Integration of Knowledge Management in Virtual Groups

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ABSTRACT

This paper focuses on exploring knowledge work in two types of virtual groups, attempting to identify common themes and key differentiators. We were particularly interested in investigating how various forums support, or do not support, collective virtual knowledge work. Our study demonstrates that, despite apparent differences in purpose and objectives (drives), synergies exist between virtual communities and teams. Virtual groups such as virtual communities, communities of practice and virtual teams perform emergent knowledge work based on relationships, interaction and self-regulation. These groups carry out a variety of valuable knowledge work, which is often motivated by individual or group-based - rather than managerial – needs. We develop a model of the role of virtual groups in knowledge management (KM) in business and social organizations, and suggest that our model forms a basis for further exploration of this increasingly important topic.

INTRODUCTION

Knowledge management (KM) is increasingly linked to work performed by often-distributed groups consisting of communities and teams collaborating to solve complex problems across specialisations (Schaffers *et al.,* 2003). Group work can be allocated by management, with autonomy awarded to groups for all kinds of activities, including critical decision-making. Increasingly, however, group work is self-motivated, with workers congregating around emergency, *ad hoc* needs (Alavi & Tiwana, 2002).

Computer-mediated communication (CMC) has become a popular channel for communication, cooperation and collaboration by *virtual communities and teams.* Nowadays, these virtual groups play significant roles in all kinds of societal and organizational activities – for example, outsourcing (Hiltz & Turoff, 1993; Schaffers *et al.*, 2003). Interestingly, virtual groups have also led to the emergence of specific subcultures, with new management and self-management practices and tools extending and sometimes replacing existing physical mechanisms and structures (Torlina and Kazakevitch, 2003).

Businesses and society gain from virtual group knowledge work in different, but related ways. Businesses benefit through the establishment of internal knowledge flow links and the sharing and creation of knowledge leading to organizational learning and innovation (Hlupic & Qureshi, 2003; Schrage, 1990; Sharkie, 2003). Society benefits through the establishment of knowledge networks based on shared interests and objectives; validation of knowledge created elsewhere; and the provision of a fertile environment for knowledge stimulation and innovation. Perhaps more importantly, such communities simultaneously reflect and convey changes in the body of knowledge and learning structures in the wider society, transferring knowledge of a broader societal context - such as national culture, arts, social life, humanitarian issues and politics (Reinghold, 1999; Castells, 2000).

Researchers have recently begun to investigate KM in virtual group work (for example, Alavi & Tiwana, 2002; Bieber *et al.,* 2002; Lichtenstein & Swatman, 2003). Schaffers *et al.* (2003) called for greater research into the role of KM in supporting and integrating new types of complex co-operative work, within and across increasingly networked organizational boundaries. Accordingly, we elected to investigate knowledge work in virtual communities and teams, feeling there

were benefits to be harvested from identifying and comparing knowledge work issues in these two types of structures – for guiding the design of complementary, integrated virtual spaces and processes where knowledge work could flourish, and defining corresponding requirements for supporting systems and technologies. Following, we provide an introduction to knowledge work in virtual communities and teams, discuss findings from two case studies, draw conclusions and offer final remarks.

KNOWLEDGE WORK IN VIRTUAL COMMUNITIES AND TEAMS

We commence by offering definitions of 'virtual community' and 'virtual team', terms which are often confused by theorists and practitioners. We define a virtual community as groups of people who engage in many-to-many interactions online, and form wherever people with common interests are able to interact (Cothrel & Williams, 1999), generally representing weak tie networks such as social networks and networks of practice. Virtual teams embrace a wide range of project-based, task-based or topic-based occupational teams and groups working in a virtual space. Classically, they are defined as strong tie networks, however we extend the definition to medium-to-strong tie networks – for example, a collective of groups of people at work who temporarily assemble to fulfil a business purpose. Virtual teams may be part of a virtual community, or may exist as a separate entity independent of other on-line structures.

Virtual Communities and Knowledge Management

Early virtual communities were formed around social issues, however more recently, community-building has emerged as an important business opportunity. Hagel & Armstrong (1997) argue that in the commercial world, virtual communities have the potential to overturn many traditional business structures, while Bressler & Grantham (2000) suggest that in the new business climate, successful businesses must transform themselves into a community of employees who cluster in pursuit of a common objective. In contrast, Rheingold (1999) believes it unlikely the community model will ever deliver direct revenue, suggesting that the greatest value of a community arises from the quality of generated content, knowledge, experience sharing, improved communications, and new forms of culture.

Virtual communities involve knowledge sharing, illustrated by the application of what has been learned through the community (Lueg, 2001). These communities support the capture, sharing and management of knowledge that is otherwise difficult to access and structure. Hypertext tools are employed to construct forums, with linked discussions on specific topics of interest, thereby enabling knowledge generation, and linking of knowledge objects through hyperlinks (Beinhauer, 2000; Radding, 1998). Personal profiles of members' specialisations spawn subgroups that share more personalised knowledge (Beinhauer, 2000).

Virtual Teams and Knowledge Management

Virtual teams which work across time zones and geographical boundaries are increasingly prevalent in businesses (Townsend *et al.*, 1998), with experts suggesting they are the best choice structure for

harnessing, integrating and applying distributed knowledge in organizations and other collaborative groups – largely because the individuals involved provide a context in which their tacit, specialist knowledge can be recombined into collective knowledge (Alavi & Tiwana, 2002). Indeed, without such group work, there is no opportunity for individuals to identify synergies in their specialist knowledge. Ratcheva (forthcoming) finds such synergies in virtual teamwork, while Qureshi *et al.* (2000) explain the contribution to learning of socio-cognitive conflict resolution in virtual teams, when the competing viewpoints are offered from diverse knowledge backgrounds.

Virtual team knowledge work is able to capitalise on the ease with which team composition can be altered in virtual space, combined with participant acceptance of such fluid team structures. As needed, people can be rotated in (and out) of teams (Alavi & Tiwana, 2002; Townsend *et al.*, 1998) and, according to Schaffers (2003), such evolving needs tend to be for people's knowledge.

FINDINGS FROM CASE STUDIES OF LITER.RU AND EMAIL

In this section, we report findings from two case studies of a virtual community and a virtual team environment. We were interested in investigating knowledge work in business organizations as well as in social non-professional virtual organizations with intensive knowledge generation. Discourse analysis (Fairclough, 1992) was employed to analyse text and documents in context, enabling the identification of patterns, themes and trends. Feature analysis (Kitchenham & Jones, 1997) was used to identify the key features of CMC technologies for virtual communities and teams, from specifications found in existing literature.

The virtual community investigated was 'liter.ru' – a Russian literary publishing site – implemented as a portal. A preliminary investigation of knowledge work in twenty knowledge intensive communities, based in Australia, US and Russia was undertaken through discourse and feature analysis. Liter.ru was selected for an in-depth case study as an example of a successful KM system with an integrated computer-mediated environment, and a management model that encourages community building, quality content generation and innovation. The virtual teams studied operated in the context of a large Australian university, and collaborated using email. For this study, five hundred consecutive messages and three hundred conversations featuring knowledge development were collected from the Eudora email archive of an academic (one of the authors) at a large Australian university. The fact that the two authors are members of the same academic department enabled participant involvement in the research, thereby providing context and understanding.

Knowledge Work in a Virtual Community: *Liter.Ru*

In introducing the relevance of our choice of study of liter.ru in a KM context, we note that the primary aim of this community is to establish a creative environment, rather than simply aiming for online publishing. The virtual space comprises an interactive meeting place for authors and readers, and also fulfils the role of a knowledge sharing facility. The collected publications constitute a constantly updated knowledge repository, forming the basis for a high quality, contemporary digital library. Knowledge generation is carried out by the community members through their interest-specific activities – publication, reviewing, discussions and other value-added activities. Patterns of knowledge work described in (Lichtenstein & Swatman,, 2003) - and in the virtual team analysis below - are clearly identified in liter.ru.

Management of the community is based on the self-management model which includes adaptive development of self-regulatory measures and policy, complemented by effective, integrated web-based tools. The community website allows for immediate publication and sharing of information and knowledge. Online reviewing of new literary work immediately follows publication, with feedback and responses given in real time. Learning is thus accomplished, enabling community development through the negotiated knowledge of accepted and unaccepted collective norms, as well as enabling authors to shape their future work on the basis of knowledge gained.

The sources of value for community members include the high level of member interactions and contributions to community content. Although generated content is not filtered, site management encourages high quality content by enabling author and publication ratings, thus creating a knowledge evaluation process as well as relationships and knowledge links between members.

Community members establish formal and informal groups and associations within the community. The basis for such groups or teams may be sharing a specific interest in a particular genre or style, or pursuing a group interest such as establishing a new club, or publishing a book together, or simply appreciating one another's work. Higher quality knowledge is thus generated (Beinhauer, 2000). Exercising freedom of site use, a diversity of authors have joined the community, creating stratification and relative isolation "by choice" of the different groups. Border-crossing of groups is possible, however people usually choose to read, review, and socialise with the members of their own informal group. Bonds and trust thus develops, leading to greater knowledge sharing. Such informal grouping also offers a natural mechanism for managing complex implicit knowledge.

Knowledge Work by Virtual Teams in Organizational Email

As reported elsewhere (Lichtenstein & Swatman, 2003), we found that virtual teams were summoned through an initial message inspired by a need perceived to be of mutual interest to team members. This message became part of a knowledge trail consisting of successive, related emails in one or more threads emanating from the first knowledge seed email. In the conversations, selected because knowledge development took place, knowledge was crystallised along the knowledge trail through processes of knowledge qualification and combination, with reference to knowledge resources including authorities, documents, and contributions of insights, ideas, suggestions and context by participants.

New participants were co-opted as needed for their decision-making power, interest or additional knowledge. Infrequently, team members were dropped off the circulation list. By the end of knowledge trails, the tacit knowledge of participants had clearly been shared and combined, and new organizational knowledge had been created in the form of plans, innovation, decisions and actions. As a result of the concomitant organizational learning, new social and intellectual capital had also been created.

Team members were motivated to undertake knowledge work out of a knowledge need. To an extent, this motivation was enabled by the medium of email - which has been likened to an employee habitat, commanding high levels of attention and organizational work throughout a typical workday (Ducheneaut & Bellotti, 2001). Email allows spontaneous discourse, while its messages have been found to possess high levels of attention-attracting and excellent sensemaking characteristics, including personalisation and contextualisation (Lichtenstein & Swatman, 2003).

Relationships developed among employees were collegial, with bonds strengthened by the sense of shared purpose in working to resolve evolving collective work needs and issues. Group knowledge work was not monitored by management. Instead, teams co-opted decision-makers, other experts and peers as needed, to receive approval and other qualification (evaluation) of new knowledge being developed, in the light of current organizational objectives, plans and regulation.

Role of Virtual Groups in Organizational Knowledge Management

From our empirical findings, we provide a model of the integration of virtual groups in organizational KM systems, for organizations where virtual groups play a key role (Figure 1).

Knowledge work is integrated in an organization-wide KM context. Groups are self-motivated, based on the building of relationships which can vary from collegial (for example, in the workplace) to warm and personal (for example, in a societal virtual community). Groups are self-regulated and self-organizing, making decisions often without recourse to management, then providing feedback to management who respond with altered organizational plans or information about goals, policy or knowledge evaluation. If management is needed for decision-making purposes, representatives may be co-opted into virtual group work.

Figure 1: Integration of Knowledge
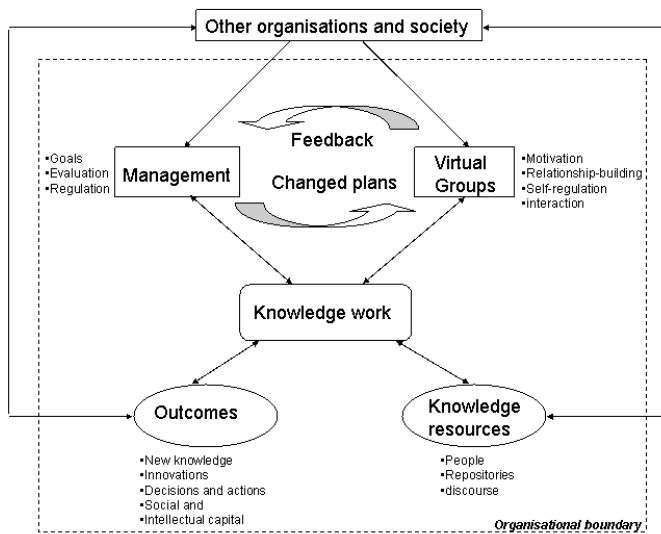
Through group discourse, knowledge is captured, shared, created and applied, with recourse as needed to knowledge resources in the form of other people, repositories and additional discourse. Outcomes are produced from knowledge work, including new knowledge, innovations, decisions, actions, and social and intellectual capital. These in turn become part of the knowledge resources, which may be tapped into as needed.

Management similarly performs knowledge work as necessary. External groups and individuals provide impetus to internal management and virtual groups to initiate knowledge work. They can also contribute to knowledge work outcomes and repositories, and may be granted access to draw on internal outcomes and repositories.

CONCLUSION

Our research has highlighted several important features of knowledge work in virtual groups which when present, we suggest, raise the value of knowledge work found in discourse in these spaces.

First, we found that the ability to engage and involve members of the virtual groups is important to the value of the knowledge work. The relationship characteristic is typically omitted in KM systems implemented in practice; lack of affinity or individual purpose associated with KM in organizations is often present, although rarely surfacing. Generally, management is focused on "achieving results" - that is, measurable contributions in terms of organizational value. However, motivation for individuals to contribute usually lies in a separate layer of knowledge work, and is often rooted in building relationships and trust between members, achieving personal or group-felt goals,. These issues underpin successful knowledge work, but are not always easily translated into direct organizational goals.

Second, our investigation of knowledge creation in the non-business online community indicated that a variety of personal goals can lead to a high level of interaction and generation of collective knowledge of high value, even though organizational motivation is completely absent. In the business setting, on the other hand, we found that virtual teams were motivated by a variety of individual, collective or organizational needs.

Third, emerging pragmatic group-felt needs - rather than management directives – drive organizational knowledge work, with knowledge naturally and intuitively captured, created, shared and applied through everyday group discourse and practice.

Fourth, the contribution of multiple conflicting perspectives in knowledge discourse was found to assist in the resolution of decision problems by enabling participant voices to be heard and processes of consensus to evolve naturally.

A fifth theme relates to knowledge ownership and control. How is knowledge-under-construction controlled? Who is in charge and making decisions? Bieber *et al* (2002) notes the negative effect on collective knowledge value when individuals control knowledge development solely. In our study, we observed more democratic decision-making by empowered employees. However, at times, those in authority stepped in and took control of knowledge-under-construction and associated decisions through knowledge qualification, illustrating political and power motives in the construction of knowledge (Lichtenstein, 2004).

As our sixth observation, we suggest that established organizational issues such as everyday practices, interaction, discourse and relationship building are often treated as separate from knowledge capturing, creation and transferring. This creates a fragmented view of knowledge in organization, and breaks the cycle of re-creating and renegotiating collective knowledge, which in fact should be treated as an ongoing process.

Overall, we observed the evolutionary and empowered nature of knowledge work performed by self-directed groups, and the contribution of this kind of work to organizational learning and increased social and intellectual capital. We believe that our research is the foundation of future research in which design features of virtual group structures and their knowledge processes and repositories can be established, based upon the kinds of characteristics that we observed occurring naturally in our study.

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