The Role of E-Collaboration Systems in Knowledge Management

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INTRODUCTION

Since knowledge retrieval takes place at the interface between social interaction and technology (Gammelgaard & Ritter, 2005) successful systems of e-collaboration intended to manage knowledge involve the effective integration of both their technical and social components. Alongside technical developments, the standardisation of communication protocols has provided the realistic prospect of universal interconnection of businesses. The ubiquity of technology is not, however, reflected in the way that people, using the collaborative infrastructure, make sense of the data that emerges from the collaboration and go on to construct meaning from it. This is mediated not only by technology but by local culture, most explicitly represented by the recurrent activities that represent practice carried out by local communities of workers (Lave & Wenger, 1991; Brown & Duguid, 1996; Wenger, 1998). This interplay of technology, working practice, organisational structure and people traditionally lies at the heart of socio-technical systems (Leavitt, 1965) applied to leverage the skills of knowledge workers. This article examines the role and contribution of e-collaboration systems in inter-organizational knowledge management. The processes underlying this interplay are viewed from three perspectives: communication, collaborative practice and community, opportunities for the future development of e-collaboration systems are then proposed.

BACKGROUND

The role of information systems has been widely debated within knowledge management research. Knowledge is recognised as a critical organizational resource (Alavi & Leidner, 2001). It is claimed that organizations innovate by drawing on knowledge (Nahapiet, Gratton, & Rocha, 2005) in the "knowledge economy" (Carter & Scarbrough, 2001). The exchange or transfer of knowledge is an essential aspect of knowledge management (Bresman, Birkinshaw, & Nobel, 1999), as reusing knowledge saves time, effort, and money (Bhatt & Emdad, 2001). This is particularly important when the reuse of knowledge prevents "reinventing the wheel" (Hansen, 1999). Organizations can be viewed as distributed knowledge systems (Nahapiet et al., 2005) concerned with how to exploit knowledge already existing in the organization (Kakabadse, Kouzmin, & Kakabadse, 2001). This exploitation is more frequently referred to as knowledge management and the next section identifies some of the major issues surrounding collaboration within this activity.

KNOWLEDGE MANAGEMENT

Typically the features of information systems used for knowledge management activities can be divided into three main categories (Alavi & Leidner, 2001); repositories of stored knowledge collections, search mechanisms to find people with specific features of expertise and virtual spaces or knowledge networks. The first of these three categories lends itself to an ontological approach to the nature of data, information and knowledge (Blackler, 1995). The second category leads to an epistemological approach concerned with what can be known and the nature and residence of skills and knowledge within particular contexts of use. However, it is the third category of virtual spaces and knowledge networks that the rest of this article will address as the most relevant to leveraging of value from knowledge management systems through e-collaboration.

Although technology provides a repository for codified knowledge for people who are separated, socialis-

ing is more important than technology (Lagerstrom & Andersson, 2003) and it is the relationships between people that most affect knowledge transfer. Oliver and Kandadi (2006) suggest that organizations need to provide an appropriate communication infrastructure such as knowledge portals to assist in the development of communities of practice. Gammelgaard and Ritter (2005) suggest that electronic communication offers increased opportunity for dialogue and increased frequency of contact and define three categories within which barriers to knowledge transfer may be explored. The first category is knowledge fragmentation, where knowledge is dispersed around the organization and knowledge is inaccessible for a number of reasons. The second category relates to barriers where knowledge is hidden as a result of the quantity of data, information, and knowledge that is held. The third category involves barriers of decontextualisation. In this category, knowledge is located but cannot effectively be retrieved or used due to cultural, technical, or organizational distance between sender and receiver. In the same pattern as for the Alavi and Leidner (2001) model, the first two of these categories relate to the ontological and epistemological issues referred to earlier. The third category presents a different challenge to the development of effective knowledge management systems: the decontextualization of knowledge. A more situated understanding of knowledge and collaboration might address this issue through the analysis of activity resulting from them. One approach to this problem rejects the concept of knowledge altogether and instead proposes the attribute of "knowing" as something that individuals or organizations *do* rather than contending with knowledge as something they supposedly possess. This approach places recurrent activities going on in a work community at the very centre of an analysis of socially situated knowledge and is used to analyze the dynamics of the systems through which knowing is accomplished.

Socio-historical activity theory (Engestrom, 2001) is another approach increasingly being used to identify knowledge situated within communities of practice. This explores the dynamics between agents, such as the users of collaborative systems, objects of activity, such as trading processes, and the community within which this trading takes place. The fundamental questions of collaboration remain, of how to collaborate, with whom and why Nahapiet et al. (2005) is analyzed in the following sections from the orientations of communication, collaborative practice, and community (Bafoutzou & Mentzas, 2002).

E-COLLABORATION AND COMMUNICATION

Collaboration requires mechanisms for intra- and interorganizational communication. An example of such a structured protocol categorisation is the open systems interconnection (OSI) reference model (Day & Zimmerman, 1983) used to define the requirements for communication across different equipment and applications by different vendors. It divides the communication processes into seven self-contained levels,

Table 1. Layers within information systems

Layer 7	Application layer: Includes the protocols that support user applications and addresses issues of file access and management.
Layer 6	Presentation layer: Deals with data syntax during transfer between two application processes to enable computers using different file formats to communicate.
Layer 5	Session layer: Includes protocols for establishing, maintaining and ending sessions between user applications so that differences between platforms are transparent to the user.
Layer 4	Transport layer: Includes the protocols that are responsible for the reliability of end to end connections.
Layer 3	Network layer: Deals with protocols to establish, maintain and terminate end to end network links routing messages across the network.
Layer 2	Data Link layer: Provides protocols to control logical links.
Layer 1	Physical layer: Includes protocols responsible for establishing, maintaining and ending physical connections (point to point) between computers.