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Co-designing a Socio-Technical Solution to Mitigate Workplace Communication Overload: An Interdisciplinary Practice-Based Study

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Abstract. The proliferation of Information and Communication Technologies (ICTs) in professional environments has led to an increase in communication activities, resulting in communication overload. This thesis seeks to address this challenge by proposing a socio-technical solution. Using a co-design methodology that integrates workshops, ethnography and interviews, the study explores workers' communication practices and organizational dynamics. These findings will be used to inform the system design and identify actionable strategies in the organization. The overall aim of this research is to deepen our understanding of effective solutions for improving communication practices and working conditions. It also aims to provide insights into interdisciplinary collaboration and methods for cross-disciplinary data sharing.

1 Introduction

The use of information and communication technologies (ICTs) in professional contexts has become widespread and communication is now distributed across different tools, both digital and non-digital. This blending of communication practices requires employees to engage in articulation work, which can be challenging as it involves cognitive, physical, attentional and coordination efforts (Denis & Licoppe, 2008; Figueiredo & Lopes, 2017; Ughetto, 2018). This has resulted in an increase in the communicative aspect, resulting in employees being exposed to multiple interruptions and simultaneous activities (Ingham, 2003; Datchary, 2011; Bidet, 2017; Arnold et al., 2023).

Consequently, there has been an increase in the use of digital and technological tools designed to enhance communication and collaboration in the workplace. These tools aim to simplify tasks and support employees in various activities. However, the rapid and frequent advancements in technology can present a challenge. When adopting new technological tools, it is necessary to reevaluate methods, processes, and organizational strategies (Bobillier Chaumon, 2020). This can lead to significant disruptions and disorganization in the workplace, which are often borne by individuals or groups.

Regulating workplace communication overload is a significant challenge for companies, both in terms of efficiency and occupational health. However, the solutions implemented thus far have been ineffective. Both awareness-based recommendations and purely technical solutions are not perceived as effective means of improving practices (Prost & Zouinar, 2015; Salembier & Zouinar, 2017).

2 Research questions and methodological approach

The objective of this thesis1 is to co-design a socio-technical solution that regulates communication in order to reduce communication overload among employees. The methodology used combines co-design workshops with ethnography and employee interviews. Its purpose is to serve both the development of new practices and the advancement of scientific knowledge through a dialectical reflection/action process (Sendra et al., 2022). To achieve this, the project adopts a participatory design approach that involves stakeholders in the early stages (Koskinen et al., 2011). This approach is guided by principles of participation, democracy, inclusion, equality, and sharing (van der Velden & Mörtberg, 2021). It recognizes individuals as genuine experts on their own

[1] This thesis is part of the interdisciplinary research project titled "VERTUOSE: Towards an infrastructure for communication supporting sustainable mediated communication practices." It brings together sociologists, computer scientists, and a psychologist. The project involves three research laboratories (LAAS, LISST, LIST3N) and is supported by the French National Centre for Scientific Research.

situations and the issues that concern them, rather than being referred to as mere 'users' (Sanders, 2008).

This practice-based study examines workers' practical experiences and the socio-organizational conditions that shape communication activity. The analysis aims to contribute to the design process by providing information on practices, work activity, representations, and organizational issues (Anderson, 1997). It also provides recommendations for system redesign and identifies constraints that individuals encounter in their activities (Baxter & Sommerville, 2011).

The study seeks to answer the following research questions: How can interventions in communication practices improve employees' quality of life and working conditions? How are communication conventions collectively developed? How can these discussions be facilitated? The study explores the strategies used by individuals to regulate communication and the collective conventions of use, which may be more or less negotiated and explicit (Datchary, 2011). The aim of this intervention is multi-layered, as it not only defines tool functionalities but also elaborates on the collective and organizational dimensions of the tool's implementation. The technical aspect involves software deployed on the organization's IT infrastructure and various terminals. This is supported by an organizational intervention aimed at assisting employees in establishing collective conventions that will direct the system's actions to reduce repetitive, exhausting, or problematic communication. Additionally, involving employees from the beginning of the project ensures transparency, comprehension, and ownership of the solution, which are prerequisites for its long-term sustainability.

Considering the interdisciplinary nature of the project, the study also examines the issues and contributions of sociology when working with other disciplines. It explores the interaction between Sociology and Computer Science within the research group, including the complementarity between disciplines and the circulation of theories, concepts, and methods.

3 Work and findings to date

The work completed thus far can be classified into three main areas: a literature review, fieldwork, and the start of data analysis. Initially, a systematic literature review and synthesis were conducted based on various approaches in the areas of workplace communication, participatory design, interdisciplinary work, and computer network architecture.

Fieldwork with the project's partner organization began in February 2022. The process involved several techniques, including 110 hours of ethnographic observation, 5 hours of interviews, 19 hours of co-piloting meetings, and two co-design workshops with all employees, each lasting two days for a total of 14 hours. The purpose of the interviews and ethnographic observation was to gain a comprehensive understanding of the workers' practices and the role of communication in their work. This information was used to plan workshops and design activities based on participants' actual experiences, even during the ideation phase. In addition, this method proved to be an efficient way to avoid costly self-observation by employees in a context of time pressure (Gaudart & Volkoff, 2022). The constant presence in the field also strengthened the participants' confidence, allowing them to fully engage in the exchange.

Co-piloting meetings were used to jointly monitor the project's progress with two employee volunteers, co-conceive research hypotheses, and plan and debrief co-design workshops. These individuals play a crucial role as privileged informants, monitoring organizational changes resulting from our discussions in terms of both organizational and communication conventions.

The co-design workshops aim to define the research problem and co-design solutions that are adapted to the employees' reality. These discussion forums bring together employees, sociologists, and computer scientists to share, learn, and confront their points of view, with the goal of co-constructing a solution that is acceptable and accepted by all. Each day has been planned carefully to establish a framework of listening and mutual trust, where individuals express diverse viewpoints and engage in a process of 'reflection-in-action' (Grosjean et al., 2019).

The analysis of the data has already started. Different methods for storing and integrating data from various sources are being tested. This task is challenging as it requires significant effort, particularly in formatting the data. Additionally, analyses are difficult to carry out since each piece of data reflects different aspects of reality. There is also the challenge of interdisciplinary work since the data analyses must lead to useful recommendations for the computer system's design (Ackerman, 2000). The research team is currently analyzing the data collected during these workshops, taking a truly interdisciplinary approach to designing a system that considers the diversity of viewpoints within the partner organization.

The preliminary findings suggest that employees' work is characterized by the succession and interweaving of different projects, resulting in intrinsic fragmentation. This type of work necessitates individual and collective organization of activities and working time. However, engaging in multiple activities does not necessarily result in constant interruptions on a daily basis (Datchary, 2011). According to Datchary & Licoppe (2007), even if a person appears to be engaged in just one activity, the others remain in play.

Overload can become an issue when communication becomes burdensome and lacks meaning for workers. The workshops revealed concrete problems related to work overload, difficulties in coordinating hybrid work, and dissatisfaction with certain forms of collective organization. These discussions allowed for a review of current practices and the exploration of collective solutions, which are currently undergoing testing. Furthermore, the employees proposed an inventory of potential forms for a regulatory body focused on communication and provided a list of ten data points to share with the research team.

4 Next steps

Future challenges include analyzing workshop data, continuing ethnographic work, and testing the functionalities offered by the new system developed by the computer scientists in collaboration with the participants.

To avoid perpetuating power imbalances between disciplines within the research team, it is essential to involve the Humanities and Social Sciences in the design process led by computer scientists. This task requires a clear articulation of terminologies, techniques, and ways of knowing, since ethnographic totalization procedures involve immersion in the uniqueness of circumstances, whereas computational modeling involves generalization at a universal level. Additionally, this work involves a strong connection between the analyses derived from qualitative research and the practical demands of system design (Karasti, 2001).

Relating professional practices to system design can be a complex process that may not align with typical research timelines. Questions often arise regarding the duration of sociological analyses and the need to make progress in system design. However, I strongly believe that this complex approach is worthwhile as it ensures a deep understanding of social realities while also facilitating the development of a technological solution that is tailored to and embraced by all stakeholders involved.

5 Expected contributions

The contribution of my thesis is threefold. Firstly, it aims to consolidate knowledge of the strategies employed by workers, collectives, and organizations to mitigate communication overload. The analysis of the three-year processes will enhance understanding of effective solutions to improve communication practices and working conditions.

Secondly, the insights gained from this study aim to contribute to bridging the gap between qualitative research findings and the practical requirements of system design. Specifically, I am interested in exploring manners of facilitating the translation of ethnographic and sociological data into actionable contributions in the field of collaborative systems design.

Finally, this research will provide insights into interdisciplinary collaboration and methods for sharing data across disciplines. It will explore ways to foster collaboration among researchers from different backgrounds who use different methodologies, particularly in computer science (such as modeling) and social science (such as inductive analysis).

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