Virtual team collaboration: building shared meaning, resolving breakdowns and creating translucence

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Abstract. Managing international teams with geographically distributed participants is a complex task. The risk of communication breakdowns increases due to cultural and organizational differences grounded in the geographical distribution of the participants. Such breakdowns indicate general misunderstandings and a lack of shared meaning between participants. In this paper, we address the complexity of building shared meaning. We examine the communication breakdowns that occurred in two globally distributed virtual teams by providing an analytical distinction of the organizational context as the foundation for building shared meaning at three levels. Also we investigate communication breakdowns that can be attributed to differences in lifeworld structures, organizational structures, and work process structures within a virtual team. We find that all communication breakdowns are manifested and experienced by the participants at the work process level; however, resolving breakdowns may require critical reflection at other levels. Where previous research argues that face-to-face interaction is an important variable for virtual team performance, our empirical observations reveal that communication breakdowns related to a lack of shared meaning at the lifeworld level often becomes more salient when the participants are co-located than when geographically distributed. Last, we argue that creating translucence in communication structures is essential for building shared meanings at all three levels.

Keywords: virtual teams, communication breakdown, translucence, shared meaning, social context
1. INTRODUCTION

Globally distributed organizations often bring people of different cultures and languages across heterogeneous locations together to collaborate on specific projects. Virtual teams are groups of geographically and/or organizationally distributed participants who collaborate towards a shared goal using a combination of information and communication technologies (ICT) to accomplish a task (Townsend et al., 1998; Lipnack & Stamps, 2000; Majchrzak et al., 2000; Kirkman et al., 2004). Virtual teams can refer to teams comprising of participants who never meet physically (Jarvenpaa et al., 1998), or to situations in which team members rarely meet face-to-face (Chudoba et al., 2005); thus, use ICT as the primary medium of interaction. Other concepts such as ‘hybrid teams’ or ‘far-flung teams’ are also used to describe teams with geographically distributed participants performing highly interdependent tasks that meet face-to-face occasionally (Bell & Kozlowski, 2002; Griffith et al., 2003; Malhotra & Majchrzak, 2004; Fiol & O’Connor, 2005). In this paper we investigate the communication practices of international virtual teams organized within a hybrid work arrangement.

Virtual teams must place the ongoing challenge of managing the collaboration at the very centre of teamwork. Some researchers view the management of virtual collaboration as articulation work (Gerson & Star, 1986; Schmidt & Bannon, 1992), that comprises all tasks involved in assembling, scheduling, monitoring and coordinating individual yet interdependent activities between the geographical distributed participants. Articulation work requires shared meaning in order to engage in fruitful negotiations and to avoid or quickly recover from communication breakdowns. The team members need to develop a shared meaning context and common language for making sense of each other’s actions. Creating shared meaning normally develops over time and by means of face-to-face interaction (Chudoba et al., 2005). Therefore, geographically distributed participants have a significantly more difficult task when developing shared meaning, because access to each other is only mediated via the traces left in the technology. However, there is a risk that participants ascribe individual interpretations to the traces that are quite different from the intended meanings of the traces. The lack of regular co-located encounters for social or work related activities inhibits the development of a shared meaning context and increases the risk of communication breakdowns. So the questions that remain are: How can we conceptualize the organizational context which is the foundation for building shared meaning in virtual teams and how can we improve the conditions for building shared meaning without co-location?

In this paper we propose the concepts shared meaning and translucence, and demonstrate their usefulness for analysing and theorizing about collaboration within virtual teams. Briefly, translucence can be defined as the triangulation of visibility, awareness and accountability. Likewise, we define the shared meaning context as the background knowledge that guides actors in organizing and shaping their interpretations of events. Our primary interest is to explicate how these two concepts are important when investigating the collaborative practice and for designing collaborative technologies to be used in virtual teams. The empirical work presented in this paper is the case study of two virtual teams engaged in hybrid work arrangements.
In section 2 we define the theoretical framework of shared meaning, technology mediation and translucence. In section 3 we present the organizational context of the case study while introducing the two virtual teams. In section 4 we present our research approach and our data sources. We then present our theoretical analysis of the empirical observations: first related to translucence in section 5 and then related to technology mediation of translucence in section 6. Finally, we offer conclusions.

2. THEORETICAL FRAMEWORK

2.1 Shared meaning in virtual teams

Teamwork is highly dependent on how well participants are socialized into the organizational context and their ability to make sense of and respond to each others’ actions (Suchman, 1987; Weick, 1993). An essential feature of virtual teamwork is communicative action or the ability to successfully negotiate and communicate with each other (Clark & Brennan, 1991). Many studies note that communicative action in virtual collaboration is dependent upon the emergent and time-consuming process of establishing common ground (Olson & Olson, 2000; Cramton, 2001; Malhotra & Majchrzak, 2004; Bjørn & Hertzum, 2006). Establishing common ground is a process of creating a shared meaning context; failure to establish and maintain such a context can result in serious breakdowns in collaboration (Cramton, 2001). Knowledge sharing is another fundamental feature of collaboration that is closely related to the process of building a shared meaning context. It is in ‘the process of consensus building that knowledge is shared and vice versa’ (Malhotra & Majchrzak, 2004). However, a key problem is how to conceptualize and articulate the shared meaning context as a fundamental aspect of virtual teamwork.

Some information systems researchers have pointed out that all actions within an organization are socially oriented and take place within a predefined organizational context (Lyytinen & Ngwenyama, 1992; Ngwenyama & Lee, 1997; Ngwenyama, 1998). The organizational context is the foundation for building shared meaning (Daft & Weick, 1984). For the sake of analytical clarity, we will delineate three conceptual structures of the organizational context: (1) the lifeworld; (2) organizational structures; and (3) work practice. The lifeworld is the intersubjective reality that is built on the interpretations of all personal work experiences as well as the collective experiences of the members of an organization (Ngwenyama & Klein, 1994). Habermas (1981) defines lifeworld as formed by the lived experiences and beliefs that guide peoples’ attitudes, behaviours and actions in their interaction. It consists of the unarticulated and taken-for-granted assumptions, knowledge, culture, beliefs and values. According to Schütz (1982), the lifeworld is the frame-of-reference that provides individuals with implicit guidelines for organizing, shaping their interpretations and enacting meaning to events and situations. The lifeworld schemes serve as filters of the collective reality like a veil through which people observe and interpret the actions of others (Ngwenyama & Klein, 1994, p. 133). Fractures in lifeworld schemes surface only during breakdowns of understanding or when seemingly contradictory organizational actions are closely investigated (Schein, 1992).
Organizational structures comprise explicit, articulated and visible structures, such as policies, norms, symbolic artefacts, ritual activity and patterned behaviour (Gioia, 1986; Lundberg, 1989). Examples of organizational structures related to virtual teams can be travel and email policies. The initiation of a virtual team comprising people from different sub-groups of the wider organization can be viewed as the emerging of a new organizational context in which a shared meaning context, new organizational structures and work practices need to be negotiated and enacted. The initiation of the virtual team must also include articulation work, setting boundaries, negotiating commitment to common goals, resources and so on (Strauss, 1988; Mark & Poltrock, 2003). While such initiation processes are essential for articulating organization structures (norms and policies), work practices – it must be understood that these structures are emergent – are continually being reshaped due to ongoing social interactions and negotiations amongst the participants (Klein & Truex, 1996).

The work practice level comprises the profession-specific norms, collaborative practices and languages. In organizations, various groups develop different vocabularies (i.e. lexicons) and everyday speech usage (i.e. parole) based on their professional background, the nature and the organization of their work. Different groups develop different lexicons and parole based on their traditional workplace experiences. Developing a common work language is a process in which various uses of language influence each other and creating new language forms and meanings (Holmqvist, 1989). For international teams, the complexity increases since participants do not necessarily share a common language. Further, geographic dispersion restricts the mediation of lexical differences and adoption of new vocabularies amongst the participants. Consequently, the potential for creating a new language form and building shared meaning is limited. Moreover, the interplay between formal and informal language can lead to problems of understanding when the participants don’t share the same meaning context (Robinson, 1991). For example, ordinary artefacts such as text documents (emails, memos, etc.) have a formal language as well as a context of meaning. The context of meaning enables the actor to enact meanings not explicit in the document but relevant to reading the text (Ngwenyama & Lee, 1997). In virtual teams, participants have limited access to developing a shared meaning context because they do not have regular face-to-face encounters, which support the development and alignment of common frames of reference. Thus, the risk of communication breakdowns increases.

The organizational context is a foundational element for the development of shared meaning for all organizational actors (Ngwenyama & Lee, 1997). The lifeworld and organizational structures define the possibilities and potential for action, providing stocks of knowledge, rules and resources upon which actors can draw to interpret each other’s actions. In everyday action situations (work practices), the organization’s policies, norms and resources serve to enable, constrain and sometimes prescribe what is proper or improper, and to lend meaning to an individual’s actions. The organizational structures also define authority and status of the individuals within the organization. As actors mediate action situations employing technology, they draw upon these stocks of knowledge, as well as material and non-material resources of the organization (Giddens, 1984; Lyytinen & Ngwenyama, 1992). While executing their work activities, actors rely upon the fact that they share aspects of the organizational context on key
elements and categories. Thus, the organizational context can be viewed as a fundamental element of the shared meaning context having practical consequences for the construction and negotiation of teamwork (see Figure 1).

2.2 Technology mediation and translucence in virtual teams

Employing technology to mediate communication and actions is essential to virtual teamwork. However, the communicative activities of virtual teams can be highly influenced by the collaboration technology and the organizational context (Ngwenyama & Lyytinen, 1997). Groupware technologies are open-ended applications (collections of rules and resources), but while their use is determined by how the participants adapt the application to their organizational context and work requirements, the functionality of the specific technology can constrain its users (Ngwenyama & Klein, 1994; Orlikowski & Hofman, 1997). A necessary requirement for virtual collaboration in a groupware technology is a common information space comprises a common repository and functionality to create and share objects-of-work amongst the participants (Carstensen & Schmidt, 1999). To effectively use the information space requires ‘articulation work’, that is participants must construct meanings related to the shared objects and negotiate agreements on how to enact meaning in the shared information items (Strauss, 1988; Hertzum, 1999; Weick et al., 2005). The common information space also provides visibility so that each participant can monitor and remain aware of the collaboration. In this regard the common information space serves as a kind of social ‘sphere’ within which social actions are propagated, ‘objects-of-work’ are operated upon and articulation work is achieved (Ngwenyama & Lyytinen, 1997).

New virtual teams have an increased risk of communication breakdowns (Hinds & Mortensen, 2005). This results from an underdeveloped shared context of meaning, and articulation work upon which smooth communication depends, leaves no digital traces in the groupware (Cramton, 2001). Further, geographic and mental distance amongst participants

Figure 1. Three analytical levels of the organizational context providing the basis for shared meaning.
often lead to simplified views of the work situation (Suchman, 1995). Important aspects of collaborative practice become invisible at a distance and the boundaries shadowing the work increases. Hence, achieving and maintaining visibility is essential to collaborative practices within virtual teams (see Table 1).

Translucence refers to groupware design features that permit important but invisible social clues to be visible, thus enabling distributed collaborators to monitor and interpret each other’s actions during collaboration. Translucence is an important feature of collaborative technologies, and should be provided in a low-effort, seamless way that does not interfere with the user’s primary task (Ebling et al., 2002). The main purpose of translucence within collaborative technologies is to avoid or recover from communication breakdowns. A communication breakdown is a disruption that occurs when previously successful work practices fail, or changes in the work situation (new workgroup, new technology, policy, etc.) nullify specific work practices or routines of the organizational actors and there are no ready-at-hand recovery strategies (Ngwenyama, 1998). Rennecker & Godwin (2005) identify two types of communication breakdowns that result from lack of translucence: (1) delays from blocked access to a needed resource and (2) interruptions due to unscheduled synchronous interactions that cause discontinuity in a current activity. While breakdowns manifest at the level of work practice, they can involve any of the three levels. On the lifeworld level, breakdowns can challenge the taken-for-granted constitutive knowledge of actors forcing them to reassess mental models and work routines. On the organizational level, they may force changes in policy, procedures and technologies.

Socially translucent systems that allow participants to observe each other’s actions have three important characteristics: accountability, awareness and visibility (Erickson & Kellogg, 2000). In face-to-face situations, awareness and accountability are closely linked and difficult to distinguish. However, in a technology mediated environment they are easier to distinguish. Accountability is accomplished through activities that make each collaborator’s actions visible to monitoring of others (Heath et al., 2002). Accountability result from and is facilitated by the knowledge that all actions are visible to all collaborators in the work situation. This knowledge that one’s action is visible to others can result in compliance with social norms, even if it is to avoid sanctions from others (Erickson & Kellogg, 2000). As an aspect of translucence,
awareness is concerned with making social context cues visible to the collaborators. When social cues become visible, team members become more aware of each other’s actions and presence and adjust their actions accordingly. Socially translucent systems assist collaborators in to seamlessly achieve visibility of all actions during the collaboration.

3. THE ORGANIZATIONAL CONTEXT OF THE CASE STUDY

The case study reported upon took place in a global transportation company with 100,000 employees located in Europe, Canada, the US and Asia. The company develops and builds a variety of transport vehicles as well as programmable transport-related electronic devices (e.g. doors and train signalling systems). As a result of mergers, the company develops software at different locations including Scandinavia and Asia. In 2002, they launched a capability maturity model based software process improvement (SPI) program. The initial mandate of the project was the development of common software processes. The two teams we studied were involved with different initiatives related to the SPI program.

3.1 Team 1

Team 1 consisted of ten participants located in Denmark, Germany, Thailand, Finland and Sweden. The team project manager was located in Germany, and the participants were chosen by their local managers. The main objective of the project was to develop one set of common software development processes. This task was overwhelming and difficult, since neither top management nor the team members had a common understanding of the project goals or activities. Team 1 met initially in April 2002 at a 3-day co-located kick-off workshop. At this meeting, the project manager presented rules for communication (e.g. when to use email or telephone), and fixed dates and times were established for telephone meetings. Lotus Notes was selected as the groupware and a Notes Database was configured to serve as a common repository for the project. Each team member was expected to fill in a weekly flash report describing their progress. Each member of the team was also given a toy figure of a knight (see Figure 2) as a symbolic representation of their membership in the virtual team. Team members placed these figurines on their computer monitors. The project of Team 1 failed; after 1 year, top management disbanded the team and the project was terminated. It is ironic that the symbol of choice of this team was the Templar knights of the crusades who failed due to their inability to ‘share meaning’ (or ideology) across distances.

3.2 Team 2

Team 2 consisted of five participants located in the US, Canada, UK and two different locations in Sweden. The goals of the project were the development of a high-level software configuration management (SCM) process grounded in existing software practices, and the piloting of the SCM-process at three sites in the company. Team 2 met regularly in 2–5-day co-located
workshops at the different sites (Toronto, Canada; Stockholm, Sweden; Cleveland, UK and Oregon, US). Between the co-located workshops, the team made three releases of the SCM-process. Before the last two workshops, it conducted three pilots (in Bangkok, Halmstad and Halifax) of the SCM-process and assisted the local software development teams in implementing the SCM-process. Team 2 mostly used email and telephone to mediate their work, and never used the Lotus Notes database that was established for the project.

3.3 The shared meaning context of Team 1 and Team 2

In order to facilitate a comprehensive understanding of the organizational context forming the foundation for building shared meaning in the two teams, we present a conceptual map in Figure 3. The company (labelled distributed organizational context in Figure 3) can be analytically delineated into lifeworld, organizational structures and work practices. The lifeworld consists of taken-for-granted background knowledge and assumptions related to the company’s culture. Since the company is global, the lifeworld of the distributed organizational context is related to the ‘local’ lifeworlds comprising the basic assumptions constituted within the local geographical sites (local organizational contexts) such as the taken-for-granted knowledge about human interaction in Thailand or Canada. Similarities exist between the lifeworlds of the local organizational contexts. These similarities comprise the lifeworld of the distributed organizational context: the global company.

The organizational structures of the distributed organization comprise the explicit and articulated roles and norms formulated by the company (e.g. ‘the vision of one global company using one set of common software processes’) typically communicated by internal magazines, memos and newsletters. The organizational structures articulated by the global company influence those structures within local organizational contexts. However, the organizational...
structures from the global company are often translated to fit local organizational contexts, and additional structures particular to local organizations are often enacted with local stories and rituals supportive of the local organizational contexts.

**Work practices** as constituted by the profession-specific norms and language used by all employees also differ between the local organizational contexts. Language used at one geographical site is constructed through constant contact between sub-languages between

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peoples’ various professional backgrounds. However, people from the same professional background have an occupational vocabulary for interaction (labelled ‘the professional context’ in Figure 3). The model in Figure 3 shows how the organizational context of a virtual team is a conglomeration of pieces related to lifeworlds, organizational structures and work practices that participants bring from their local organizational contexts. Developing shared meaning within virtual teams thus comprises negotiation processes, where the local organizational contexts serve as the foundation for building shared meaning.

In Team 1, the participants had to develop shared meaning across six local organizational contexts situated in Denmark, Germany, Finland, Thailand and two locations in Sweden. In Team 2, the participants had to develop shared meaning across four local organizational contexts situated in Canada, the UK, the US and Sweden. In no team had the participants collaborated together previously; however, they shared the professional context of software improvement processes.

4. THE RESEARCH APPROACH

In this research we apply an interpretive case study methodology (Eisenhardt, 1989; Walsham, 1995; Klein & Myers, 1999). This methodology is appropriate because it focuses on the complexity of human sense-making in emerging situations and attempts to understand the phenomenon through the meanings that participants assign to actions and situations (Klein & Myers, 1999). Our aim is to develop theoretical concepts and patterns, grounded in empirical data that will explain the social phenomenon of virtual team collaboration. We want to understand how geographically distributed team participants try to make sense of their collective practice by investigating the participants’ interpretations of distributed collaboration.

4.1 Data collection

Our primary source of data are the interviews conducted with participants and project managers of each team. However, other data collected and used in this research include organizational documents, transcripts of email correspondences, work documents, field notes and participant observations (cf. Table 2). These data are appropriate for our interpretive case study, as they allow us to access the participants’ interpretations regarding actions, events and the organization context within which the events occurred (Walsham, 1995). Unfortunately, it was not possible to observe the co-located workshops or to gain access to complete email communication within the teams, thus we triangulated the empirical observations from early interviews (C, D and E) to later interviews (H, I, L and O) while combining the empirical observations with the data sources such as the slides from the workshops (Q), the printout of specific email-correspondences (J) and the content analysis of the Lotus Notes Database (F). This approach helped us to interpret the collaborative practices within the teams and how the collaboration during co-located workshops was executed and experienced. The secondary data (e.g. A, B, G, K, M, N and P) support our competence analysis of the material at hand by
Table 2. Data sources

<table>
<thead>
<tr>
<th>Types of data</th>
<th>Team 1</th>
<th>Team 2</th>
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<tbody>
<tr>
<td>A) Participation in top management meeting <em>November 2002</em></td>
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<tr>
<td>B) Observed one CMM assessment where CMM-consultants from Canada interviewed 15</td>
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<td>software engineering employees about their work at the Danish site <em>November 2002</em></td>
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<td>C) Individual interview with the Danish team member from Team 1 including diagnostic mapping of problems, <em>November 2002</em></td>
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<td>D) Conducting one two-hour group interview with the project manager of Team 1 and the project manager of Team 2, <em>November 2002</em></td>
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<td>E) Interview/reflective conversation with project manager of Team 2, <em>November 2002</em></td>
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<td>F) Analysis of the content of Team 1’s Lotus Notes database, <em>November 2002</em></td>
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<td>G) Informal observation at the local German site in <em>December 2002</em></td>
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<tr>
<td>H) Individual interview with the German team member from Team 1 including diagnostic mapping of problems, <em>December 2002</em></td>
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<tr>
<td>I) Interview/reflective conversation with project manager of Team 1 in Germany including diagnostic mapping of problems, <em>December 2002</em></td>
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<td>J) Print-out of an email correspondences between two participants from Team 1, labelled ‘Email-waste-of-time’ by the Danish participant from Team 1, <em>December 2002</em></td>
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<td>K) Participation in top management meeting <em>January 2003</em></td>
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<td>L) Interview/reflective conversation with the project manager of Team 2, <em>January 2003</em></td>
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<tr>
<td>M) Observations at the local Danish site within the organization having informal conversation with employees and observing the organization <em>January 2003</em></td>
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<td>N) Informal observations at the local Swedish site <em>January 2003</em></td>
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<tr>
<td>O) Conducting one 3-hour group interviews with two participants (US and Swedish team member) from Team 2 in Sweden including diagnostic mapping of problems, <em>January 2003</em></td>
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<tr>
<td>P) Document analysis of company official information material</td>
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<td>1. Internal magazine</td>
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<td>2. Our key corporate values</td>
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<td>3. Common Systems and Processes: Getting it right</td>
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<td>4. Slides: Software within research and products</td>
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<td>5. About the organizational structure</td>
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<td>Q) Document analysis of material related to the two teams</td>
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<td>1. CMM – description</td>
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<td>2. Slides: A proposal for a simplified software engineering process and tools group – SEPTG</td>
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<td>3. One example of a weekly flash report from Team 1</td>
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<td>4. Slides: Software processes, methods and tools in two versions</td>
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<td>5. Slides: Software processes, methods and tools – communication rules</td>
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<td>6. Slides: External communication interfaces</td>
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<td>7. Slides: SEPG in two versions</td>
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<td>8. Project Mandate for Team 2</td>
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<td>9. Schedule for the CMM assessment in Copenhagen</td>
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<td>10. Lessons learned from the CMM assessments in Stockholm, Helsinki, Copenhagen and Braunschweig</td>
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<td>R) Field and dairy notes reflecting expressions and experiences. These were made all the way through the process <em>November 2002–March 2003</em></td>
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<td>S) Validation of findings in form of given a presentation top management and the two project managers of Team 1 and Team 2, <em>March 2003</em></td>
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CMM, capability maturity model; SEPG, Software engineering process group.
providing context. The secondary data sources provided us with the opportunity to construct an understanding of the ‘part’ (the primary interviews) in relation to the ‘whole’ organization. In this way, the secondary data support the principle of the hermeneutic circle, which is essential for interpretive research (Klein & Myers, 1999). Furthermore, our data was validated by the company’s top management and the teams’ project managers (S).

4.2 Data analysis

The analysis began during data collection and was captured in field notes and a diary kept by the first author. In this initial analysis, the first author described incidents and recorded reflections, impressions and feelings about the processes experienced. However, systematic analysis of the interviews was conducted after the data collection was completed. The authors also conducted within-case analyses, which involved a detailed case study write-up (Eisenhardt, 1989). The write-ups consisted of both the pure transcriptions of the interviews and also coherent descriptions of special events that combined material from all interviews and documents from the field. The coherent descriptions enabled us to access subtle changes and differences in participant interpretations (Walsham, 1995).

To systematically analyse the interviews we transcribed from audio format to electronic text and imported the transcripts into HyperResasearch for coding. Low-level categories were defined and notes (inspired by grounded theory) were attached to the text explaining the content (Glaser & Strauss, 1967). We then conducted a cross-case analysis between the empirical observations from both teams using memos, which were useful for investigating counterintuitive impressions emerging from the initial data analysis (Eisenhardt, 1989).

During interpretive analyses, the use of theory played a crucial role. We used theory both as an initial guide (e.g. analytic distinction of shared meaning context) in the analysis process, and a part of our final product by our conceptualizations of shared meaning and translucence (Eisenhardt, 1989; Walsham, 1995; Klein & Myers, 1999). Initially, we followed an open approach in analysing the data (Walsham, 1995). It was only in later stages of our analysis that the importance of the concepts of shared meaning and translucence started to emerge. In this way, we used theory as a ‘sensitizing device’ to view our data in a certain perspective (Klein & Myers, 1999), relating the write-ups, memos and low-level concepts indicated in the transcriptions of the interviews to the theoretical high-level concepts; thus creating a more abstract understanding of the process of building shared meaning in virtual teams.

Later, the theoretical concepts of shared meaning and translucence were used to conduct a systematic analysis of the empirical materials. All communication problems and their categories were written in a table, with links to the raw data in HyperResearch, and with exemplary quotes illustrating how participants articulated the problems. Some problems were related to the same fundamental issues, resulting in new groupings and categories of problems. Then all problems were labelled and categorized into social, technical and distributed issues. Following this, we selected the problems that were related to the main communication breakdowns. We define main communication breakdowns as disruptions that significantly compromised the
collaboration. The main communication breakdowns were then categorized according to the three levels of shared meaning, and analysed with respect to the concept of translucence. We used our definitions of lifeworld, organizational structures and work practices to identify at which level a specific breakdown was grounded. Additionally, the use of technology related to the creation of shared meaning was analysed. Table 3 below shows all the main communication breakdowns categorized into levels of shared meaning, and the problems with technology mediation of shared meaning. The following analysis section will explore all communication breakdowns at each level of shared meaning, before we discuss technology mediation of translucence.

5. CREATING TRANSLUCENCE IN VIRTUAL TEAMS

The development and maintenance of shared meaning requires translucence in communication structures at different levels: lifeworld, organizational structures and work practice. Without translucence, the risk of communication breakdowns increases. Our analysis suggests that breakdowns occur due to a lack of translucence on different levels, and that the recovery process requires critical reflection to create translucence. Sub-sections address each level of breakdown.

5.1 Translucence at lifeworld level

The lifeworld level comprises assumptions, knowledge, culture, beliefs and the taken-for-granted knowledge that organizational members use to act on and interpret the actions of others. All participants in a virtual team have their own lifeworld that is grounded on earlier experiences in the organization’s life and is forming their expectation to collaborate. Experiencing communication breakdowns at the lifeworld level often makes taken-for-granted
knowledge salient such as cultural differences. Thus, creating translucence at the lifeworld level is an alignment process where participants negotiate the basic assumptions about working in the virtual team by, for example, negotiating the norms, values and beliefs.

5.1.1 Communication breakdowns at the lifeworld level

In our case, the differences in expectations and processes and the need for creating translucence emerged at the co-located workshops. Co-located workshops are known to be important to shaping virtual teamwork (Maznevski & Chudoba, 2000; Kirkman et al., 2004). Living in different countries with different cultural norms and habits, Team 2 tried to establish the newly formed context by bringing gifts and greetings to the scene.

This other interesting thing that this team has that I've never seen before is this international gift thing. When I pack, here's Louis's pile, here's Michael's pile and by the way Sven wants to see pictures of the new kid... There's always stuff going or coming in. And Louis brings chocolate. Sven brings liquorice. Michael usually shows up with fudge. We take baby gifts for Michael's baby. And the latest thing as of the huggy-huggy, kissy-kissy thing – Michael has always done that. Not in Zurich, he kissed me in Toronto though. OK, from Michael you get one kiss, from Louis you get two. It's like this bee sting we had to go work it out, because how does this work? I'm from the States, we shake hands! (American member, Team 2)

The cultural exchange had a positive impact on the development of shared meaning in the virtual team. However, the collaboration within the co-located workshop was also associated with communication breakdowns experienced as a conflict on the work practice level, caused by the differences at the lifeworld level. The various working habits grounded in various lifeworlds crashed at the co-located workshops. Below, Team 2's project manager articulate how cultural working habits crashed at the co-located workshops.

If you look at my team, there are things like, some members were working, and worked very hard, they worked weekends, they have families and they work 15–20-hour days. [Not a Dane or a British person] but to a lot of the Americans and the Canadians they will sacrifice weekends and leave their kids, and they will fly off to Australia and... So there is a very high expectation to that the rest of the people in the team will do the same. [...] [Working remotely] people can take work, they can have some work and then send it back. There is not deadline pressure. So, if the Canadians or the Americans wanna work weekends they can, and it doesn't affect me and you. But when you get to these meetings, where you show up, that's when you get the problems, because all of a sudden it's like, we are gonna start at 8 in the morning and work until 9 o'clock in the night, and we are gonna do that for five days. And if we don't finish, then maybe work Saturday, so the expectation is really very high... specifically within this five member group, you only get the real problems when we meet in one room, because then you have the clash of the cultures. (project manager of Team 2)

The participant's expectations and assumptions of how the work at the co-located workshop should be conducted were not aligned. There were different interpretations of what it meant to
work hard, especially between the Swedes and the Briton on one side, and the Canadian and American on the other. The cultural gap had a bad influence on the co-located collaboration. At the first workshop in Toronto, all came and stayed through the entire process. In Stockholm everyone attended the first day that was used for organizing the workshop, but some left before the end. In Cleveland some came late, and in Oregon people came and went at different times so they did not have a full 5-day workshop. The participants tried to change these patterns by using an external consultant to moderate the workshop in Oregon, but did not succeed.

For Team 1 the main communication breakdown at the lifeworld level concerned the negotiation of the project objectives. This breakdown occurred the first day and was never resolved, and eventually led to the disbanding of the team after a year. Through our investigation, we find that this communication breakdown was located at the lifeworld level. The project manager of Team 1 prepared a program for the initial workshop so that the participants could develop relationships and trust (Jarvenpaa et al., 1998). Reflecting on the situation at the initial workshop, the project manager contemplated that the foundation for doing these kinds of activities was not present then and was still not present 8 months later.

The idea was to drive, and the group was called process, methods and tools, and no one had a clue of what we should do. . . . Seeing this today, the difficulties were that most of them never worked in this environment, they have no experience using English as the business language. The first time as such, and they didn't, and even today many of them don’t know, the details of what to do. We started this educational thing, but I think it's far away from being finished. . . . The next day we continued until 10 o'clock, and then we had this brainstorming session discussing many things. And it was a real brainstorming session; it was very, very difficult to get real benefit from it, because the people had to find in their own language what they were talking about. And if you don't have English as your mother language, then it's much more difficult than if you have. (project manager of Team 1)

It is assumed that international team members have access to a common language. In Team 1 some of the participants were not fluent in the business language of the company, which further complicated the development of a shared language making it impossible for the team to initially negotiate the general objective.

5.1.2 Creating translucence at the lifeworld level

Breakdowns at the lifeworld level were experienced at the work practice level when the participants from the two teams were co-located. It was the consequence of incongruence in lifeworlds that resulted in the unproductive workshops. Team 1 never produced the expected outcome and Team 2 never had productive co-located workshops. Creating translucence and developing shared meaning at the lifeworld level comprise negotiations of the most fundamental elements. It is difficult to negotiate collaboration at the lifeworld level because differences are unarticulated and invisible as long as the collaboration works smoothly. Thus, creating translucence is an ongoing negotiation process aligning lifeworlds, building the virtual team context while developing shared meaning related to the experienced breakdowns. Unresolved
breakdowns at the lifeworld level and their consequences for work practices impact the collaboration negatively. Moreover, it should be noted that since it is very difficult to change unwanted patterns in virtual teamwork, it might be beneficial to address this issue initially (Tyre & Orlikowski, 1994; Jarvenpaa & Leidner, 1999; Huysman et al., 2003).

5.2 Translucence at organizational level

The toughest issues in information system design are those concerned with modelling co-operations across heterogeneous worlds, of modelling articulation work and multiplicity (Bowker & Star, 2002). Members of virtual teams are, like everyone else, participating in various local organizational contexts. However, the boundaries between the contexts become more challenging when geographical distance is the demarcation line. Virtual team members are participants in both the virtual team context and the local contexts in which they are physically located. The organizational level consists of the explicit and visible organizational structures forming the virtual team context; thus the physical location of management and the project manager is a part of the organizational level affecting the negotiated shared meaning.

5.2.1 Communication breakdowns at organizational level

In Team 2, top management and one team member were located in Toronto, Canada. The project manager was located in Cleveland, UK. When top management wanted information about the team, they usually went to the member in Toronto rather than the project manager in the UK because it was easier than calling Cleveland that involved a 5-hour time difference.

And they all sit in Toronto, and it’s a hell of a lot more convenient to wander down the hall or to call [the team member], than it is to call [the project manager] with this 5-hour difference. (US Team member in Team 2)

The various locations of the team members, top management and the project manager resulted in communication breakdowns. Communication between management and the team did not go through hierarchical structures mediated by the project manager. Instead, communication was often mediated by the Canadian team member and not the project manager in the UK. Hence, important decisions affecting the work were communicated through invisible structures. When people collaborate, they become involved with extra activities such as dividing, allocating, coordinating, scheduling and interrelated activities and tasks between participants. This extra work is referred to as articulation work (Schmidt & Bannon, 1992; Bowker & Star, 2002). Articulation work is seamlessly interrelated with tasks and actions. Invisible communication between top management and the team influenced by the geographical location of management caused team members (including the project manager) to feel left out of important decisions. Participants saw assignments, tasks and actions as appearing or disappearing behind the inaccessible negotiations between management and the Canadian team member.
and it all kind of ended up in the project schedule all of a sudden. From one day to another. The original was that we were doing pilots in Bangkok and Halmstad. . . . And what I can remember all of a sudden, Halifax showed up in the monthly power point of some document somewhere. (Swedish Team member from Team 2)

The number of pilot projects changed unbeknown to the team members. This gave an impression that the pilot project in Halifax suddenly appeared. Strategic discussions resulting in activities disappearing were also inaccessible to the team members.

I don’t know how this works exactly . . . It just disappears. Or gets re-negotiated, get shuffled or [project manager] and [team member in Toronto] had some discussion where to push it though another project. There is a strategy discussion going on there that the other three of us don’t know about. We just see the action go away. (US Team member from Team 2)

The articulation work required for collaborative planning of actions was constrained by the invisible and opaque communication structures at the organizational level. The invisible structures prevented team members from knowing when work was transformed and re-negotiated. They felt they could not rely on former decisions since they could be changed without their involvement. They felt they were ignored and overruled by decisions made elsewhere. The communication breakdown experienced at the work practice level (e.g. tasks disappearing) stemmed from the conflict regarding organizational structures at the organizational level. In an organizational context, well-socialized actors have taken-for-granted knowledge and a set of pre-interpreted patterns of meaning about the organization which serves as a reference scheme and enables actors to act and interpret the actions of others (Ngwenyama & Lee, 1997). The interpretation of others’ actions is complex in the virtual teams if participants do not develop a shared practice; thus, lacking a reference scheme enabling them to interpret each other’s actions. Opaque communication structures at the organizational level constrain the building of shared meaning. Lack of a reference scheme increases complexity in interpretation of others’ work and doing articulation work, aligning individual actions to the actions of others. The team members in the study experienced incongruence in frames of reference (Orlikowski & Gash, 1994), and articulation work became constrained. The team members functioned under this condition knowing that they could not influence important communication that was taking place. The actions of some team members were culturally influenced (i.e. based on work ethics and issues of convenience in this case) and were inaccessible and too complex for interpretation by global team members abroad.

The project manager of Team 1 tried to establish a shared meaning at the organizational level by, for example, providing the symbolic artefact of knights. This artefact had the purpose of representing the organizational structures of the team by being present all the time locally (at the computer screens), reminding the geographical distributed participants that they are a part of a virtual team context.

[I wanted] to have some kind of symbol and to create some kind of community. So I had this idea of how the group was fighting for one set of common processes. And they get playmobile, small figures you can sample together; it was a small knight, so that everyone
can put them on their desk. You are isolated, so now you have something on your desk, which reminds you of where you belong to (project manager of Team 1)

However, the unresolved breakdown at the lifeworld level meant that the team members lacked a common language to negotiate and construct meaning related to the symbolic artefact. Thus, the knights on the local computer monitors did not serve to make the participants feel less isolated.

5.2.2 Creating translucence at organizational level

Where the negotiation of shared meaning related to the lifeworld and work practice are handled by the virtual team members, negotiation on the organizational level is in the hands of management. When geography enables management to use informal ways when directing the work of the virtual team instead of using the explicit and visible structures they themselves initially provided, then these opaque, implicit and invisible patterns have serious consequences for the work practice. Creating translucence at the organizational level is, in this way, a process of developing the appropriate organizational structure for the team, articulating the decision-making process, and then actually using it in practice. Moreover, the construction of symbolic artefacts representing the organizational structures of the virtual team context requires managerial support such as allocation of resources. Also, symbolic artefacts require negotiations that create shared meaning, thus unresolved breakdowns at the lifeworld level in respect to developing a shared language negatively influence the construction of symbolic artefacts at the organizational level.

5.3 Creating translucence at work process level

The work process level consists of profession-specific norms and work practices. All communication breakdowns manifest at the work practice level; however, not all breakdowns are grounded at this level, as we have illustrated above.

5.3.1 Communication breakdowns at work process level

Team 2 experienced communication breakdowns related to the work assignment: developing the SCM-process reflecting the software development practice of the 10 divisions around the globe. However, prior to the project, SCM-processes existed locally, thus, bringing the four highly skilled group members (excluding the project manager) together and challenged the negotiation, since each member had its own locally preferred SCM-process causing a strategic discussion (Ngwenyama & Lyytinen, 1997). The strategic discussion entailed convincing the others of how to develop the SCM-process using existing local best practices. Participants focused on achieving an advantage over the others. Consider the quote below:

[The department] in Toronto has a process description already. So does Oregon. They are all over the place. They are multiple. But the two best ones are in Oregon and Toronto.
Locally these exist. Oregon already had one, Toronto already had one. We looked at all the divisions. Here is where the SCM-process already exits. Now we are gonna build one? Well why start from a blank sheet, if you have all these pieces already. The idea was: Take this survey – take the best from the process – and that became [the organization's] SCM. It makes sense based [on] inter-sustainable standards. Does ours look exactly the same – the one we build in Oregon? No, but the content are the same. Ok. All right then you get down to the documents the deliverable. The process description documents. If we use the table's content would I be ok? Sure. Do I have the same activities and deliverables? Sure. But do I fundamentally wanna start with Toronto's process description and turn it in to the organizations-process description? No. (US Team member in Team 2)

In Team 1, most of the participants continued to work on their former projects after the initial kick-off and only three people were fully released to participate in Team 1. These three people (one Dane and two Swedish employees) formed a sub-project aiming at developing a code standard. They, however, had many disagreements about how to achieve this outcome. Investigating the existing code standards within the company, they found that each site has its own local standard. The sub-group tried to locate a tool for validating code standard. However, having nine different code standards, they had to define a common standard before locating the validation tool. When they began by reviewing the code standard at the Swedish site, a communication breakdown related to the professional context emerged. The review was situated in a co-located setting in Sweden, where two of the sub-group members introduced the standard – created primarily by one of the Swedish members – to software engineers. The last member of the sub-group had called in sick that day. After observing and talking to the engineers, the two-team members assessed the result.

We totally disagree about how the review had went. [A Swedish member] though that it went well and there only were small corrections to be made. I, on the other hand, was of the opinion that the programmers did not have a clue of the meaning behind the code standard. (Danish team member in Team 1)

The Danish member perceived that introducing a code standard comprising approximately 200 rules to all software engineers in the company was unrealistic. Instead he suggested they implement an industrial code standard, since the chance of engineers already being familiar with an industrial standard was high and it would also be easier to locate a generic tool for validation. However, the Swedish member totally disagreed.

Bringing highly skilled and motivated people together to agree on a common task is a challenge that is well known from software development practice (Ngwenyama & Lyytinen, 1997). Specialists often follow different goals and find themselves in conflict during teamwork; however, they still collaborate to produce the expected product, as did the sub-group. The conflict did not have anything to do with antagonism, but it was embedded in the task. Since the participants of Team 1 and Team 2 had prior experiences working with SCM-processes or code standards, they had their own ideas, assumptions and expectations of how the work should be done.
5.3.2 Creating translucence at work process level

Creating translucence building shared meaning at the work practice level is a negotiation process between the participants where sub-languages are in contact, new languages are formed and meanings are developed. Participants engage in and are challenged by each others’ perspectives on how to do a task. Resolving the breakdown at the work practice level can include a critical reflection on the lifeworld level, if the breakdown is fundamentally grounded. However, the breakdowns illustrated here were related to the negotiation of the work process. Here, participants’ knowledge, language and professional norms concerning SCM-process and code standards at the professional level were on the agenda. Thus, the participants had a common professional language to negotiate this aspect at the work process level, providing the possibility for articulating their differences and building shared meaning. The communication breakdown incident of Team 1 was easier to resolve than the breakdown experienced by Team 2, because Team 1 could refer to top management to decide whether to use an industrial standard or not. Team 2’s communication breakdown was not resolved easily, since the negotiation process was implicit and ruled by the actions or non-actions concerning the assignment. There was clearly no translucence in the process, especially regarding the second release of the SCM-process. Here, the Canadian member changed the work of the whole team without consulting others and released the SCM-process within the whole organization. The American member describes the second release as, ‘release two was not team consensus, but team consensus edited’. The team was unable to create translucence around their work process in this incident, thus the development of shared meaning was constrained.

6. TECHNOLOGY MEDIATION OF TRANSLUCENCE

The technology mediation within the two teams was mainly done by email and phone, since neither of the teams managed to adapt the groupware system, Lotus Notes. The question is then, how can email enact translucence supporting the development of shared meaning in virtual teams?

6.1 Constrains of emails in creating translucence

Email is a collaborative technology supporting communication. However, email does not provide a public arena in which participants can collect their common items. Email does not provide a shared workspace in which collaborative objects-of-work and their locations become visible for others to monitor, increasing the possibility for mutual accountability. Instead, the objects-of-work are distributed on individual laptops and exchanges occur based upon individual and local structures instead of being structured accordantly to a shared collaborative understanding. In the case of Team 2, participants expressed a need to have all documents available at one shared repository making both objects-of-work as well as their locations visible for others, to monitor supporting accountability. None of the participants (including the project
manager) had an overview of the project documents; hence, there was a lack of translucence. This created extra work for all. When attempting to locate a specific document, members would search their local email database, sort the emails by date, and then possibly retrieve the right document.

I will go looking in my Lotus Notes emails because I save all of them. And I would have to say search for project mandate, and I would find all of them, and then I would look date wise and then I would look content-wise and then I would give you one. And then is it the right one? Is it the current one? I don’t know. And if you call [the project manager], you can’t trust what he gives you – he just lost his complete Lotus Notes database. We have to send him everything. (Team member)

Email provides a medium for creating and transmitting relatively unstructured messages and tools to organize and manage conversations amongst individuals and loosely organized groups (Ngwenyama & Lyytinen, 1997). We do not argue that email is not useful in virtual teams, but we argue that it is not enough since the virtual team needs a platform on which they can represent their collective work (by object-of-work as well as by actions). Without this platform the opportunity to make individual work visible for others to monitor decreases. The adaptation of common repositories requires negotiations constructing shared meaning related to the objects and structures within the technology. In Team 1, members’ use of the Lotus Notes database was not connected to a negotiated shared meaning concerning the repository. The Danish member explains that only he, the project manager and the Swedish member had uploaded documents to Lotus Notes.

[Besides me] the Swedish member uploads hundreds of documents. [I do not read these], because he uploads hundreds [of] documents. (Danish team member from Team 1)

Investigating the Lotus Notes database 8 months after Team 1 initially was formed, we found that the system did not contain hundreds of documents – only a few documents were uploaded. Also, few attempts were made to begin discussions (e.g. notes written by the project manager to begin an online discussion of the project objective; however only followed by one small comment). They never managed to adapt the system into their collaborative practice.

Because virtual teams have few opportunities for casual physical encounters, they need to work on objects, share them and use the representations within a common repository to interpret the actions of the others creating translucence. Adaptation of a common repository requires negotiations that develop shared meaning related to the use of the technology. Without these negotiations, the technology will not become an active part of the teamwork. This constrains the possibility for actors to monitor geographically distributed collaborative situations. Routine social interaction requires that actors can monitor the situations in which they operate and reflect upon their own actions and the actions of others (Ngwenyama & Lee, 1997). This is constrained when email mediates all communication within the team.

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6.2 Visible configuration of the application mediates translucence

Configuration of a technical application reflects how a participant interprets the collaborative work, like the creation of an awaiting-action folder in Team 2. The company has rules that govern how to use email (e.g. that every email received should have a response within 24 hours in the receivers’ time zone). However, in Team 2, the use of email changed according to the actions and interpretation of others’ actions. Even though the official rules for response time exist, the American member expressed that she did not receive responses to all her emails. Acting on her experience of the actions of others, she created an awaiting action folder in her email box. She configured the technical application.

I have an entire ‘Awaiting action’ file folder of Emails sent to [project manager], Emails sent to [team member in Toronto] with no response that they even got the thing, let alone intended to do anything about it. (American member from Team 2)

The American member experiences difficulties in interpreting the actions of others when using email as a medium. She experiences the communication disruption of delay, since she did not know if the recipient had received the email nor had any intentions of doing anything about the content of the email. She is left waiting, thus creating a folder, effectively putting her inquiries on hold. The folder is based on her interpretation of the actions of other.

Researchers agree that the alignment process of the technology and work practice is essential (Orlikowski & Hofman, 1997; Ngwenyama, 1998; Majchrzak et al., 2000). This alignment of technology is a process in which work practice and technology-use practices merge, resulting in a new practice different from both the pre-existing (before technology) and initial practice (introduction of technology). Aligning technology includes configuration of the application, for example, changing the folder structures by creating new folders related to particular practices. However, when using an email application, the configuration is visible only by individuals and not by the collective. In Team 2, the awaiting action folder is visible only in the American member’s email box. None of the other team members has access to this folder, thus they are not aware that questions have gone unanswered. Hence, email does not support configuration at the group level which is known to be an important feature of groupware (Ngwenyama, 1998). Many email work routines can only be inscribed at the individual level; however, they represent how the individual perceives the collaborative work and therefore are essential to the interpretations of collaborative actions. It is only through the human processing of the actions of others (in this case, only visible in the email messages) that the shared practice can emerge building shared meaning.

6.2 Enacting richness creating translucence

In the area of managerial communication involving email, the primary ‘processing’ of data into information is performed by humans and not by hardware or software. It is through the process of enactment that people, not electronic communication media, bring about the richness they experience in their communication (Weick, 1969). One example of the lack of richness within
email communication was detected in the printout of the email correspondence in Team 1 (see section 4.1, J). The email correspondences were between three team members and was printed out and handed over to us by the Danish member as an example labelled ‘Email-waste-of-time’. The printout contains 16 messages exchanged within 2 days by the three team members concerning the issue of ‘How to make a document available on the intranet web’. The main problem was that even though they could upload documents to the intranet, these documents are not visible for those others than the author due to internal policies concerning uploading rights, etc. They did not solve the problem. However, more importantly, much of the content within the emails are related to the difficulty involved in interpreting the other participants’ utterances.

Reflecting a successful example of how to mediate shared meaning by means of email creating translucence at the work practice level, we have the email exchange between two members of Team 2. While the teamwork began in March, it was not until November that the participants had implicitly negotiated rules for using email in situations where correspondence resembled synchronous chat.

[Team member in Sweden] and I have worked together so extensively, that if I’m on the phone, or if we’re doing an email conversation, and one of us has an appointment or a meeting or whatever, there’s an email that says, ‘got to go now, we’ll finish later!’ So that you don’t keep e-mailing and expecting some reply, and there’s no one there anymore. . . . And how long did it take us to get to that? Thanksgiving. November. It was highly amusing, but I’m sitting in Oregon yelling, ‘expected behaviour, yay!’ I know that nobody’s there, so I’m not going to send anything. I’ll just wait till later, that’s much easier. (Team member)

The little sentence ‘got to go now, we’ll finish later’ made a difference in the way the two participants collaborated via email. The sentence gave the content of the email social context and it gave the receiver the possibility to ‘access’ the physical situation of the provider, which impacted the shared context of the participants. It supported the receiver when interpreting the action of the provider, since without the sentence, the receiver would have continued to send emails and then it would have been difficult to interpret the silence that followed. However, ‘human processing’ or enacting richness requires a shared background, lifeworld, or scheme of reference on which participants can interpret the actions of others. The importance of shared meaning increases when using open-ended systems. Using open-ended systems increase the complexity of interpretation of others’ actions, since the system itself does not provide resources for structuring the interactions. There is no clear workflow.

Given this episode of ‘human processing’ that developed expected email behaviour between participants, it can be argued that in the situated use of email, the participants successfully created translucence in the very incident mediating shared meaning. First, the American knew that the Swede was no longer by her computer because she explicitly stated she was leaving the computer, thus providing ‘visibility’. Then, the American behaved accordingly to this knowledge as she became ‘aware’. The Swede wrote she would be away from the computer because she knew she ‘could be judged’ according to her actions – she was being held ‘accountable’ for her actions. Here we see how visibility is only provided one way (from
Sweden to the US), while awareness has two forms of creating accountability: the American becomes aware of the Swede and the Swede is aware that the American is aware creating accountability. Through human processing, the participants created translucence when communicating by email in this specific situation; hence, they reduced the complexity of interpreting each others’ actions. The reduction of complexity or ambiguity is the result of human nature rather than the nature of email.

7. CONCLUSION

How can we conceptualize the organizational context that is the foundation for building shared meaning in virtual teams and how can we improve the conditions for building shared meaning without co-location? The organizational context of a virtual team is a conglomeration of pieces related to the lifeworlds, organizational structures and work practices of the local organizational contexts (local sites), the distributed organizational context (global company) and the professional context (SPI). Shared meaning is the frame of reference for the taken-for-granted knowledge, which enables participants to act and interpret others’ actions. In this paper we proposed three analytical categories of the organizational context; lifeworld, organizational structures and work practices, which we believe to be important in understanding the development of shared meaning in a virtual team situation. We argue that new virtual teams are prone to communication breakdowns due to sense-making failures at these three levels. Further, we argue that translucence in the very work situations may reduce the number of communication breakdowns.

The empirical observations suggest that creating translucence in virtual teams at the work practice level comprise negotiations of specific professional norms and work practices, which includes the development of a shared work language. Creating translucence at the lifeworld level comprises negotiations between the participants about the most fundamental issues of their collaboration. These include establishing the new team context, which is different from the existing local contexts. Lastly, creating translucence at the organizational level comprises negotiations between top managers, and to some extent, team members deciding the appropriate explicit structures and visible decision patterns surrounding the organizational context of the virtual team. In addition, our empirical observations challenge previous research (Maznevski and Chudoba, 2000; Kirkman et al., 2004; Chudoba et al., 2005) by illustrating that periodic face-to-face encounters not only impact the virtual team context positively, but also challenge the context by serving as a ground for communication breakdowns since it is during co-located events that major discontinuities at the lifeworld level become salient.

Finally, we argue that email, as a groupware technology, does not automatically mediate translucence, because participants cannot enact collaborative configuration of the application. Groupware technology should support collaborative configuration upon the application, thus, providing participants with the ability to construct and revise the conceptual structures of the shared workspace. The technology should also support the enrichment of mediated actions that facilitate visibility, awareness and accountability. Without translucence in the negotiations
of shared meaning, the risk of breakdowns in communication increases. Thus, translucence is a vehicle to support shared meaning. We do not propose that the ultimate goal for distributed collaborative practice is visibility, as in video conferencing. Instead, we argue that it is essential that technology designs provide participants with the opportunity to create translucence by permitting the invisible or tacit knowledge at the cultural level, related both to the work as well as to the use of technology that travels across distance when building shared meaning at all three levels.

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Biographies

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