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A Preface to 'Infrastructuring and Collaborative Design'

Volkmar Pipek[1] , Helena Karasti[2,3] & Geoffrey C. Bowker[4]
[1]University of Siegen, Siegen , Germany (E-mail: volkmar.pipek@uni-siegen.de); [2]Luleå University of Technology, Luleå , Sweden (E-mail: helena.karasti@oulu.fi); [3]University of Oulu, Oulu , Finland (E-mail: helena.karasti@oulu.fi); [4]University of California at Irvine, Irvine, CA , USA (E-mail: gbowker@uci.edu)

1. Introduction

Over the past decades, the emerging 'interconnectedness' of people, things and activities that spawns from processes of digitalization has received much attention in various disciplines in Humanities, Social Sciences, Information Systems and Computer Sciences. The topics of consideration vary, of course, as do the epistemological positions contributing to the discourses, but the sustaining interest in understanding and explaining what is happening, and why, has resulted in terminologies highlighting the relational aspects between individuals (and their activities), their social organization (as e.g. cities, companies or communities), and the technological infrastructures they use in order to perform activities and organize their practices. It has been highlighted that these relations and dependencies do not emerge somewhat accidentally, but that there are agendas and activities that - intentionally or unintentionally - modify or construct these relations and dependencies.

How infrastructures are formed and designed is a current area of research in a number of fields, including Computer-Supported Cooperative Work, Science and Technology Studies, and Information Systems. Although there already are a number of special issues on the topic of Information Infrastructures (Edwards et al. 2009; Jirotka et al. 2006; Lee et al. 2010; Monteiro et al. 2014), one on Knowledge Infrastructures (Karasti et al. 2016) and one presenting a toolbox for the ethnographic study and theorizing on infrastructures (Appel et al. 2015), this Special Issue is the first one to focus particularly on research that engages with a relational and processual (in-the-making) perspective and/or design-oriented interest towards Information Infrastructures. This approach has been called the study of 'infrastructuring'.

Infrastructuring thus proposes new, original challenges to contemporary CSCW and design in general by, for instance, extending the temporal, organizational, societal scopes and diversifying collaboration arenas from the common use, design

and development to tailoring, appropriation, repair, maintenance and standardization, to including professionals from industry, formal organizational structures like standardization bodies and authorities as well as community members and citizens in informal, community-based initiatives.

Furthermore, it has been pointed out that the emergence of infrastructures is not only a question of "being designed" in traditional sense, nor is it just "happening" without some intentionality involved. A growing body of work has started to explore what is actually being done and taking place in infrastructuring in a wide variety of settings; others have proposed suggestions for design methodologies/approaches making room and accounting for infrastructuring as a longitudinal, unfolding process.

In the call for papers we encouraged contributions along the following topic lines, however not limited to them, in order to take stock of the recent developments in infrastructuring research:

- empirical studies of infrastructuring
- theoretical/reflective articles on what the turn from the relational notion of information infrastructure to the processual one of infrastructuring denotes
- what could be learned from these studies towards developing design methods and approaches for infrastructuring
- examples of participatory/collaborative infrastructuring approaches/methods
- design cases and approaches that push traditional boundaries to involve communities not typically considered in CSCW
- practice-based and practice-initiated design cases and approaches
- cases and theoretical contributions to consolidate and improve design/ infrastructuring methods and practices

2. Publication Process

We received for this Special Issue 26 submissions with an unusual breadth of domains considered (healthcare, finance, office, culture, science, business, etc.) which gave us quite a challenge in having to find appropriate reviewers. We are thankful to around 120 researchers around the globe who considered our invitation to participate in the review process, and in particular to those around 70 colleagues who accepted it. These researchers from the CSCW, Science and Technology Studies, Information Systems, E-Learning, Media Studies, Software Engineering and Participatory Design communities helped us within 10 months to identify and improve around 12 submissions that were selected for publication. Due to the number of high quality submissions received, this JCSCW double issue with its eight papers does not cover all of it, the remaining part of contributions will appear in a later issue of JCSCW. This is why we as guest editors decided to postpone the full introduction

usually provided for special issues to the later edition, and leave the reader at this point with a brief overview of the contributions covered in this double issue.

3. Articles in this Double Issue

The first article by Grisot and Vassilakopoulou (2017) examines infrastructuring in the development of eHealth services. Drawing on the tradition of infrastructure studies that considers embeddedness as a resource ('installed base') the authors analyze the design and development of new web-based capabilities for communication between citizens and primary healthcare practitioners in Norway. In this empirical context, new patient-oriented services require renegotiating existing infrastructural relations that typically center on the information and communication needs of healthcare providers. Therefore, the article 'Re-infrastructuring for eHealth: Dealing with turns in infrastructure development' is highlighting the particular occasions of infrastructuring that entail facilitating the new logic of patient-oriented services within the established social and technological networks of Norwegian healthcare.

The second article by Ulriksen et al. (2017) also reports on a study from a Norwegian healthcare setting, but focuses on 'Infrastructuring in healthcare through the openEHR architecture', a project aiming at standardizing the electronic patient record (EPR) content. The authors have studied empirically over several years how clinicians and other system users have engaged in the highly distributed processes of developing standardized elements or clinical concepts that are called archetypes in the openEHR architecture. With a focus on the challenges of infrastructuring in a large-scale user-driven standardization process the authors provide insights into how power relations and politics shape the infrastructuring processes.

In the third article, titled 'Biography of a design project through the lens of a Facebook page', Maria Menéndez-Blanco et al. (2017) present a design case around the topic of dyslexia. Their account of the use of a tool ecology around a Facebook page provides interesting insights for the use of social media to manage and interact with publics to support infrastructuring efforts.

Marttila and Botero (2017) discuss in the fourth contribution 'Infrastructuring for Cultural Commons' their experiences with two infrastructural initiatives to preserve Europe's cultural heritage for future generations on digital platforms. They address particularly strategies to probe the 'installed base' that previous infrastructures provide in order to find orientation in infrastructuring efforts, and the 'gateways' that allow infrastructuring processes to happen. The practices as they are and as they could be can be simulated and stimulated by creating socio-technical workarounds, ad-hoc arrangements and prototypes of the technological horizon of opportunity.

Lindley et al. (2017) describe in the fifth paper 'Surfacing Small Worlds through Data-in-Place' how placing a voting infrastructure offering multiple participation channels into a neighborhood turned out to foster infrastructuring efforts in the neighborhood not because it helped decision making, but because it helped the

mutual understanding of diversity and multiplicity of attitudes and opinions within the neighborhood. They refer particularly to the material qualities of the infrastructure, and how these material qualities contribute to a (re-)production of publics and help to draw people into the structural configurations of heterogeneity, while assuring them that they can make a difference.

Young and Lutters (2017) use in the sixth contribution titled 'Infrastructuring for Cross-Disciplinary Synthetic Science: Meta-Study Research in Land System Science' the concepts of 'infrastructure inversion' and 'points of infrastructure' to describe the case of developing an infrastructure for an emerging scientific discipline: Land System Science. The research perspective that this community establishes has been significantly driven by the availability and emergence of Information Infrastructures that allow the global observation of human land use (e.g. Geographical Information Systems, Satellite Imagery, and Ecosystem Modelling and Simulations). They were able to describe four cases where existing research infrastructures did not fit the requirements of the new emergent discipline anymore, which forced researchers in a collaborative design effort to build tools they can work with, resulting in a new infrastructure.

Elena Parmiggiani (2017) addresses in the seventh paper 'This is not a Fish: On the Scale and Politics of Infrastructure Design Studies' methodological issues that come with research interests in infrastructuring as collaborative design. Coming from a critical reflection of the way ethnographers gather relevant information and tell the story of a practice, she experimented with four modes of scaling ethnographic work to meet with the challenges that processes of infrastructuring pose to the ethnographer. Using the example of an oil company's project to design a platform for subsea environmental monitoring in the Arctic region, she is able to show how Bertil became a fish of interest to the debates about oil and gas operations, but even more how the ethnographer of processes of infrastructuring can make use of these scaling mechanisms to be able to discuss the issues that matter at the political level of these processes.

Bødker et al. (2017) provide in the eight paper 'Tying Knots: Participatory Infrastructuring at Work' a discussion of 'participatory' infrastructuring using a case study from an educational context. They discuss the concepts of knotworks, relational agency, and symbiotic agreements to bring into focus activities and processes in which participants are not only engaged in while designing technology, but also while creating the structures, networks, and agreements that are crucial to creating sustainable outcomes. This way, they aim to map out a territory between infrastructuring and participatory design.

We are glad that we were able to collect a diverse and exciting body of contributions around the topic of 'Infrastructuring and Collaborative Design', and are happy to be able to announce that there is more to come in a later JCSCW issue. It was a pleasure and a highlight for us to serve as guest editors, and we hope our readers will feel as stimulated and inspired by these contributions as we felt while working on this Special Issue.

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