The Role of Technology in Supporting Communities of Practice

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INTRODUCTION

Most KM literature which investigates the role of technology in supporting communities of practice is oriented either technically or socially. Works that adopt a technical orientation tend to focus sharply on issues such as robustness, scalability, interoperability, and security. Furthermore, they invariably include a plethora of KM tools ranging from databases, portals, and search engines. The dynamics that occur in communities of practice, on the other hand, receive cursory treatment. Works that adopt a social orientation tend to delve into cognitive and social processes but are usually confined within the context of distributed communities. They discuss how technology is used to mitigate the geographical separation among members. However, beyond citing the generic capabilities of technology, such as enabling connection among members, holding electronic content, and providing search functions, the role of technology to meet the peculiar needs of communities of practice has rarely been expounded.

For this reason, this article seeks to clarify how technology can be used to support communities of practice. First, it develops a conceptual model which provides a parsimonious approach to unravel the nebular properties of communities of practice. Next, it explains the power and limitation of technology within the realm of knowledge management and proposes a suite of capabilities found in extant technology tools which supports communities of practice. Finally, this article briefly discusses emerging technologies that could be used to meet the rising needs of community members.

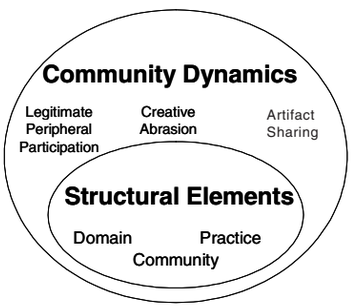
BACKGROUND: UNRAVELING COMMUNITIES OF PRACTICE

Communities of practice are commonly conceptualized as informal aggregations of members who are drawn by common interests to engage in sense-making activities through sharing, learning, and solving problems (Brown & Duguid, 1991; Lave & Wenger, 1991). Due to their spontaneity and richness of interaction among members, communities of practice have been widely acknowledged as the ideal social structure to support the sharing and development of knowledge (Lesser & Stork, 2001; Wenger et al., 2002).

Several studies have been done on communities of practice, for example, those involving Xerox technicians (Orr, 1996), flute makers (Cook & Yanow, 1993), military oilfield services engineers (Edmundson, 2001), and internationally distributed organization members (Hildreth et al., 2000). Communities of practice may differ in attributes such as size, lifespan, physical boundaries, and the degree of recognition in the organization. However, all communities of practice share certain common salient features. These features are included in a conceptual model illustrated in Figure 1. Even though in reality, the constituents in the model are amalgamated and not easily distinguishable, they have been identified discretely to facilitate analysis.

Shown at the core of the model are the *structural elements*. Structural elements distinguish communities of practice from all other types of groupings such as project teams, task forces, and interest

Figure 1. A conceptual model of communities of practice



groups. The three structural elements are domain, community, and practice (Wenger et al., 2002). Domain refers to the sphere of knowledge related to a specific area of expertise held by members. Community denotes the sense of identity, confidence, and level of trust among members. Practice is the set of common tools, framework, methodologies, and vocabularies shared by members. Without the simultaneous presence of all three structural elements, a community of practice does not exist. For example, residents in the same neighborhood who have developed a sense of oneness but do not share expertise in a common domain are not regarded as a community of practice. Similarly, a community of practice does not come into existence simply by assembling a group of strangers who possess comparable levels of expertise in a given domain. There has to be a sufficient level of trust and confidence among them before they would consider themselves as part of the same community.

The outer layer in the model shows the *community dynamics*. Unlike structural elements which are defining features of communities of practice, community dynamics refer to the interaction and processes that occur in healthy and thriving communities. Community dynamics include legitimate peripheral participation (Lave & Wenger, 1991), creative abrasion (Leonard-Barton, 1995), and artifact sharing (Hildreth et al., 2000). Legitimate peripheral participation is a complex and composite process through which new members become matured members by acquiring knowledge from the group. It has three inseparable aspects, namely, legitimation, peripherality, and participation. Legitimacy concerns power and authority relations in the group, and it represents the degree of acceptance a member gains from the community. Peripherality refers to the individual's social rather than physical proximity in relation to the community. This in turn is dependent on the individual's history of participation in the group and the expectation of the individual's future interaction with others in the group (Lave & Wenger, 1991).

Creative abrasion, sometimes conceptualized as productive tension (Hirschhorn, 1997) or multi-faceted dialogue (Zárraga & García-Falcón, 2003), refers to the meeting of minds on common ground to explore and negotiate different opinions and, as a result, generates new ideas (Leonard-Barton, 1995). It is seen in flourishing communities of practice whose members share heterogeneous experiences and perspectives but are bound by the spirit of community to confront a common challenge. Creative abrasion occurs only when there is a right balance between cohesiveness and diversity. Diversity without cohesiveness leads to disorder. On the other hand, cohesiveness without diversity results in group-think (Cohen, 1998).

Artifact sharing is a natural part of everyday work among members in the community of practice. Artifacts such as documents, charts, and images are used for planning, reflection, discussion of issues, and solving problems (Hildreth et al., 2000). They form part of the explicit corporate memory in the organization (Anand, Manz & Glick, 1998) and give permanence to the knowledge stewarded by the community.

TECHNOLOGY AND KNOWLEDGE MANAGEMENT

The use of technology in managing knowledge is not new. Intranets such as EPRINET used in the US electric utility industry (Mann et al., 1997) are based on early generations of networking and computer technology that sought to improve knowledge access. Mainframe computer technology was used to develop online conferencing and forums for collaboration and knowledge sharing (Foulger, 1991). In fact, for a long time, most organizations perceived technology as the cornerstone of all knowledge management initiatives, including developing communities of practice, mainly because technology represents a highly tangible and the easiest part of the implementation.

However, several researchers and practitioners have cautioned against the excessive focus on technology (Anand et al., 1998; Davenport & Prusak, 1999; Nonaka & Takeuchi, 1995). They argue that the success of a knowledge management initiative does not rest on the deployment of technology solutions alone. Research has revealed that some of the greatest difficulties in knowledge management include changing people's behavior, promoting a knowledge-friendly culture (Ruggles, 1998), and low absorptive capacity of the knowledge recipient