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Sharing Interdepartmental Knowledge using Collaboration Technologies: Action Research Study

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Abstract

Organizational processes today are marked by a growing fragmentation of knowledge and responsibilities. Rarely a process is found that is entirely carried out by one small group of people housed in the same department and physically close to each other. The most likely picture are processes encompassing activities carried out by two or more separate departments that are physically isolated from each other, and whose members have their own "culture" and follow their own schedules. While this configuration has its advantages, it also leads to a number of problems stemming from the fact that members of one department have very little knowledge about what members of other collaborating departments do. This paper discusses a study in which an email-based collaboration technology is used to support knowledge communication among people from different departments. The findings of this study are generally positive and contradict most of the empirical research conducted so far. Yet, these findings are plausibly explained based on a combination of social influences and compensatory adaptive behavior.

Keywords: Knowledge Management, Knowledge Sharing, Organizational Learning, Business Processes, Process Redesign, Computer-mediated Communication, Collaboration Technologies.

Background and motivation

Most organizational processes require the involvement of two or more departments to be executed, each contributing its own specialized knowledge. This knowledge fragmentation can lead to productivity and quality losses and has been the main target of a number of management consultants and organizational researchers, particularly since the 1990s, with the emergence of the organizational learning movement (Moingeon and Edmonson, 1996; Senge, 1990). In spite of this, the impact of collaboration technologies on knowledge sharing has not been the focus of much research, with only a few representative studies in the 1990s. Most of these studies have led to either inconclusive or negative findings, particularly those conducted in non-controlled settings. Orlikowski's (1992) study of a Lotus Notes implementation at a large consulting firm concluded that organizational culture and reward mechanisms prevented knowledge sharing

among consultants, in spite of the perception by subjects that Lotus Notes provided a new and effective path for the exchange of knowledge. A similar study, conducted by Neilson (1997) at a public organization and also using Lotus Notes, led to the conclusion that collaboration technologies per se have a small impact on interdepartmental knowledge sharing, and on organizational knowledge "retention" when employees leave the organization. Other studies also showed lackluster results when collaboration technologies are used to enable knowledge sharing between expert and non-expert employees (Ackerman, 1994).

The social influence model of computer-mediated communication behavior (Fulk et al., 1990; Markus, 1994) has been invoked to explain many of the neutral and negative findings above. The rationale is that if organizational norms and culture are not conducive to knowledge sharing, the introduction of collaboration technologies will make little difference. Others, such as Riggs et al. (1996), explained the findings on the basis that simple collaboration technologies such as email, Lotus Notes and Web-based conferencing lack enough technological sophistication to support knowledge sharing.

This paper presents findings of a study of effects of a simple collaborative technology, namely email conferencing, on interdepartmental knowledge communication. The findings of this study are overall positive and thus contrast with most of the empirical research conducted so far (only briefly reviewed above) regarding the impact of collaboration technologies on knowledge sharing (Ackerman, 1994; Neilson, 1997; Orlikowski's, 1992). The collaboration technology used in the study is simple enough to provide an empirical basis that is largely inconsistent with the call by Riggs et al.'s (1996) for more technology sophistication as a solution to reduce knowledge sharing obstacles. The positive findings of this study are interpreted in light of two theoretical models, the already mentioned social influence model (Fulk et al., 1990) and the compensatory adaptation model (Kock, 1999; 1999a), and found to be consistent with both models.

Research context and findings

The study was conducted as an action research intervention (Lau, 1997; Wood-Harper, 1985), in which the researcher provided collaboration technology support to interdepartmental groups engaged in process improvement tasks. The groups analyzed interdepartmental business processes, initially exchanging knowledge about those processes and subsequently discussing ideas on how to improve them. Twelve such groups were facilitated in two New Zealand organizations over a two-year period. Six groups were conducted at the New Zealand Ministry of Agriculture and Fisheries; the other six groups were conducted at the University of Waikato. At the New Zealand Ministry of Agriculture and Fisheries, forty-seven employees from eighteen different departments participated in the study. At the University of Waikato, sixty staff and faculty from fifteen different departments participated in the study. Groups lasted from ten to forty-five days and had from five to fifteen members each. The median number of departments represented in each group was four. Most of the group interaction was mediated by Listservs created by the researcher using Novell Groupwise macros. These Listservs enabled Internet-based communication that was independent of the email packages used (i.e. most email packages could be used), and full and simplified exchange of most types of file formats, as email attachments.

Sixty-two semi-structured in-depth interviews were conducted with group members regarding the perceived impact of the collaboration technology on variables seen as related to interdepartmental knowledge transfer. Interview respondents have participated in similar face-to-face interdepartmental groups in the past, and used those experiences as a basis for comparison. Table 1 summarizes a frequency distribution analysis of interview answers. Two interdepartmental knowledge transfer attributes are shown on Table 1: "Individual Learning", which refers to individual learning about other departments' role and inside activities regarding the organizational process under consideration by a group; and "Departmental Heterogeneity", which refers to the number of different departments represented in a group.

Answer / Variable	***Individual Learning***	***Departmental Heterogeneity***
Increased	32 (51.6%)	52 (83.9%)
Decreased	13 (21%)	1 (1.6%)
Had no effect	15 (24.2%)	4 (6.5%)
I don't know	2 (3.2%)	5 (8.1%)
Chi Square	10.61	> 100
P	< .01	< .001

Chi-square parameters: N=62, df=2 ("I don't know" answers were disregarded)

Cronbach Alpha (Waikato vs. MAF) = .72

Table 1: Distribution of answers from sixty-two respondents

Table 1 shows two statistically significant perception trends: (a) That collaboration technology support led to an increase in individual learning; and (b) That collaboration technology support led to an increase in departmental heterogeneity. Interviewees were asked to explain their answers (i.e. perceptions about attribute increases or decreases due to collaboration technology support). The two main reasons independently given by interviewees to explain why collaboration technology support had increased individual learning were: (1) A higher departmental heterogeneity enabled by the technology; i.e. having more people from different departments broadened the knowledge based used to analyze processes, which in turn led to increased learning; and (2) A better quality of individual contributions through the electronic medium in comparison with similar contributions in face-to-face situations. The increase in departmental heterogeneity caused by collaborative technology support was primarily explained by the asynchronous and distributed communication modes afforded by the technology.

Discussion and implications

The findings summarized in the section above are consistent with the social influence model (Fulk et al., 1990; Markus, 1994), as groups where formed with the objective of exchanging process-related knowledge among different departments. This led to secondary social influences (e.g. perceived group mandate, expected individual behavior) that were conducive to knowledge communication. These influences combined with the technology's support to asynchronous and distributed communication to remove material and scheduling obstacles to group interaction.

However, the second most frequent explanation by interviewees for the perceived increase in individual learning cannot be easily understood based on the social influence model. Such explanation was that the "quality" of individual contributions had been improved by the use of an electronic medium for communication when compared with quality of individual face-to-face contributions. This explanation contradicts theoretical models (e.g. media richness theory) that argue that any communication medium that is "leaner" than the face-to-face medium will be perceived as less appropriate for knowledge communication (Daft and Lengel, 1986; Lee, 1994).

One can either dismiss the explanation above, claiming that it may be due to research-induced perception bias, or look for a theoretical basis on which to understand it. One of the few theoretical models that provides a basis on which the interviewees' explanation can be understood is the compensatory adaptation model (Kock, 1999; 1999a). This theoretical model argues that collaboration technology users "initially" perceive any electronic medium as less appropriate than face-to-face for knowledge communication. However, the compensatory adaptation model argues that, if social influences "encourage" the use of the medium, then the users of the collaboration technology will tend to adapt their behavior in order to overcome the "leanness" of the medium.

This study has found qualified support for the theoretical explanation above in interviews and content analysis of electronic contributions. In interviews, respondents often alluded to the influence of a "more ambiguous" medium on their constructing "better" individual contributions. See, for example, these two illustrative interview answers, whose contradictory tones imply both a perception of leanness as well as compensatory behavior:

> *"People read different things [in electronic contributions]. [Member's name - removed], for example, was misunderstood as volunteering to do something, when in fact she had made just a supportive comment."*

> *"… you produce a better quality contribution [when interacting electronically]. Take for example what [member's name - removed] wrote, she wrote a lot and it seemed that she thought a lot about it before she [posted] it to the group. She wasn't just babbling off the top of her head, she tended to think out what she was writing. I know I did it a lot, specially my first message. I really thought a lot to put it together."*

In addition, a content analysis has found that individual contributions in the groups facilitated in this study had significantly more words and were better structured than individual contributions in transcripts of similar face-to-face discussions facilitated by us in previous studies (the transcripts were generated from tapes of those discussions).

The findings of this study and their theoretical interpretation have research as well as industry implications. The main research implication is that most of the empirical findings regarding collaboration technology support to knowledge sharing can be theoretically reinterpreted, based on a theoretical framework that incorporates the social influence and the compensatory adaptation models. This reinterpretation may shed light on why results in the past have been generally neutral or negative, and provide the basis for the development of group processes and collaboration technologies that are more conducive to knowledge communication. The main implication from an industry perspective is that "more is not necessarily better" in terms of

collaboration technology features and sophistication. Even simple yet ubiquitous tools such as email can be creatively used to support effective knowledge communication and, as a consequence, give companies a competitive edge in today's organizational world of fragmented process-related knowledge.

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