System (EDIS), and were preparing to upgrade their application from a datafile version to a MS SQL version. While all the EDs had implemented EDIS ten years previously, it was used by each ED and ED staff differently. Major differences between the five EDs included the level of EDIS integration within the daily workflow, the number of clinicians assigned to the ED, and how EDIS was initially implemented into the ED. The three criteria for inclusion in the study comprised medical or nursing ED employment, experience using EDIS, and rostered for shifts during the 2-week data collection period.

The researcher designed and developed a self-administered and context-specific 2-section questionnaire based on an instrument used by Axford and Carter (1996) to investigate how nurses believed computer technology impacted their practice. The first section contained ten questions addressing demographic details, and the second section contained items related to EDIS and work satisfaction (contributing to or decreases) that respondents rated according to a five-point Likert scale (1=strongly disagree to 5=strongly agree). Pearson's chi-square test was applied to all statements, with a chi-square probability of 0.05 or less considered statistically significant, and results  $0.010 > p \leq 0.001$  considered highly significant.

## Results:

Of the 160 clinicians who responded to the survey (53% response rate), close to or just over 50% agreed with three of the four positive statements, and at least two thirds of respondents disagreed with all four negative statements.

The four positive statements related to EDIS contributing to the clinician's work satisfaction by:

- organising the relevant information about each patient;
- providing security in the knowledge that information is not lost or old;
- enabling them to use their expertise; and
- providing better access to information.

Nurses reported more support than medical officers for all positive statements, however knowledge security demonstrated reasonably similar responses (nursing 52%, medicine 45%). Nurses also acknowledged the value of information being organised (63%  $\chi^2 10.162$ ,  $p 0.006$ ) and accessible (71%  $\chi^2 14.604$ ,  $p 0.001$ ) much more than the medical officers (39% and 44% respectively). The most statistically significant result ( $\chi^2 38.226$ ,  $p 0.000$ ) was in relation to the system enabling the two professional groups to use their expertise (nursing 47%, medicine 5%).

The four negative statements related to EDIS decreasing the clinician's work satisfaction by:

- disrupting their thought processes;
- making their work effort less visible;
- causing them to distrust the system's accuracy; and
- causing them frustration when learning about the system and how to use it.

Respondents recorded similar disagreement about thought process disruption (nursing 71%, medical 70%) and system accuracy distrust (nursing 67%, medicine 68%), whereas medical officers disagreed more than nurses with the statements addressing a reduction in work effort visibility (nursing 63%, medicine 70%) and that the system was frustrating to learn (nursing 68%, medicine 82%).

## **Discussion:**

Understanding the organisation's structure and workflow, and ensuring that the system supports that work practice and larger organisational goals are critical when implementing an information system. User-hostile software that does not support work practice and makes tasks less manageable and more time-consuming will generate substantial resistance from the clinicians forced to use the system. Information systems often challenge basic institutional assumptions and beliefs about how health care should be organised, disturb conventional patterns of conduct, and impel clinicians to modify established practice routines (Laerum et al. 2004, Lorenzi et al. 1997, Massaro 1993, Scott et al. 2005). Further to these views, incompatibility between systems is interpreted by clinicians as a serious flaw in basic functioning (Darbyshire 2004), and forces them to enter the same data more than once. Not only does this situation result in clinician frustration, dissatisfaction, suspicion, distrust, cynicism, resistance, and sabotage (Dowling 1980), there are concerns about skill elimination, and role erosion (Axford and Carter 1996).

Understanding why clinicians accept or reject information systems is proving to be one of the most challenging issues in health informatics research, as study results to date have been mixed or inconclusive. Contribution to work satisfaction can be related to Davis' (1993) perceived usefulness, that is, less time will be taken to perform a certain task or the output will be a higher quality. A closely aligned concept is that of Rogers' relative advantage, whereby the degree to which an innovation is perceived as being better than the idea it supersedes, and can be expressed in economic or social terms.

The introduction of EDIS brought with it an additional clerical burden and relatively few tangible benefits for the clinicians, yet participants in this study do not view the system subverting their work output. Applying Rogers' (2003) characteristic of relative advantage, EDIS has the relative advantage of bringing together disparate pieces of information about a patient for the benefit of the clinician, providing easy access to this information, and affording clinicians the ability to enter and view the information in multiple locations in the ED.

A bad situation cannot be improved by automation, and a system will miscarry if it does not function efficiently or provide information requirements in a timely fashion. Usefulness can be viewed in terms of a fit between the technology and the tasks that the user performs – that is, the system is capable of being used advantageously. When users perceive the system as one that accommodates their daily activities, they are more likely to have a positive attitude towards the system. Studies undertaken by Davis (1993) demonstrate that usefulness is 50% more influential than ease of use in determining usage, emphasising the importance of incorporating the appropriate functional capabilities of the new system. Despite having multiple screens, and multiple sub-screens within these screens, clinicians did not view EDIS as being difficult to navigate between screens or data entry flow to be counterproductive to the overall mission of ED services.

The most statistically significant result of the study was in relation to EDIS enabling the two professional groups to use their expertise, with just over 50% of medical officers disagreeing and only 5% agreeing, in comparison to 20% of nurses disagreeing and 47% agreeing. Previous studies of medical officers have indicated that they regard clinical information systems to result in diminished efficiency and they fail to add value to their work, in addition to their potential to reduce clinical autonomy and shift authority (Mc Donald et al. 2004, Rogers 2002, Tanenbaum 1994, Treister 1998). Prior studies of registered nurses have revealed a very different perspective – that they perform most of the invisible articulation work within health care delivery, and that information systems are seen as a vehicle to legitimise their professional position and make their occupation seem more scientific through increased visibility of skill level and work complexity (Axford and Carter 1996, Goorman and Berg 2000, McCloskey 1995, Wagner 1995, Wagner 1993). This study appears to support this assertion.

The findings of this study identified that nursing staff have more positive attitudes towards EDIS than medical officers, and that they detect an association between EDIS and activities that contribute to work satisfaction. Whilst nursing respondents were able to identify many benefits of EDIS, enabling their expertise to be used was the most prominent when compared to medical officers. This last point needs concentrated research to be undertaken to further investigate the link.

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