Differences in Doctors’ and Nurses’ Assessments of Hospital Culture and their Views about Computerised Order Entry Systems

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Abstract. The organisational culture of a health facility has been identified as a significant factor for successful implementation of clinical information systems. There have been no reported studies exploring the link between sub-cultures and the use of information systems. This study utilises cross sectional surveys to measure doctors’ and nurses’ perceptions of organisational culture and relate this to their use of a hospital-wide mandatory computerised pathology order entry (CPOE) system. Data were collected by administering an organisational culture survey (Organisational Culture Inventory, OCI) along with a user-satisfaction survey to a population of 103 doctors and nurses from two clinical units in an Australian metropolitan teaching hospital. We identified subcultures based on professional divisions where doctors perceived an aggressive/defensive culture (mean percentile score = 43.8) whereas nurses perceived a constructive culture (mean percentile score = 61.5). There were significant differences between doctors and nurses on three of the attitude variables with nurses expressing more positive views towards CPOE than doctors. The manifestation of subcultures within hospitals and the impact this has on attitudes towards clinical information systems should be recognized and addressed when planning for system implementation.

Keywords. Implementation - deployment, Diffusion, Managing Change, Organisation,

Introduction

Information and communication technologies in the health industry have been slow to diffuse, particularly in relation to patient care clinical information systems [1]. The organisational culture of a health facility has been identified as a significant factor for successful implementation of such information systems [2-4]. Organisational cultures

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in health are complex and pluralist with typically multiple cultural features operating simultaneously. Sub-cultures inherent in health care organizations [5,6] may be based on occupational, professional, gender, race or functional distinctions. They can reflect or differentiate from enterprise-wide organisational culture and can draw their values and beliefs from outside ties, for example medical subspecialty professional groups and colleges [7].

As the value of clinical information systems is becoming increasingly evident, what is lacking is a study which measures hospital sub-cultures and links this to the mandatory use of a clinical information system. This paper seeks to provide such a study. We investigated the following question: Is there a relationship between hospital sub-cultures and attitudes to, and satisfaction with, clinical information technology? There have been no published studies we could find which have explored this relationship.

1. Methods

1.1. Research Settings

The study was conducted in two clinical units, an Emergency Department and Haematology/Oncology ward, in a 405 bed Australian metropolitan public teaching hospital. The choice of hospital for the study was purposive, based on its long-term use of a CPOE system. This was a hospital-wide, mandatory system which allowed doctors and nurses to order and view clinical laboratory and radiology tests electronically for all patients. Doctors and nurses were the primary users of CPOE, with each having different levels of use.

1.2. Study design, population and data collection

A cross sectional survey design was employed using two instruments: an organisational culture inventory; and a user satisfaction survey. The population (n=103) comprised all doctors (n=42) and nurses (n=61) in the two clinical units of the hospital.

1.3. Study instruments

1.3.1. The Organisational Culture Inventory

The Organisational Culture Inventory (OCI) [8] provides a point-in-time picture of clinicians' perceptions of the culture of their hospital in terms three general clusters which distinguish between: constructive (members are encouraged to work cooperatively and to their full potential resulting in high levels of motivation and teamwork); passive/defensive (members are expected to please those in positions of authority and wait for others to act first); and aggressive/defensive (members are expected to oppose new ideas, compete and appear competent and independent) cultures [9]. Within each of the three clusters there are four behavioural norms which constitute the cultural style. For example within the constructive culture the four norms are: achievement (expected to set challenging but realistic goals); self-actualising (be concerned about their own growth); humanistic/encouraging (be
supportive and resolve conflicts constructively); and affiliative (expected to cooperate with others).

1.3.2. User satisfaction survey

A user satisfaction questionnaire based on previous point of care evaluation questionnaires [10] was developed and trialled with the final survey consisting of twenty two closed-ended questions relating to the impact of CPOE on work practices, patient care, and doctors’ and nurses’ satisfaction with, and attitudes to, the system.

1.4. Data analysis

Percentile scores were calculated for each of the 12 behavioural norms in the OCI and significance was tested using $\chi^2$. Scores below the 50th percentile are low and reflect weak expectations of the behaviour in question. Scores above the 50th percentile reflect stronger expectations and scores that fall close to the 50th percentile reflect moderate expectations for the behaviour in question. The means of the percentile scores of the four culture styles within each culture cluster were calculated to ascertain the culture of each professional group.

2. Results

2.1. Population and respondents

From the population of 103 clinicians in the two clinical units, 75 (30 doctors and 45 nurses) completed the OCI (response rate = 73%) and 96 (36 doctors and 60 nurses) completed the user satisfaction survey (response rate = 93%).

2.2. Comparisons between doctors’ and nurses’ perception of culture

There were differences between the perceptions of doctors and nurses where doctors perceived an aggressive-defensive culture (mean percentile score = 43.8) in contrast to nurses who perceived a constructive culture (mean percentile score = 61.5). There was a significant difference between the doctors’ (percentile score = 35) and nurses’ (percentile score = 80) perceptions on the humanistic/encouraging style ($p<0.01$). Doctors were also high on the perfectionistic style (percentile score = 61).

2.3. Comparisons between doctors’ and nurses’ attitudes to, and satisfaction with, computerised test management systems

There were significant differences between responses of doctors and nurses on three attitude variables (Table 1). Nurses were significantly more likely to agree that computerised test management systems helped in deciding which tests are appropriate to order and made their work more interesting. Doctors on the other hand were more likely to agree that CPOE resulted in over-ordering of tests.
Table 1. Attitudes to the computerised test management system (n=96)

<table>
<thead>
<tr>
<th>Attitudesa</th>
<th>Doctors n=36</th>
<th>Nurses n=60b</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using computerised test management systems:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Results in cookbook medicine</td>
<td>Agree % (n) 28 (10)</td>
<td>Neutral % (n) 11 (4)</td>
<td>Disagree % (n) 61 (22)</td>
</tr>
<tr>
<td>Depersonalises medicine</td>
<td>Agree % (n) 11 (4)</td>
<td>Neutral % (n) 19 (7)</td>
<td>Disagree % (n) 69 (25)</td>
</tr>
<tr>
<td>Helps in deciding which tests to order</td>
<td>Agree % (n) 25 (9)</td>
<td>Neutral % (n) 19 (7)</td>
<td>Disagree % (n) 56 (20)</td>
</tr>
<tr>
<td>Improves the practice of medicine</td>
<td>Agree % (n) 61 (22)</td>
<td>Neutral % (n) 31 (11)</td>
<td>Disagree % (n) 8 (3)</td>
</tr>
<tr>
<td>Results in over ordering of tests</td>
<td>Agree % (n) 58 (21)</td>
<td>Neutral % (n) 14 (5)</td>
<td>Disagree % (n) 28 (10)</td>
</tr>
<tr>
<td>Alienates doctors from patients</td>
<td>Agree % (n) 3 (1)</td>
<td>Neutral % (n) 8 (3)</td>
<td>Disagree % (n) 89 (32)</td>
</tr>
<tr>
<td>Makes my work more interesting</td>
<td>Agree % (n) 33 (12)</td>
<td>Neutral % (n) 50 (18)</td>
<td>Disagree % (n) 17 (6)</td>
</tr>
</tbody>
</table>

Notes
1. *attitude variables were measured on a five point Likert scale collapsed to a three point Likert scale with ‘agree’ including ‘strongly agree’ and ‘disagree’ including ‘strongly disagree’
2. b n=60 with 1 missing response from ‘helps with deciding which tests to order’
3. c significant at p<0.05

Doctors and nurses were similarly satisfied on all the items measuring satisfaction with ordering tests using the computerised test management system. The majority of doctors and nurses thought that computerised ordering: was reliable (83% and 91%); improves productivity (72% and 66%); was not time consuming (61% and 63%); and did not have a negative impact on patient care (83% and 81%).

3. Discussion and conclusion

Our study showed that organisational cultures are not uniform within large teaching hospitals. This finding supports previous studies on cultures within healthcare organisations as being diverse with numerous emergent sub-cultures, often manifesting along professional lines [11,12]. These results also draw attention to comparative attitudes about the acquisition and use of clinical information systems which have implications for preparing organisations for innovations. They highlight the importance of identifying, explaining and measuring sub-cultures, particularly amongst
professional groups, before implementation to develop tailored strategies to facilitate acceptance and use.

How do organisational sub-cultures as perceived by doctors and nurses in this study relate to their attitudes toward, and satisfaction with, the computerised test management system? The relatively constructive culture of nurses is one where they broadly support the uptake and implementation of a new clinical information system. Nurses did in fact have more positive views. The aggressive/defensive culture perceived by doctors would appear to discourage the uptake of new innovations as they would by definition tend to oppose new ideas either openly or indirectly, or both. The high perfectionistic styles of doctors could also be counterproductive to the implementation of new clinical information systems. A culture of blame and the need to be perfect is not conducive to implementing change.

These findings have implications for those interested in facilitating the acceptance and implementation of clinical information systems. The results indicate the importance of examining sub-cultures prior to implementation to enable cultural characteristics and differences between professional groups to be taken into account. A cross-sectional measure of organisational culture within professional groups provides a point-in-time picture which can be used to prepare for an information technology implementation by highlighting areas where cultural change might be enacted. Certain behaviours can then be encouraged or discouraged. Systems and processes and practices which promote a constructive culture can be instituted at the individual/job level (such as goal setting, job design and motivational processes), the manager/unit level (such as performance appraisal) and the organisational level (such as communication and employee involvement). The acknowledgement by governments, policymakers and managers of the importance of organisational sub-cultures for clinical information system adoption will enable more resources and specific policies to be directed towards successful implementation. Cultural readiness for an innovation should be viewed as a key requirement for hospitals when preparing for system implementations with resources and efforts directed towards developing constructive cultures which support innovations. The results from the exploration of organisational sub-cultures at this hospital exposed the relationships between sub-cultures and how doctors’ and nurses’ perceived and supported innovations. The complexity and characteristics of sub-cultures within large organisations should be taken into account given the impact of culture on the uptake of new technologies.

3.1. Limitations of research methods and procedures

A limitation of this examination of organisational culture at the hospital was that only quantitative data sets were used. These data could be complemented by interviews and observations which might explore the differences between espoused and enacted values and also gauge the strength of attitudes. Another limitation is that the sample included doctors and nurses from two units of one hospital. The results may not be strictly generalisable to the population of doctors and nurses outside the study areas.
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References