Knowledge Dynamics in Communities of Practice

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- Knowledge management
- Tacit and Explicit knowledge
- Intellectual assets
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Abstract

With the increased application of recent technologies such as the Internet, CRM and advanced software capabilities, it has been suggested that the time has come for a debate on a new paradigm for knowledge management. As a contribution to this debate, this paper will examine a case study of an outpatient's clinic in an Australian public hospital with the objective of gaining a better understanding of the issues related to knowledge transaction in communities of practice. A tentative knowledge dynamics model is proposed to stimulate discussion and future research.

Introduction

As a contribution to the debate on knowledge management in health, this paper will review the results of a case study. The objective is to gain insights of knowledge dynamics in an outpatient's clinic of an Australian public hospital. This clinic can be classified as a community of practice within the hospital's organisational setting. The methodology involved a case study approach. This research approach was considered to provide a fine grained approach recommended for improved understanding of nuances, detail and the forces underlying the phenomena under observation (Harrigan 1983). Focus on detail was an important attribute of this study notwithstanding possible shortcomings in not being able to externalise the research findings. Yin (1984) has responded to the issue of externalisation by pointing out that case studies like experiments are generalisable to theoretical propositions and not to populations or universes. Hence this project can be classified as exploratory and was intended to uncover issues of knowledge creation and transaction which impact on the delivery of health services in a public hospital, hence providing insights to the implications for knowledge management in this environment.

Direct observation is one of six data collection techniques recommended for case study research (Yin 1984, p 85). The data for this case study was collected as part of a video ethnography project exploring clinician identity in multidisciplinary health care teams. A researcher spent 10 months observing and videoing a variety of interactions between team members, including a number of focused observations of the corridor space in the clinic**.** The excerpts presented are transcripts taken from video footage of two particular clinic sessions (Iedema., Long, Forsyth, & Lee., 2006). All names used are pseudonyms.

The Research Site

The outpatients clinic involved in this study provides care for people with spinal cord injury who have developed pressure ulcers. It is an innovative clinic, in that it brings together a team of multidisciplinary clinicians in one clinic session. Where previously patients would have had to make separate appointments to see a number of clinicians: the specialist spinal doctor, occupational therapist, physiotherapist and, if their wound required surgery, a plastic surgeon and in some cases also an orthopedic surgeon. At this clinic they had access to everyone at the same time. This has a

number of advantages for both clinicians and patients. Although the sessions are long, they are more convenient for the patients than multiple hospital visits, especially given the transport complications associated with having a spinal cord injury. For clinicians, it gave them the opportunity to discuss their treatment needs with each other, allowing much more achievable management plans to be instigated.

The clinic also included a social worker, dietitian and peer support worker, all of whom contributed to quality of patient care and effectiveness of care management plans. Members of the clinical team gather for monthly team and case management meetings and for teleconferences to rural clinicians as required. Most of the team members of this clinic also work together in other capacities within the spinal unit: servicing inpatient clients, and in other outpatient clinics. Also present during the clinic are at least one, but often two nurses who are based in outpatients, who assist the multidisciplinary team with patient organization, follow-up appointment scheduling, specialist appointment booking, test ordering and wound dressing. There are other outpatients clinics running simultaneously, and other outpatient nurses come through the corridor to get equipment, or help out if this clinic is busy and theirs is slow.

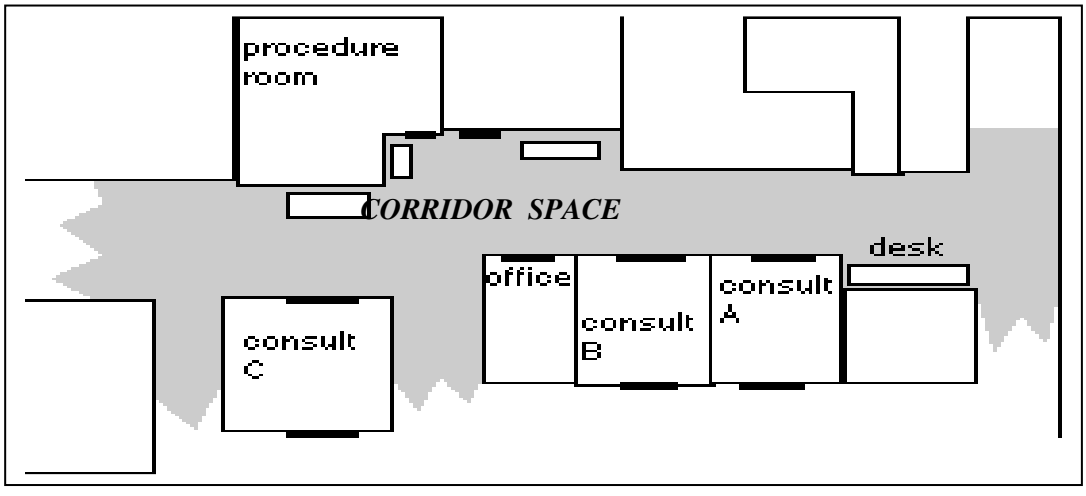
The multidisciplinary approach to pressure ulcers has produced dramatic clinical outcomes. For patients with wounds requiring surgery, the average time spent in hospital was reduced from 264 to 54 days. The cost benefits to the hospital system are significant. In this hospital, the cost of treating a pressure ulcer surgically for someone who has not come for pre-operative consultation in the clinic averages $198,000 per patient. The average cost for patients who have come through the clinic is less than a quarter of that, $42,000.

The doctor and nurse have their offices in the same place, in the offices of the unit specialty. Allied health team members have offices based in their professional units (i.e. dietitian in the dietetics department, physiotherapist in the physiotherapy department etc). There are two implications that follow from this: structurally the only times all team members are together are during the fortnightly clinics and the monthly team meetings, and spatially some people have more access to others in the daily course of their work. For example, the physiotherapy and occupational therapy departments are next to each other; as are the social work and dietetics departments. Both are on different floors to the unit offices, where the staff specialist and CNC have their offices.

The staff specialist who established the team consciously aimed at a “flat”, non-hierarchical management structure, and values informal and non-formal as well as formal communication. All team members described the clinic as “chaotic”, however they were convinced of the value of communicative flexibility this offered. Many of the care management decisions were made in non-formal communications in the corridor of the outpatient’s clinic. The corridor provided flexible communicative space in which complex, multifactorial, heterogeneous interactions could take place (Iedema , Long , Carroll , Stenglin and Braithwaite, 2005).

The diagram below shows the layout of the clinic space. Conversations most frequently take place in the corridor space between the procedures room and the office, however they also take place in the corridor outside consulting rooms A and B, or around the desk at the end of the corridor (see Figure A)

FIGURE A: PLAN OF THE CLINIC’S CORRIDOR SPACE



Corridor Communications

Discussions in the corridor included the expected exchanges of clinical knowledge, as well as giving and receiving of instructions. In this clinic, corridor conversations also covered a wide variety of other topics, such as time management and work flow planning; discussions on equipment costs and purchasing (for both patients and the clinic); incidental, filler and social communications; knowledge, skill exchange and reflection on practice; and conflict resolution. As such, the corridor space facilitated five modes of communication that are central to, and we would argue necessary to, effective multidisciplinary teamwork and knowledge exchange in a hospital: clinical, technological, organizational, affective and reflexive.

In hospital based health care in industrialised communities, clinical knowledge is inextricably intertwined with technology. Treatment and management plans inevitably involve technology in at least part of their panning and implementation. By way of example, in the following excerpt, the occupational therapist (OT) tells the social worker about a discussion she had with a patient regarding a particular wheelchair that the doctor has recommended.

excerpt 2:

> OT … and then he said he understood why [doctor] wanted him to buy it [....] it means that you can get out of bed, and you can change the angle of how you sit and you can just be a little bit more interactive [.....]

Technology discussions in the corridor included clinical applications of technology, such as types of pressure relieving mattresses and cushions that might be suitable for particular patients needs. They also included high-tech diagnostics, such as heat mapping photography equipment to track wound healing; evidence based practice, such as latest recommendations on types of bandaging for particular types of wounds; infrastructure discussions about having tracks installed into particular treatment rooms to allow hoists to be used (to lift patients) and very pragmatic exchanges of skills, such as how to insert text boxes into word processing documents, or tips on navigating the newly introduced telephone note dictation service.

Technology can either facilitate or hinder communication. For example, IT facilitates or hinders in that hospital communication is strongly technology driven. For example, computerised notes are replacing and/or accompanying hand written medical records; clinicians communicate via email and mobile phone; x-ray and pathology test results are increasingly accessed via computer rather than by paper record. Technology also requires communication: clinicians keep each other informally appraised of new developments, they exchange information on usage and practice, as well as on workarounds (ways of 'fooling' the system), and they reflect on effectiveness or otherwise of technological solutions. Corridors facilitate conversations about all of these aspects of hospital work.

Knowledge Transfer

Corridor communications allow clinicians to pass on knowledge which they see as relevant to patient care but regard as inappropriate to document, such as information about patient emotional state, family situation or substance abuse.

The following interchange occurs between the occupational therapist, the nurse and the doctor, in the area outside procedures room (refer Figure A). They begin discussing the patient who is located in the room behind them, offer and accept infection control advice, move on to discuss a patient who has been admitted on the ward as an inpatient, engage in knowledge exchange regarding input from a surgeon, make a joint management plan regarding the patient, discuss how best to negotiate what they require with ward staff, and discuss the appropriateness of the patient's involvement in feeding back management plan decisions to night shift staff on the ward. The conversation involves a significant

amount of body language, as well as verbal interchange, with clinicians using their hands and bodies both for illustration and emphasis. Participant's code key is;

DR; Specialist medical practitioner
OT; Occupational therapist
CNC; Clinical nurse

A sample conversation from excerpt No. 14:

DR .... [he has to not] sit up so much. He's sitting up for 6-8 hours.

OT How is the pressure area?

DR It's a grade one area *[indicating size with fingers - not large]*, but he's got no fat over his IT [ischial tuberosity] area, so he's going to have to be another couple of weeks off it, just to finish it off.

OT But he hasn't .... *[tying apron around front]*

CNC *[reaching hand in OT's direction]* Don't tie it around the front.

DR Yeah *[reaching hand out, smiling]* I can't do the back tie.

OT *[ties apron around the back]* He hasn't agreed to ... um .. any equipment or anything. He's not on a mattress, or anything. *[looking at CNC]* He's just on his own bed.

DR I'm not sure what's happening.

CNC I can't remember.

OT He's got a seating appointment this afternoon as well.

DR Collette [relieving occupational therapist] said that she talked to [community organization] about his equipment, who said ...

OT I need to catch up on what's happened, then.

DR I guess the thing is he's sitting up for 6 - 8 hours anyway, and that area's not going to heal unless he gets off it.

OT OK. That's fine. I can talk to him about that. Can I pick your brain about patient C as well. He's getting red areas on his shins, and ..

Knowledge Dimensions

The literature draws a distinction between tacit and explicit knowledge. Tacit knowledge is that held in the minds of individuals while explicit knowledge is that externalised and shared with others. It has been suggested that there are four modes of interaction between these two forms of knowledge (Polanyi 1967);

- From tacit knowledge to tacit knowledge: the process of 'socialisation' through shared experience and interaction

- From explicit knowledge to explicit knowledge: the process of 'combination' through reconfiguring existing knowledge such as sorting, adding, recategorising and reconceptualising explicit knowledge can lead to new knowledge
- From tacit knowledge to explicit knowledge: process of 'externalisation' using metaphors and figurative language
- From explicit knowledge to tacit knowledge: the process of internalisation through the learning process

The knowledge management process as necessarily loose and collaborative because the human qualities of knowledge such as experience, intuition and beliefs are not only the most valuable, but also the most difficult to manage and maximise (Daveport and Prusak 1998). Hence the knowledge management process integrates theories from at least four distinct fields; theories about organisational culture, organisational structures, organisational behaviour and knowledge based systems leading to theories about knowledge support infrastructures (Baskerville and Dulipovici 2006).

More recent research emphasises the importance of context in the knowledge conversion process (Ancori, Bureth and Cohendet 2000) suggesting that knowledge should be seen as a cultural process situated in and inextricably linked to the material and social circumstances in which it is produced and consumed (Hassard and Keleman 2002). A balanced environment of power, control and trust is seen as essential condition for a successful knowledge oriented culture, Allee (2003) suggests that if people do not trust each other, they do not exchange knowledge and ideas. Here trust helps build and sustain valuable networks and rewarding relationships while a lack of trust erodes knowledge leadership, creation and transfer.

The knowledge management process is seen to begin with the formulation and implementation of strategies for the construction, embodiment, distribution and use of organisational knowledge. Other strategies include those for the basic management functions to monitor and measure the knowledge assets and processes (Quintas et al 1997).

Discussion

From this case study there have been a number of interesting observations regarding knowledge dynamics in this particular community of practice. The clinical team being multi disciplinary and multi functional implies a wide variation in the type and range of tacit knowledge held by individuals. Given favourable conditions, there is opportunity for the team to generate new knowledge using this rich and diverse individual base.

Others have observed the importance of context (Ancori, Bureth and Cohendet 2000) and environment on knowledge dynamics (Hassard and Keleman 2002). In this case it was observed that the informality of the Clinic's corridor was conducive to the free flow of knowledge transfer among the team members. The informality of location also meant that knowledge transfer frequently occurred without documentation and that there was an open flow of more sensitive knowledge that may have been inhibited in a more formal workplace environment.

This research showed that much knowledge exchange took place via five modes of communications; clinical, technological, organizational, affective and reflexive. Here the corridor location was all important as a meeting place to encourage the free flow of tacit individual knowledge and the creation and exchange of team (explicit) knowledge.

The importance of technology in the exchange of clinical knowledge was observed in this case study. It was seen to play an increasingly important function in the knowledge transmission process. This presents a challenge to future knowledge dynamics as it was observed to have both positive and negative impact on knowledge flow and quality in this case study.

Building on the work of Polanyi (1967), it is possible to gain further insights into knowledge dynamics in a community of practice setting. An analysis of knowledge flows in this case study reveals various dimensions of implicit and explicit knowledge exchange. These have been classified below together with the suggested conditions of knowledge sharing and release where relevant.

Implicit knowledge;

Type A) Spontaneously released on own initiative

Type B) Shared when triggered by Clinic conditions/demands

Type C) Not shared or released and not able to be articulated

Type D) Not shared or released but potentially able to be articulated

Explicit knowledge;

Type X) When released from an individual

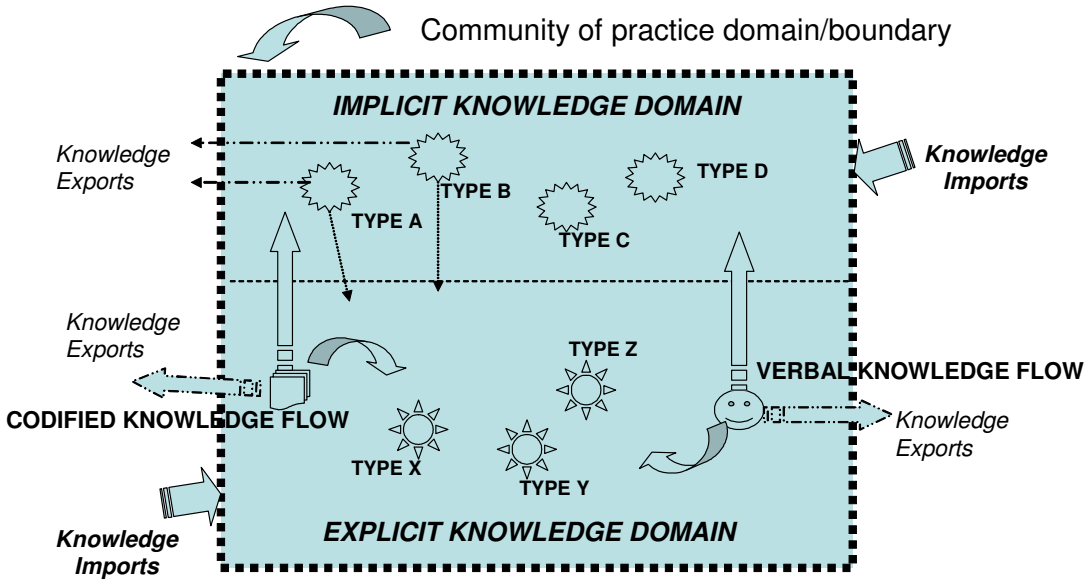
Type Y) Existing team knowledge

Type Z) Newly generated by the team

Figure B attempts to present these various types of knowledge diagrammatically and in flow format. The knowledge individual members release spontaneously becomes explicit at the time of sharing with the team (Type A implicit knowledge). On some occasions, knowledge may be triggered by Clinic conditions or demands (Type B implicit knowledge). Certain knowledge that individuals hold may not be able to be articulated (Type C implicit knowledge). This may be because an individual cannot encode the knowledge in a form that could be decoded by the team. For example, others may not have had the necessary technical training or education to enable decoding. Other researchers have warned of the difficulties involved in the group use of tacit and unarticulated knowledge (Leonard and Sensiper 1998). Other knowledge held by individuals may not be transmitted to the team for reasons other than articulation issues (Type D implicit knowledge). Here knowledge may be held as confidential.

Explicit knowledge in the Team domain may take various forms. Knowledge may enter the Team domain directly from an individual (Type X explicit knowledge). At any point in time, there will be knowledge that was previously generated by the team ((Type Y explicit knowledge). As the team continues to operate, new knowledge will be generated (Type Z explicit knowledge). Team knowledge may be exchanged verbally. It may also be codified for more tangible retention and use either within the team's operating environment, or externally transmitted (knowledge exports). It should be noted that team knowledge of any type will flow back to individuals. Figure B shows the possibility of the inward flow of knowledge (knowledge imports).

FIGURE B CLINIC KNOWLEDGE DYNAMICS MODEL



The exploratory and tentative classification of knowledge derived from this case study may lead to a better understanding of how knowledge is transmitted and exchanged in a team environment. It will also have implications for knowledge management which will be discussed in the next section of this paper. There is no suggestion as to the appropriate application of these observations or knowledge classifications to other health care situations. Future researchers may study knowledge exchange dynamics in other health care locations with a view to building on this exploratory work and contributing to the long path of generalising relevant early findings.

Implications for Knowledge Management

It has been observed that there is an increasing trend to attempt to acquire and share expert knowledge held by health care workers with a view to providing improved decision support and medical education systems (Abidi, Cheah and Curran 2005). Health care has had the luxury of learning from the experience of other industries as managers move to improve clinical and operational performance in today's hospitals.

This case study review reveals the importance that communities of practice can play in the flow of knowledge within organisations. It further shows that setting informality can encourage members of a community to share their knowledge. Managers should recognise this when planning knowledge strategy for the organisation. Another author has prepared number of components to help guide knowledge management planning and practice in health care operating environments (derived from observations made in this research project and Guptill (2005)).

Communities of practice: Knowledge management is more than a centralised repository of data, documents and other information. It also encompasses the social context of others experiences in the process. Here the goal of knowledge management is to codify and understand how the dynamics of the particular community operate in the context of the wider organisation.

Environment: Operating environment is all important in facilitating the flow of knowledge. Hence creating a conducive atmosphere to knowledge exchange is fundamental to effective knowledge management. In planning knowledge management strategies and processes, the importance of informal exchange locations and occasions need to be included as critical knowledge transfer is likely to occur in such places.

Teams: The health care workplace often consists of multidisciplinary teams working closely together. This may present challenges to knowledge transfer processes because of differences in grounding,

education, training, experience and sometimes values. Hence knowledge management needs to take a holistic view of how members of a team relate, communicate and interact.

Content management: Here a repository is developed to facilitate knowledge exchange with careful planning as to the types of content to be published, access guidelines, update process and publishing practice. This phase also includes a communications plan for marketing the knowledge base throughout the organisation.

Knowledge and capability transfer: In addition to information and knowledge transfer, there should be change in behaviour leading to innovation, operational process improvement and enhanced patient care. This component is concerned with strategies to ensure the spread of new and best practices between units and across hospitals.

Performance results tracking: To ensure that knowledge activities lead to improved organisational performance, rigorous monitoring needs to be incorporated into the tracking of results. Three types of measures are seen to be appropriate;

- outcome measures that reflect attainment in clinical, financial and operational targets
- process measures that track activity that is expected to yield results
- satisfaction measures that track improvements in staff/consumer/physician satisfaction with the care process

Technology and support infrastructure: This research has shown that technology has both a positive and negative impact on the flow of knowledge in a health care environment. With technology playing an increasing role in all sections of health care, careful planning is required to consider each adoption phase and the impact it will have on knowledge transmission and management. Managers need to minimise any potential negative effects that may come with the introduction of new technology modules.

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We look forward to other opportunities for collaboration and interaction with you during the program of social activities including the Happy Hour Welcome, a Cocktail Reception at the National Gallery Victoria and the Conference Dinner.

I thank participants and guests from twenty-four international locations, New Zealand and Australia for their commitment to ANZAM, and hope that you enjoy your stay in the City of Melbourne.

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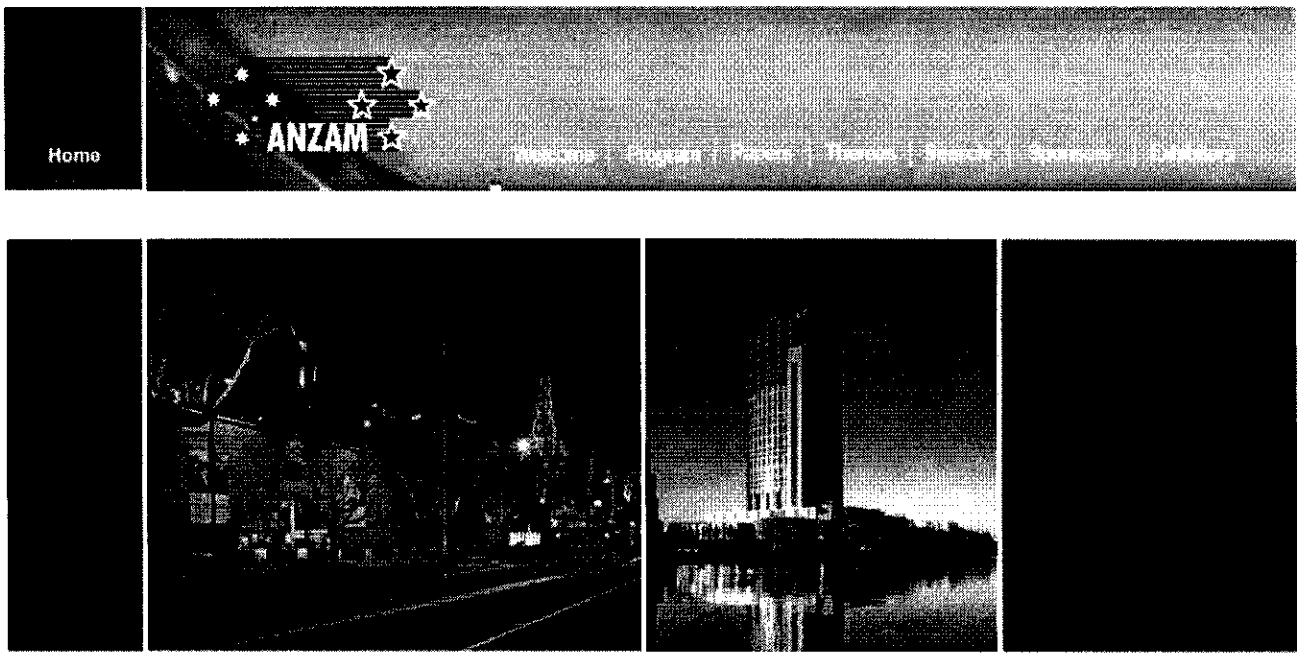

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