Transferability of Findings in Socio-Informatics: Enabling Social Change beyond the Individual Case

Maximilian Krüger[1,2,*], Philip Engelbutzeder[1], Marc Gerbracht[3], Markus Rohde[1] and Volker Wulf[1]

[1]Siegen University, Germany
[2]Universidade Federal do Pará, Belém, Brazil
[3]Institute for Sustainable and Digital Cooperation (DNZ), Siegen, Germany

Abstract

Design research, especially within Human-Computer Interaction is often a form of action research, that aims to create interventions through the design of artefacts. But how exactly can design research support the creation of change? In this paper we present the approach of Socio-Informatics which we have developed over the past two decades, and reflect on the different ways in which this research and its results contribute to changing social practices.

Keywords

Socio-Informatics, Epistemology, Transferability, Action Research

1. Introduction

Many forms of design research can be understood as action research (see e.g. [1]). While other disciplines may be more cautious about their desire to create change, seeking to appear neutral or objective (all problematic terms in their own way), the design of artefacts is often an intended intervention, aimed at creating change or supporting the creation of change somewhere, somehow.

Action research seems to have gained a poor reputation, but design-oriented research remains one of the few domains in science and research that is explicitly considered action research or at least action-oriented. Yet creating or supporting change in whatever domain is not a straightforward process. Therefore, the question remains: how does design and design research create social change?

In this paper we try to answer this question, by examining a specific form of design-oriented research we have been developing for several decades, which we call socio-informatics (SI) [2, 3, 4, 5].

Socio-Informatics (SI) emerged in critical interaction with existing academic traditions, seeking to overcome narrow, management-oriented or techno-centric conceptions of computing. It is an approach that explicitly acknowledges that design research is always interventionist, but argues that these interventions must be grounded in deep, situated understandings of social practices. By foregrounding this orientation, SI challenges deterministic or purely formal approaches to design that ignore social contexts or treat them as secondary concerns.

The paper is structured in the following way. We begin by outlining the research program of socio-informatics, including its epistemological foundations and its position on the spectrum between natural and social science, positivist and interpretivist research. We then explore the different ways in which socio-informatics aims at creating change, including brief examples from our own research history. Lastly, we will discuss our approach in relation to other forms of action and design research and outline future directions for research.

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*Corresponding author.
maximilian.krueger@uni-siegen.de (M. Krüger); philip.engelbutzeder@uni-siegen.de (P. Engelbutzeder); marc.gerbracht@uni-siegen.de (M. Gerbracht); markus.rohde@uni-siegen.de (M. Rohde); volker.wulf@uni-siegen.de (V. Wulf)
0000-0002-5686-0566 (M. Krüger); 0000-0002-9219-7327 (P. Engelbutzeder); 0000-0002-9827-6544 (M. Gerbracht); 0000-0003-3290-5261 (M. Rohde); 0000-0002-1214-1551 (V. Wulf)

2. Background: The research program of Socio-Informatics

2.1. Foundations and Goals

Socio-Informatics is an approach focused on both the design of technology and the study of its use. It is rooted in the practice-based approach of human-computer interaction (HCI) and computer-supported cooperative work (CSCW). This practice-based approach, in turn, is rooted in the "turn to practice" of the social sciences [3]).

Developed as a critical response to the formal, technically oriented traditions of German computer science and the management-focused approach of business informatics or information systems [1], SI emphasizes the importance of ethnographically informed, participatory design. This commitment is not only methodological but also deeply normative: SI argues that researchers have a responsibility to support and improve social practices in ways defined *together* with those affected.

The central goal of Socio-Informatics is therefore not simply to analyze existing practices but to contribute to their development through carefully designed socio-technical interventions. It rejects views of technology as neutral or universally applicable, insisting instead on the situated, contingent, and negotiated nature of change. Design outcomes must be collaboratively developed and evaluated in the context of their actual use, acknowledging the "double character" of technology as both shaped by and shaping social practices.

Moreover, Socio-Informatics adopts a reflective, critical stance toward its own interventions. It aims to make the world "a better place", not in a naive or unilateral way, but through participatory processes that empower local actors to define what "better" means for them. This requires researchers to remain aware of their own positionality, to navigate power asymmetries, and to invest in long-term, trustful engagements. Such an orientation aligns SI with traditions of participatory design and critical systems thinking, while demanding ongoing reflexivity about whose interests are served by any intervention.

This commitment to supporting practice improvement shapes the methodological approach of SI, which we describe next.

2.2. The process of Socio-Informatics

Methodologically, socio-informatics incorporates several principles or elements [6].

It usually begins with an initial pre-study or context study, to gain an understanding of exisiting practices and the challenges members face. This inquiry is typically participatory and qualitative, employing interviews and (participatory) observations. The resulting data form the foundation for the next step.

The pre-study is followed by participatory design activities. First, the collected data are analysed to define a case and identify a challenge in the practices or an opportunity to support or enhance them. This is followed by the exploratory task of asking: "what could work?" to address the challenge or opportunity of the case, recognizing that design requirements and solutions cannot be directly derived from this analysis. The study's results are necessarily partial: they can describe a challenge, but not dictate how to addressed or solved it. Deciding how to go forward is thus always a creative and explorative process. After these two decisions are made, an artefact is designed. This entire process is (ideally) participatory, involving members of the practice context in the decision, to ensure that the case is worth addressing and that the manner in which it is addressed aligns with their wishes, needs, and ideas. Participation continues through design decisions made during the actual development and design of the artefact.

Socio-Informatics also insists on a critical, reflexive stance toward its own design practices. Researchers must examine how institutional settings, funding sources, and power asymmetries shape design outcomes. It is not enough to claim participatory design; there must be systematic analysis of how such participation is structured, whose voices are included or excluded, and what values are negotiated in the design process.

[1] in German, Wirtschaftsinformatik

Lastly, the artefact is introduced into the practice context for members to work and appropriate. This is understood as a creative process: Use does not just follow design. Members need to give the artefact meaning and integrate it into their practices, which requires changing those practices. Crucially, this process reveals shortcomings of the artefact , which then needs to be addressed and adapted as the practice itself evolves in response to its introduction. Studying this process of appropriation employs the same methodological approach as the pre-study, relying on interviews, observation, and interpretive analysis. Introducing a technical artefact into the practice thereby also changes the initial practice: the challenge to be addressed becomes another one as a result. In line with Rittel & Webber [7], problems are not solved but only re-solved.

These are only the most central elements of the socio-informatic approach, and they do not necessarily occur in that order, nor are they necessarily as distinct from each other as described here. Depending on the context and situation where research takes place, members might be more or less involved in each stage. They might already have specific and elaborate ideas for design interventions that are voiced in the pre-study. Studies do not need to complete all elements to produce valuable knowledge, nor do they need to stop there: knowledge can also be generated by comparing several design case studies (e.g. [2]). In order to describe how the knowledge generated through this approach can be valuable and create change in and especially beyond the specific context under investigation, we next consider the epistemic foundations of the socio-informatic approach and its place in computer science and HCI.

2.3. Epistemological Foundations and the Question of Generalisation

As a design science that produces technological artefacts as well as knowledge about social contexts and change, socio-informatics sits between natural science and social science. It builds on the physical nature of computing technology, rooted in deterministic natural science, to create specific artefacts that function according to natural laws. Of equal if not more importance, however, is its goal to understand social practices and the roles digital applications play in them. This is its social science dimension, and while fields such as experimental psychology or economics might blur the border by following positivist traditions of the natural sciences, socio-informatics is firmly on the interpretivist side.

The knowledge created in socio-informatics about social practices, and the role of digital applications is always tied to the specific contexts in which it emerges. But the fact that it does not uncover universal laws does not mean this knowledge is inapplicable elsewhere. Generalization to other contexts is both possible and desired in the SI program, but it follows different 'rules' than the experiment- and statistics-driven approach typical of psychology, which claims to produce universally applicable knowledge.

There are several ways in which knowledge generated in this program is applicable elsewhere; we briefly list three.

1) Following the ethnomethodologist approach outlined, e.g., by Crabtree et al. [8], who in turn draw on Harvey Sacks [9, 10, 11], the research results of SI illustrate or highlight structures of society, which Sacks called the "machinery of interaction" [11]. These are patterns that members of a society use constantly to interact and that apply in other parts of society as well, recognisable to its members. Unlike research based on statistical analysis that requires many cases to justify its claims, identifying such structures or machineries of interaction does not require specific numbers of examples (which is the hook for the Crabtree paper and its critique, with which we wholeheartedly agree). Identified structures apply to the rest of the society as well (the borders of a society, however, and thereby the limits of this kind of generalization, are not necessarily easy to identify, but that is a separate issue).

2) Socio-Informatic knowledge furthermore reveals *possibilities,* in a way similar to Harold Blumer's idea of *sensitizing concepts* [12, 13]. Sensitizing concepts offer insights about how society works, drawn from specific contexts, that might not necessarily apply elsewhere but sensitize researchers to the possibilities. When studying practices this is precisely the kind of knowledge socio-informatics aims to generate: showing how people organize their work in a particular context and use digital tools in ways that might also occur elsewhere in the same or similar manner, but not necessarily so. Similarly, when developing and deploying designed artefacts and studying their appropriation, socio-informatics generates knowledge about how social practices can potentially be changed through socio-technical

interventions. Things have worked (or not) for us, and therefore might work in other contexts too, though without any guarantee.

3) The knowledge generated through the socio-informatics program is embodied in the designed artefacts and the design decisions behind them. The artefacts themselves carry therefore knowledge, or they are knowledge, without fully determining how they are to be used or what effects they will have. Their application wherever physical conditions allow is therefore a form of generalization, even though they do not carry absolute knowledge about their use [2].

It is important that we do not resolve to this form of research and its more limited or humble truth claims only because we like to, but because we see no other option. Positivist research of course makes broader and more general claims to knowledge and its applicability or generality, but such a stance has been criticized by many and from many different angles, including authors such as Haraway [14] and Harding [15], Feyerabend [16, 17] or Bruno Latour (e.g. [18]).

Nevertheless, and to conclude the main take away from this section, even though socio-Informatic knowledge is generated in specific and strictly limited contexts the size of a social practice, it remains applicable and generalizable in specific ways to other contexts. Following from this, we will next explore how socio-informatics research can support, create, effect social change.

3. How Socio-Informatics Works

Our research program potentially supports change largely through three means: 1) Knowledge Creation, 2) Artefacts and 3) Participation in Design. We will look at each one in turn.

3.1. Knowledge Creation

Socio-Informatics produces several forms of knowledge, that are applicable by others in different ways and for different ends.

Firstly, it generates knowledge about how practices are structured. This can inform or inspire design activities and/or investigations into other practices. A well-known example in CSCW (though not our own) is the sensitizing concept of "articulation work" ([19] in [20]). This concept describes a crucial element of cooperative work and alerts researchers to the potential presence of articulation work activities in other settings. It also carries implications for how practices and/or their change can be supported through design (e.g. by designing applications that facilitate articulation work).

Secondly, socio-informatics creates knowledge about the specific problems encountered in the practice under investigation. This knowledge can serve as the foundation for design activities to address similar problems in the same or other contexts. It therefore informs design work or alerts designers to design opportunities.

Thirdly, it generates knowledge about the use of technology and the kind of effects it creates before an intervention. This helps to inform research and design work.

Fourthly, it creates knowledge about the role of technology *after* an intervention, revealing what worked or did not work in achieving a specific change in a practice. Such insights highlight possibilities which can inspire and inform other design activities.

Fifthly, by reflecting on the research and design process itself in meta-research, socio-informatics potentially informs or inspires the research practices of others. SI aims to contribute to the broader scientific discourse by developing and refining methodological concepts. Examples include Grounded Design, Design Case Studies, Integrated Organization and Technological Development, and PraxLabs [6, 3, 2, 21]. These frameworks help structure design engagements, support meta-research, and enable comparative analysis across cases, fostering cumulative knowledge that remains sensitive to local contexts

[2] we say do not carry absolute knowledge, but artefacts might carry partial knowledge about their use, in the sense that Microsoft Word is more likely to be used for writing than for calculating or generating images, even though it could be used for that too and probably happens also.

3.2. Artefacts

Artefacts themselves create change - that is indeed the goal of their design - even if there can be no guarantee that the intended change will occur. They are a directed intervention into practices, designed with a specific change in mind. When an artefact is applied and appropriated in a specific context it produces effects, even though the exact nature of those changes cannot be fully anticipated because they are contingent on local conditions. Nevertheless, appropriation by members of a practice context inevitably changes that practice in some way.

Socio-Informatics views artefacts not as static products but as part of ongoing processes of "infrastructuring." This concept highlights that design continues into use, as users appropriate, adapt, and reconfigure artefacts over time. Infrastructuring emphasizes that users are co-designers, shaping the artefact and their own practices in a mutually constitutive way [22].

An example from our own work illustrates this. In [23] we reflect on a project in which we designed a tool to support maintenance practices at an industrial manufacturing plant. The tool was designed to facilitate the reporting and prioritization of maintenance issues, which would help organize the maintainers work but also allow to adapt production planning to maintenance issues and machine or tool failures. The study followed the process described above, but when it was rolled out, management of the plant only gave access to specific people in the organisation's hierarchy, which was not planned or agreed on prior to roll-out. It therefore created unintended and unanticipated effects in the organisation's hierarchy. Nevertheless, it did address some of the challenges it was designed to do, and the company rolled it out to other departments. (See [23] for a more elaborate description of the design case study).

Furthermore, the artefact itself also embodies knowledge beyond its application and appropriation. It demonstrates to others designerly and technological opportunities as well as the design decisions that led to the final design. This, in turn, can inform other design and development work.

3.3. Participation in Design

Lastly, the participatory nature of our design approach creates an additional opportunity to support change. Participation is not simply a means to gather requirements, but a transformative practice in itself. Through participation, stakeholders develop new skills, build mutual understanding, and renegotiate roles and responsibilities. SI research emphasizes that this process is often messy, conflictual, and contingent [24], but precisely in this complexity lies its potential for meaningful change. Participation in design generates learning effects for participants. While it helps researchers better understand practices and the design requirements of the participating members of the addressed context, it also enables participating members to learn about technological possibilities during the design process. Participants can also develop a clearer understanding of their own requirements, needs and demands for an application addressing the agreed-upon challenge. Finally, they may gain new skills related to technology design and introduction processes.

An illustrative example comes again from our own work. In [25] we describe how, together with an industrial SME in the region of our university, we designed a tool intended to serve as a checklist in the quality control process of large machine pieces, welded at an external plant. Members of the quality management department, whose challenges the tool actually addressed, were deeply involved in the design process, to the extent that one employee took on some of the coding work. When the moment for roll out in practice had arrived, the IT department of the company blocked the application due to security concerns[3]. Nevertheless, through the design process the participating members learned about their own requirements which enabled and encouraged them to select suitable commercially available options, which they had been afraid of before, and enabled them to create a new role for the participating employee involved in coding, whose new role it became to create similar projects himself in the company. (See [25] for more information on this example from our research history.)

[3]The department had so far deliberately been excluded by the participating members exactly for the fear that they would hinder the project

With this, we highlight three potential ways in which socio-informatics can create change. We do not claim there is any guarantee that projects will work exactly as described here. A further limitation lies in the wish to expand or fully realize the effects described above, which is to some extent outside the scope of the actual research and design work. The following chapter describes the challenges of expanding our work and reports on several experiences we have had in trying to overcome these challenges.

4. Expanding

While above we sketched potential means for creating change that the socio-informatics approach offers, this does not mean that these changes actually occur or occur beyond the immediate research context. To achieve this, further activities might be necessary [4].

The effects of the knowledge we created are limited by their reach, by the number of people who actually have access to this knowledge, even if it is theoretically applicable in other contexts. This is of course not unique to socio-informatics but a challenge for all scientific endeavors. Distributing scientific knowledge, making it accessible especially to practitioners is a task beyond the usual activities of research of course, which at most include the publication of scientific articles, written in jargon and often behind paywalls. It requires journalistic work and science communication, or other forms of knowledge sharing such as presentations or workshops. Ensuring that "practitioners" outside of one's immediate circle of colleagues find and have access to knowledge (and see value in it) does not follow immediately from research and other academic work "as usual" but requires specific activities.

Similarly, there are limits to the realm in which artefacts can be effective. The artefacts designed as part of the research process of socio-informatics are rolled out firstly in the context in which they were developed. They might also be included in other research projects, but by themselves they will not be found by other practitioners, and, depending on the level of development, might not be immediately applicable. Bringing them to other contexts where they could be of use is also not always part of research projects, but requires "transfer work", for which perhaps transfer offices of universities are responsible. Common avenues to achieve broader reach is open-source publishing of the code and design, on publicly accessible repositories, or founding start-up companies and achieving a wider reach with economic activities. There are other avenues of course, but none of them follow immediately from the research and design work which we have described above. Researchers who want to achieve or support wider change with their work will have to deviate from "research as usual" and engage in activities that are not their daily bread and butter (or they need to partner with people whose bread and butter it is).

In our group we have made several observations as to how the results of our work can spread and diffuse throughout the region of our university, beyond the immediate contexts in which the work took place [25, 26]. A crucial element in what we observed was the notion of "spillover", that effects of a design intervention spilled from one context to another. This did not happen by itself, neither was it the result of only directed effort, but it took place through serendipity and certain kinds of activities. It is also not best thought of as 'transfer' but as co-construction of knowledge, in which designed artefacts take on a supportive, mediating role. An example illustrates the observed process.

After developing the checklist tool designed to support quality control processes, outlined above in section 3.3, a person employed by the administration of the region to support local companies often worked in close collaboration with us. She heard of the project and independently saw a potential benefit of the application for the care sector of the region. She invited members of our research team and from there a design collaboration developed with various actors in the care sector. Together with a care institution a research and design project was carried out. A pre-study revealed that care staff faces significant workload collecting and monitoring health data about patients but also about the temperatures of fridges where medicine is stored, etc. This data was usually collected with pen and paper. An application was envisioned that would consist of a checklist similar to the quality management application, but in a smart watch format. Later it was discovered that much of the data

could be connected automatically via interfaces in the various devices already used to measure data, such as oximeters and fridges. Instead of the smart watch application, a dashboard and IoT system was developed that allowed the automatic collection and display of the necessary data. The example illustrates potential means and conditions for broadening the area in which socio-informatic can become effective. Such spillover requires actors that see the potential for spillover between different contexts and that have the personal connections to make it happen. It also requires a similarity of practices that an application addresses, e.g. in our case regular activities of monitoring data (of welded machine parts in one example, health data in the other). The artefact is not simply carried over from one sector to another but provides an opportunity for collaborative knowledge creation appropriate for the context. The artefact itself carries knowledge, and illustrates opportunities and decisions, but this knowledge needs to be appropriated for the new context, which is an active and creative process. Supporting such spillover effects also requires the construction and maintenance of social networks, as spillover depends on interpersonal connections, which can be a significant amount of work beyond central research and design activities [25, 26].

We have also noted the success and necessity in some projects of extensive network-work and press work. In larger projects that include several disciplines and institutions we have created specific roles of "network managers" and public relations managers located in the specific project instead of the university as a whole. The positions are responsible for creating, maintaining and deepening relations with various actors in the region and ensuring that the results of the work as well as opportunities for collaboration are spread. These connections are crucial for spillover to occur, as such personal connections and awareness of opportunities are in some sense the 'infrastructure' along which spillovers occur. We have reflected on these activities also in [26].

5. Conclusion

With this article we give an overview of the socio-informatics research program and the different ways in which it realizes its commitment to action research and to creating change. It does so principally by engaging with practices as its primary research focus, but also as the focus of its design interventions. While we outline above how socio-informatics intends to support change, socio-informatics does not necessarily imply the direction of the change. Its commitment to practices implies a certain commitment to people and what they actually do, the sense and meaning they perceive in their practices as well as the challenges - not what other people think they ought to be doing. This carries with it certain implications for the kind of change socio-informatics supports. For example, it would be difficult to design for the full automation of jobs within the research program of socio-informatics, unless the workers in question wish for it, including the consequences this would have for their employment. SI is nevertheless adaptable to a broad variety of contexts, of which the varied output of our group over the past decades provides ample proof.

In our deliberations we also deal with the range or arena in which socio-informatics usually or effectively supports change. This arena is characterized by several limitations which are not unique to socio-informatics but apply to other disciplines and varieties of design research as well. The impact of knowledge is limited by the number of people who have access to this knowledge, the impact of design interventions is limited to the context in which they are carried out. We have nevertheless made experiences with deliberately broadening this arena for our work, and have published initial observations and reflections about our experiences. However, more research is required to develop a better understanding of how the arena in which change is supported under the socio-informatics program can be increased.

Ultimately, SI frames itself as an interventionist design science with a clear normative orientation: to support and improve social practices in collaboration with those who enact them. It rejects the search for universal, one-best-way solutions, arguing instead for context-sensitive, participatory, and reflective approaches that respect the complexity and contingency of social life.

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Declaration on Generative AI

The author(s) have not employed any Generative AI tools.

References

[1] D. C. Collatto, A. Dresch, D. P. Lacerda, I. G. Bentz, Is Action Design Research Indeed Necessary? Analysis and Synergies Between Action Research and Design Science Research, Systemic Practice and Action Research 31 (2018) 239–267. doi:10.1007/s11213-017-9424-9.

[2] V. Wulf, M. Rohde, V. Pipek, G. Stevens, Engaging with practices: Design case studies as a research framework in CSCW, in: Proceedings of the ACM 2011 Conference on Computer Supported Cooperative Work, CSCW '11, Association for Computing Machinery, New York, NY, USA, 2011, pp. 505–512. doi:10.1145/1958824.1958902.

[3] V. Wulf, V. Pipek, D. Randall, M. Rohde, K. Schmidt, G. Stevens (Eds.), Socio-Informatics, Oxford University Press, Oxford, 2018. doi:10.1093/oso/9780198733249.001.0001.

[4] C. Simone, I. Wagner, C. Müller, A. Weibert, V. Wulf, Future-Proofing: Making Practice-Based IT Design Sustainable, Oxford University Press, Oxford, United Kingdom ; New York, NY, United States of America, 2021.

[5] V. Wulf, A. Weibert, K. Aal, S. Rüller, M. Rohde, et al., The praxeological research programme of socio-informatics–the Siegen school, Acta Informatica Pragensia 10 (2021) 333–348.

[6] M. Rohde, P. Brödner, G. Stevens, M. Betz, V. Wulf, Grounded Design – a praxeological IS research perspective, Journal of Information Technology 32 (2017) 163–179. doi:10.1057/jit.2016.5.

[7] H. W. Rittel, M. M. Webber, Dilemmas in a general theory of planning, Policy sciences 4 (1973) 155–169.

[8] A. Crabtree, P. Tolmie, M. Rouncefield, "How Many Bloody Examples Do You Want?" Fieldwork and Generalisation, in: O. W. Bertelsen, L. Ciolfi, M. A. Grasso, G. A. Papadopoulos (Eds.), ECSCW 2013: Proceedings of the 13th European Conference on Computer Supported Cooperative Work, 21-25 September 2013, Paphos, Cyprus, Springer, London, 2013, pp. 1–20. doi:10.1007/978-1-4471-5346-7_1.

[9] H. Sacks, The baby cried. The mommy picked it up, Lectures on conversation 1 (1992) 236–242.

[10] H. Sacks, Notes on methodology, in: J. M. Atkinson (Ed.), Structures of Social Action, Studies in Emotion and Social Interaction, Cambridge University Press, Cambridge, 1984, pp. 21–27. doi:10.1017/CBO9780511665868.005.

[11] H. Sacks, Sociological description, Berkeley Journal of Sociology 8 (1963) 1–16. arXiv:42890107.

[12] H. Blumer, Symbolic Interactionism: Perspective and Method, University of California Press, 1969.

[13] H. Blumer, What Is Wrong with Social Theory?, in: Sociological Methods, Routledge, 2006.

[14] D. Haraway, Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective, Feminist Studies 14 (1988) 575–599. doi:10.2307/3178066. arXiv:3178066.

[15] S. Harding, Rethinking standpoint epistemology: What is" strong objectivity?", The Centennial Review 36 (1992) 437–470.

[16] P. Feyerabend, Farewell to Reason, Verso, 1987.

[17] P. Feyerabend, Against Method: Outline of an Anarchistic Theory of Knowledge, Verso, 1975.

[18] B. Latour, Circulating reference: Sampling the soil in the Amazon forest, in: Pandora's Hope: Essays on the Reality of Science Studies, volume 24, Harvard University Press, 1999, pp. 24–79.

[19] A. Strauss, Work and the Division of Labor, The Sociological Quarterly 26 (1985) 1–19. doi:10.1111/j.1533-8525.1985.tb00212.x.

[20] K. Schmidt, L. Bannon, Taking CSCW seriously, Computer Supported Cooperative Work (CSCW) 1 (1992) 7–40. doi:10.1007/BF00752449.

[21] V. Wulf, M. Rohde, Towards an integrated organization and technology development, in: Proceed-

ings of the 1st Conference on Designing Interactive Systems: Processes, Practices, Methods, & Techniques, Dis '95, Association for Computing Machinery, Ann Arbor, Michigan, USA and New York, NY, USA, 1995, pp. 55–64. doi:10.1145/225434.225441.

[22] V. Pipek, V. Wulf, Infrastructuring: Toward an Integrated Perspective on the Design and Use of Information Technology, Journal of the Association for Information Systems 10 (2009) 447–473. doi:10.17705/1jais.00195.

[23] C. Kotthaus, N. Vitt, M. Krüger, V. Pipek, V. Wulf, Negotiating priorities on the shopfloor: A design case study of maintainers' practices, Computer Supported Cooperative Work (CSCW) 32 (2023) 141–210.

[24] M. Krüger, A. Weibert, D. de Castro Leal, D. Randall, V. Wulf, "What is the Topic of the Group, Please?" On migration, Care and the Challenges of Participation in Design, Proceedings of the ACM on Human-Computer Interaction 5 (2021) 1–29.

[25] M. Krüger, M. Gerbracht, N. Vitt, M. Kudic, M. Ahmadi, A. Boden, F. Offergeld, M. Stein, C. Kotthaus, D. Unbehaun, et al., Travelling artefacts: Lessons learned from interventions in a regional innovation ecosystem, in: Proceedings of 20th European Conference on Computer-Supported Cooperative Work, European Society for Socially Embedded Technologies (EUSSET), 2022.

[26] M. Kudic, M. Krüger, M. Gerbracht, M. Ahmadi, A. Boden, M. Stein, C. Kotthaus, N. Vitt, D. Unbehaun, P. Tolmie, et al., Knowledge spillover: Between serendipity and strategic planning-lessons for practice-oriented interventions into regional innovation systems, Proceedings of the ACM on Human-Computer Interaction 8 (2024) 1–26.