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The struggle for 'appropriateness' - new sources of (techno-)stress

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Abstract
Information and communication technologies are employed in every aspect of contemporary life. Facilitated by ICT, many innovations in the organization of work have taken hold. The effects of these developments on the quality of life are disputed. By referring to the phenomenon of â technostress,â scholarsâ caution against potentially harmful effects of ICT on workersâ health. This relatively new line of research roots the sources of stress for the individual in features of ICT. The present paper is motivated by the observation that ICT is also rooted in social relations. The way it is used is heavily influenced by social norms and sensemaking. Based on this, the paper theorizes about new sources of stress originating from the social sphere that are enabled and facilitated by ICT. In particular, the paper investigates the notion of â appropriatenessâ as a theoretical building block for a more complex understanding of stress in todayâ s workplaces. In doing so, the paper seeks to establish a new theoretical framework capable of investigating new sources of stress on a theoretical as well as empirical level.

Keywords: information systems, technostress, ICT, appropriateness

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Information and communication technologies are employed in every aspect of contemporary life. Facilitated by ICT, many innovations in the organization of work have taken hold. The effects of these developments on the quality of life are disputed. By referring to the phenomenon of 'technostress,' scholars' caution against potentially harmful effects of ICT on workers' health. This relatively new line of research roots the sources of stress for the individual in features of ICT. The present paper is motivated by the observation that ICT is also rooted in social relations. The way it is used is heavily influenced by social norms and sensemaking. Based on this, the paper theorizes about new sources of stress originating from the social sphere that are enabled and facilitated by ICT. In particular, the paper investigates the notion of 'appropriateness' as a theoretical building block for a more complex understanding of stress in today's workplaces. In doing so, the paper seeks to establish a new theoretical framework capable of investigating new sources of stress on a theoretical as well as empirical level.

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1 Introduction

Information and communication technologies (ICT) are widely accepted and employed in contemporary society. Yet, their effects on the quality of life and work are disputed among scholars. On one hand, innovation in ICT is continuously heralded and marketed as a means to increase employees' productivity and well-being. ICT facilitates and enables new forms of work; it is viewed as liberating employees from the chains of fixed office hours and space. Telework or telecommuting is just one example of new, more flexible and more productive modes of work that also improve employees' quality of life (Cisco, 2009). On the other hand, the emerging literature on 'technostress' puts these changes in work and life under scrutiny by examining the degree to which the use of ICT leads to strain on the worker (Ayyagari, Gover, & Purvis, 2011; Weil & Rosen, 1997).

In contrast to previous technological innovations, ICT's pace of change has been faster and its proliferation into work practices is much broader. Furthermore, the term ICT refers to an increasingly heterogeneous group of tools. ICT and in particular technologies for computer supported cooperative work (CSCW) allow for distributed, technology mediated work. With ubiquitous access to organizational resources a growing part of modern employees is enabled to work when, where and with whom they need. Hence, the new technological infrastructure of the modern workplace facilitates new ways of organizing work. Teams can be comprised of the employees most capable for the project at hand.

In this paper we argue that these developments promote situations in which employees are involved with multiple social contexts in their day to day work, which potentially gives rise to strain that can't be explained simply by the degree to which they use ICT. Thus, we set out to theorize on potentially new stressors originating from multiple ICT-supported group contexts at work. The guiding question of this paper is: Why and in what way is distributed, multiple group work supported by ICT contributing to stress levels of workers?

The paper is structured as follows: First, we juxtapose the approach taken in this paper against other stress research. Next, we explore the role of ICT in the re-organization of the modern workplace. We do so by sketching broad trends in the development of technology and the organization of work that allow appreciating the role of ICT in the work settings under scrutiny. Section 4 centers on the phenomenon that is core to this paper - how technology is used and appropriated in groups. A firm understanding of these processes is required to appreciate why and how the notion of 'appropriateness' may serve as a new theoretical lens to identify new sources of stress in multiple-team settings. Next, in our discussion, we explore and discuss ways in which our approach may contribute to a different understanding of technostress.

2 ICT and its influence on occupational health

ICT is embedded into our daily practices, whether at work or home. It has become a taken-for-granted aspect of modern life. Scholars and practitioners alike have pointed out the potential of ICT to increase simultaneously productivity and well-being of employees. For example, a 2009 study of employees at Cisco found that telecommuting not only increases employee productivity, but also has positive effects on work-life flexibility and job satisfaction (Cisco 2009). 80% of the nearly 2.000 participants in that study reported an improvement in their quality of life and 67% of the respondents said that their quality of work improved likewise. The study estimated that Cisco realizes annual savings of $277 million thanks to telework and telecommuting.[1] However, several studies suggest that ICT can be held responsible for negative implications on health which ultimately lead to inferior productivity. The following provides a brief overview of research taken in this direction.

2.1 Research on stress and ICT

[1] A recent, international study by Regus (2012) reports that flexible working practices, enabled by IT, contribute to productivity. At the same time the findings provide evidence for increased motivation of staff. (cf. http://www.regus.com.au/images/Flexibility%20Drives%20Productivity_tcm78-49367.pdf , Last accessed: 14.09.2012.

"[…] The liberating effects of ICTs that relieve users from repetitive tasks coexist with demands for new work patterns, greater time, and more technology skills." (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008, p. 418). This observation motivates research on 'technostress,' a term coined in the 1980s encompassing "any negative impact on attitudes, thoughts, behaviors, or body physiology that is caused either directly or indirectly by technology" (Weil & Rosen, 1997, p. 5). Technostress as a concern for workers' health is a rather new topic in information systems research. IS researchers are largely influenced by work originating in Psychology and Organization Science and examine whether and how ICT use leads to increased stress. Experimental studies have examined how particular technologies or problems thereof lead to stress, one example of which can be found in Riedl et al. (Riedl, Kindermann, Auinger, & Javor, 2012), who set up laboratory experiments to measure reactions of users to a system breakdown, and found that such events were indeed experienced as being stressful. Another example is a study by Mark et al. (G. J. Mark, Voida, & Cardello, 2012), who compared normal email users with a group of workers who refrained from email for a several days, and found that refraining from email use was correlated with lower stress levels.

A more broadly-based study by Ayyagari et al. (2011) conceptualized different sources of strain by drawing on established categories of stressors in the organizational stress literature (e.g. Cartwright & Cooper, 1997; Malhotra, Kim, & Agarwal, 2004). These formerly technology agnostic stressors were reframed using ICT literature, allowing an investigation of technostress along these dimensions. The findings of their questionnaire study, summarized in Table 1, suggest that ICT increases stress levels by aggravating factors such as role ambiguity, job insecurity, or work overload.

Table 1: Summary of ICT features that can cause stress

Stressor	Effect of ICT-features
Work-home conflict	ICT allows for a constant connectivity that is perceived as an encroachment of personal space.
Invasion of privacy	IT represents an invasion of privacy by its capacity of monitoring and surveillance.
Work overload	ICT may lead to work overload as it raises the pace of work, which in turn contributes to the stressor 'work overload'.
Role ambiguity	Due to its proliferation and rapid changes disruptions of work and situations of conflicting demands become more likely.
Job insecurity	Given the constant changes in technology it becomes challenging for workers to maintain mastery over their tools.

Ragu-Nathan et al. (2008) draw on the Transaction-based model of stress, which consists of four interrelated constructs: *Stressors* are stimuli (e.g. events, conditions, demands) that create stress for the individual. *Situational factors* are (organizational) mechanisms that have a moderating effect on stress. *Strain* represents the observable response of the individual to stress. Together with the situational factors, strain influences *other organizational outcomes* like turnover, job satisfaction or absenteeism. The authors consider several sources of technostress: "[…] ICT create stress because they are complex and change frequently, involve significantly steep learning curves, require more work, lead to excessive multitasking, and are accompanied by technical problems and errors." (Ragu-Nathan et al., 2008, p. 422). Support for end users, their involvement in the design and planning of systems, and appropriate communication of changes are considered technostress inhibitors.

This newly emerging research topic that suggests that ICT can lead to negative impacts for workers dovetails well with Jarvenpaa and Lang's (Jarvenpaa & Lang, 2005) observation that user experiences with mobile technology are often paradoxical. For instance, the possibility of being "always-on" engenders a feeling of empowerment in users. Yet, the very same functionality is blamed by users for feeling that they are forced to respond to messages anytime, anywhere. They found that users strive to mitigate conflict situations by employing two generic coping strategies: (1) avoidance, meaning minimizing the interaction with the

technology, or (2) confrontation, a strategy to better understand and accommodate technology. We will later elaborate on the implications arising out of a confrontation strategy.

2.2 The social aspect of health

At a broader social level, the use of ICT to facilitate new forms of organization and the impact of those new forms on workers' health are being recognized. Changes in the organization of work take their form in trends like process reengineering, organizational restructuring, or flexible staffing. Institutions like the National Institute for Occupational Safety and Health (NIOSH) in the US and the European Agency for Safety and Health at Work (EU-OSHA) investigate the impact of working conditions on workers' health. Their reports acknowledge that the organization of work has changed and that the rapid developments in ICT over the past decade were a major facilitator of that change. The report by NIOSH (NIOSH, 2002) suggests that ICT will affect three levels ranging from (1) the individual's work context, (2) the managerial or organizational context, and (3) the wider external context on a societal level. The increasing use of ICT changes not only the individual job characteristics and tasks but also leads to other, more flexible work arrangements. The NIOSH further observes that the "revolutionary changes in the organization of work have far outpaced our understanding of work life quality and safety and health on the job." (NIOSH 2002, p. 1). Although these reports acknowledge that the capacity to track and describe these changing work patterns is very limited, they suggest that ICT plays a key role and impetus in most of these developments (Eurofound, 2011, p. 14). For instance, a Dephi-study commissioned by EU-OSHA forecasts work intensification as an important emerging psychosocial risk factor that builds on the growth of ICT in the workplace (EU-OSHA, 2009, p. 106). Many of the variables used to characterize different types of work organization resurface in studies investigating workers stress levels (EU-OSHA 2009; e.g. workload, control). Yet, "The final outcome seems to be very much dependent on the context into which practices are introduced" and the ways in which they are implemented (Eurofound, 2011, p. 32).

We suggest that some of the "paradoxical" findings with respect to the impact of ICT use on workers can be reconciled by understanding them in the context of the ICT-enabled organizational forms in which they are embedded.

3 Modern condition of information workers

In light of sometimes paradoxical findings regarding the impact of ICT, Arnold (Arnold, 2003) calls for a new approach in understanding the consequences of technology, one "that is based in the reconstitutive qualities of technologies [allowing] us to say that work is both more efficient and less efficient (and neither), not because different measures of different things can produce both results, but because the ground upon which work is understood, and the ground upon which efficiency is understood, are each altered (together)" (Arnold 2003, p. 253). Following this argumentation, technostress researchers need to reconsider their understanding of the (modern) nature of work. ICT does not render work necessarily either stressful or relaxing; however our understanding of work and its organization have shifted together with the technical infrastructure. Against this backdrop, we delineate three emerging modes in the organization of work as they are affected by and affect the use of ICT.

Growing importance of interactive tasks: A McKinsey report (Manyika, Lund, Auguste, & Ramaswamy, 2012) describes three waves in which technology transformed the nature of work. The early incorporation of IT in organizations focused on the computerization and automation of routine work and gave rise to the assembly line. The second wave focused on transactions, meaning jobs that involved tasks of information processing and transaction handling. These transaction jobs were easy to standardize and hence automate (e.g. bank clerk -> ATM; retail cashier -> self-check out). The third wave is proclaimed to reach out to the archetypical jobs of the knowledge economy. Complex interactions like joint problem solving take center stage in companies' struggle to raise productivity. According to the report, this is due to an increasing demand of companies in employees capable to handle complex interactions and significantly higher salaries associated with these (Johnson, Manyika, & Yee,

2005; Manyika et al., 2012). Thus, companies are now seeking to raise the productivity of jobs that cannot be automated. ICT promises to ease communication and collaboration, representing the means to support complex interactions that bridge time and space, promising efficiency gains for information workers.

The expanding toolset of the information worker: The characteristics of ICT found in today's workplaces differ significantly from its historical antecedents like the telephone or fax-machine. First, modern ICT is characterized by a much higher frequency of updates, new releases, and additional plug-ins. This means that employees are engaged with tools that can quickly become unfamiliar. Second, individuals enjoy a much broader diversity of tools with which to accomplish tasks. For example, email, Blogs, Wikis, IM, RTC, Twitter, and others can be used as different ways to communicate with others. Third, the higher number and diversity of different tools at employees' disposal goes hand in hand with different degrees of diffusion in society. Where the telephone as a communication technology eventually proliferated throughout entire societies, this is not the case for newer ICT like Twitter. Hence, employees are unable to assume that others with whom they interact have the same tools at their disposal or enjoy the same level of competency in using them. Fourth, platform technologies that include a wide variety of features are increasingly installed in companies to facilitate collaboration and communication among employees. Individuals within these organizations might assume that all members of the organization have access to those tools and are competent users of them. However, such platforms exhibit high degrees of flexibility in the way they can be used at work, in contrast to earlier, specialized applications.

Fifth, the increasing use of portable general-purpose computing devices such as the iPhone and Android smartphones, along with an assumed ubiquity of information infrastructures can lead to an assumption that one should be available for communication and able to perform work related tasks at any time and in any place.

Less stable organizational environment: Flexibility and mobility of the knowledge worker are made possible to an unparalleled degree by the ubiquitous access to information infrastructures. ICT facilitates new forms of telework that culminate in the nomadic worker (Garrett & Danziger, 2007; G. Mark & Su, 2010). Lyytinen and Yoo (Lyytinen & Yoo, 2002) call these work environments nomadic information environments by taking reference to the nomadic behavior of today's users. A recent article "Nomads of the working world" published in the Financial Times (Sanders, 2012) gives examples of this highly flexible and mobile style of work. In this vein Breu et al. (Breu, Hemingway, & Ashurst, 2005) observe that "Organisations have steadily evolved a physically distributed workforce, project-based structures, and less enduring team arrangements. These conditions mean that knowledge workers tend to spend a large share of their time away from the desk, traveling, and attending meetings in a range of locations." (ibid, p. 1).

The wide proliferation of ICT in companies goes hand in hand with questioning traditional, hierarchical models of organizing. "Thus, the traditional organization, where a few top managers coordinate the pyramid below them, is being upended." (Johnson et al., 2005, p. 22). In his 1990 article, Peter Drucker (Drucker, 1990, p. 98) envisioned that factories would transform from big, inflexible "battleships" to a highly flexible, modularized "flotilla" that allows rapid responses to changing needs. Others have joined into the movement for transforming organizations into small, more independent units (Picot, Reichwald, & Wigand, 2008). As companies move away from strict hierarchical control structures to units with decentralized decision competency and non-hierarchical forms of coordination, human knowledge workers provide the virtual glue that connects and coordinates these independent units.

In the following section we explore what the potential impact of such work scenarios on health is. We do so with a specific focus on the phenomenon that an individual worker is likely to be a member of, or at least interact with members of multiple teams. In doing so, we

narrow our attention to a particular phenomenon that is in some ways divorced from the current, inside the individual, focus of the existing technostress literature. Yet, we deem this aspect as particularly relevant because it has been largely overlooked.

4 Appropriating technology

The following bases our subsequent argumentation on assumptions about the interplay between the technology (material) and organizational (social) sphere. Essentially, we need to establish an understanding of how technology is appropriated into the everyday practices of organizational users.

4.1 Technology in organizational practices

In a recent literature review, Orlikowski and Scott (Orlikowski & Scott, 2008) examined how researchers conceptualized and studied the interplay between organizations and technology, and distinguished between three sets of assumptions upon which scholars base their research.

The first research stream is characterized by holding technology and organizations as separate, independent entities, each of them having their unique characteristics. Studies in this research stream view technology either as an independent or moderating variable that affects organizational outcomes. Hence, scholars strive to identify the effect of ICT on productivity levels or innovation. Likewise, technostress would be viewed as originating from technology inherent characteristics. Regarding the appropriation process, such research would evaluate technology based on a review of the requirements of the task and the features of the technology. Technology would be viewed as unhealthy if the requirements for its use lead to work overload or strain. The literature would conceive the introduction process of a technology as a rational process in which the user has a choice in whether or not to adopt and/or continue using the technology based on whether they feel it is easy to use and useful. Thus, an unhealthy technology would cause the workers attitude to shift away from being useful and they would stop using it.

The second research stream challenges the conception of technology as an independent, external force. It posits that technology is always defined in social interactions and against the background of historical, organizational contexts. Technology and organizations are thus not independent but interdependent. Hence, organizational outcomes are emerging out of a complex interplay between the material and the social. Scholars of this research stream found that different users appropriate the same technology differently. A 'technology-in-practice' (Orlikowski, 2000) as the outcome of an appropriation process results from a complex interplay in which social structures and work practices mediate and are mediated by engagement with technology (Orlikowski, 2009, p. 9). As a result the same technological artifact may serve as a material basis for different technologies-in-practice. Therefore, the question is whether or not a technology-in-practice is stressful rather than the material artifact itself. Users could potentially mitigate unhealthy uses of technology by integrating different coping strategies in their practices.

The third research stream attempts to respond and overcome the criticism of the former two. The first has been criticized for privileging technology as an exogenous force independent of social and historical context. Its assumptions that technologies' effects on organizational outcomes are predictable and stable did not hold empirical tests (ibid, p. 10 by reference on Orlikowski, 2007 and Orlikowski & Iacono, 2001). Yet, the second stream of research has been criticized for giving primacy to human actions and interpretations. The very materiality of technological artifacts was not entirely neglected, but it was severely restrained.

Scholars of this third research stream argue that these weaknesses arise from an underlying Cartesian dualism that posits technological artifacts and human actors as separate entities. Instead, these scholars propose that a relational ontology is needed that relies on a co-constitution of material and social entities (Orlikowski 2009). The actuality of socio-technical assemblages is not explained by properties of one or the other, "[…] relations and boundaries between humans and technologies are not pre-given or fixed, but enacted in practice"

(Orlikowski & Scott, 2008, p. 462). In this view practices are conceived as the locus in which the social and the material fuse and co-constitute one another (ibid.).

The Heideggerian interpretation of "equipment" represents another theoretical advancement seeking to overcome the Cartesian dualism (Riemer & Johnston, 2011). Riemer and Johnston (Riemer & Johnston, n.d.) describe the temporally sequential unfolding of appropriation from a Heideggerian perspective in three phases: first, technology is encountered as an object (present-at-hand) that needs to be studied in relation to its material dimension (what does it afford?), its practical dimension (what is its relation to the existing practice?) and its social dimension (what is its relation to social norms?). Before technology becomes part of everyday practices and disappears into the background the second phase denotes the necessity to place it as a tool among other tools in practice. This phase of 'place-making' is conceived by the authors as a form of sense making.

Thus, at a basic individual level, the relationship between ICT and stress would be governed by a person's familiarity with the technology. The non-existence of familiarity and a lack of a sense of appropriateness will induce a need for the development of familiarity. This leads to a feeling of uncertainty, which increases strain.

> *Proposition 1: Unfamiliarity about the appropriate way to use a technology leads to strain.*

4.2 Digital habitats – Intertwining technologies and communities

In a social context, the process of an ICT becoming equipment is affected by more than simply its relation to social norms – the ICT's use must take its place as a tool that is used in concert with the other people with whom one works. Communities-of-practice (CoP) denote configurations of people (i.e., teams) that pursue shared enterprises over time and engage in joint practices (Wenger, 2005). In these joint practices, participants of CoPs negotiate meaning and construct their identities. The book *Digital Habitats – stewarding technology for communities* (Wenger, White, & Smith, 2009) starts with the observation that communities

increasingly draw on and are made possible by digital tools. The place in which community members engage in practice and negotiate meaning, if it is supported and enabled by ICT, has become a digital habitat. Wenger et al. (Wenger et al., 2009) borrow the term habitat from biology in order to highlight that a digital habitat consists of a set of digital features necessary for survival of the CoP and highlights the ways in which the community exploits these features, just as a biological species exploits the physical features of their habitat. Together, species and environmental features co-constitute a habitat that changes with mutual adaptation, becoming "a mutually-defining relationship between a species and a place" (ibid, p. 37).

In the same way that a biological habitat may be particularly suited for one species and not another, the same digital habitat may be particularly well or ill-suited for a particular CoP: "The optimal configuration for a community includes the complement of technologies that are aligned with its key orientations." (ibid, p. 69).

The notion of the digital habitat nicely describes how CoPs and the technological configuration of their digital habitat are intertwined. Taking this notion a step further, developing conventions within a CoP for collaboration is important for promoting effective collaborative work (G. Mark, 2002). While Gloria Mark's (2002) work centered on a specific groupware system, it resonates nicely with Wenger's concept of digital habitat. She conceives of conventions as a 'social infrastructure' that enables groups to effectively collaborate in electronically mediated settings. "[…] users cannot simply be given a groupware system and be expected to optimally use it without some common agreements on the means of operation." (ibid, p. 351). The case of her study focuses on a team distributed to two locations that was supposed to collaborate over distance by means of a groupware system. The study revealed the need for developing a wide variety of different conventions of how to use and collaborate effectively by electronic means. Examples include conventions about mundane details like how to store information, information ownership and practices about the

circulation of information. Especially conventions regarding new work processes proved difficult to emerge. The study also revealed that the emergence of conventions is more challenging in distributed settings since collocated team members learn about working practices by peripheral observation and conversation. Thus, we propose that the development of conventions in distributed settings may take more time and effort than in collocated teams.

> *Proposition 2: The more a community of practice relies on mediated technology, the more likely that members of that community of practice will experience strain when setting conventions for use of technology.*

Fehler! Verweisquelle konnte nicht gefunden werden. displays an individual (outlined in black) taking part in a CoP which is mediated by two ICT (green, yellow).

Figure 1: Example of a Community of Practice

In addition to the substantial effort needed to realize one's interdependencies within a community of practice, the study points to the problem that subgroups may develop concurrent, heterogeneous conventions for the same aspects of the shared workspace. "[…] shared workspaces, and especially those whose usage cross organizational boundaries, are often used by those having different perspectives and even conflicting beliefs about work." (ibid, p. 374). Concerning the technological artifact, the study finds that systems offering great flexibility in the way they can be put to use require equally more detailed conventions regulating their use. "The stronger the technical flexibility, the more rules must exist for how we can handle this." (ibid, p. 373).

Mark concludes her paper by observing that "Habits must first settle into place: people must learn which functionality will be used, and how. A caveat is that while such awareness

information brings benefits, it will also impose overhead on users" (ibid, p. 383). It is this imposed overhead that is one of the cores of this paper. Teams need to appropriate technology in their processes. This appropriation process is ongoing and materializes differently in different teams. It is a process that is at times cumbersome, may involve "struggling" (ibid., p. 358), and at least requires some effort. Sharing such conventions entails developing expectations about the behaviour of other group members (ibid., p. 356). Such common knowledge emerges and resides on the group level. As such it becomes an issue of membership. Mutual expectations smooth work processes and collaboration scenarios, but these take time and effort to achieve.

> *Proposition 2a: The more flexible and open a technology is, the more likely it becomes that it is appropriated differently in different CoPs.*
>
> *Proposition 2b: The more flexible and open a technology is, the more effort is required to establish a common sense of appropriateness in CoPs.*

By adopting this viewpoint, we recognize that individual workers have some influence on what technology they use and how, but that the teams and others with whom they interact also have significant influence. In such a context, a team, being a CoP, might adopt a technology for their use that is at the same time unhealthy in its use for one or more members.

Considering now that an individual worker is likely to be a member of many communities of practice, each community develops conventions of collaboration, meaning each engages in a process of finding the appropriate way of incorporating ICT in their work. We suggest that each CoP may come to a different set of conventions, whether those CoPs inhabit the same or different digital habitats. These different conventions and the workload associated with choosing among them converge at the level of the individual worker. Indeed, if a worker is a member of several projects and teams, each of these projects and working spheres could be conceptualized as CoPs. Thus, today's information workers are increasingly members of multiple CoPs. Many of these are not co-located, so many of the processes that underlie the

maintenance and building of CoPs have become technology-mediated. Figure 2 displays a model describing an individual's co-presence in several CoPs. Each employs a different set of tools, entertains a different set of technology-in-practice. The same (e.g. green symbol) technology may have different significance in different communities.

Figure 2: Model of an individual's co-presence in CoPs

We assume that the workload is amplified at the individual worker level because the adoption of a new technology in an organization is likely to lead to different appropriations in the various groups. This means that a given individual might be taking part in the negotiation of use for a single technology across many different groups whose members might have different ideas about how it should be used. Furthermore, when the ripple effect is internalized (i.e., the worker just accepts several incompatible changes made in their various CoPs), the worker's quality of life is likely to suffer because they now have to cognitively balance several different modes of use for this single technology.

> *Proposition 3: The more communities of practice with which an employee interacts, the more uncertainty about the appropriate way to use a technology.*
>
> *Proposition 4: The more communities of practice with which an employee interacts, the more likely that the worker will use a technology in a way that causes strain.*

The following section extends our proposition that information workers are struggling to engage in ICT-mediated practices appropriately. 'Appropriateness' is understood as using technology in ways that conform to the conventions of the respective CoP.

4.3 Juxtaposing ICT-related stress with ICT's scope of use

Our theoretical framework of how technology influences stress in a social environment is based on two dimensions of practice. The existing technostress literature has largely focused on the issues surrounding an individual's use of technology. Here, we expand that notion to include the effects of technology and its surrounding practices in social contexts. The first dimension of our framework considers the **user's familiarity with a technology**. By learning and accommodating technology into our daily life we learn how to use the technology. We gain more or less mastery of the device. Of course we may also fail to do so. Anxiety, fear and feeling overwhelmed by the complexity of the technology may lead to stress. As such the technology may always remain foreign, unfamiliar equipment. As a technology is introduced to an individual and they are unfamiliar with its features and possible uses, this can lead to stress because its role and function are unfamiliar. Users in this circumstance must have coping mechanisms that enable them to incorporate the technology into their work practices. Moving further down in this dimension, we note that when a technology has been integrated into a employee's daily practices, his/her workload might increase. Finally, even familiar equipment may inflict uncertainty and stress as we struggle with misfits of our communication preferences and those of our communication partners.

The second dimension in our framework is concerned with the **degree to which an individual must consider other social spheres when using a technology**. We acknowledge that a technology and its surrounding practices might only affect the interaction of an individual and one other. In a dyadic sphere, the impact of a technology has somewhat similar effects on stress as the technology would have if the individual were working alone. However, as the individual realizes that the use of a technology might impact a broader sphere of their social world, we propose that the impacts can increase at an exponential rate. Technology and ICT in particular are used collectively by teams, organizations and society. Conventions are required to render such distributed coordination effective. Usage may need to be negotiated

with a broader sphere of others even if the tool is already familiar on an individual or dyadic level. The absence of conventions or the establishment of ineffective ones may contribute to ineffective habits when individually familiar technologies are used differently by others in a broader social sphere (e.g. badly managed conference calls).

Table 2 provides an overview of our theoretical framework and the two dimensions. It provides exemplary sources of stress at the intersection of both dimensions. Throughout this paper we essentially argue that research on technostress has predominantly engaged with phenomena situated in the first two columns, i.e. the perspective rested either on the individual or a single organizational unit or team.

Scope of use / *Familiarity*	Individual perspective on communication (dyadic)	Single Community of Practice	Multiple Communities of Practice	Sources for stress
Coping with unfamiliar equipment	*Proposition 1: Unfamiliarity about the appropriate way to use a technology leads to strain.* *Proposition 2: The more a community of practice relies on mediated technology, the more likely that members of that community of practice will experience strain when setting conventions for use of technology.* *Proposition 2a: The more flexible and open a technology is the more likely it becomes that it is appropriated differently in different CoPs.* *Proposition 2b: The more flexible and open a technology is, the more effort is required to establish a common sense of appropriateness in CoPs.*			Role and function of technology are unclear, causing uncertainty. Conventions need to be developed, causing overhead.
Coping with familiar equipment	*Proposition 3: The more communities of practice with which an employee interacts, the more uncertainty about the appropriate way to use a technology.* *Proposition 4: The more communities of practice with which an employee interacts, the more likely the employee will use a technology that causes strain.*			Constant awareness and employment of appropriate practices across heterogeneous contexts, causing overhead and uncertainty.

Table 2: Theoretical framework

5 Discussion

While stress is experienced individually, the way ICT is used remains subject to social processes. Technostress arising in a social context might seem at first glance to be a relatively straightforward phenomenon. At a simple level, being "always on" would lead to increased workload, and a fragmentation and interruption of work (G. Mark, Gonzalez, & Harris, 2005; G. Mark, Gudith, & Klocke, 2008). However, empirical evidence suggests that switching between different tasks is not problematic for employees per se; rather, it is the switching between higher levels of work organization that causes stress (González & Mark, 2004).

Furthermore, the adoption of technology in groups revolves not only around what to use it for, but also whether or not and in which way it is appropriate to use it. Such shared conventions and commitments are necessary to effectively collaborate; however, such a process of appropriating technology is not easily achieved but takes time and effort (G. Mark, 2002; Riemer & Johnston, n.d.). This phenomenon motivates our proposition that an individual's co-presence in multiple digital habitats may engender a "struggle for appropriateness".

The notion of 'appropriateness' builds on the process of appropriation as a process in which the individual engenders a technology with a feeling of familiarity. The artifact is no longer alien to the practices but has become part of the tools that are readily employed for various tasks, meaning the individual has gained mastery over these familiar tools. Yet, equalizing such mastery with technical knowledge or knowledge about features falls short of capturing what we mean by 'appropriateness'. It misses the social, interpersonal dimension in which the particular ICT is embedded. The ability to use appropriate means for communication and the sensitivity to communicate appropriately are both implied by our conception of 'appropriateness'. The former connotes the "right" choice of ICT among other tools for the task at hand. The latter underlines the often implicit conventions of how to communicate thoughts using a particular ICT: "It's not what you say, but how you say it."

One might notice the lack of a sense of appropriateness when entering a new job or facing the challenge of collaborating with members of other cultures. Suddenly, one has to think twice before sending an email, perhaps considering whether to address the other formally or informally, and whether it wouldn't be more appropriate to use the phone rather than email. There is a sense of uncertainty that has nothing to do with one's technical knowledge.

Throughout this paper we argued that these sources of uncertainty are more frequently encountered and dealt with by today's information workers. We believe that these sources stem for example from:

- not knowing how to use a particular piece of technology

- not knowing how a particular communication act will be received by another person
- not knowing how a technology should be used in a group
- not knowing whether a particular communication practice that is deemed appropriate in one group would be considered appropriate in another group

In the previous sections we argued that the modern condition of work has changed. Essentially, we observe that today the ideal organization is portrayed as a distributed organization in which highly-specialized individuals collaborate across boundaries of time and space. This necessary distributed teamwork is facilitated by ICT. Yet, the work puts a high onus on the individual, since he or she has to work with a growing number of distributed specialists in an overall growing number of projects which involve a shorter duration of working relationships between team members and who might have different conventions about what ICT should be used and how they should be used.

This new perspective on technostress suggests different research methods than questionnaire and experimental studies that have been undertaken so far. Questionnaires are difficult to design that would take contexts into account that included multiple team/project membership, multiple technologies, and multiple practices. Most often questionnaires are asked in general terms and not specific. A researcher using a questionnaire survey seeks to establish a correlation between properties of the technological artifact and the perception of stressors by the respondents. Hence, researchers strive to identify characteristics of technology that can be held responsible for increasing levels of stress in the workforce. However, a questionnaire that proposes that characteristics of technology are the sources of stress fails to recognize that the stress from using a particular technology might arise from the intersection of several social spheres.

Experiments can test a particular stressor, but it would be impracticable to test the impact of multiple group memberships. Hence, it would only make sense to have field experiments in which a proposed stressor is encountered in its true contextual state. Hence, we argue for a qualitative, interpretive research approach.

6 Conclusion

The argumentation of this paper adresses a specific work situation. Essentially, we posit that ICT allows for distributed forms of work to an unprecedented degree. The reliance on project-based work is a typical characteristic not only of the IT-sector (cf. Latniak, Gerlmaier 2007) but prevalent in other sectors like consultancies as well. Taken together, these developments pose result in a work situation in which members of a team do not share a common context in their work. Instead, a large part of their interaction has become technology-mediated. Sharing the same context allows for more subtle feedback loops regarding the appropriateness of using technology. It implicitly engenders constant learning. Replacing such a shared, physical context by technological mediation represents new challenges to such a work situation.

In addition, people are engaged in multiple CoPs at the same time. Each of these CoPs entails a potentially different, distributed group of collaborators. Each of these groups needs to appropriate technology and may do so in a different manner. These social norms are emergent and constantly emerge. Different groups may come to different conclusions regarding the appropriateness of using a technology for specific communication acts. Thus, the CoPs may enact differently shaped digital habitats. These different digital habitats converge at the individual level, inducing a 'struggle' to employ the means for collaboration as required by the respective CoP. This paper explores this "struggle for appropriateness" across CoPs as a potential new source of stress originating from the modern organization of work. The notion of 'appropriateness' is introduced in this paper to capture this phenomenon theoretically. The idea that technology needs to be appropriated and enacted in teams is not new to IS and CSCW research. Yet, the implications of being simultaneously enmeshed in multiple, distributed CoPs and the resulting potential to inflict stress on the individual represents a blind spot in current research on stress. It leads to the exposition of the presented theoretical framework, intending to capture the influence of multiple groups on the stress level of the individual.

This paper argues that ICT is not simply put into use but needs to be appropriated and embedded into work practices. Users negotiate the appropriate usage of tools in their work and team context. Considering the influence of the changes in the organization of work that we sketched above, we come to the conclusion that this yields the potential for a new source of stress; a form of 'technostress' that does not emerge out of the properties of technology but out of the altered nature of the organization of work and necessity to incorporate tools in such context. Former relatively stable organizational structures provided the opportunity to cultivate a common understanding. Ever changing communication partners and contexts alter this taken-for-granted background. In such circumstances, employees constantly need to cultivate rules anew. They face a struggle to use technology appropriately in a way that fits the social norms governing the relationships with colleagues, customers, or team members – all of which are constantly in flux. This paper theorizes that this struggle may represent a new source of stress.

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