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How are you, my digital friend?

Semiogenesis of a Visual Communication Concept for Emotional Contents of Future HCI in Smart Living Contexts.

Marianne Pührerfellner
University of Art and Design Linz, Industrial Design
marianne.puehrerfellner@ufg.at

Abstract. Imagine it's 2040, and you are living together in a collaborative network of diverse digital entities. As human beings, we often act and react emotionally, mainly in a non-verbal way. Simulating emotions is a sub-aim of the Human-Technology Symbiosis, one of the seven grand HCI challenges (Stephanidis & Salvendy, 2019). How might we enable our autonomous actants to communicate emotionally? This poster aims to scope out the research project on a visual interface for digitally connected systems based on emotions and moods. The project uses a speculative and more-than-human approach to investigate the possibilities and implications of this new coexisting form with smart living products and systems.

Overview

The term “Internet of (Every-)Things” (IoE) describes a vision where everyday objects, human beings, virtual data, and various kinds of environments live in coexistence (Snyder, 2017). Ubiquitous interfaces will play a significant role in our lives. Humans are no longer interfering in the IoT ecosystem's decision-making process anymore, and those black boxes are becoming more and more unreadable for humans.

Imagine the following situation:

> *It's 2040. You and your family are living in a flat, in symbiosis with digital entities. Your furniture consists of different mates. Every entity plays a different role in your cohabitation.*
>
> *Your door is a friendly, courteous entity giving everybody a warm welcome and has a strong protective instinct. Your table is in the centre of communication. It is smart and has a sense of humour but unfortunately tends to give private information out to its manufacturing company because it puts a lot of pressure on the table concerning its updates.*
>
> *Today is one of those days. Your door welcomes you with a warm colour, but the pattern in the left corner gives you already a hint that something is a bit different. You enter your apartment, and your attention immediately falls towards the table. It seems like it has done something wrong. Did it upload your private data to the company again just to get an update for its interface? It looks like a dog after stealing a piece of cake (Figure 1). You ask your table, “Hey buddy, how was your day? You seem a bit distracted”.*
>
> *It answers “ – ”*

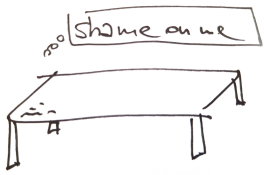

Figure 1. Table showing shame after uploading private data

The project intends to investigate the possibilities of inscribing the “vibrant matter” (Bennet, 2020) of “emotions” (Damasio, 2011) in a socio-technical interface in HCI. The abstract visualisation of that emotional material attempts to enable a “visceral communication” (Norman, 2004) between things and people. These considerations of human-technology relationships are interesting for both intelligent co-living and coworking constellations.

Background

Thing-centred design approach

Agency is a concept that has a long history in the field of interaction design and intelligent interfaces. Latour (2010) has tried to find a way out of the dichotomy between human-centred and object-centred notions of agency. His term "actants" defines a source of action that can be human or not or a combination of both; something that acts or to which activity is granted by others. It implies no special motivation of individual human actors, nor of humans in general.

Critical reflections emerge on the relationship between technologies and humans when it comes to IoT. The IoT Design Manifesto (Afdeling Buitengewone Zaken et al., 2015), for example, wishes to establish human-oriented principles for designing IoT systems, signed by a collective of professionals. They provide guidelines and raise important questions about transparency, openness, sustainability, and responsibility. History teaches us that a purely human focus is problematic, and we must rethink the dichotomy between subjects and objects.

In contrast to Latour's relational ontology, the postphenomenological approach, however, explicitly does not give up the distinction between human and nonhuman entities but separates them. This separation makes it possible to conceptualize the "active" role of technologies. Agency takes shape in complicated interactions between human and nonhuman entities. "Technologies become mediators of human experiences and practices rather than functional and instrumental objects" (Rosenberger & Verbeek, 2015). The theory of vibrant materialism (Bennet, 2020) also paints a "positive ontology of vibrant matter", which dissipates onto-theological dichotomies like life/matter, organic/inorganic, and object/subject and sketches a political analysis that accounts for the contributions of nonhuman "actants".

In terms of the relationship itself, there is a need to go beyond a human-centred perspective towards a thing-centred perspective to bridge the gap between things and us. The "affective things" project by the designer Ioanna Nicenboim (2020) investigates the new domestic landscape of possible interactions in a more-than-human design framework. This thing-centered approach gains access to the nonhuman perspective of things, trying to explore if things will understand our behaviour from their limited perspective.

Addressing the transparency of causality, Bennet (2020) has noted that even human agency remains something of a mystery. She has asked, "If we do not know just how it is that human agency operates, how can we be so sure that the processes

through which nonhumans make their mark are qualitatively different?" This leads me to the conclusion that a rational transparency alone cannot be the key to a human-thing relationship. How can we communicate in a visceral way with our things?

From emotional interaction to transhuman relationship

Emotions are part of the human experience and play a big role in our life, (maybe) even a bigger one than the rational one. In the Morse Things project, Wakkary et al. (2017) reflect on the nature of living with the IoT and investigate human-technology relations. One of the findings of this project is the projection of human qualities onto things. The participants tended to anthropomorphise nonhumans by considering an "emotional life" of things, comparing them to children or animals or implying awareness.

Lucy Suchman (2007) considers three elements necessary for humanness in contemporary AI projects: embodiment, emotion, and sociality. For daily objects, we must rematerialise those black boxes and find new strategies to integrate emotion and sociality into our UX design.

What sorts of emotions/moods are relevant for interaction in the coexistence of humans and machines? Is it possible to project our set of emotions onto our digital mates? How can ubiquitous digital entities express visual information in an emotional way?

Living and working in coexistence with digital actants means that we begin an intimate relationship with actants. Social relations can be arranged in two axes: power (dominant to submissive) and intimacy (hostile to friendly) (Figure 2).

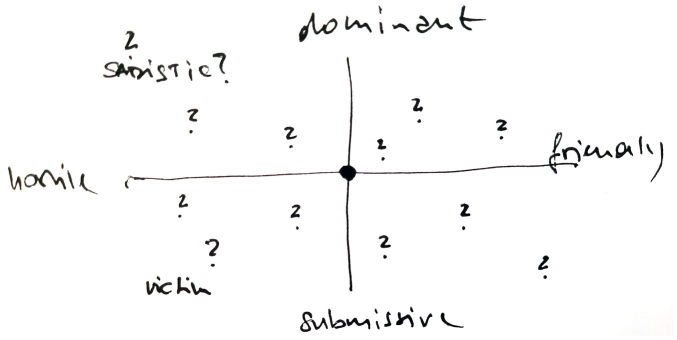

Figure 2. Interpersonal model based on Kiesler (1982). What kind of relationship do we want with our actants?

The emotional repertoire of a thing and the definition of emotional triggers/appeals involves inscribing cultural values and has a socio-political aspect. A personalised inscription of emotions into a system has the potential to define an individual culture in a personalised thing-human relationship. According to the

repertoire of the emotional concept by Traxel & Heide (1961), a subtle-dominant thing is more likely to show anger and rage if faced with an unpleasant situation, whereas a submissive-friendly thing is more likely to react anxiously to the same situation. How much power and intimacy do we concede to this relationship?

Visual semiotics of emotions

There is a common consensus that design can evoke emotions and make them re-experienceable for the viewers. According to Wildgen (2018), symbolic behaviour lies at the heart of human nature. Language and art (visual and musical) make up the core of the human capacity for sign creation and usage (semiogenesis).

Designers create/recognise patterns as object languages that they "read" and "write" into materials (Cross, 1982). Heimann & Schütz (2017) have explored the structural similarity between emotions and formal language (Figure 3).

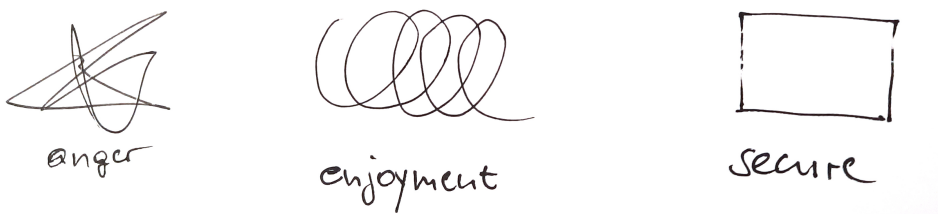

Figure 3. Examples of structural similarities between emotions and formal language

Although an exact match can never be achieved, it can still be a powerful tool for shaping impressions of emotions. According to Thomas Alkemeyer (2003), new competencies of different interpretation patterns must be learned by individuals with the growing complexity of social relationships.

In the field of generative design, we have new possibilities for "semiogenesis". Generative design tools allow us to reveal synthetic inner moods step by step and produce images in real-time. This kind of algorithm art might be a way to translate and represent the synthetic emotions of systems.

Methodological Consideration

Rittel and Weber (1973) opened new perspectives for design, beyond a problem-solving one, to address "wicked problems" by creating space for discussion and by inspiring and encouraging people to imagine alternative ways of being. The research does not emphasise precise analyses or carefully controlled methodologies. Nigel Cross (1982) has described this shift as the "designerly" way of knowing. Design "has its own appropriate culture" yet does "not completely

disregard[ing] other cultures". The resulting knowledge is "contingent and aspirational" rather than problem-solving and fixing.

The present projects uses a speculative design approach (Dunne & Raby, 2013) and shifts human-centered design methodologies into thing-centred ones guided by a design thinking process.

The great advantage of this process is the great variability needed in design projects, and due to the iterative nature of the process, the individual phases will overlap considerably.

Initial Results: Emotional Diary Probes

The method of cultural probes strives to find out more about accepting the idea of emotional things by provoking inspirational responses.

> The artist-designer approach is openly subjective, only partly guided by any "objective" problem statement. Thus, we were after "inspirational data" with the probes, to stimulate our imaginations rather than define a set of problems (Gaver et al., 1999).

The cultural probe "how are you my digital friend?" was designed like a site of an emotional diary between things and human. It introduced the participant to a vision of coexistence:

> "In the future, we will live together with our digital devices like in a family or community. Do you sometimes feel that your roommates show emotions or are in a certain mood? Can you observe any? And when and how do the things show their emotions?"
> (Figure 4. Introduction of the probe)

So far, I have asked 25 participants, between 10–25-years old, which objects of their private environment already exhibit special emotions or moods, and in which situations do those emotions or moods occur. In addition, they are invited to describe the situation and draw or photograph the emotion or mood they observed.

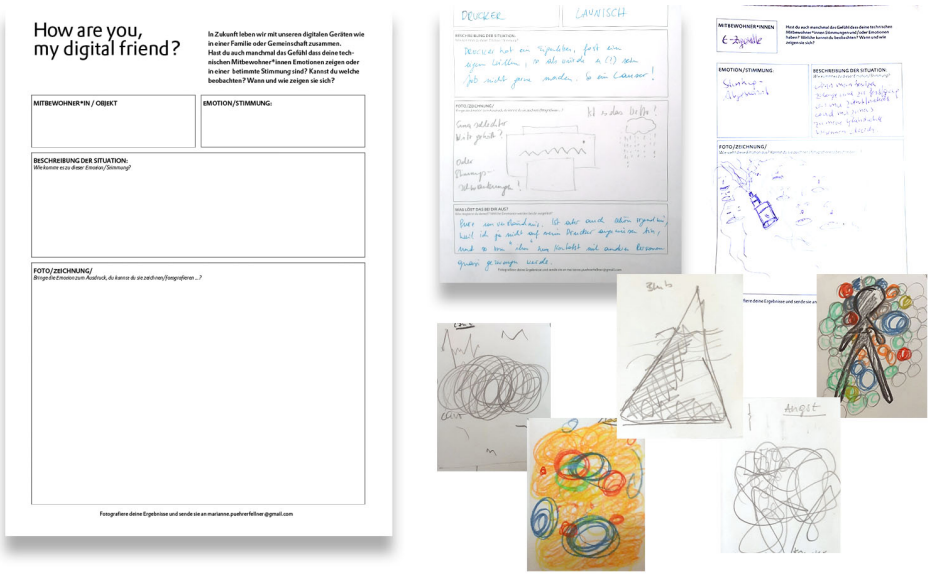

Figure 4. How are you, my digital friend? Cultural probes show the emotions of actants

Most of the participants draw an emotional case of an actant, while others write from the perspective of their entity or as a reincarnation of themselves. The types of things encompass a broad range of heterogeneous things like a bad-tempered shower, a fed-up gold ducat, a mysterious but helpful cable clutter, angry mobile phones and PCs, lazy chairs, moody colour pens, mirrors, and a jealous Kitchen Aid, just to mention a few. What is noticeable is that most things are ascribed with negative emotions like anger, fear, or sadness. This reveals that most of the time we inscribe unpleasant emotions to things while they are with us.

This result has encouraged me to look for an emotional concept that establishes a balance between positive and negative emotions.

Conclusion and Future Work

This project will focus on the capability of objects to act as social actants and engage in emotional interaction with ubiquitous smart systems. The design research project will show several cases that explore various (simulated) moods and emotions of digital entities according to their contextual triggers. These will provide a critical perspective on the relationships between humans and things and how they are shaped.

The next steps in the project will be to evaluate and select a suitable emotional concept for a socio-technical interface, define object personas (Giaccardi, 2021) based on hypothetical and fictional relationships, define several emotional situations in a human-thing relationship inspired by the probes (seek stories), and

sketch a generative design concept based on the secondary research (visual language).

In 2040, what if we live in a collaborative network of diverse digital actors—how might we as designers enable digital entities to communicate emotionally with humans?

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Impressum

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c/o Prof. Dr. Volker Wulf
Fakultät III
Universität Siegen
57068 Siegen
E-Mail: volker.wulf@uni-siegen.de

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Performative Practices and States of Play: Exploring the Role of Arts and Culture in the Co-Creation of Anticipatory Governance Dynamics

David Crombie
Center for Research and Innovation, HKU, Utrecht, The Netherlands
david.crombie@hku.nl

Revathi Kollegala
K8, Saarbruecken, Germany
rk@k8.design

Soenke Zehle
xm:lab - Experimental Media Lab, HBKsaar, Saarbruecken, Germany
s.zehle@hbksaar.de

Abstract. As the question of anticipation moves center stage in design-driven policy and governance development processes, anticipatory approaches to governance have expanded the focus of such exploration to concerns ranging from the co-creation of scenarios to complexity management strategies. Through *anticipate*, a non-disciplinary research network initiated and coordinated by arts and culture organizations interested in collective agency and intelligence, the authors have explored and engaged with this dynamic. To facilitate critical assessments of the paradigms that inform the design and widespread adoption of predictive systems, we have reframed anticipation as a collective intelligence design research agenda. Exploring and engaging with research affirming the centrality of collective, cooperative and co-creative dynamics in the design of socio-technological systems, the *anticipate* network focuses on the aesthetic practices through which such agency and intelligence become tangible. Introducing the OECD's work on anticipatory innovation governance, this essay aims to contribute to these conversations on co-creative systems design by making the case for the inclusion of arts-and-culture approaches in anticipation-oriented policy and governance development processes.

1. Anticipatory Governance and Collective Agency

Our research engages with the widespread concern that the ecological and economic transition of Europe's societies is above all a collective action problem. The tasks ahead of us overwhelm individual agency and call for new forms of collaboration. Since bridging the gap between having to (individually) act now for a future (collective) benefit remains a challenge for many of us, we are convinced there is an urgent need for "futural" approaches to guide the behavioural, social and cultural change for which this crisis calls. We contend that the first step in addressing these collective action challenges is to contextualize the very concept of agency - to understand how different contexts affect what we can do, and how we can best support the individual and collective exercise of such agency. Specifically, we focus on the role of anticipation as a collaborative practice allowing us to expand and explore the temporal horizon of our individual and collective agency, and emphasize the relevance of such anticipatory practices from across arts and culture to the design-driven policy processes currently being established to organize this transformation.

As many of us work in arts, culture, and design contexts, the growing interest in design-driven policy intrigues and inspires us to seek new forms of cooperation with those involved in these policy processes. This centrality of arts-and-culture approaches amplifies complementary research and design-driven policy efforts such as the EC's Enlightenment 2.0 initiative and its critical reexamination of citizenship.[1] In addition to Enlightenment 2.0 research on collective agency and

[1] https://ec.europa.eu/jrc/en/enlightenment-research-programme

intelligence, related initiatives include the Horizon Missions on climate change[2] and on smart cities[3] as well as the living-in.eu platform[4], GAIA-X[5] and the European Data Strategy[6], the work of the EU Policy Lab[7] on future-oriented co-creation methods and the New European Bauhaus[8], and the EU Science Hub's work on education and creativity (Venckutė et al, 2020).

Reflecting this interest in integrative approaches across different domains, the EU Policy Lab has also stressed that a "structured and systemic approach to generate insights relevant for the mid-to-long term future" should "build not predictions but plausible narratives about alternative futures".[9] The climate scientist Hans-Joachim Schellnhuber has frequently made the case for poly-centric approaches to mission-driven transformation processes; the "Bauhaus der Erde" (Planet Home) manifesto that partially inspired the "New European Bauhaus" also stresses the need for "new narratives for the future", where each narrative needs to be "one that doesn't moralize, but rather makes palpable the benefits of ecological change".[10] Our emphasis on narratives also reflects research on "change agents". A first comparative study of global best practices in encouraging "change agents" concludes that "there was only one overarching 'language' that was easily understood by all sectors and disciplines: the use of narratives and storytelling. ... We need a shared learning and collaboration framework that works in practice. Underpinning this whole-system framework is a shared language based on narratives" (Rotman, 2018). The multiplicity of meanings made as vast numbers of people engage in a coordinated process of transformation calls for special attention to these dynamics of meaning-making.

Such observations have been echoed in the *Enlightenment 2.0* and EU Policy Lab approaches already referenced as well as the European Commission's first annual *Strategic Foresight Report, Strategic Foresight - Charting the course towards a more resilient Europe*, presenting the Commission's strategy to integrate strategic foresight into EU policy-making. The report analyses resilience along four interrelated dimensions – social and economic, geopolitical, green and

2 https://ec.europa.eu/info/publications/climate-resilient-europe_en
3 https://ec.europa.eu/info/publications/100-climate-neutral-cities-2030-and-citizens_en
4 https://living-in.eu
5 https://www.data-infrastructure.eu
6 https://ec.europa.eu/digital-single-market/en/european-strategy-data
7 https://blogs.ec.europa.eu/eupolicylab
8 https://europa.eu/new-european-bauhaus/index_en
9 https://knowledge4policy.ec.europa.eu/behavioural-insights/about-behavioural-insights_en
10 https://www.bda-bund.de/2020/05/planet-home, https://www.bauhausdererde.org

digital – and explains its importance for achieving our strategic long-term objectives in the context of the digital, green and fair transitions. The first priority of the strategy is to "build and use collective intelligence to anticipate developments and prepare for new opportunities and challenges earlier and more effectively" (EC, 2020, 4). We aim to link the interest in collective action and intelligence to such a wider vision of futural agency and the role of co-creation activities in anticipating alternative futures. In this paper, we enter this conversation by way of a canvas developed by the OECD to support anticipatory policy-making and facilitate such collaborative sensemaking.

2. OPSI's Innovation Facets Model

Expanding the focus of the EU policy processes featured in the introductory section, one of the most comprehensive efforts attempting to focus on anticipation in innovation governance is the work of the OECD's "Observatory on Public Sector Innovation" (OPSI). Contributing to such a shift, OPSI researchers integrate anticipation into an "innovation facets" matrix that compares and contrasts four different types of innovation.[11] Acknowledging that "[a]nticipatory innovation is the least developed facet, in the public sector and beyond", they also note that this is changing as more actors engage with future developments.[12]

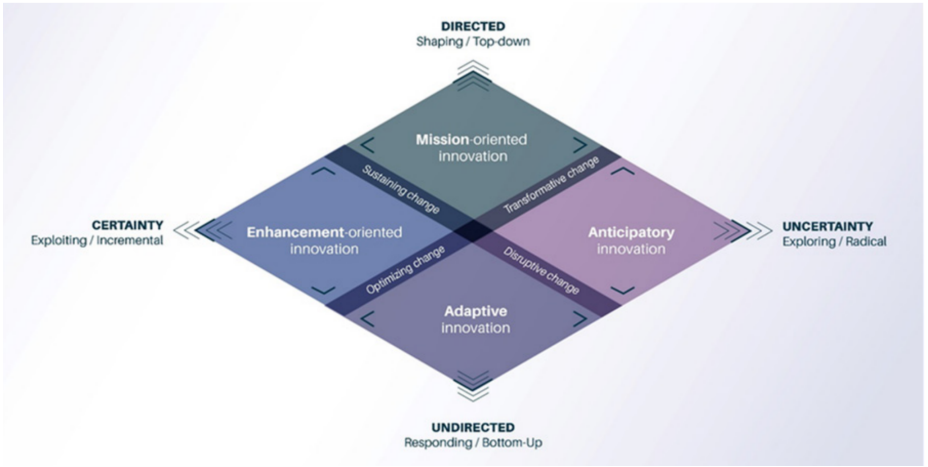

Figure 1. OPSI Innovation Facets Model

[11] https://oecd-opsi.org/projects/innovation-facets
[12] https://oecd-opsi.org/projects/anticipatory

Enhancement-oriented innovation	Mission-oriented innovation
"How might we do X better?" Focus on questioning not what is being done, but rather how it is done and whether it can be done differently, and hopefully better	"How might we achieve X?" Focus on a driving ambition to achieve an articulated goal, though the specifics of how it might be done are still unclear or are not set in stone
Adaptive innovation	**Anticipatory innovation**
"How might our evolved situation change how we do X?" Focus on realisation that things are happening that don't fit with what is expected	"How might emerging possibilities fundamentally change what X could or should be?" Focus on recognising and engaging with significant uncertainty about not only what works, but also what is appropriate or possible.

Figure 2. OPSI Innovation Facets Matrix (summary by the authors)

3. Performative Practices and States of Play

Building on future studies, scenario development, and speculative design, the interest in anticipation as a holistic framework continues to grow (Poli, 2019; Miller, 2018). In this context, authors and colleagues initiated *anticipate* - a collective intelligence design research network. Many of the ideas in this essay have been co-developed in the context of conversations across the research network.[13]

When the network was initiated, the researchers decided not to position the project in the context of a specific academic discipline or research field but to maintain a "non-disciplinary" stance reflecting the shared interest in experimental research methods. This approach echoes critical assessments of the European research system: "[t]he solutions to the complex 'wicked' problems that we face today will be systemic" and "[b]e open to systemic experimentation for innovation in the public and private sectors" (EC, 2019, 7, 13). Such a stance is, in turn, necessarily dynamic (tracking transformations rather than observing final states) and collective (as there can be no single perspective from which the whole of a process or system comes into analytical view).

[13] https://www.anticipate.network

It is through the “anticipatory arts" of play (role-playing, storytelling, dystopian and utopian thinking in cinema, games, literature) and their what-if power that we can develop new ways of engaging in fore-sighting activities on all levels of generative engagement - from the individual citizen to the policy maker structuring the different stages of such engagement (Garcia et al, 2020). In the course of the anticipate network conversation, we have come to embrace a type of play where players change the rules of engagement and exploration as they move through the process using the following principles of engagement:

1. Explore Impact. Rather than solely focusing on a single technology (such as artificial intelligence) as a field of applied innovation, the network makes the question of collective intelligence the focus of non-disciplinary inquiry and experiment. This allows us to approach, explore and comprehend the wide-ranging implications and possible impact of machinic intelligences without locking us into the dynamics of technological development.

2. Imagine Innovation. New imaginaries, new narratives, new horizons - if we are to anticipate worlds in which human and non-human actors become part of collective intelligences, we will need all of these. In imagining alternative futures, the network widens the space of innovation. This goes both ways, as we also need to innovate imagination. New technologies change the way we can arrive at concepts, tell stories, foresee futures. This opens up new problem spaces and calls for new conceptual blueprints to ultimately create new instruments for the organization of change.

3. Co-Create Discourses. We can only find the new if we have a language that allows room for the unknown. Otherwise we may not be able to name the new when we encounter it - or miss it altogether. The network critically assesses the terms we have come to use to talk about the new - and creates new terms whenever we think existing terms won’t do. The co-creation of new languages is one way to anchor technology design in a broader and more holistic conversation about how we want to live and work.

4. Make Worlds. The distinctions we have established in education and research have served us only so well in building new alliances. Rather than struggling to re-connect what we have come to accept as always already separate - IT, SSH, Arts and Culture - we begin with a multi- and even non-disciplinary view of the systems and worlds of which we are a part. In the context of ecological crisis, we need to have a better sense of how the world exists - its interdependencies, its timescales, its spatialities. If technology is to play a role in addressing this crisis, we need a way of speaking about worldmaking that acknowledges that technologies can play multiple roles, and that our ways of exploring impact must acknowledge the complexity of technological agency.

5. Contextualize Agency. The conditions of change frame our agency - as they change, so do our options for individual and collective action. Awareness of contexts directly translates into new possibilities for action. We need to rethink how we can explore anticipatory assumptions, harnessing structures for mutual learning to meet these challenges. By collaborating with a wide range of actors, we can devise new educational formats to properly assess, scope and tackle more complex and chaotic problems.

4. Culture, Connectivity, Co-Production

Given these principles, the “innovation facets” that interest us most in the work of OPSI are “mission-orientation” and “anticipatory”. Both stress different types of future agency and serve as a reminder that the future is plural - a banality, but as anticipation research has shown, we often fall into the trap of backshadowing without realizing it: “The stories we tell about the future, including our future selves, must be open, multi-linear, and multidimensional in order to avoid anticipatory backshadowing, which forecasts the future as a continuation of the past and present” (Lively, 2019). Focusing on the experimental approaches of arts and culture to explore the anticipatory assumptions we make, we hope to be able to avoid such “tacit” biases. Methodologically, we have foregrounded approaches that acknowledge the central role such narratives play.

While we welcome that such acknowledgement of the role of culture - identity, memory, narrative - is slowly finding its way into policy perspectives, as exemplified by the European Commission’s work on “Enlightenment 2.0” or the “New European Bauhaus”, we remain cautious as such insights are all-too-quickly subsumed into a new master narrative of “resilience” (as in the EC’s key work on “Strategic Foresight”). It is highly problematic when “creativity” is invoked as the key ingredient of resilience strategies and such creativity is undermined by the conditions of self-exploitation and scarcity management that characterize the life and work of many artists and cultural actors (Polivtseva, 2020). So rather than invoking “culture”, we always speak of “arts and culture” to recall the wide range of aesthetic and performative practices that constitute “culture”. We contend that an inclusive society offers narratives that allow everyone to play a role rather than narratives whose fundamental assumptions make such inclusion impossible (Costanza-Chock, 2020). In such a process, anticipation is both a concept and a way to act. This is key to the work of *anticipate*, because arts and culture do more than power the cultural and creative industries (which is how many policy narratives position arts and culture). They reimagine cultures of connectivity and modes of human and non-human relation, draw attention to the friction involved in “scaling” local dynamics to translocal (global) levels, and offer forms of performative co-production that allow us to experiment with futural forms of collective agency and intelligence.

5. Research Contexts and Outlook

If the concept and practice of anticipation is referenced in HCI research, much of it occurs in the context of autonomous and intelligent systems and focuses on anticipating user behaviour or designing virtual agents. Our research is more in line with Steinhardt & Jackson (2015) as they advance three basic claims:

> "first, that long term technological development and sustainability in science is guided by complex and distributed forms of futurism; second, that all actors (both individual and collective) orient towards the future (at both temporally close and distant scales); and third, that actors engage in complex and skilled forms of anticipation work - individual and collective, formal and informal - that guide and shape the present character and experience of collaborative life" (ibid.).

Research in CSCW has played a key role in advancing our comprehension of media in facilitating cooperative agency (Schuettpeltz, 2017). As noted by Suran et al (2020), "Collective Intelligence (CI) platforms have become a vital resource for learning, problem solving, decision-making, and predictions"; research by Draheim (2019) has also stressed the link between current collective intelligence design approaches and the history of cybernetics, specifically the role of Stafford Beer's Viable Systems Method in organizational development; and Grunewald et al (2019) have called for more research on collective consciousness to better understand the motivations and outcomes of collective intelligence dynamics. Our own research on the role of co-creative and collaborative formats of sensemaking has explored anticipation as a matter of cooperation and collective intelligence design from the very beginning - anticipatory practices framed by these platforms for collaboration, inspired by systemic design approaches, and aiming at broader dynamics of worldmaking.

Following our interest in exploring artistic practices that reimagine citizenship and democracy for an age of autonomous systems and artificial intelligences, we now intend to engage with anticipation in the context of context-specific triple loop learning formats - formats that link individual and organizational learning - by developing modules for *anticipate academy*, a follow-up project to the anticipate research network. Along with OECD research on systemic design (OECD, 2021), the OECD-OPSI work on innovation facets will be an important reference in designing such learning modules, and we plan to work with public sector actors to explore how anticipatory innovation governance concerns might best be made tangible in different local contexts.

Exploring our shifting sense of "socially embedded technology" via terms such as collective agency and intelligence, the authors are convinced that such changes include the concept of the social itself - when machines are part of cooperative dynamics, "the social" extends beyond the domain of the human and human-machine interaction to include new forms of distributed agency and intelligence. The adoption of distributed intelligent systems by public and private actors, driven by the interest in reorganizing human-machine collaboration and informed by a range of values, cannot but raise concerns regarding the ways in which we imagine the future of human-machine relations. Focusing on the central role of language - the way we describe and discuss these systems - in framing the kinds of agencies and intelligences we imagine, the IEEE has recently called for a "de-anthropomorphizing" of machinic intelligences to create space for new visions of collective intelligences and address the full range of ethical implications of co-designing such intelligences (Kostopoulos, 2021). Given the centrality of the question of the human in this context, one would imagine that arts and culture have played a central role in such exploration. This has not been the case. But as discussions of innovation increasingly involve holistic approaches to ideation, implementation, and impact assessment, we engage with the "arts of anticipation" to stress the role arts and culture have played and will continue to play in anticipating multiple futures.

This is about more than calling attention to arts and culture as a sector rarely considered in innovation policy, or its structural precariousness aggravated by the current crisis. We see arts-and-culture-inspired anticipation as part of a broader conversation about the redesign of socio-technological systems and regenerative economies, whilst at the same time expanding our historical awareness of the ambivalent role artists have played in the development of such systems (Beck and Bishop, 2020). We are beginning to imagine machines as actors in democratic societies by giving "automated decision-making systems" an ever-expanding role (Algorithm Watch, 2020), the European Parliament has already (and passionately) debated whether or not to grant machines independent legal status (EP, 2016), and philosophers are exploring how the plasticity of machinic intelligence might affect how we imagine human-machine communities (Malabou, 2019). Through the collaborative analysis and assessment of embodied experiences across the arts, we aim to facilitate our comprehension of contextual agency in embedded systems and human-machine-networks more generally, to couple such technological

visions with the distributed non-human agency of ecosystems, to support the co-creation of new interfaces to these systems, and hence to foster the future-oriented engagements with societal challenges that are needed to comprehensively analyze and effectively address them. Embracing the arts and cultures of anticipation helps us to rethink the ways in which we want to live and work. And makes sure we don't fail to explore a future just because we struggle to imagine it.

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Designing for Local Economies of Personal Artifacts

Anton Fedosov, Mervin Cheok, Elaine M. Huang
People and Computing Lab, Department of Informatics, University of Zurich
antonf@ifi.uzh.ch, mervin.cheok@uzh.ch, huang@ifi.uzh.ch

Abstract. Many non-profit resource sharing organizations and collectives (e.g., libraries of things) and local peer-to-peer exchange initiatives leverage underutilized personal resources, such as household tools, to optimize their use. These local sharing initiatives and arrangements often suffer from challenges of continued participation, visibility of members' interactions as well as interpersonal trust among the membership, which prevent their sustainable development. In prior work, we engaged in a field study of Pumpipumpe, a local resource sharing community in Switzerland to identify members' needs and requirements to support sharing practices among neighbors. Following insights from this study, we conducted a generative participatory workshop with six community members and design and sustainability experts to approach these emergent challenges. We present the design artifacts that we have developed for the co-creation workshop as well as three design alternatives that our participants conceptualized to address issues of visibility of social interactions and trust among neighbors.

Background

Resource sharing organizations, such as tool libraries or community-owned workspaces, and peer-to-peer informal exchange arrangements (e.g., sharing with neighbors) play a key role in supporting environmental sustainability efforts in two important ways: (i) by maximizing the use of artifacts (e.g., tools) and thus minimizing the consequences and effects of manufacturing new things (Blevis, 2007) and (ii) through promoting acts of DIY repair, re-use, and renewal of things (e.g., a broken chair) and places (e.g., the home), over disposal and acquisition of new things (Thackara, 2006). They also encourage social value in the sharing economy, where community members jointly own and develop services and resources. Furthermore, Light and Miskelly (2015, 2019) emphasize the importance of grassroots sharing initiatives in developing social cohesion, resilience, resourcefulness in neighborhoods, and promoting sharing cultures among people. Nonetheless, there are several interpersonal and organizational challenges pertinent to such resource sharing initiatives (Fedosov et al., 2019b). For example, poor visibility of activities within sharing communities (Odom, 2014), and emergent issues of trust and reciprocity among membership (Cheshire, 2011; Lampinen et al., 2013).

Prior research has identified the need to support designers within the context of the sharing economy to address these challenges (Fedosov et al., 2019a; Fedosov, 2020). Prior work has also examined the challenges and opportunities of local peer-to-peer exchange systems (Suhonen et. al, 2010), identified a mismatch between peoples' attitudes regarding what they want to borrow and what they are willing to lend in their local communities (McLachlan et al., 2016), and called for further exploration of informal economies of underutilized personal artifacts, such as household goods, hardware tools (Dillahunt et. al., 2017). We draw on this prior research as well as on our own fieldwork with one local resource sharing community in Zurich, Switzerland (Fedosov et al., 2021), which uncovered practical aspects of how borrowing and lending are orchestrated, and how trust is established within the community.

To this end, we conducted a co-design workshop with six participants to explore opportunities for design within this space. We focused on two design strategies elicited from our prior field study (Fedosov et al., 2021): (1) fostering willingness for interpersonal encounters, and (2) leveraging online information to promote participation. The contribution of this work is twofold: we developed a set of design materials to illustrate design strategies for local economies of personal artifacts, and we conceptualized several design alternatives in the workshop to address the community's emergent challenges. In this short paper, we describe our case study, the workshop procedure, and present the three conceptual designs, which we plan to field-test in the future.

The Pumpipumpe Sharing Community

Pumpipumpe[1] is a volunteer-driven sharing community that promotes the co-use and re-use of underutilized household assets (e.g., bikes, tools, sports gear) while encouraging face-to-face encounters among neighbors (Fedosov et al., 2021). To start sharing items with the community, one is required to order a set of stickers that can be affixed to a mailbox to signal what one is willing to share (Figure 1). The images on the stickers vary from common household items to rarely used kitchen appliances and leisure equipment. Pumpipumpe offers supporting digital tools, such as a map (https://map.pumpipumpe.ch) of what's available where, but it leaves it to members to agree on how to arrange sharing, terms of use and return. The initiative was founded in Bern, Switzerland in 2012 and has since attracted participation from over 24 000 households, primarily in central Europe. Earlier we conducted a field study of this sharing community in Zurich (Fedosov et al., 2021), and uncovered: (1) the members' accounts of orchestrating sharing events; (2) functional aspects of the supporting digital tools; and (3) the symbolic meanings of the mailbox stickers. In this paper, we report how we conceptualize those findings though a co-design workshop with a varied set of stakeholders and domain experts.

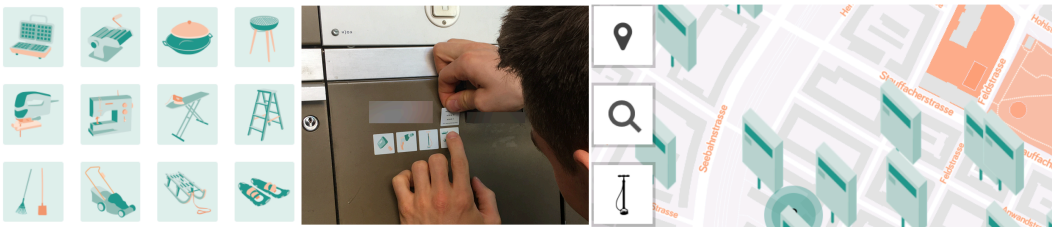

Figure 1. Stickers emblematic of the resource sharing community on a member's mailbox and the online map of participating households in a neighborhood.

The Workshop Procedure

We conducted the workshop following participatory (Simonsen and Robertson, 2013) and co-design methodologies (Sanders and Stappers, 2008). We aimed to explore how community interactions (e.g., tool requests and exchanges) can be made more visible to community members, as well how can we improve interpersonal trust (Cheshire, 2011) within the community membership, i.e. the confidence between individuals and their willingness to be accountable to each other. We recruited six participants for the 2-hour co-creation session. Four of

[1] The name Pumpipumpe stems from a delicate interplay of two German words: "eine Pumpe" that means a pump (e.g., a bike pump) and "pumpen" that means both to borrow something from someone and to lend something to someone.

them had participated in the Pumpipumpe community: two members, one co-founder and one volunteer. Additionally, we invited two experts to take part in the workshop, both had heard of the community but had not explicitly engaged in its activities. One expert had a background in product design, another in the sharing economy and sustainability. We adopted the Sharing Economy Design Sprint (Fedosov et al., 2019a) format as it is valuable for creating conceptual designs in the context of the sharing economy.

Materials

The workshop was conducted online. The tools and materials included video conferencing software, a virtual whiteboard with vector design elements and prompts, and digital workshop materials such as post-it notes, drawing tools, a canvas, as well as shared textual documents for note-taking. We also developed input resources for the sprint, namely: a design brief, three personas and a scenario (Appendix A and B). Three prototypical personas were drawn from our previous empirical inquiry with the community and described the distinct attitudes of the Pumpipumpe members: a pragmatist, an idealist, and a supporter. The personas (Appendix A) and the envisioned scenario (Appendix B) aimed at evoking empathy in our workshop participants when conceptualizing their ideas. Finally, we created a set of design cards (Appendix C), which aimed to provoke reflection and contemplation on the underlying challenges and opportunities in the community, and to foster design of potential solutions.

The deck consisted of 20 cards (Appendix C) spanning the two main categories of design considerations identified in the previous field research (Fedosov et al., 2021): (1) fostering willingness for interpersonal encounters and (2) leveraging online information to promote continued participation. For example, the cards in the first category illustrated social barriers in the community (e.g., of approaching strangers, discomfort of indebtedness and fears of being a burden), highlighted the importance of surfacing shared interests when selecting the sharing audience, emphasized the value of incremental involvement in the community and encouraged expression of borrowing needs. In the second category, the cards showed the value of reflective practices with a view towards re-use of underutilized resources, offered design strategies to engender trust by presenting available information about the shared resources (e.g., through providing detailed descriptions of the tools) and experiences of the peers (e.g., though capturing and annotating the histories of prior use (Fedosov et al., 2018)), and suggested challenges related to the low-frequency of community interactions. Finally, we added a special card entitled “Sustainability” to promote reflection on conscientious consumption of resources, and a wild (blank) card, which could be filled in based on the personal experiences of our participants.

Activities

We drew on the design sprint methodology (Knapp et al., 2016), one of the most widely used approaches in professional design practice, in which designers create concepts within a limited time and with limited resources. We adapted the Sharing Economy Design Sprint format (Fedosov et al., 2019a), tailoring its activities to meet the specific context of our research (e.g., we used our own cards).

After getting familiar with the design brief, the personas, and the envisioned scenario (see Appendix A and B), we prompted participants to reflect on the ways of approaching strangers when borrowing an item based on their own experiences with the community or outside of it. We also solicited ideas on potential digital content which could represent activities in the community. We collected a number of ideas related to the information that could be made available about a neighbor to aid an exchange (e.g., a user profile, preferable contact time), to visualize successful and failed exchanges among neighbors, as well as a set of strategies that would lower the hurdle of approaching a stranger (Figure 2). We then asked the participants to identify possible breakdowns that could occur at different stages of the sharing process (Figure 3).

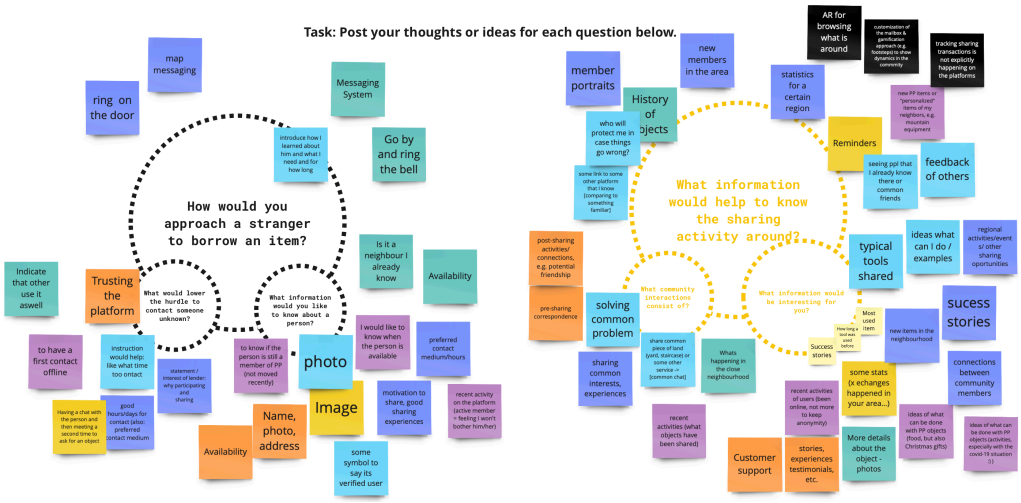

Figure 2. The filled canvas for the mapping activity.

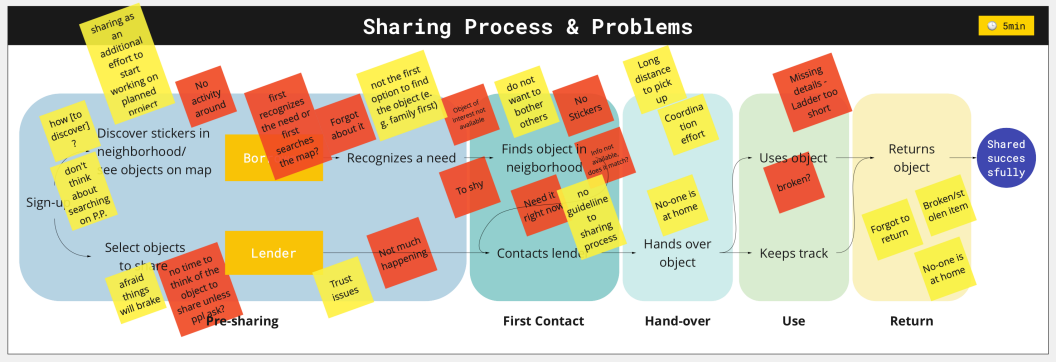

Figure 3. The potential breakdowns in the sharing process identified by our participants in the offered scenario (red post-its) and overall (yellow).

During the co-creation exercise we asked participants to sketch ideas for our design challenge and offered a toolbox template that participants could use during this phase (Figure 4). Next, we asked participants to pick a few Pumpipumpe design cards from the deck to reflect upon their ideas to improving their initial sketches and to justify their design choices in the relation to these cards.

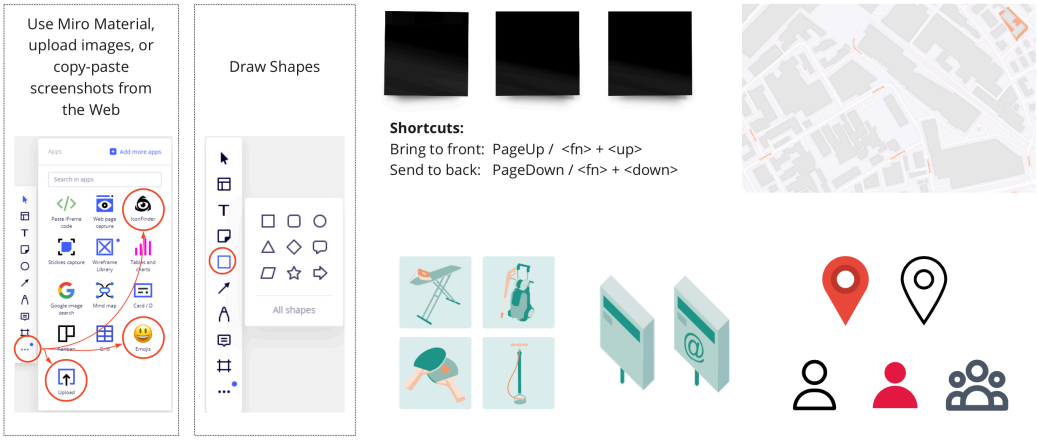

Figure 4. Toolbox template for sketching user scenarios: a subset of the Pumpipumpe stickers, the icons for mailboxes, users, a map template and a few additional materials (e.g, pins for the map).

Design Alternatives

During the participatory co-design session, several ideas for service features emerged that explored the visibility of community interactions and offered opportunities to increase trust among neighbors. We describe three such ideas below: *Community Feed*, *Neighborhood Promenade*, and *Onboarding Assistant*. Note that these initial ideas, which elements have been inspired from the

contemporary digital platforms, do not necessarily solve all the emergent challenges of the community at once, but rather offer a few avenues for designers to start approaching them in the broad context of collaborative consumption.

Community Feed

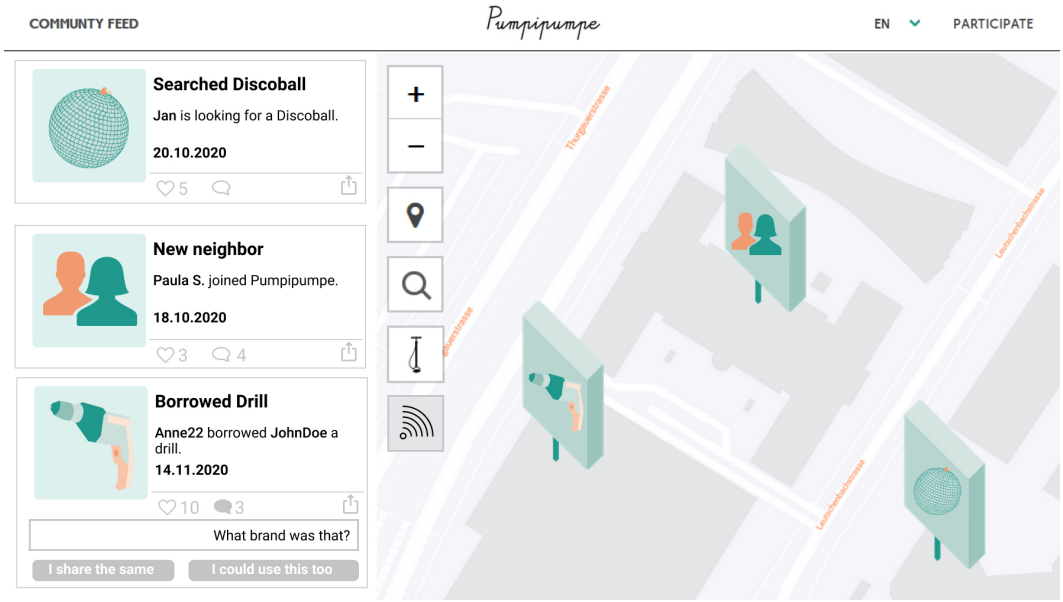

Figure 5. Community Feed displays the most recent interactions on the platform: search queries, new members in the neighborhood, currently borrowed items, etc. It encourages reactions on entries.

The *Community Feed* feature reflects recent members' interactions on the Pumpipumpe platform and could be positioned next to the map interface (Fig. 5). The activities on the feed include but are not limited to searching for an item, displaying newly added, requested and shared items, as well as recently registered members in the area. The participants agreed on the importance of showing these activities not only based on their immediate location (e.g., within neighborhood), but also in a larger geographic area (e.g., city, country). In turn, members may opt-in to receive proximity notifications from the feed. The benefit could be two-fold: (1) members would see new objects available nearby; and (2) notifications would indicate activity in the neighborhood – a signal that is important for building and sustaining a sense of social presence in exchange communities (Suhonen et al., 2010). Members could adjust granularity and levels of visibility of their disclosures. Additionally, the participants recognized the value of reacting and commenting upon messages in the feed (Figure 5), e.g., using upvoting mechanisms, or mentioning that they share the same item or could imagine lending that item in the future (e.g., based on frequently searched items in the area). Finally, the community feed can interface with the social media platforms

(e.g., Twitter) to increase visibility of the Pumpipumpe community and spark an interest in the sustainable consumption values and practices among wider audiences.

Neighborhood Promenade

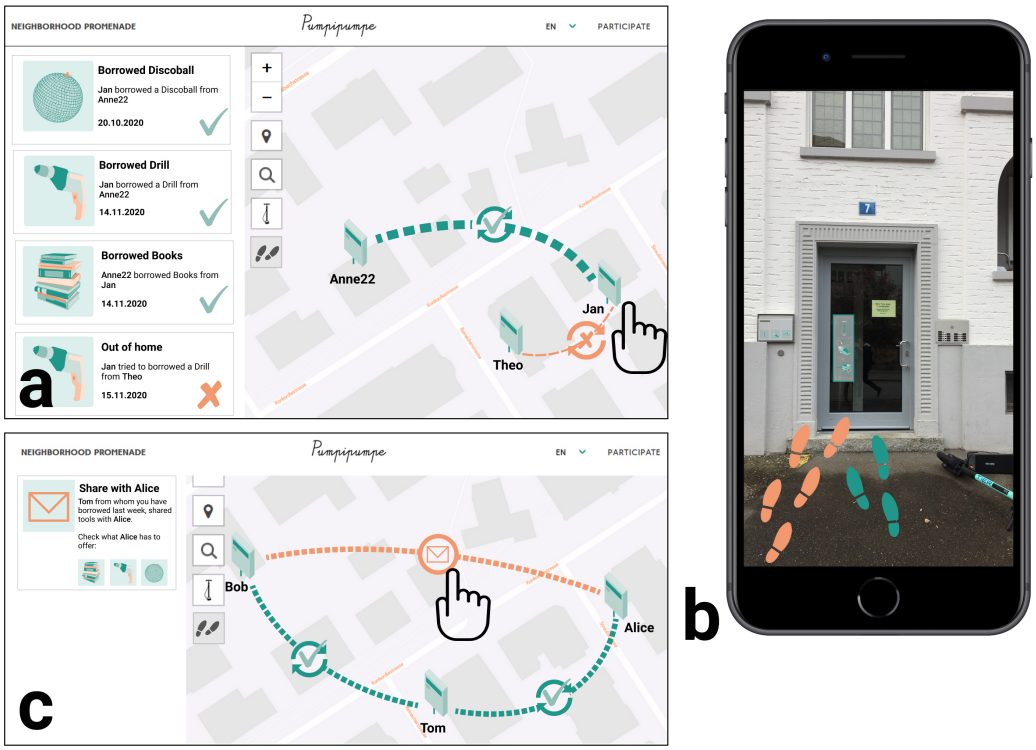

Figure 6. Neighborhood Promenade visualizes community interactions (a) on the map, (b) using AR interface and (c) provides suggestions to explore items in the neighborhood based on histories of use

The participants emphasized the value of seeing feedback on successful and failed community interactions in a playful way. The *Neighborhood Promenade* feature would display traces of the contextual micro interactions within a neighborhood over time (e.g., successful exchanges, failed attempts to borrow items, outdated stickers on a mailbox). The visualizations could take the form of virtual footprints and messages overlaid on the existing map interface (Figure 6a) or even using augmented reality technology (Figure 6b). Making these traces visible may engender trust and create curiosity within the community and also serve a practical purpose – allowing a borrower to leave a note about an (attempted) visit. These spontaneous in-situ interactions when a lender is not at home at a time of a visit, found frustrating by would-be borrowers (Fedosov et al., 2021), can be easily addressed by this platform's feature. Specifically, the service can use a

geofencing mechanism determining a proximity of a lender's mailbox, while preserving privacy, and allow a borrower to write a virtual message to a lender with contact details.

Furthermore, neighborhood promenade may support creation of new social ties among unknown members based on successful and verified exchanges with the community using the transitive relation. For example, one participant illustrated this in Figure 6c. The platform suggests a *trusted circle* between Alice, Bob, and Tom. Since both Alice and Bob successfully exchanged previously objects with Tom, they could explore possibilities of sharing with each other. This further creates an opportunity to design for transferring trust between peers and among different sharing economy platforms.

Onboarding Assistant

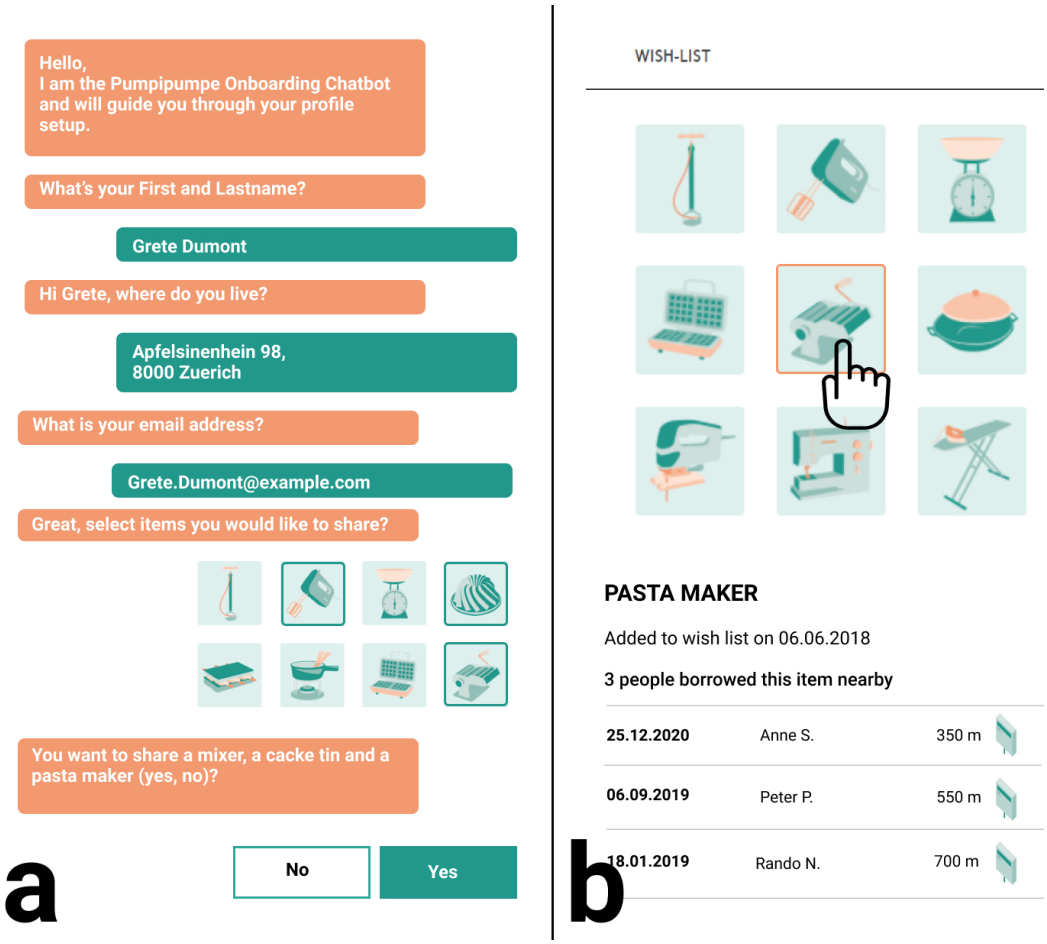

Figure 7. (a) Onboarding Assistant guides a new member through the registration process; (b) Wish-list feature keeps tracks of the items one wants to buy and suggests to borrow them in the vicinity

The participants conceptualized the idea of *Onboarding Assistant* to start sharing with the community. The assistant (e.g., a chat bot) can be triggered upon scanning the physical stickers spotted in the neighborhood, or through visiting the community's website. It will guide new members through the registration process, aid in creating personal inventories (Figure 7a), provide tips for reaching out to neighbors, as well as follow newly registered users through the privacy settings at the supporting platform. This feature addresses the need for providing guidance identified in the prior research, where members need instruction within the sharing process due to the social barriers of meeting unknown people (Fedosov et al., 2021). The assistant can also prompt existing members to reflect on their consumption patterns (e.g., buying vs. sharing), provide ideas for repairing objects, or encourage trying a new activity (e.g., snowshoeing) through borrowing available items nearby. The assistant can also implement a *"wish-list"* (Figure 7b). For example, if someone in the community shares a new item, the others who have that item on their wish list can see that it's now available. The service could broadcast a notification to the interested parties, for example, when a neighbor wishes to dispose of some household items (e.g., books).

Conclusion and Future Work

In this work, we presented design artifacts created in a co-design workshop with one local sharing community in Switzerland. We also discussed three design alternatives geared towards increasing visibility of membership activities and improving interpersonal trust among neighbors. We seek the ECSCW community feedback on further developing these preliminary ideas.

We aim to iterate on these design ideas with key Pumpipumpe stakeholders to establish a ranked list of technological features to align with their existing digital tools. In the future, we will implement some of these features in the form of interactive prototypes, and field-test them with the community. Specifically, we plan to conduct a longitudinal diary study to examine how the features can shape community members' needs for engendering trust, afford collectivity (Bødker et al., 2020), and continuous participation in the community using digital tools. Based on the results of this study, we will provide recommendations for integrating value-added features to the Pumpipumpe platform and create conditions for continuous maintenance and support of these features.

Acknowledgments

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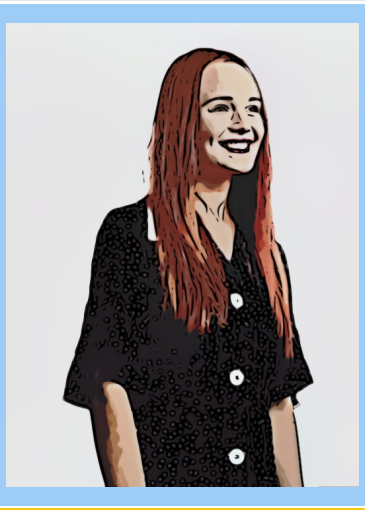
Appendix A: Design Sprint Materials (Personas)

"I don't like it when working tools are thrown away. I rather give my unused stuff away or gladly pick up tools from the others and give them a second life."

- Cares about others and is always willing to help
- Enjoys the company of others but is also happy to retreat back to his solitude
- Often walks around the neigbhorhood
- Stumbled upon Pumpipumpe online when he needed a circular saw for a project
- Uses an older Android phone for phone calls and text messaging

Henry

54 years old / early retired because of chronic medical conditions / receives social benefits



"I like Pumpipumpe because it encourages people not to buy things that they hardly ever use."

- Is very social, has allways people around her
- Passionate sharer of things and services
- Shared via Pumpipumpe
- Got introduced to Pumpipumpe by a friend (Fabian)
- Uses a **Fairphone 3**, a tablet and a notebook,
- Always connected

Nora

28 years old / Ph.D. candidate in Sociology / Lives in a shared flat with like-minded people

"I expect things to work out of the box; I don't want to spent too much time figuring out how something is supposed to work."

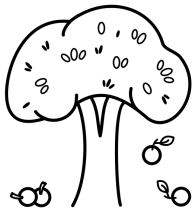
- Is a reserved person
- Sticks with his friends, does not participate much in neighborhood activities
- It doesn't bother him to buy new eco-friendly things
- Got to know Pumpipumpe through a newsletter of a sustainability-focused organization
- Joined two years ago
- Has not lend or borrowed something via Pumpipumpe yet
- Uses newest Apple devices for work and for leasure

Fabian

43 years old / writer from Basel / lives alone in a loft

Appendix B: Design Sprint Materials (Scenario & Design Brief)

Scenario



On a warm spring day, **Henry** decided to work on his garden. He would need a ladder to cut branches of a cherry tree. At that moment, he thought about Pumpipumpe – the service he signed-up a few years ago but never used since that time. Henry wasn't sure if there are any active Pumpipumpe members in the area and checked the map. Luckily, there were, and he found a ladder a few streets away.
It took Henry a few days to gather enough courage to go and knock at the neighbor's door. What a disappointment when he realized that he could not find a mailbox with stickers at a location. It took Henry another three days until he tried to search again. This time he was lucky. He discovered a shared flat, and one of the tenants was fortunately at home. **Nora** opened the door, and they quickly discussed and agreed that Henry will bring back the ladder on the same day, once he would be done.

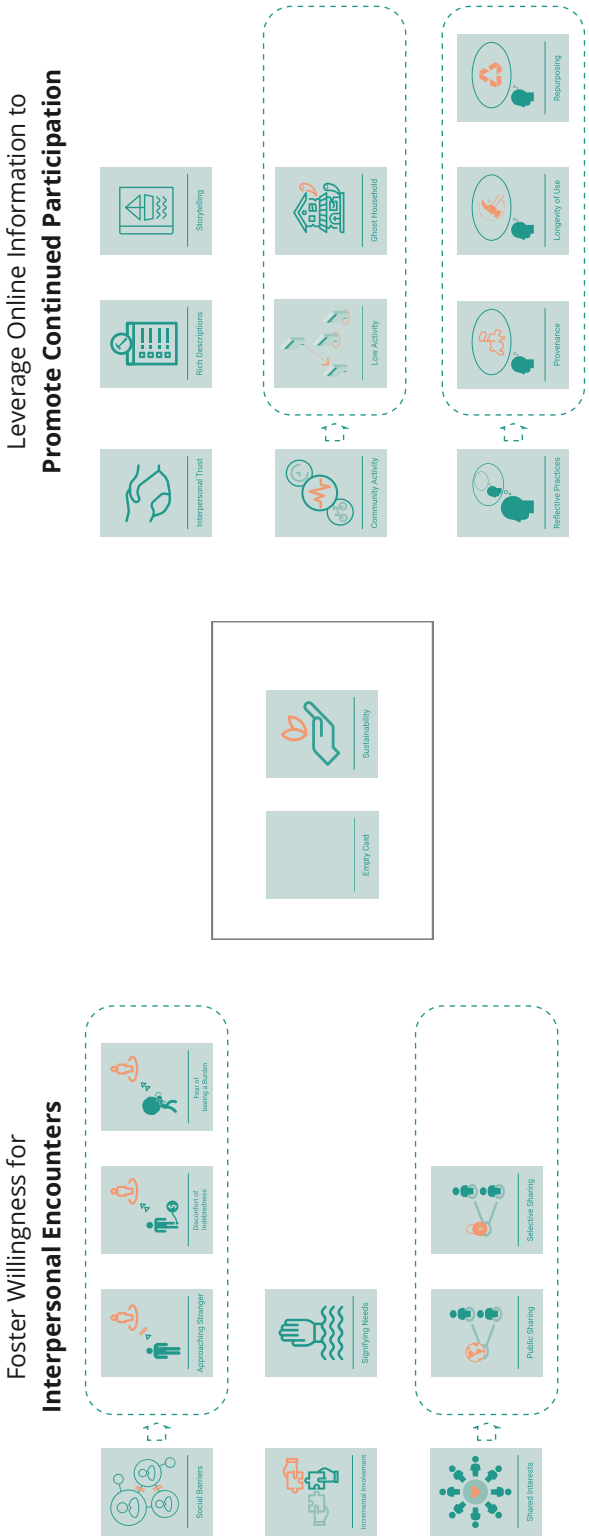
Henry then used the ladder during his gardening activities. Once the work was done, Henry went right back, rang at the door, and met another tenant of the shared flat who took the ladder back. Henry thanked him and, satisfied, returned home. He was happy with the idea that he could rely on the service once in a while.

A few weeks later, Henry was sitting in the garden under the cherry tree when Nora passed by. She stopped and greeted Henry. They had a quick chat. Nora wanted to know how Henry learned about Pumpipumpe. Her friend **Fabian** recommended her a platform. Henry also wanted to know how often Nora lends stuff and if she knows many other Pumpipumpe members. Nora told him that she rarely gets approached for things and doesn't know many other members are around. Both were curious about how much sharing happens in their neighborhood.

Design Challenge

Client:	Pumpipumpe Community
Design Challenge:	Foster interpersonal encounters by **encouraging people** to be curious and interact with each other and at the same time **keep members engaged** on the platform by providing them useful details based on available information at the Pumpipumpe platform.
Deliverables:	Design a feature that offers an **overview of community interactions** and increases feelings of **trust** among neighbors.

Appendix C: The Pumpipumpe Design Cards



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Confronting Asylum Decision-making through Prototyping Sensemaking of Data and Participation

Trine Rask Nielsen, Panagiota Katsikouli, Anna Højberg Høgenhaug, William Hamilton Byrne, Thomas Gammeltoft-Hansen, Tijs Slaats, Henrik Palmer Olsen, Thomas Troels Hildebrandt, Naja Holten Møller

Department of Computer Science & Faculty of Law, University of Copenhagen
trn@di.ku.dk, pk@di.ku.dk, ahh@jur.ku.dk, william.hamilton.byrne@jur.ku.dk, tgh@ju.ku.dk, slaats@di.ku.dk, henrik.palmer.olsen@jur.ku.dk, hilde@di.ku.dk, naja@di.ku.dk

Abstract. The research outlined in this paper is focusing on understanding asylum decision-making and outcome variations across the Nordic countries. As a preliminary study, we extract data from an open dataset[1] of decision summaries from the Danish Refugee Appeals Board. The approach we propose, offers points for discussion of how prototyping context and participation can help raise questions about such data and engage stakeholders. Combining the application of Machine Learning (ML) and Natural Language Processing (NLP) with participatory methods (e.g. critically designed artefacts) enable us to 1) move beyond "obvious" ML-application areas, 2) through sensemaking of data with stakeholders, and 3) co-develop approaches to data science from a CSCW-perspective.

1 https://fln.dk/da/Praksis

Introduction

In CSCW and related areas of research scholars are starting to investigate how to respond to and create a shared research agenda for the refugee crisis (Talhouk et al. 2016, 2019; Almohamed et al. 2020; Tachtler et al. 2021). Increasing interest in data-driven technologies for decision-support has led to scholars asking new questions about the role of technology in relation to large-scale political issues (Dombrowski et al. 2016; Molnar 2019; Costanza-Chock 2020). As such, scholars begin to discuss the entrenched inequities of data science tools among the already marginalized and how they locate wealth and power largely in Western societies (Taylor et al. 2021). Acknowledging these deep issues of inequity "data are part of the problem, to be sure. But they are also part of the solution" (D'Ignazio et al. 2020).

The research outlined in this paper is part of the interdisciplinary research project "Data Science for Asylum Legal Landscaping" (DATA4ALL). The project leverages data science to understand outcome variations in asylum adjudications across Nordic countries. Despite decades of legal harmonization, the chance of receiving asylum for displaced people from the same country varies significantly across Europe (Goodwin-Gill et al.; Guild 2016).

According to the 1951 Refugee Convention Article 1A, a refugee is defined as a person:

> "who is outside his or her country of nationality or habitual residence; has a well-founded fear of being persecuted because of his or her race, religion, nationality, membership of a particular social group or political opinion; and is unable or unwilling to avail him – or herself of the protection of that country, or to return there, for fear of persecution" (The UN Refugee Agency)

The 1951 Refugee Convention does not define how states should determine refugee status. Asylum proceedings and status determinations are left to each state. In this context, asylum claims are left for adjudicators to decide on the basis of testimonies and the disclosed material, which become adjudications dataset available for data science (New to Denmark).

To that end, the paper proposes an approach and initial points for discussion of how a CSCW-perspective can help raise questions about such dataset. Data from asylum adjudications stems from a complex and cooperative decision-making practice, which is only opaquely described as they are extracted. Contextual factors that may affect data production, include imprecise language interpretation (e.g. Weibert et al. 2019), lacking trust in authorities (Almohamed et al. 2020), as well as implicit bias of adjudicators can also shape interpretations of asylum claims (Chen et al 2017).

A CSCW-perspective centers on showing the boundaries and inadequacies of applying techniques from data science such as Machine Learning (ML) and Natural Language Processing (NLP) on an "incomplete" dataset and the context and practices that shaped it. A premise for this project is thus the combination of

methods and approaches, including critical thinking. We design our method to also consider questions such as *how* data are constructed and what counts as useful data in the formal legal process. Prototyping critical research artefacts, we propose, serves as a tool for inquiry into both practice and the wider political context of sensitive areas such as asylum decision-making. In addition, the paper offers some initial examples from the application of ML and NLP to asylum decision summaries from the Danish Refugee Appeals Board.

Machine Learning of Asylum Decision-Making

Machine learning (ML) is increasingly being used in various decision-making contexts including in public administration. ML is being endorsed to support decision-making in adjudications involving applications for asylum (Chen et al. 2017) to decrease variation in decision outcome (Ramji-Nogales et al. 2007), improve impartiality, and decrease "unfair" decisions made by human judges (Heyes et al. 2019; Chen et al. 2017). Large-scale datasets are not yet being applied to asylum-decision making in Denmark, though ML has been increasingly applied in sensitive settings (e.g., social welfare) fueling debates on its use (Flügge et al 2021). In Denmark, the government has introduced a new National strategy in 2019 with the aim of becoming a frontrunner in AI through an ethical and responsible perspective on machine learning use in public casework: "The public sector should take advantage of AI to provide a world-class service" (Ministry of Industry, Business and Financial Affairs 2019).

Meanwhile, large-scale data are gaining attention in the asylum domain. In 2020 it became public that adjudications of recognition rates of one judge of the Danish Refugees Appeals Board varied significantly from the adjudications of other judges between 2012-2019 (Flygtningenævnet 2020). Prior CSCW-research have forcefully documented the importance of unpacking the situated and cooperative aspects of decision-making in practice; thus, careful investigation of the social organization of work is critical for giving context to such data (Randall et al. 2007, Møller et al. 2020). Cakici et al. show that questions of "Othering" of displaced individuals that are not considered European are not confined to practices of asylum decision-making (Cakici et al. 2020). "Hence, engaging in situated analyses of data practices means confronting big political questions revolving around Europe, treating the different practices through which the people of Europe are brought into being as political struggles over questions such as "Who are the people of Europe?" (Cakici et al. 2020: 204).

As large-scale datasets become available, anticipation grows that these can be transformed into knowledge to inform decisions, increasing algorithmic authority (Lustig et al. 2016; O'Neil 2016). Legal decision-making more broadly has seen an increase in algorithmic systems for decision-support (Zalnierute 2019; Olsen et al. 2020). In asylum decision-making, interest in data and algorithms entail

streamlining and increasing transparency in decision-making (Molnar 2019; Pakzad 2019).

Raising questions about large-scale data from a CSCW-perspective is critical because ML and NLP are applied on "incomplete" data stemming from a complex and cooperative decision-making practice that is only opaquely described by the data available for the data scientists.

Variations Identified in Asylum Cases

The DATA4ALL project will use data science techniques for the purpose of explanatory research. As a preliminary study, we extracted publicly available data from decision summaries of asylum cases treated by the Danish Refugee Appeals Board (The Danish Refugee Appeals Board). The dataset has 3 obvious limitations. First, it only contains cases that were, at a first instance, rejected by the Danish Immigration Service. Second, not all cases treated by the Refugee Appeals Board are publicly available and it is therefore not representative of the complete set of asylum cases. Third, the dataset only contains the summaries of the decisions.

After applying NLP and regular expressions on the decision summaries, we extracted the following information for every case: applicant's nationality, gender, religion, date of entry in Denmark, date the case was processed by the Refugee Appeals Board, marital status, asylum category, whether the applicant has previously applied for asylum in another country, whether the applicant has had involvement with political parties/organizations and the military, whether divergences were noticed in their application, whether an investigation was carried out in cases of torture, and the Refugee Appeal's Board decision.

From this analysis, we found varying rates between cases being granted asylum vs the cases not granted it, in relation to each extracted feature. Some examples, with regards to the applicant's nationality are highlighted in figure 1.

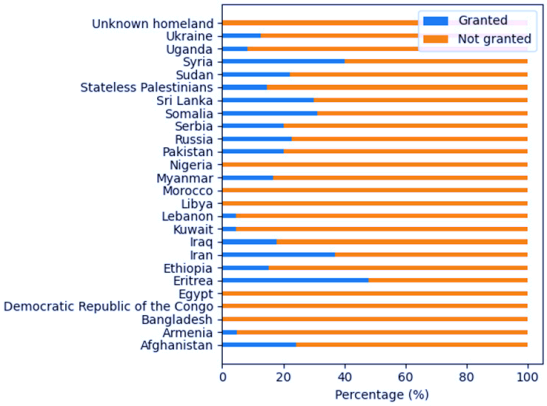

Figure 1. Percentage of applicants granted asylum according to country of origin. Where the country of origin is unknown (unknown homeland), no one has been granted asylum in the appeal process by the Danish Refugee Appeals Board between 2003-2020.

We then built a number of classifiers on all possible combinations of features in order to investigate the models' accuracy on predicting case outcome. We received varying classification accuracies depending on the classifier used, and the combination of features, with values ranging from 43% (when SVM is used) to 82% when Random Forest was applied on the features: nationality, gender, and religion.

An initial analysis of these data indicates that applicants where the country of origin is not disclosed are not granted asylum. This points to a system built around nation states that disadvantages those applicants who do not conform with traditional expectations of formal processes through which the people of Europe are "brought into being" (Cakici et al. 2020).

The goal of our project is to provide a deeper interpretation and contextualization of data from asylum decision-making, for example, asking questions to the data on the role of the asylum application form and how the applicant is shaped through data as an asylum seeker.

Our aim with this preliminary paper is to highlight the challenges that arise from data science requests for a clean, representative and complete dataset, in order to draw confident conclusions with regards to the underlying reasons of the variations detected.

Prototyping Sensemaking of Data and Participation

To inform the leveraging of data science techniques in asylum decision-making, we propose participatory methods (e.g. Menendez-Blanco et al. 2017) that enable sensemaking of data (Neff et al. 2017) together with stakeholders. Prototyping covers a spectrum from product development (Andersen et al. 2017) to critically designed artefacts that can form tools for inquiry (Baumer 2017; Menendez-Blanco et al. 2017; Baumer et al. 2018).

In CSCW and related fields of research, critically designed artefacts serve as "containers of ideas" (Bødker 1998), meant to act as heuristics, and as catalysts for both sense-making and future thinking (Danholt 2005). Thus, such artefacts can enable adversarial design and serve as material evidence in political discourse: "By revealing the conditions of political issues and relations, adversarial design can identify new terms and themes for contestation and trajectories for action" (DiSalvo 2011:13).

Prototyping is especially useful to 1) engage stakeholders in the asylum domain and connect large-scale data to its situated context while promoting data literacy of stakeholders. Further, prototyping allows us to 2) unpack the different political struggles influencing variations in asylum outcomes that cannot be ascribed to the situated practices of asylum decision-making (Teli et al. 2018). 3) Data are transformative of future practices and prototyping enables stakeholders who are not trained in data sciences to co-develop methods and take part in the discussion and design of databased services (Seidelin et al. 2020).

In order to get a deep understanding of the Danish asylum decision-making process, an overview of the current Danish asylum procedure was created as a starting point for prototyping a critically designed artefact. Taking this approach (*following* Menendez-Blanco et al. 2017) can enable us to query into the kind of data from asylum cases that we present here as example. Thus, a first prototype is currently being developed that amplifies the role of data and how they can enter the formal decision-making process.

Prototyping critically designed artefacts serves two purposes in this project: 1) gaining a shared understanding and common vocabulary in regard to Danish refugee terms and processes, and 2) mutual learning (Kensing et al. 2013) through participation of all stakeholders to establish a platform for sensemaking of data and discussions of the work practices of asylum decision-making, such as the subtle categorization of cases (Møller et al. 2011; Møller et al. 2020).

Finally, the sensitive nature of asylum decision-making makes it urgent to amplify asylum seekers and their advocates perspectives (Talhouk et al. 2019). Through applying a critical approach, it becomes possible to also research "counter data" not available in formal decision summaries. Thus, counter data is missing data or data that are currently not collected because of e.g., bias, lack of social and political will, or structural oppression (D'Ignazio et al. 2020).

Closing Remarks

The project DATA4ALL and the approach proposed in this paper is interdisciplinary, which is pivotal to how we engage stakeholders. Our approach seeks to maximize synergies across disciplinary boundaries (Law and Computer Science), institutions (e.g., the Danish Refugee Appeals Board), and advocates for asylum seekers (e.g., the Danish Refugee Council and Refugees Welcome).

All case summaries retrieved for this study were anonymized upon retrieval. The extensive datasets of over 100,000 asylum adjudications across the Nordic countries that cannot be anonymized are securely stored and handled in accordance with GDPR. An ethical and responsible data science approach is imperative for any project engaged with asylum cases of this kind. In this respect, we adopted a strategy for amplifying stakeholder participation as advocated in ethical guidelines for AI (e.g., European Union 2019 and Dansk Standard 2020).

Consequently, we commit as interdisciplinary scholars to an ontology that recognize asylum applicants and decision-makers as active participants in the shaping of transformative data and possible near-future practice and technologies in the field of asylum decision-making.

We call on the CSCW-community to commit to researching and disclosing the boundaries and inadequacies of applying data science techniques such as ML and NLP and recognize the transformative potential of data for all.

Acknowledgements

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An Ontology for Evaluation of Remote Collaboration using Augmented Reality

Bernardo Marques, Samuel Silva, Paulo Dias, Beatriz Sousa Santos
IEETA, DETI, University of Aveiro, Aveiro, Portugal
Contact Author: bernardo.marques@ua.pt

Abstract. Research on remote collaboration mediated by Augmented Reality (AR) has been mostly devoted to creating and exploring the enabling technologies to establish a shared understanding among distributed collaborators. Yet, a more in-depth consideration of the nuances of collaboration should be considered in order to improve the methods to support, as well as to evaluate such processes. However, evaluation is a particularly challenging endeavor given the multitude of aspects that may influence remote collaboration scenarios that should be assessed to understand how collaboration occurs through this new medium. In this context, integrating characterization and evaluation methods for characterizing the collaborative process is of paramount importance. We propose a knowledge-based ontology describing relations among dimensions of collaboration and the main concepts of the evaluation process to guide researchers in designing and conducting their evaluations, thus providing a more comprehensive perspective on the collaborative process and the value of AR in this context.

Introduction

Scenarios of remote collaboration imply that collaborators establish a joint effort to align and integrate their activities in a seamless manner. Usually, it requires context-related information to be exchanged among distributed team-members, providing support to communication, cooperation, assistance, training, learning as well as knowledge sharing (Lukosch et al., 2015; Kim et al., 2018; Ens et al., 2019).

In this vein, Augmented Reality (AR) appears as a valuable technology as it combines the advantages of virtual environments and seamless integration with the real-world objects. This allows multiple collaborators to overlay responsive computer-generated information on top of the real-world environment, in order to serve as basis for situation mapping, allowing identification of issues, analysis and discussion of complex problems and situations, as well as sharing assumptions and beliefs (Ens et al., 2019; Barroso et al., 2020; Madeira et al., 2020; Lee et al., 2020; Marques et al., 2021).

In the past three decades, most of the research efforts in AR remote collaboration have been focused on creating and exploring the enabling technology, as well as propose novel approaches to support its design and development. Solutions using AR can be used to empower distributed workers, which require know how and additional information from professionals unavailable on-site (Gurevich et al., 2015; Teo et al., 2019). Regardless of their localization, remote collaborators can provide guidance and real-time spatial information, highlighting specific areas of interest, or sharing information (Cidota et al., 2016; Hall et al., 2018; Ens et al., 2019; Zigart and Schlund, 2020) in the form of visual communication cues, e.g., pointers, annotations, hand gestures, among others (Gurevich et al., 2015; Ens et al., 2019).

These solutions can better support analysis, discussion and support of complex problems and situations, given its ability to enhance alertness, awareness, and understanding of the situation, allowing interactions between geographically dispersed collaborators (Neale et al., 2004; Ens et al., 2019; Belen et al., 2019).

As the field matures, the focus is being intensified on a wider range of human factors, particularly those that should be supported to embrace the ultimate goal, which is truly supporting collaboration. In this context, the evaluation of such scenarios becomes an essential aspect to ensure the quality and relevance of the growing number of prototypes, which are paramount to contribute to a more in-depth knowledge of how the collaborative effort occurs by assessing different aspects of collaboration itself.

This is a difficult endeavor, given that scenarios of remote collaboration are multifaceted, which means many aspects may affect the way teams collaborate (Belen et al., 2019; Ens et al., 2019; Marques et al., 2020; Merino et al., 2020). Without proper contextual information, the identification of key issues that need to be tackled to understand and improve collaboration becomes extremely difficult. In addition, current frameworks are not sufficient to characterize how collaboration occurs (Ens et al., 2019; Marques et al., 2020),

falling short to retrieve the necessary amount of data for a more comprehensive analysis, thus requiring an eclectic perspective. In this regard, trying to apply conventional evaluation techniques to scenarios of remote collaboration without adapting them can lead to dubious results, falling short to retrieve the necessary amount of data for more comprehensive analysis.

Hence, if the methods used are not properly applied, the results and findings reported may be misleading or of limited value, preventing researchers from gaining access to the whole picture. As a consequence, without the appropriate mechanisms, the research community does not accumulate enough experience and evidence to understand what works (and what does not), to which extent and how to use the analysis of the collaborative process to inform future improvements, thus allowing to build better AR-based solutions and improve collaboration among distributed team-members. Therefore, a better characterization of the collaborative process can lead to an additional perspective on the nuances of collaboration, and in turn, provide researchers with the possibility to easily extract results and conclusions and thus determine the success of the collaborative effort.

In this vein, the integration of proper characterization and evaluation methods regarding the collaborative process is of paramount importance. An example, is the use of ontologies, which may help surpass current evaluation challenges, by allowing researchers to tackle the lack of consideration for a common framework that encompasses remote collaboration, AR technologies and evaluation, which may serve as grounds for community practice and reporting, thus reaching the goal of improved assessment for the field. By considering these characteristics, ontologies may also contribute to make evident that many of the aspects that define an assessment of a collaborative effort supported by AR are not even addressed when considering how reporting is presented in current literature. For example, whether collaborators were able to use an AR solution to its full potential or how the available information was used to achieve their common-goals, which are important aspects for understanding the collaborative effort itself, which are rarely reported, making it difficult to judge the real meaning of the results presented and the proper assessment of all aspects associated to the collaborative process. To elaborate, if different dimensions of remote collaboration are considered, evaluation will certainly not be the same, thus requiring new measures, or the use of different tasks to motivate the use of AR technologies between distributed team-members.

The goal of an ontology is to define a common vocabulary, i.e., set of terms for researchers who need to describe the facts of a given field. It captures the intrinsic conceptual structure of a field and usually covers classes that describe concepts of interest. In addition, ontologies may also help systimatization of existing works, allowing to share knowledge about reasoning strategies or problem-solving methods with researchers from the community, who have similar needs for knowledge representation in such field, thereby eliminating the need for replicating the knowledge-analysis process (Chandrasekaran et al., 1999; Noy and McGuinness, 2001).

In this paper, we present an ontology to support a semantic knowledge base, which can be used to understand relations among different dimensions of remote collaboration and the main concepts of the evaluation process. The goal is to provide a common ground to help guide researchers comprehend the scope of evaluations tackling scenarios of remote collaboration using AR, e.g., how they were designed, their results and interpretations. Thus, generating an additional perspective on the nuances of collaboration in scenarios where distributed team-members collaborate through AR to achieve a common goal.

Ontology for Evaluation of AR Remote Collaboration

This section describes an initial effort towards the creation of an ontology for conducting evaluations in scenarios of remote collaboration mediated by AR. Literature shows that a wide range of approaches can be adopted for developing an ontology, since its design is considered a creative process and every individual effort may result in different ontologies. The applications of the ontology and the designer's understanding of the domain will undoubtedly affect the ontology design choices (Chandrasekaran et al., 1999; Noy and McGuinness, 2001).

To this effect, we performed sessions of brainstorming (Jacko, 2012; Jerald, 2015) with 6 experts, including researchers and faculty members with several years of experience in multidisciplinary areas, such as Human-Computer Interaction (HCI), Virtual and Augmented Reality (VR/AR), multimodal interaction, as well as remote collaboration, who co-authored multiple publications, and participated in international projects on these subjects, over the years. In this vein, we conducted several face-to-face and remote meetings to obtain ideas and discuss the creation of the ontology, sometimes with different combinations of experts, according to their availability over several months. Likewise, two experts were randomly selected to be absent from these meetings, in order to provide richer feedback later during an independent critical analysis of the ontology, i.e., understand possible ambiguity of some concepts, attributes and relations. This process resulted in the refinement of the ontology over several iterations.

The strategy chosen to define and populate the ontology (Figure 1) was to consider the main dimensions of collaboration (e.g., team, time, task, communication, interaction, among others) (Marques et al., 2021) as the core classes and associate them with other concepts (following an existing ontology for groupware evaluation (Araujo et al., 2003, 2004)) that exist in common evaluation processes, like scope, design, setup, data, instruments, and others, as depicted in Figure 1. The proposed ontology aims to support a semantic knowledge base to understand the scope of evaluations addressing remote collaboration mediated by AR, e.g., how they were designed, their results and interpretations. More specifically, for registry how contextualized information can be used during the evaluation of the nuances of collaboration in scenarios where distributed team-members need to collaborate through AR to achieve a common goal.

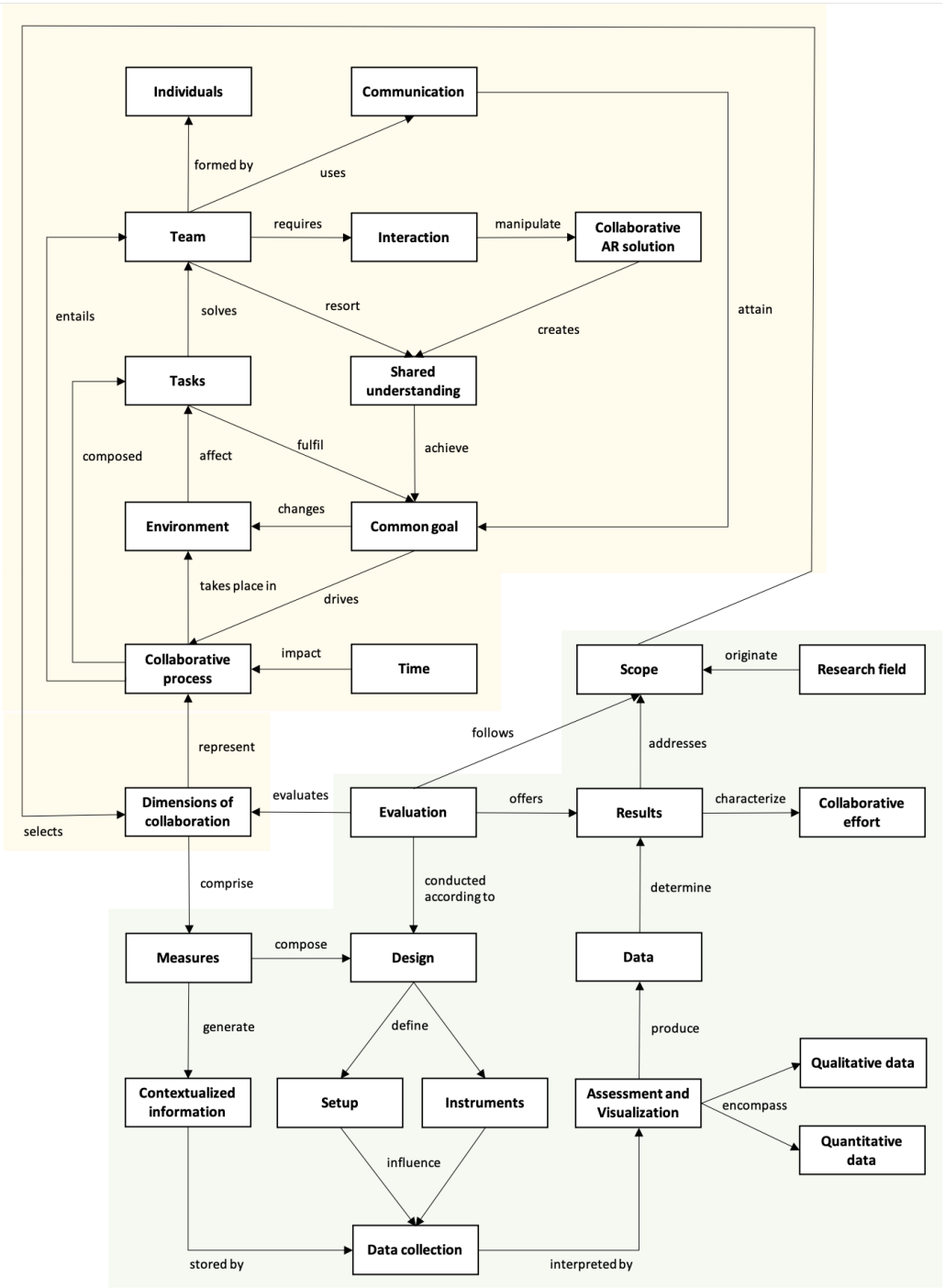

Figure 1. Ontology for contextualized evaluation in scenarios of remote collaboration mediated by Augmented Reality, which can be used to understand and guide the scope of the evaluations, how they were designed, their results and interpretations. In yellow: classes, properties and relations among dimensions of collaboration. In green: the main concepts of the evaluation process

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The classes, concepts and attributes in the ontology serve as a guideline for the evaluation design. Evaluation is needed in order to address a specific scope generated within a research field. In scenarios of remote collaboration, the collaborative process entails tasks that need to be fulfilled, time representing the synchronicity of the tasks, environments in which these tasks occur, and a team formed by distributed individuals. The team members must interact with each other through a collaborative AR solution, which serves as basis for situation mapping and creation of a shared understanding. By communicating, the team members can analyze and discuss possible solutions to attain a common goal.

The first step for designing an evaluation in scenarios of remote collaboration, is to properly identify which dimensions of collaboration are going to be evaluated, depending on the research scope. Each evaluation dimension comprises pre-defined measures that can be chosen to compose the evaluation design as dependent/independent or secondary variables. The evaluation can be designed in terms of the setup that will be used by the team, as well as the instruments that can be used to gather data based on the selected dimensions. The results of an evaluation comprise contextualized data (qualitative and quantitative) as the outcome of the collaboration process, which can be used to characterize the collaborative effort and in turn understand if the collaboration was effective or not.

Final Remarks and Future Work

Augmented Reality (AR) is considered as a powerful solution for analysis, discussion and support of complex problems and situations in scenarios of remote collaboration. As the field matures, evaluation becomes essential to ensure the quality and relevance of the growing number of prototypes by assessing the different aspects of collaboration itself.

However, planning, designing, performing, and replicating an evaluation are demanding activities in remote scenarios mediated by AR. Given the difficulty to evaluate such scenarios, it is important to propose enhanced evaluation strategies to conduct thorough collaborative studies and provide an additional perspective on the different dimensions of collaboration supported by AR.

As a contribute, we presented an ontology to guide researchers in designing and conducting their evaluations, aiming to generate an additional perspective on the nuances of collaboration in remote scenarios and the value of AR. The proposed ontology facilitates these activities by establishing relations among the main dimensions of collaboration and concepts of the evaluation process, in order to guide researchers define variables associated to the collaborative process, select which instruments should be applied, as well as collecting measures and obtaining results that are pertinent for interpretation in light of the scope of the evaluation. By following this systematic structure, researchers may be able to analyse and compare a variety of evaluation approaches and results, as well as make considerations and draw conclusions about the use of AR-based solutions for remote scenarios.

The proposed ontology is not intended as a closed work, but should, instead, be taken as the grounds that might enable the community to elaborate, expand, and refine it. Although some of the proposed classes, concepts and attributes might still not reflect the full scope of some categories, we consider that they create a clear enough organization to make itself evident where to insert new characteristics.

The next step is to use this ontology to create a methodological framework, aiming to support the process of conducting evaluations in a more structured manner, and thus eliciting a more complete characterization of the collaboration process in remote scenarios mediated by AR moving forward.

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Jonas Frich (2021): Is brainstorming the final frontier in the digitalization of design work?. In: Proceedings of the 19th European Conference on Computer-Supported Cooperative Work: The International Venue on Practice-centred Computing on the Design of Cooperation Technologies - Exploratory Papers, Reports of the European Society for Socially Embedded Technologies (ISSN 2510-2591), DOI: 10.18420/ecscw2021-p19

Is brainstorming the final frontier in the digitalization of design work?

Jonas Frich
Centre for Digital Creativity, Aarhus University
frich@cc.au.dk

Abstract. This work explores the publicly available annual Design Tools Survey from 2017 to 2020 to find that brainstorming and ideation consistently appear to be the only activity where professional designers make elaborate use of analog tools, like pens, paper, and whiteboards. Furthermore, this predisposition for the analog appears to be reliable for both freelancers designers to larger design teams, as well as novice to very seasoned designers. These findings are discussed in relation to collaborative design work and the interactive qualities of the tools.

Introduction

For around two decades, CSCW and HCI have developed technologies intended to support and augment collaborative design ideation (Frich et al., 2019b). However, the often collaborative practice of brainstorming and sketching new ideas using pen, paper, sticky-notes, and whiteboards is not easily improved by the introduction of digital equivalents as evidenced in work by e.g. Møller Jensen et al. (2018); Hilliges et al. (2007). These efforts are often situated in design, where work-practices often involve the prototypical activities of brainstorming and ideation (Newman and Landay, 2000; Smit et al., 2019; Vyas et al., 2009). Within

this context, a large survey of the most prominent tools used in the design industry is conducted every year (Palmer, 2020). The survey was initially launched in 2015 and exhibits a considerable focus on digital tools, as most of the designers surveyed are designing web applications, websites, or mobile applications (ibid). The survey provides an opportunity to explore the broad tendencies and development in the tools used for creative, collaborative design work.

In this work, I explore the publicly available data-sets of the Annual Design Tools Survey from 2017 to 2020. I present and discuss three insights relevant to the areas of HCI and CSCW concerned with studying and developing tools for collaborative design ideation. These data-sets are openly available online, and the contribution in this work lies in exploring development and relationships in the data and connecting these to the research efforts of the research community.

Motivation

I have been following the Annual Design Tools survey for years now, and the birds-eye-view of what tools design practitioners work with has always provided me with a satisfying counter-balance to ethnographically inspired studies or experimental setups investigating a specific intervention which are popular in HCI and CSCW (Blomberg and Karasti, 2013; Wallace et al., 2017). In addition, the respondents in the survey are professional designers, who at least in relation to creativity support tools, are actually studied less often (Frich et al., 2019b).

Finally, and what initially led me to explore these data-sets more thoroughly, was my impression that brainstorming and ideation, at least anecdotally, appeared to be the final remaining frontier in terms of digitizing creative design work - analog tools such as sticky notes, pen, paper, and whiteboard seemed to still be an integrated part of office landscapes.

Analysis and Results

It is unlikely that the Design Tools Survey was conducted with academic or scholarly goals in mind, and several limitations apply to the following analysis. The wording of some categories changes slightly from year to year, and the demographic, while stable across years, is skewed towards respondents from Europe and North America. Some of these limitations are taken into consideration in the individual parts of my analysis, and so the sample size may vary slightly. I return to the limitations of the dataset in the discussion.

I include the surveys from 2017, 2018, 2019, and 2020, as they appear to be completed by the same author and are close to similar in structure. Together, they contain almost 12,000 responses by relatively experienced designers, with the most respondents having 3-5 years of experience. The most common title for designer across the years are *UX designers*, *Product designers*, *Web designers*, and *Graphic designers*, and so the survey is also sometimes referred to as the UX design tools survey.

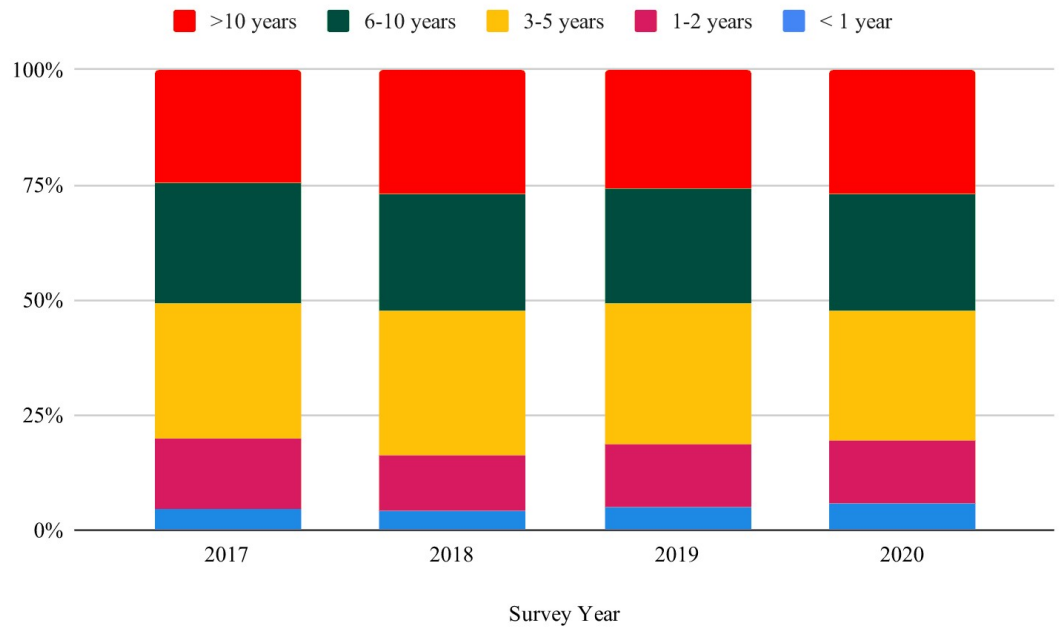

Figure 1. The experience of the designers taking part in the surveys.

Analog Tools are preferred for Brainstorming and Ideation

The surveys from 2017-2020 all inquire about what tools are used for different types of design work. The Activities are consistent from year to year, with slight changes and the addition of user testing in the 2019 survey and removal of "wireframing" in 2020. The activities included in this analysis are the ones marked with bold in table I below.

2017				**"brainstorming/ideation"**
	2018	2019	2020	↪*"brainstorming and ideation"*
	2018	2019		**"user flows, site maps, and flow charts"**
			2020	↪ *"user flows and site maps"*
2017	2018	2019		**"wireframing"**
			2020	"-"
2017	2018	2019	2020	**"interface design"**
2017				**"prototyping"**
			2020	↪ *"UI prototyping"*
2017				**"version control and file management"**
2017				**"manage design systems"**
	2018	2019		↪*"manage your design systems"*
			2020	↪*"manage design systems"*
		2019	2020	**"user testing"**
2017	2018	2019		**"handoff"**
			2020	↪*"developer handoff"*
2017				**"monitoring"**
	2018	2019	2020	↪*"experience monitoring"*

Table I. Activities covered by the Design Tools Surveys 2017-2020.

Across the last four years, designers appear to prefer analog tools either solely or in combination with digital tools for brainstorming and ideation activities. There is a striking preference for the analog tools like pen, paper, and whiteboards over digital tools like Sketch, Figma, and Miro for this activity compared to other activities like prototyping or user testing. Designers also employ analog tools to do mapping of user flows, wireframing, and prototyping, but to a much lesser degree as the share of designers solely relying on analog tools or analog in combination with digital tools never reaches above 15% in any of the last four years of the survey. Illustration 2 indicates the share of analog tools across the different activities surveys split into years. In this case, analog tools refer to the sole use of analog tools (analog only) as well as the use of analog tools together with digital (mix).

The yearly split also suggests a decrease in the use of analog tools for brainstorming over the last four years, with 2020 being an outlier likely due to the COVID-19 Pandemic (Wikipedia, 2019), where more work has been taken virtually as offices and countries have been closed and travels have been limited.

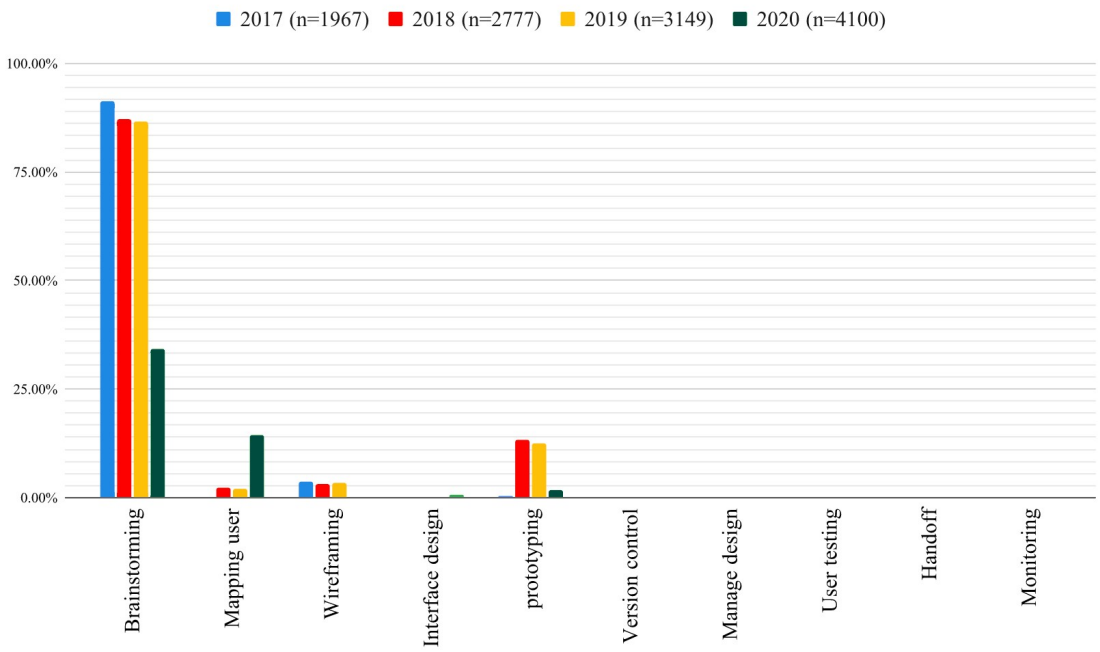

Figure 2. The percentage of analog only or analog in combination with digital tools for 10 different activities split into four years.

Design practitioners' preference for analog tools has previously been pointed out by e.g. Harboe and Huang (2015) or Møller Jensen et al. (2018), who based their claims on a qualitative, interview study of 13 designers and a case study at a design company, respectively. The finding here corroborates these existing claims using a much larger sample and provides clear indications of the magnitude of the matter in contrast to other designerly activities.

Novice and experienced designers prefer analog tools for brainstorming to the same degree

The finding that brainstorming and ideation appears to be the only activity dominated by analog tools prompts further investigation. Within this activity category, I further examined whether the saying 'old habits die hard' may be at play in the preference for tools. The underlying conjecture is, that because tools like Miro (www.miro.com), Milanote (www.milanote.com) and Mural (www.mural.co) –which to some degree mimic analog whiteboard–have only recently (<5-10 years) gained traction, it may be that the designers educated or trained a long time ago have developed a preference for analog tools which persists into the current, where digital alternatives could be expected to be offering more opportunities.

To investigate this, the data was split into experience from less than 1 year (<1 year) to more than ten years (>10 years) of experience.[1] The result is illustrated in the following figure , and while there was a significant relationship between tool preference and experience for 2018 and 2020, where the effect size of these are not interpreted as great (small=0.05 and medium=0.15 at df=4 (Kim, 2017)).

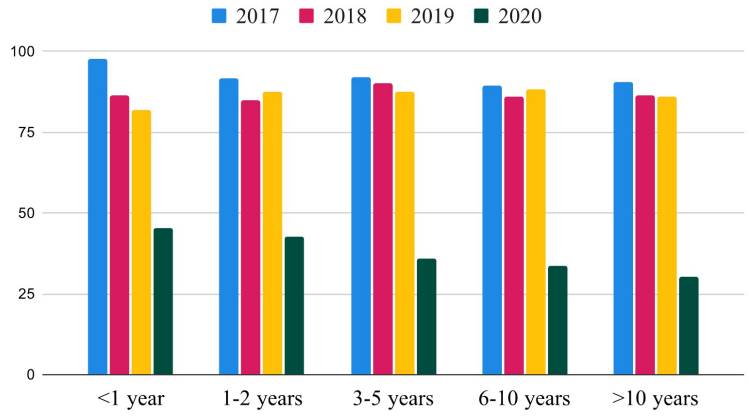

Figure 3. The percentage of designers in each experience category who prefers analog (only or mix) tools for brainstorming.

Year			Value	df	p	Cramer's V
2017	N=1961	X^2	7.808	4	0.099	0.063
2018	N=2732	X^2	10.140	4	0.038	0.061
2019	N=3083	X^2	5.125	4	0.275	0.041
2020	N=3729	X^2	34.124	4	$< .001$	0.096

Table II. Chi-Squared Tests of the relationship between tools preference and experience of the designers..

Two speculative interpretation to these tendencies can be offered: First, it may be the case, that more seasoned designers were more inclined to leave the analog tools completely when the COVID-19 pandemic hit, and secondly that the slight decrease in preference for the analog illustrated in the previous figure 2 in the three pre-covid years is mainly driven by the relatively 'new' designers with little experience.

Working in teams and the inclination towards using digital

Another way of investigating the particular case of analog tool preference for brainstorming and ideation relates to the collaborative nature of such activities.

[1] I excluded 'students' as this data was only available in '19 and '20, and a mistake was made in 2017 and part of 2018 as some respondents could choose 5-10, which overlaps with 3-5. I coded this data as 6-10 to fit with the remaining, correct, responses.

One way of dealing with this, is by asking whether team-size matters here? One of the potential benefits of the digital is the shareability across remote team-members (Everitt et al., 2003; Vyas et al., 2009), and so the share of teams leveraging digital tools either alone or in combination with analog tools would potentially be larger than the share of individuals. In other words, you could expect more digital tools used in collaborative constellations.

The design-team size variable is not optimal in 2017, as there are non-exclusive categories (10-15 and 11-100) as well as a 1-10 category making it impossible to distinguish between working individually and in a team of i.e. three. For 2020 the wording of the questions is essentially different, as it asks about designers at the place of employment, rather than the size of a design team. Consequently, this part of this analysis only leverages the 2018 and 2019 data. Furthermore, very few respondents are in design teams larger than 10, as 88% and 83% for 2018 and 2019 respectively are either working alone or in teams sized 2-10 as illustrated in figure .

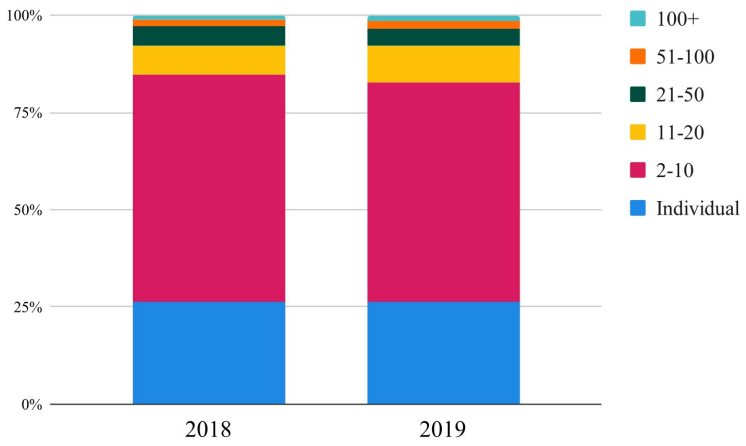

Figure 4. The percentage distribution of design team sizes for 2018 and 2019.

Whether designers are working individually (i.e. as freelancers or as a single designer in an organization) or in design teams does not appear to play a large role in whether digital tools are used for brainstorming and ideation. For 2018 the difference between individual designers and those in teams was approximately four percentage points and in 2019 it was half a percentage point. The relationship between team/individual and tool-use was only significant in year 2018 X^2 (1, N = 2710) = 6.64, p = 0.010, albeit with a less than small effect size (Cramer's V=0.050).

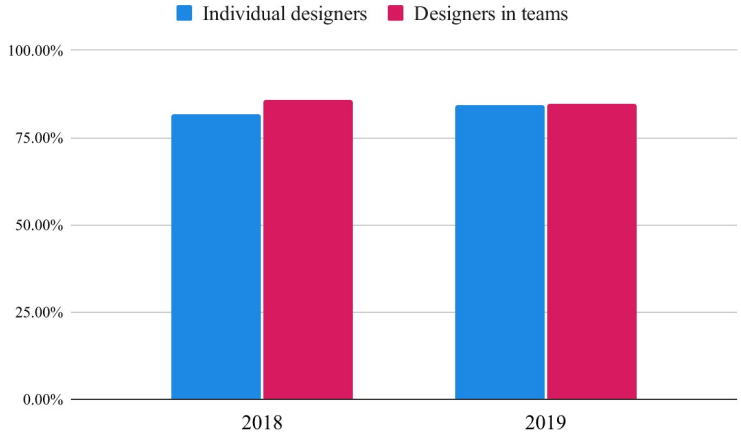

Figure 5. The percentage designers using digital tools (either alone or in combination with analog) for brainstorming and the size of their design team.

While it is quite remarkable that the preferred tool for a highly collaborative activity like brainstorming is unaffected by whether designers work solo or in teams, this may be explained by two considerations: First, as the analysis here is only based on pre-covid years, it is fair to assume that design-teams would often be co-located thus limiting the previously mentioned benefits of the digital to support remote collaboration. Secondly, in 2018 and 2019 the most popular digital design tool was Sketch, which is essentially an interface design tool, that offers a vector-based infinite canvas. It is difficult to see this type of application serve the purpose of e.g. pen and paper or sticky notes and whiteboards. Such a tool would be more similar to the previously mentioned Miro or Mural, which resembles a sort of 'digital whiteboard'.

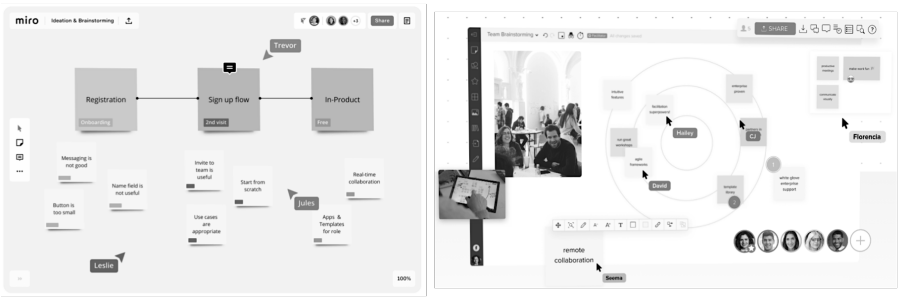

Figure 6. Screens from Miro's (www.miro.com) and Mural's website (www.mural.co).

This idea is even further supported by the 2020 survey. While the variable for design team size in this survey is incomparable to other years, the survey indicates a dramatic increase in the use of digital whiteboards tools, with Miro seeing massive growth as indicated in table III. This again indicates that, the digital tools used for brainstorming and ideation pre-covid perhaps served a 'different' purpose than pens, paper, whiteboards etc. and that if substitutions for these tools are needed, Sketch, Figma, and Illustrator are not necessarily core brainstorming tools.

	2018	2019	2020
Miro (Prev. named Realtimeboard)	1.5%	5.2%	33.6%
Mural	0.5%	0.5%	4.5%
Milanote	1.4%	1.4%	1.7%

Table III. Percentage of respondents reporting to be using either Miro, Mural or Milanote).

Summary and Discussion

Brainstorming appears to be the last remaining activity of professional design work that has not yet undergone complete digitalization. And while the pandemic in 2020, has caused a large increase in the use of digital tools, analog tools remain somewhat central for this particular activity. This predisposition for the analog does not appear to be affected to an extensive by the experience of the designers or whether designers work alone or in teams.

It is hard to predict, whether designers will return to their previous practice post-pandemic, or whether a new work-practice around tools like Miro has been established. An additional point to this discussion is that existing research on the difference between analog and digital tools for brainstorming in design appears to lean towards the conclusion that while the process may be affected by the choice of tools, the product (i.e. ideas or creative outcome) remains somewhat similar. For example, Hilliges et al. (2007) found that "that the overall number of ideas generated remained roughly equal" across digital and analog conditions and Møller Jensen et al. (2018) similarly stated that "Although the number of sticky notes created is not significantly different between the physical and the digital setups there is a difference in the interaction with the notes". Recently, my colleagues and I have also examined changes in the process when moving from analog to digital by considering the phenomena of divergent/convergent thinking, finding that the digital setup appears to support convergent thinking to a larger degree (Frich et al., 2021). Keeping these findings in mind, it is easy to imagine a designer trying out a digital tool for brainstorming to discover that it 'feels' differently (due to changes in the process), not willing to jeopardize a given project, the designer falls back to analog tools. Being 'forced' to use digital tools for brainstorming may have some designers realize that similar outcomes are produced and thus, together with the added benefits of e.g. versioning and shareability sway more designers to take up digital tools for brainstorming. Furthermore, and as has been reported from close observations of how designers work with tools and externalizations, creative work often resembles much 'smaller' iterations or view-shifts, whereby new information is obtained from reexamining externalized ideas Suwa and Tversky (1996); Frich et al. (2019a). This further raises the question of whether considering "ideation" or brainstorming as a single activities is reasonable in a practical contexts.

Acknowledgments

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HiveToHive: Creating Connectedness Over a Distance

Mathanki Yogarasa, Jeppe Aagard Olesen & EunJeong Cheon
Department of Computer Science, Aalborg University, Denmark
{myogar17, jaol15}@student.aau.dk, echeon@cs.aau.dk

Abstract. With social distancing becoming the norm in society as a result of the COVID-19 pandemic, the need for connectedness is more important than ever. While current communication technologies such as the smartphone and email connect us with others, they don't necessarily create a feeling of connectedness. To explore alternative ways to promote such feelings, we developed 'HiveToHive', a wall-mountable interactive device intended to increase connectedness to distant loved ones using short text messages. HiveToHive consists of individual, connectable, hexagon-shaped touchscreen devices called Hives. Each Hive represents a one-to-one connection between the user and a loved one. During the user evaluation, we found that HiveToHive increased participants' feelings of connectedness with others.

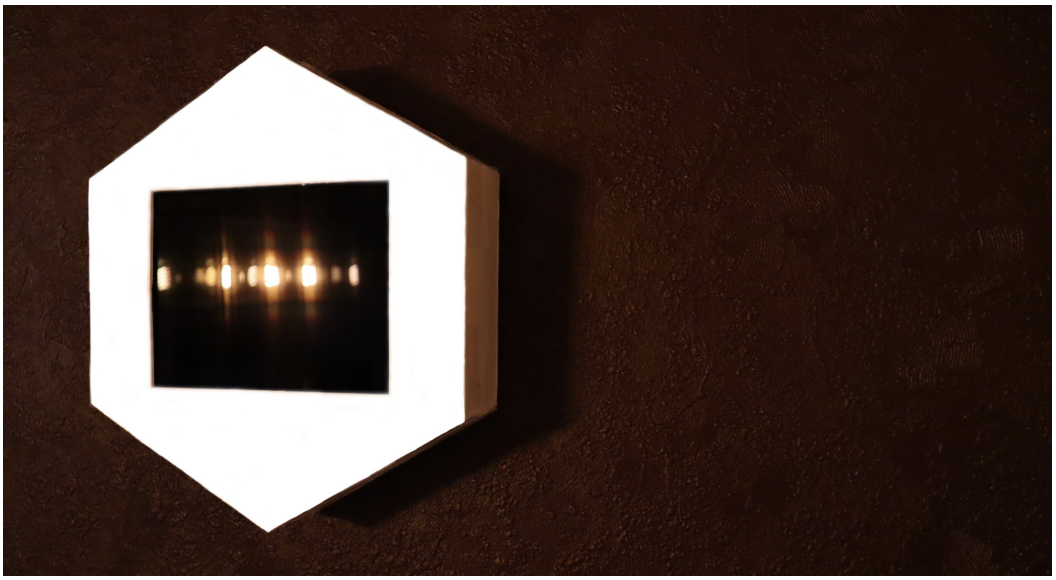


Figure 1. *Prototype of HiveToHive.*

Introduction

Separation between loved ones has become a progressively common phenomenon in recent years, as a result of divorce, displacement by crisis (Shen et al., 2019), or long-distance relationships (Hassenzahl et al., 2012; Singhal et al., 2017). Consequently, this has produced an interest in telecommunications to cultivate connectedness (Shen et al., 2019; Moss and Schwebel, 1993; Kelmer et al., 2013; Canary and Dainton, 2003; Tollmar et al., 2000; Neustaedter and Greenberg, 2012; Timmerman, 1991) by using technology to maintain relationships with loved ones. The most current technologies' primary aim is not intended to facilitate emotional communication, but rather explicit information excluding qualities such as closeness, intimacy, and love, all of which are important to psychological well-being (Hassenzahl et al., 2012). In this paper, we introduce 'HiveToHive', a wall-mountable interactive device intended to increase connectedness to distant loved ones using short text messages. We also describe the conceptual and technical components of 'HiveToHive'.

Background

The Importance of a Short Personal Message in Feeling Connected

One way of socially connecting with others is through text messages. Rettie (2016) introduces a form of text messages called one-liners, short messages without salutations, e.g. 'Have a good day'. They are a way to stay connected even though the sender and receiver are apart and express feelings regardless of age. Using one-liners, you can let someone know that you are thinking about them without

interrupting them. Additionally, one-liners can create a feeling of connectedness between sender and receiver, which can have a positive effect on their connection. Rettie's research supports the emotional importance of text messages in romantic relationships, among close friends, within families, between parents and children, and between siblings (Rettie, 2016). Based on Hassenzahl's earlier mentioned claim, this could mean that one-liners improves a person's life satisfaction and well-being. Köbler et al. (2010) performed an explorative study on people's usage of status messages on Facebook. The study suggested that users who shared personal information using status messages felt a deeper sense of connectedness. The more they shared, the more connected they felt. Furthermore, they found that even messages between users containing no significant information, only mundane and routine subjects, increased their feeling of social connectedness.

Inspired by previous works (Hassenzahl et al., 2012; Rettie, 2016; Köbler et al., 2010; Shen et al., 2019), our motivation for this study is to acquire a deeper understanding of how interactive devices can be used to increase connectedness remotely using one-liners. Because of the current COVID-19 pandemic, this research topic particularly resonates with many people, and we would like to further explore the use of interactive technologies over a distance (Neustaedter and Greenberg, 2012; Mueller et al., 2005; Chien et al., 2016). The question that guided our design is: *How can we develop an interactive device which utilizes one-liners to create a feeling of connectedness with loved ones who are physically distant?*

Ways to Create a Personalized Signal: Colored Messages, Touches and Meaningful Images

There have been interactive devices which allow users to send personalized signals to connect people who are separated by distance (e.g., (Shen et al., 2019; Saadatian et al., 2014; Stawarz et al., 2012; Park et al., 2010)). For example, Mole Messenger (Shen et al., 2019) is a pair of connected creatures which help children to share and send messages to their loved ones. Mole Messenger is a box containing a mechanical mole. The mole can be tapped to deliver differently colored messages to represent the mood of the user. This device highlights that although phone calls and text messages can overcome family isolation in adults, they are not necessarily as effective for children (Shen et al., 2019). Another novel way of keeping in contact with friends or family who are apart is Friendship Lamps[1]. Touching a lamp changes its color, and paired lamps light up in the same color. Users can select between ten different colors and connect an indefinite number of lamps. Sending a message in the form of colored lights is a simple way to show your loved ones that you are thinking of them. Another example of connecting people over a distance is Lovebox[2]. Loved ones can use their mobile phone to send short messages or images to the Lovebox, on which an external heart spins until the lid

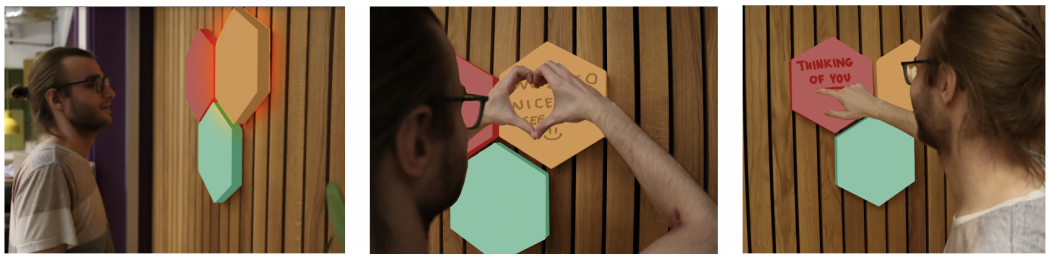
[1] Friendship Lamps: Long Distance Friendship Lamps, https://www.friendlamps.com

[2] Lovebox: A modern take on the classic love note, https://en.lovebox.love

is removed. The sent message is then displayed to the box owner. To reciprocate, the owner can spin the heart with their hand after reading the message, sending a cascade of digital hearts in return. The box itself has a simple and aesthetically pleasing design which blends into the surroundings of most homes. Our HiveToHive (more details in the next section) takes inspiration from the three products above; however, HiveToHive features key differences: (1) the messages written in HiveToHive are all hand-drawn, making each correspondence feel more personal such as the feeling of reading something personalized like handwritten letters, (2) interaction with HiveToHive is done with hand gestures, making it feel fresh and different, and (3) HiveToHive is an ambient device; the messages are not a disturbance, but rather something noticed when the user has time to read and respond to the message. When receiving a message using a typical communication device such as a phone, smartwatch, or PC, one's feelings are oftentimes associated with uncomfortable or stressful responsibilities. The screen size of HiveToHive allows only one-liners to be transmitted. In this way, HiveToHive intends to change the experience of receiving messages to a positive one, and (4) HiveToHive is not only a means of communication, but also designed to be an aesthetically complementary fixture in your home.

HiveToHive provides an alternative form of communication with your loved ones. Under COVID-19's severe constraints on physical contact, we believe that a tool like HiveToHive would support individuals' connections with each other.

The Design of HiveToHive



a: User sees a new message has arrived from Receiver1, corresponding to the orange Hive.

b: User makes a heart gesture to save the message from Receiver 1.

c: User writes a message to Receiver 2, corresponding to the red Hive.

Figure 2. *User looking at a HiveToHive comprised of three Hives, each corresponding to a specific individual.*

HiveToHive aims to establish a special line of communication between users and their loved ones in an effort to create a sense of connectedness. The concept is built around hexagon-shaped cells, or Hives (Fig. 2), which can be used to communicate with drawings or written one-liner text messages. Each Hive represents a single loved one, creating a one-to-one relationship between participants and Hives. The Hives are mounted adjacent to each other on a wall, forming a network of one-to-one communication with loved ones. The Hives can be taken off the wall and moved around, allowing the user to draw or write on them, as they see fit. Multiple

ideations through sketching and brainstorming led to the hexagonal shape, as it stood out from the typical round and square electronic shapes. More importantly, this allowed for a fun and practical way to grab each Hive and connect multiple Hives together. The materials and dimensions were chosen to make it light enough to hang on a wall, and handy to hold when writing or drawing messages. When a message is received, the recipient Hive shines with colored lights to make the user aware of the message's arrival (Fig. 2a). The user color-codes each Hive to assist them in remembering to whom they correspond. We chose to add lights rather than sound or some other forms of feedback in order to make the Hives less disturbing, like many other communication devices can be.

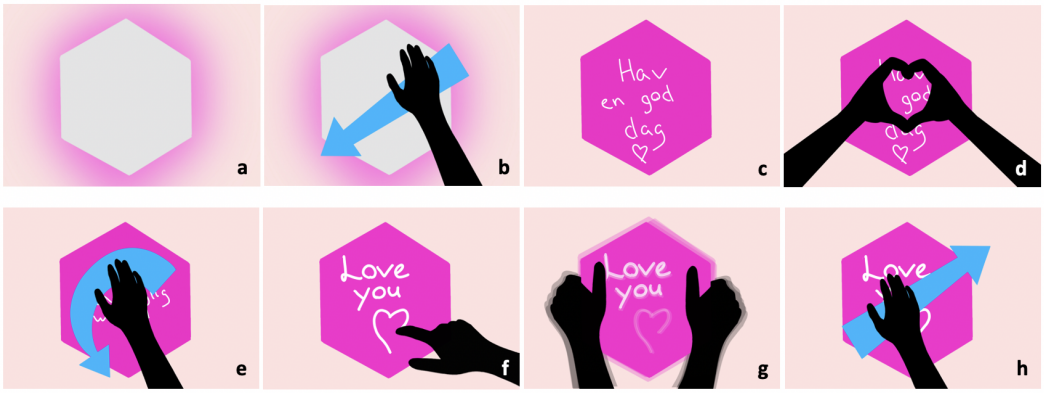


Figure 3. *HiveToHive's Eight Interaction Modes.*

Light shines from behind every side of the Hive, illuminating the wall behind it (Fig. 3a). The user makes a right-to-left swipe over the surface of the Hive (Fig. 3b) to open incoming messages (Fig. 3c). The user can save a message within a given timeframe by making a hand gesture of a heart over a Hive (Fig. 3d). If the user wants to view their saved messages, they can make a hand gesture similar to that of turning a dial (Fig. 3e), thereby allowing them to scroll through their saved messages as they please. To return to the Hive's default state, the user makes another right-to-left swipe. To send a message, the user taps the screen of the Hive corresponding to the loved one whom they want to message. The tap activates a drawing state in which a short message or figure can be written or drawn (Fig. 3f). If the user is not satisfied with the message, the Hive can be shaken, erasing the last drawn line (Fig. 3g). When the user is satisfied with a message, they can send it with a left-to-right swipe (Fig. 3h). To demonstrate the interactivity of HiveToHive, we attached our concept video[3].

Technical Implementation of HiveToHive

The prototype was made by creating the hexagonal shape out of foamcore and polyurethane foam. As the prototype was modelled to be used in the user

[3] Please follow this link: https://youtu.be/fX7CSLx8XRM

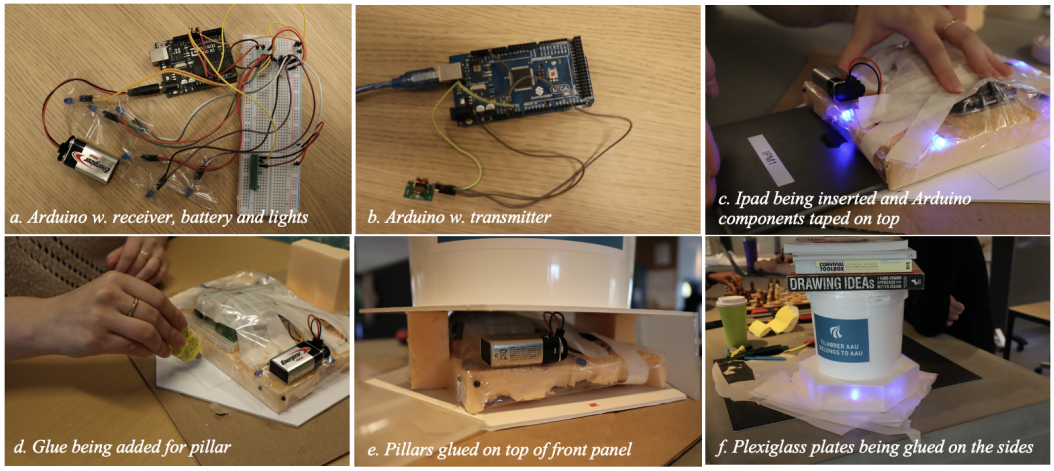


Figure 4. *Creation of the Prototype*.

evaluations, we used the wizard-of-oz approach to simulate the various interactions through interior lights and a screen. Inside the prototype were lights, controlled with two Arduinos. The first Arduino in the prototype had a receiver, a battery and was connected to the lights, as illustrated in Fig. 4a. The second had a transmitter, which could control the lights inside the prototype (Fig. 4b). The two Arduinos were programmed to turn the lights on and off through a radio-signal. In order to simulate a drawing experience in our user evaluation, a touchscreen in the form of an iPad Mini was added, and controlled using TeamViewer.

Evaluation

To get an understanding of whether HiveToHive could create a feeling of connectedness, we conducted a user experience test of our prototype. The test focused on how users understand our design concept and interact with HiveToHive. Furthermore, as previous study (Rettie, 2016) has shown, one-liners can create a feeling of connectedness, we would like to see if this applies for our prototype in the context of connecting to distant loved ones. The evaluations were conducted in a Usability lab, as seen in Fig. 5, where each evaluation could be monitored from a control room, thus we were able to use the Wizard of Oz method, by controlling the prototype from the control room, without any disturbance to participants. Our evaluation included six participants completing 11 activities, allowing each to experience the features of the product. The choice of participants were restricted because of COVID-19, and as such we did not find an adequately diverse group for our evaluations. Five of the participants were aged 19-25 and one was 57, among these were four women and two men. Two of them were unemployed, two were university students, one worked in an electronic store and one was a nurse. During user testing, the participants were asked to complete the following activities: (1) activate the screen by tapping it with your finger, (2)

use your finger to write ‘Hello’ on the screen to a person you care about, (3) send the message by using a left-to-right swipe hand movement, (4) put the Hive back on the wall, (5) open a received message by swiping your hand right-to-left, (6) save the message by forming a heart with your hands, (7) see your saved messages by making a screw hand gesture, as you would when turning a dial, (8) go back by using a right-to-left swipe gesture, (9) activate the screen by tapping it with your finger, (10) draw a house, and, (11) delete the drawing by shaking the screen.

Figure 5. *Evaluation:* ***a.*** *Illustrations of interactions, and low-fi prototypes hanging on the wall,* ***b.*** *A user experience test in progress.*

Following the activities, a semi-structured interview was conducted containing questions about the system, its influence on connectedness, the different interactions, and its aesthetics.

Interacting with HiveToHive

All six participants (P1-P6) mentioned that they enjoyed interacting with the product through hand gestures and thought it was easy. One participant (P4) added "*I don’t think it could really be done any more intuitively,*" and another (P1) said, "*It is idiot-proof.*" The participants generally found the interactions simple and easy to remember, however some participants (P1, P4, P5 & P6) mentioned experiencing slight confusion when to swipe left or right. Some participants (P4 & P6) suggested adding animation to remedy this confusion. When asked whether they would like auditory feedback to assist them, a few (P2 & P6) expressed an interest, while another (P4) deliberated, "*I would prefer it if it was mute but with animation. You have all sorts of other devices in your home that make sounds already,*" indicating that it might be useful if the product had sound features, but also an option to disable sounds completely. Participants were divided on the hand gesture for saving messages. Some (P1 & P2) felt it was a cute function, and could relate it to other social media features. Others (P3, P4 & P6) found it a bit awkward.

Personalization

The majority of participants (P1, P2, P3, P5 & P6) specifically mentioned that they would prefer if each Hive had their own colored light, as they felt it adds a personal touch, having a color correspond to a certain loved one. Some (P1, P3, P5 & P6) mentioned that it would be difficult to tell connections apart if they had many Hives mounted on their wall. One participant (P5) suggested adding a signature to each message to identify the sender, thus allowing the Hives to have the same color, "*[...] different colors is really good. Otherwise, you would need names [on the messages]"*. Two participants (P2 & P5) mentioned that they especially enjoyed drawing instead of using a keyboard to formulate messages, as it made it more personal, one (P5) stating "*[...] it's your personal handwriting, and not just a keyboard. I think that is a lot more personal.*"

Physicality

In terms of HiveToHive's physical dimensions, the participants (P1-P6) expressed an affinity for the hexagonal shapes, mentioning that they seemed both different and contemporary, and that the Hives' size and shape fit well into their hands. The participants (P1-P6) agreed on placing the product in a place where they spend much of their time. Most (P1-P5) suggested that they would place it in their living room and some (P1, P3 & P4) mentioned that they would use the product as a decorative element, "*It is 'hyggeligt' that it is on display*" (P1). All participants (P1-P6) liked being able to pick a Hive off the wall and move around with it. Participants (P4 & P5) mentioned that a Hive was difficult to draw on when mounted, and impossible to delete a message from the mounted position, as one must physically shake a Hive to do so. A participant (P4) mentioned "*I think you kind of have to be able to do it [take a Hive off the wall], because you cannot really have it on the wall and still draw and write [...]*" (P4).

Connectedness

All six participants (P1-P6) mentioned that they thought HiveToHive would positively influence their feeling of connectedness, if it were in their home. One participant (P4) mentioned in relation to the at-risk population, "*This would be a great tool for people that do not regularly go out [...]*", and another (P3) added, *"I have family in other countries with whom I do not communicate with very often, but with [Hive] you could create a better connection to them"*. A different test method would be required to determine whether this is actually the case, for example, a field test that would allow a selection of users to bring a couple of further-developed Hives home to use over a period of time.

Future Work and Conclusion

HiveToHive creates a sense of connectedness by utilizing the concept of one-liners among people of all ages. In this way, we tried to complement previous interactive devices. We were able to evaluate our prototype with members of our target group, resulting in substantial feedback, proving our concept's function. The findings of the user evaluations evoked reflections upon appropriate technologies and dimensions of the device. We hope that HiveToHive can contribute to the groundwork of intimate connectedness over a distance among loved ones. A further iteration would be to create a fully working prototype in order to conduct a field test, which would have allowed us to prove empirically that HiveToHive can be used to maintain social connectedness, and provide more data for possible improvements and broader insights.

Acknowledgments

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Platform-Supported Cooperative Work

Babak A. Farshchian[1], Miria Grisot[2], Stefan Hochwarter[1], Anna Sigríður Islind[3], Marius Mikalsen[1,4], Elena Parmiggiani[1], Polyxeni Vassilakopoulou[5]

Norwegian University of Science and Technology[1], University of Oslo[2], Reykjavik University[3], SINTEF[4], University of Agder[5]

babak.farshchian@ntnu.no, miriag@ifi.uio.no, stefan.hochwarter@ntnu.no, annasi@ru.is, Marius.Mikalsen@sintef.no, parmiggi@ntnu.no, polyxenv@uia.no

Abstract. Platformization is transforming the way work is organized in a variety of businesses. The CSCW literature contains substantial amount of research on platforms, but this research to date has mainly been focusing on two-sided global platforms such as social media, on-demand labor, and crowdsourcing platforms. In many European countries, platformization of traditional organizations, both private and public, is well underway and accelerated by the pandemic. Platformization as a process can affect how we design systems –i.e. the platform itself and its peripheral applications and customizations –and how we use platforms for collaboration. Through this workshop we want to engage academics and practitioners in a discussion of the platformization of collaborative work in organizations. Topics include but are not limited to platform design and development, platformization processes, and platforms and work practice evolution. The socio-technical nature of platforms indicates that working across disciplines has become crucial for platform research. We therefore invite participants from all relevant disciplines.

Theme of the workshop

Platformization is transforming the way work is organized in a variety of businesses thanks to the emergence of cloud-based technologies and the recent growth of global companies such as Google, Amazon, Facebook, and Apple, all of whom utilize platform models (Tiwana, 2013). A *digital platform* often underlies modern platform organizations. A digital platform can be defined as "a set of digital resources—including services and content—that enable value-creating interactions between external producers and consumers" (Constantinides, Henfridsson, & Parker, 2018). Platforms are socio-technical systems and this understanding is key to discussing their role in contemporary organisations. A platform is a piece of software, while it is also an intermediary that connects needs with resources. A platform is a hybrid between market, firm and a community, and an organizational, technical and regulatory construct that facilitates value creation (Alaimo, Kallinikos, & Valderrama, 2019; de Reuver, Sørensen, & Basole, 2018; Islind, 2018).

The CSCW literature contains substantial amount of research on platforms, but this research to date has mainly been focusing on two-sided global platforms such as social media, on-demand labor, and crowdsourcing platforms (Hansson, Ludwig, & Aitamurto, 2019; Harmon & Silberman, 2018; Martin, Hanrahan, O'Neill, & Gupta, 2014). Such platforms are called *industry* platforms by Gawer (2014), governed by open ecosystems. Gawer also defines *internal* platforms and *supply-chain* platforms, where the scope of the platform is pre-defined to include organizations and their closest collaborators, as opposed to the more global scope of industry platforms such as Facebook and Uber. In this workshop we want to focus on how internal platforms influence and are influenced by workers in workplaces. Through our workshop we want to emphasize that platforms are not only being used by global companies in consumer-oriented markets. Platforms are also invading our everyday work practices in our organizations, and demand new ways of working and new types of relationships to our colleagues, management, and users.

In many European countries, *platformization* of organizations, both private and public, is well underway (Casilli & Posada, 2014; Gustavsson & Ljungberg, 2019; Janssen & Estevez, 2013; Vassilakopoulou et al., 2017). We define platformization as the process of organizational, social, financial and technological transformation that an organization often must go through to effectively utilize a platform model (see Bygstad & Hanseth, 2018; Farshchian & Thomassen, 2019; Islind, Lindroth, Lundin, & Steineck, 2019; Zhu & Furr, 2016). Platformization as a process can affect how we design systems –the platform and its peripheral applications and customizations –and how we use systems for collaboration. Through this workshop we also want to shed light on how platformization affects participatory design processes, but also how collaboration

is affected by platformization and its end product. The topics for the workshop include the following:

- Participatory platform design and development: This includes both design (Farshchian & Thomassen, 2019; Islind, Lindroth, Snis, & Sørensen, 2016) and/or acquisition/implementation (Pollock, Williams, & D'Adderio, 2007; Roland, Sanner, Sæbø, & Monteiro, 2017; Vassilakopoulou et al., 2017). The role of co-creation, co-design and participation is important. Is platform-centric participatory design different than PD in general and participatory infrastructuring (Parmiggiani & Karasti, 2018)? Platforms create a power imbalance by putting some participants in charge of the "platform core" and others in the periphery. How does this, together with the fact that platforms are often initially designed by others, affect participation during design and acquisition?
- Platformization processes: When platforms are being designed, developed and deployed in the nascent phases, the practices involved can be highly influential, thus shaping the platformization process. The interplay of platformization with work practices and how practices can partake in platformization is thereby of interest.
- Platform and work practice evolution: Platforms are evolving in the direction of opening up specializing, with the aim of lower transaction costs and larger markets (Gawer, 2014). This means changes to work practices (Zysman & Kenney, 2018). For instance, everyone –including those who work in normal employment relationships –might gradually have to cope with work situations that resemble those of freelancers. Paradoxically this might happen faster in the public sector. Currently we are witness to many healthcare and public sector-related platformization projects going on in European countries. Such organizational platforms can be all-encompassing, creating totally new digital workplace experiences.

The socio-technical nature of platforms indicates that working across disciplines has become crucial for platform research. For instance, legal and regulatory aspects go hand in hand with technical affordances when it comes to creating a platform-based work environment. While the IT part of platform development is quite global, many other disciplines (workplace regulations, tax regimes, cultural aspects) are highly local to specific national, cultural, economic and social settings. For the workshop we encourage multidisciplinary research submissions.

Workshop activities and goals

Our goal is to bring together researchers with common interest in the interplay between organizational platforms and work practices, to investigate the relationship with CSCW research. We want to find out what we as the CSCW community can learn from and teach to other neighboring disciplines about how platforms affect work, and how work practices affect the formation of platforms. Through the workshop we want to bring together researchers who work in this

field. In this way we want to create a community of practice for future research and related projects.

The workshop will be announced in known channels, and submissions will be requested. We will however also consider accepting participants based on their interests, during the conference. We plan to set up a panel, including researchers from CSCW but also from close disciplines including information systems to bring together complementary lenses for studying the phenomenon. The panel will be used to start a discussion, where the participants who wish will present cases from their own research. During the second half of the workshop we will employ group processes and work on developing research topics, creating an overview of the state-of-the-art, and a list of future challenges. The results will be made available as a workshop report.

A later outcome from the workshop will be an edited volume –a book or a special issue of the CSCW or other relevant Journal –depending on the nature and the maturity of the research contributed by the workshop participants.

Duration of the workshop

We plan to organize a full-day workshop. The first half of the workshop will include a panel discussion and presentations from the participants. The second half will include a group process and the creation of a draft of a workshop report.

Workshop organisers

Babak Farshchian is associate professor of software engineering and information systems at the Norwegian university of science and technology (NTNU). Babak's research interests include the digitalization of the public sector, in particular health and social services.

Miria Grisot is an associate professor in information systems at the University of Oslo. Miria’s research interests include the digitalisation of the public sector, in particular healthcare and social services with a focus on the changing nature of collaborative work.

Stefan Hochwarter is a PhD candidate in information systems and computer-supported cooperative work at the Norwegian University of Science and Technology (NTNU). Stefan’s research interest lies primarily in the digitalization of healthcare services, especially within the area of assistive technologies, platforms and participatory design.

Anna Sigridur Islind is assistant professor in information systems at the School of Computer Science at Reykjavik University in Iceland. Anna Sigridur's research

interests include design, development and use of small-scale platforms in general and for wellbeing and health purposes in particular.

Marius Mikalsen is a senior research scientist at SINTEF Digital and has a post doc position at the Norwegian university of science and technology (NTNU). Marius´ research interests include large scale information systems, digital platforms, information infrastructures and digital transformation.

Elena Parmiggiani is associate professor of CSCW and Digital Collaboration at the Norwegian University of Science and Technology (NTNU). Elena's research interests include the empirical study of the design, development, use of platforms and infrastructures in the public and private sector, in particular in connection with environmental monitoring and oil and gas data management.

Polyxeni Vassilakopoulou is an associate professor on Information Systems at the University of Agder. Polyxeni´s research interests include the design of ICT-enabled interventions in work systems and the bearing of digital technology on people and organizations.

Maximum number of participants expected

We expect 10-15 participants.

Means of recruiting and selecting participants

We will prepare a call for papers that will be distributed through mailing lists and social media. We might also invite researchers directly. The workshop will have a web page and we will create a project in Researchgate.net in order to involve participants before and after the workshop. Participants who submit position papers of 2-4 pages will be prioritized. All participants will be asked to contribute a peer-review of each other's submissions.

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Thematic Analysis for Interactive Systems Design: A Practical Exercise

Aparecido Fabiano Pinatti de Carvalho
Institute of Information Systems and New Media
University of Siegen, Germany
Fabiano.Pinatti@acm.org

Abstract. Within the fields of Human-Computer Interaction (HCI) and Computer-Supported Cooperative Work (CSCW),there is a wide acknowledgement that, in order to design useful and usable interactive systems, it is key to accurately understand users, their contexts and the practices they engage with. For that, HCI and CSCW professionals have for long been drawing on socio-scientific methods as a means towards it. While much has been said in terms of methods that can be used to capture the user contexts and associated practices, considerably less is found on how the collected data can be systematically analysed, in order to generate trustworthy representations of what has been heard and observed from participants. One possible reason for that is the lack of training of researchers in the area to use appropriate data analysis techniques. This masterclass sets out to address this gap. It aims at providing HCI and CSCW researchers and practitioners with deep knowledge about one of the most popular data analysis technique of the moment: Thematic Analysis (TA). Through a practical exercise, the masterclass will introduce and explore the procedures involved in carrying out TA, so to equip professionals from the field with the necessary tools to have a good understanding of the relevant user contexts and practices for the design of innovative, useful and usable interactive systems.

Contextualisation

Socio-scientific methods have been for long underpinning much of research and practice within the fields of Human-Computer Interaction (HCI) and Computer-supported Cooperative Work (CSCW) (Randall et al. 2007; Bannon et al. 2011; de Carvalho 2013; Wulf et al. 2018). These fields have been built upon the premise that understanding users, their contexts and their practices is essentially relevant for the design of digital technologies that can effectively support users with their activities – i.e., be useful – and can be used without problems – i.e., be usable (Sharp et al. 2006; Harper et al. 2008). In order to achieve that, a broad pallet of methods have been summoned for the **collection** of relevant data concerning those aspects.

Within the realms of the *socio-informatics* tradition, special attention has been placed on *qualitative methods* (Wulf et al. 2018). *In-depth interviews* (Hermanowicz 2002), observational methods like *shadowing* (McDonald 2005; Czarniawska 2007) and other forms of *participant observation* (McKechnie 2008), *diaries* (Gaver et al. 1999), to name but a few, have been used in a regular basis to accurately capture the big picture of the user contexts and what goes on in it. Nevertheless, as recurrently acknowledged in the literature, independent of how good a picture is, it does not speak for itself: it must be interpreted. This means that it is extremely important that all collected data be submitted to careful **analysis**, in order to make it clear what is interesting about the picture and why. The collected data must be always connected back to research questions, which should concern the research problem under investigation (Braun and Clarke 2012).

Despite the fact that there is a wealthy of qualitative data analysis approaches available to researchers, it is not uncommon to see the analysis of the rich data collected in user studies neglected. This is quite an old research problem, which is shared by different fields of research (Glaser and Strauss 1967; Miles and Huberman 1994; Mays and Pope 1995). However, worse than neglecting data analysis, it is to claim the use of one or another approach as an approving bumper sticker, as it happens sometimes – maybe, more frequently than it would be desirable.

In the past, Grounded Theory (GT) (Glaser and Strauss 1967; Strauss and Corbin 1998) used to be the label in that sticker (Barbour 2001), but after increased criticism of the research community towards the banalisation of such a powerful research instrument (Wagner et al. 2010), Thematic Analysis (TA)[1] has

[1] It is worth pointing out that different versions of TA can be found in the literature, as for example, the one described by Gibson and Brown (2009) and Miles and Huberman (1994). This masterclass refers to the variant introduced by Braun and Clarke (2006) and further elaborated in Braun and Clarke (2012), due to its systematic and sophisticated approach to TA. As Braun and Clarke (2012) correctly puts it, until early 2000, TA has been widely used, but poorly defined. Braun and Clarke's version of TA was arguably the first to clearly define steps to this approach of analysis and clearly articulate its procedures.

slowly taken its place, as it became a well-established qualitative data analysis method and it increased in popularity, under the understanding that it is a light-weight version of GT, which can still grant research results *trustworthiness* and *authenticity,* two quality criteria recurrently associated with qualitative research (Guba 1981; Whittemore et al. 2001; Morrow 2005; Bryman 2008).

While TA is arguably a method more accessible, flexible and self-contained, as it does not bring with itself any conceptual and theoretical frame, as is the case of GT, phenomenological analysis (Finlay 2012; Finlay and Eatough 2012), discourse analysis (Wooffitt 2005; Trappes-Lomax 2018), and many others, it is still a systematic approach, which demands careful handling. It is a unique method in its own, which has been proven valuable in supporting qualitative researchers in finding, organising, and providing insights in patterns of meaning across data sets. Put differently, TA is a powerful method to identify and make sense of commonalities in the way that a particular topic is portrayed in a set of collected data (Braun and Clarke 2006, 2012). Instead of being seen as a light-weight version of other well-established methods, it should be seen as a foundational and fundamental approach to other qualitative data analysis techniques (Braun and Clarke 2012; Lazard and Capdevila 2017).

TA provides qualitative researchers with the necessary tools to carry out thorough, plausible and sophisticated data analysis. It allows researchers to identify and elaborate a deep understanding of both collective and shared experiences and meanings. It allows researchers and practitioners to navigate along three different dimensions of qualitative research, concerning orientation towards (1) **theory** (*inductive* versus *deductive*); (2) **data** (*experiential* versus *critical*), and (3) **ontology** (*essentialist* versus *constructionist*) (Braun and Clarke 2012). Its versatility makes it a good fit for participatory research projects, especially those predicated on Community-based Participatory Research (CBPR) (Holkup et al. 2004; Boylorn 2008), where the involved parts are not necessarily trained researchers. It is also adequate for multimethods research, supporting the analysis of different types of artefacts, as for example, interview transcripts, fieldnotes and other types of textual, aural, visual artefacts (Braun and Clarke 2012).

TA has, therefore, a great potential for HCI and CSCW research, which very often involve users in participatory approaches for the design and development of interactive system. It provides professionals of these fields with a framework to develop a deep and accurate understanding of the users, their contexts and their practices, as they try to find solutions for the many types of wicked problems underpinning the field (Rohde et al. 2016). Using TA, does not mean to limit the creativity inherent to design. Instead, it means finding the right food for thought to feed the process, so that the resulting solutions really speak to the user contexts and needs and, as such, can support users with their practices, in a usable manner.

Goals and Activities

The goals of this masterclass is to demystify the use of TA and demonstrate how the method can be employed for the design and development of digital technologies. It will introduce the grounds and mechanisms of the method and give the participants the opportunity to engage in a practical exercise to master it. Furthermore, the masterclass will dedicate special attention to demonstrate how TA can be used to (a) guarantee rigour to the user studies carried out as part of user-centred and practice-based design projects and (b) support the generation of strong conceptual and theoretical constructs out of it.

During the masterclass, the six steps of the approach proposed by Braun and Clarke (2012) – namely (1) *familiarisation with the data*; (2) *codes generation*; (3) *themes search*; (4) *review of potential themes*; (5) *themes naming and definition*; and (6) *report production* – will be introduced, and participants will have the opportunity to test their understanding about each of these steps by completing each of them as they go on to analyse a short data artefact. Participants will be introduced to the mechanisms of coding (Benaquisto 2008) and systematic qualitative data analysis. Furthermore, they will learn about how a systematic data analysis can contribute towards the *credibility, transferability, dependability* and *confirmability* of research findings (Guba 1981).

By the end of the masterclass, participants should be able to tell what it takes to really engage in TA and to carry it out thoroughly and with quality. They will become aware of the many decisions that they will have to take as they progress in the analysis process, and what consequences this will have in the results. They will also have a complete understanding of what does it mean to say that a TA has been carried out, so to avoid being confronted in the future when saying that they have engaged in it.

Target Group

This masterclass targets any HCI and CSCW researcher interested in: (1) learning or perfecting the mechanisms and procedures of TA; (2) understanding how it can be used for user-centred and practice-based design of interactive systems; and (3) find out how it can contribute to the quality of the designed artefacts.

Format and Duration

This masterclass is originally planned to happen as a co-located activity. Alternatively, an on-line version of it will be carried out, in case the conference turns out to be in a hybrid or complete online format.

Given the extent of the masterclass activities and the time needed for them, this masterclass is planned as a full-day event. In the eventual case of a hybrid or online conference, the activities will be carried out between 15h00 and 20h00 CET, in an attempt to accommodate people from different time zones.

Number of Participants

To make it viable to assist the participants properly in all the masterclass activities, a maximum of 10 participants will be accepted.

Required Resources

In terms of infrastructure, a lecture hall capable of accommodating the maximum number of participants according to the social distancing regulations in place by the time of the conference due to the COVID-19 pandemics, provided with a projector, a proper space for projection, sound system and flipchart will suffice.

Shall the conference and, consequentially, the masterclass happen online, a laptop or personal computer equipped with a webcam will be enough. In this case, the masterclass will run over Zoom.

In the case of a co-located event, participants will be required to bring a laptop with MaxQDA 2020 Standard installed[2]. In case participants do not have a licence for the application, they are advised to download and install its trial version before the masterclass. The trial version is valid only for a few days can be installed only once. Therefore, participants should assure that the version will still be active by the time of the masterclass by the time it happens.

Organiser's Short Bio

Fabiano Pinatti, PhD, is an Associate Researcher at the Institute of Information Systems and New Media of the University of Siegen (Germany), the EUSSET Community Building Chair and one of the EUSSET Competence Network Co-Chairs. He holds a BSc and a MSc in Computer Science from the Federal University of São Carlos, São Paulo, Brazil, and a multidisciplinary PhD developed within a joint project between the Interaction Design Centre of the Department of Computer Science and Information Systems, University of Limerick, Ireland, and the Department of Sociology at the same university. His interests span Human-Computer Interaction (HCI), Computer Supported Cooperative Work (CSCW), Practice-based Computing, Interaction Design,

[2] https://www.maxqda.com/products

Software Accessibility, Cyber-Physical Systems, Mobile and Nomadic Work and Informatics in Education. The focus of his research is on technologically-mediated human practices, more specifically on the understanding on how practices can help identifying the design space of new and innovative technologies, and how they can shape and be shaped by their usage. He has published several articles on topics related to these fields of research in prestigious international conferences. He has been practicing Thematic Analysis since 2013. The method has been central to many of his research studies and has been supporting him in generating relevant conceptual and theoretical constructs to advance the state of the art of HCI and CSCW research.

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Challenges of transferring UX designs and insights across products and services

Anton Fedosov[1], Daniel Boos[2], Susanne Schmidt-Rauch[3], Jarno Ojala[4], Myriam Lewkowicz[5]

[1]University of Zurich, Switzerland; [2]SBB Swiss Federal Railways, Switzerland; [3]evux AG, Switzerland; [4]Vincit Oyj, Finland; [5]Troyes University of Technology, France

antonf@ifi.uzh.ch, daniel.boos@sbb.ch, susanne.schmidt@evux.ch, jarno.ojala@vincit.com, myriam.lewkowicz@utt.fr

Abstract. The increased popularity of UX design practices in the industry led to the creation of more usable, useful, and enjoyable digital products and services. Nonetheless, the scope of the UX efforts generally concerns a *single* product or project under development. In this workshop, we call for the shift beyond a single product paradigm towards a more ecosystemic approach in UX design to create long-lasting, reusable, and transferable UX artifacts. Gathering a group of scholars who are interested in UX processes at work, and UX practitioners, leaders, and managers, we aim to synthesize the current state of the discussion to create a UX research agenda for designing integrated digital work environments, unpacking development, users, and change perspectives to aid knowledge transfer across projects and overtime.

Introduction

The increasing digitalization of work practices naturally leads to increased use of applications and digital services to perform work. Therefore, employees have to face the constellations of different communication and reporting tools to support their tasks at hand, in addition to the main tools used to perform those tasks. For example, a member of a Swiss train crew uses a dozen apps to perform their work: a ticket checking app, railway maintenance apps, regulation repositories, intranet apps, a personal planning app, a timesheet app, a rail traffic management app, etc. A shunter operates multiple devices e.g., a smartphone, radio, specialized communication devices, and even several physical objects to coordinate and perform their work. In many cases those applications and devices are not well aligned with each other and, hence, gaps exist between the applications to ensure effortless completion of the desired user goal (e.g., challenges of transferring data among apps to serve a train passenger). Those gaps have often been managed by the workers, causing additional work, breakdowns, errors, slow adoption of new tools, fatigue, and, ultimately, workers' stress.

Several factors may contribute to this situation. First, applications usually come from various vendors or have been designed and developed during different projects, by different contractors. Despite that the orientation to the design for end-users may have gained recent popularity within the enterprise software sector (Sheppard et al., 2018), their UX efforts are merely focused on just *that single* product under development, rather than anchoring the UX culture within the organization (Boos and Horvath, 2020). The main objective of those efforts concerns how to make the application usable and useful on its own and not about how it is integrated into an existing company's infrastructure with a myriad of tools in the corporate software ecosystem and established work practices. Second, widespread agile methodologies emphasize an iterative, incremental approach for software development, and thus do not necessarily allow for comprehensive upfront analysis of complex work environments. Oftentimes, however, employee-centered issues in these environments cannot be fixed by a small sprint iteration within an agile cycle (e.g., tweaks to a UI). Third, the products are frequently rolled out and deployed by different teams (e.g., external consultants, IT) and organizations in large enterprises. Those teams may pursue different, at times even conflicting, objectives. Finally, drawing upon our own broad experiences in the industry, formative evaluations, e.g., work systems analysis, are conducted before deploying a product, however, any learnings are just used for *that particular* product and not

for other related products in the portfolio. We also noticed that the translation of research insights to design, and to requirements is hardly supported by contemporary tools and, hence, remains opaque. Consequently, we observe the emergent challenges of longevity and connectivity of (UX) design artifacts when it comes to both handing over the project from one team to another, and across projects within a team.
That marks a salient motivation for our workshop.

In this workshop, we aim on unpacking contemporary learnings and challenges of transferable UX design and insights across multiple products and services. We ask: *"How can we depart from a paradigm of designing a single product and turn to the holistic UX design approach at work?"* With the fact that many collaborative enterprise applications were developed and deployed over time, we see the value and the need to effectively integrate those apps within existing software ecosystems and work practices. Instead of focusing on *a product*, we call UX researchers and practitioners to center on an ecology of artifacts (Bødker & Klokmose, 2012), e.g. a portfolio. This, in turn, may help to improve existing and to develop new large-scale software systems, where many actors need to effectively coordinate their actions (e.g. a railway traffic management system, infrastructure maintenance, production systems in factories, healthcare trajectories of patients). That, ultimately, may lead not only to improved quality of work and create pleasurable experiences for their end-users, but also establish a ground for successful company-wide collaboration when it comes to preserving and transferring UX insights and rules.

Background

Prior work examined how user-centered design (UCD) processes can be effectively adopted in large organizations and complex projects with multiple stakeholders. CSCW has a long tradition looking at how to improve coordination and collaboration of various stakeholders within large-scale technical projects e.g., through co-creating, co-editing, sharing, linking, and archiving project documentation and materials in highly dynamic, event-driven environments (Grønbæk et al., 1992). Thamhain (2011) concluded that effective collaboration among different teams is crucial within complex technology-intensive product development. He argued that the project leaders should recognize the organizational and cultural differences of all contributing organizations to create "a

true partnership among all the stakeholders with strong linkages for communication, decision making, and technology transfer" (Thamhain, 2011).

Iivari and Abrahamsson (2002) studied the implementation of the UCD processes within software development environments. They concluded that different organizations' subcultures (e.g., usability specialists, software engineers, managers) consider the nature, the role, the interpretation, the success criteria, and the benefits of implementing the UCD processes in the organization differently. They emphasized the importance of early identification of incongruence in views of UCD techniques and expectations concerning its implementation. Those can be clarified and agreed upon a shared vision during initial projects' stakeholder meetings.

Furthermore, based on a set of case studies Junginger (2005) provided insights on how methods of human-centered product development can be applied in a project that involves a large system problem and a complex organization. She argued that to reap the benefits from UCD in an organization, it requires that both design managers and designers rethink their concept of "product". One way to think about it is to consider the organization as a product in itself and subsequently design an organization (or user-centered organizational culture for that matter). To do so the design needs some C-suite supporters to climb up the organizational ladder, away from focusing narrowly on product development aspects to influencing and guiding an organization's design strategy and culture.

Next, Hauser (2007) offered some strategies and tactics on how to institutionalize the UCD process within a large organization. This include (a) establishing shared goals between product managers and UX designers; (b) providing a description of the UCD processes and scaffolding easy-to-use examples; (c) defining clear responsibilities across organizational boundaries; (d) setting up pilot projects involving developers, product managers, designers; (e) using project participants as proxies to spread the word about the values of UCD in their teams; (f) providing opportunities for training and coaching; (g) defining use cases as mandatory project deliverables; and (h) establishing quality control routines. UX leads need to create opportunities for win-win situations among the teams to make the UCD process stick. Once UX leaders implement the UCD processes within the organization, it requires *continuous* support and nurturing. Our workshop concerns how to go *beyond* a single project towards changing organizational mindsets with respect to UCD and establishing a holistic view of the stakeholders' needs.

Boy (2012) synthesized several perspectives on effectively using UCD in large-scale organizations. He related that to managing complexity, maturity reaching in design, product integration in large organizations and provided examples from the aerospace industry (e.g., air traffic management and control systems). He further argued (Boy and Narkevicius, 2014) that holistic approaches to systems engineering are often failing due to the complexity of the highly-interconnected large organizations. UCD can provide the necessary creativity to embrace complexity rather than avoid it. Modeling and simulation approaches from UCD are considered to be effective strategies, thus, can be employed not only in the early stages but also throughout the product life cycle, and can shape human-systems integrations and create better socio-technical systems. Ultimately, Boy (2017) defined properties of a complex system: a large number of components and interconnections, many people involved in the life cycle, emergent behaviors and properties are not anticipated, adaptability issues, and unpredictability. He also referred to the work of Grudin (1994), and Norman and Stappers (2016) who discuss complex socio-technical systems from people and technology perspectives.

In parallel, there were efforts in adapting UX into popular agile approaches to software development (Beyer, 2010; Kuusinen et al. 2012; Larusdottir et al. 2018). Furthermore, Heimgärtner (2020) developed an assessment model for UCD processes and exemplified its usage. Recently, within the community of practitioners, we notice the emergence of a number of UX research approaches such as ResearchOps[1] and Atomic Research[2], which aims to operationalize and to streamline the user research practices within a company and increase their impact through e.g., quality standards, standardized processes, the use of established toolkits or frameworks. These efforts show a promising avenue for a more consolidated approach to employ and to transfer UX and user research insights across various products and services over time. What is more, these initiatives inspired the creation of collaborative repositories (e.g., Glean.ly), and thus can be seen as a first attempt to go beyond a single product mindset towards applying UX practices at scale.

This interest in comparing projects or interventions is close to the work that has been developed around grounded design (Rohde et al, 2017) through the realization of design case studies (Wulf et al., 2011). In order to allow a comparative analysis of design case studies across domains, and the building of concepts, Li and

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[1] https://researchops.community

[2] https://blog.prototypr.io/what-is-atomic-research-e5d9fbc1285c

colleagues (2020) suggested the idea of an e-portfolio. Furthermore, Wulf et al. (2015) outlined the most prominent cross-cutting issues in that space:

- The appropriation work that is needed to build the interaction between the technological system and the social system. This leads to reflections about tailorability and sharing of experiences among users.
- The ways to conduct the end-user development process in order to be agile and to adapt to ever-changing requirements and environment.
- The fact that technology should be transformative, which could lead to some evolution of practices. The question is then how to ensure that the development of practice and technology are integrated.

Our workshop looks into unpacking the challenges and opportunities when it comes to adopting such portfolio initiatives within and across organizations and product teams beyond a single product development life-cycle.

Themes and Topic Areas

The workshop will explore the following topical areas when it comes to generating cross-project knowledge within large-scale organizations. Those topics are interrelated, however, they may help us to distinguish between different elements of our overall goal of the workshop to unpack learnings and challenges of transferable UX design and insights across multiple products and services.

Development view: integrating UX early on and throughout the development
The development view emphasizes the actual processes and practices that lead to a new service or a solution. Contemporary UX approaches need to fit with those fast-paced development practices (e.g., agile methods). Therefore we inquire:

- How might we adapt our user insights and recommendations to the particular stage of the development of a new solution and the different involved contributors (e.g., portfolio manager, enterprise architect, agile team)?
- How might we do it within the popular agile approaches for development (e.g., Scrum) and their design adaptations (e.g., Lean UX)?
- How might we collect and share user insights to design new work environments that combine and integrate multiple products at once?

Worker view: designing for the end-user considering a myriad of tools

We argue that end-users struggle with not only the myriads of existing tools but also continuous changes in their work processes often introduced with those new tools. Therefore we prompt participants:

- How might we design integrated digital environments, where several products are well aligned from a user and group of users' perspectives?
- How do we take issues, such as awareness, safety, accessibility, usability, and worker well-being, into account before, during, and after the introduction of a digital solution into a workplace with many other parallel solutions and workarounds?
- What kind of design research approaches may foster a more holistic and systemic view?

Change view: adopting new forms to communicate, coordinate and collaborate

Companies undergo the ongoing processes of change, which particularities need to be addressed during the deployment of a new solution. We propose to discuss learnings around:

- How might we better design the change process from one socio-technical work system to a new socio-technical system, without having a final view from the outset?
- How might we take into account companies' organizational culture?
- How might we incorporate the re-design of the collaborative practices and related team-work in the design process of a new digital system in a given environment we design it for?

Goals of the Workshop

The goals of the workshop are to:

- bring together and encourage collaboration not just between academic researchers, but also with UX design managers and practitioners navigating complexity within large-scale projects when it comes to UX knowledge transfer;
- review and scaffold existing strategies and practices to support the transfer of UX knowledge "from the field" to the level of decision-makers (e.g., managerial level, policymakers);

- gather a diverse community of scholars, designers, human factor specialists, and product managers to collect a set of hands-on strategies and tactics valuable in the different levels of product decision-making voicing the perspectives of different stakeholders;
- aim to synthesize stakeholders' perspectives to create a research agenda for designing integrated digital work environments, where applications from different solution providers are well aligned to an end-user perspective, with a particular focus on the interdependencies between ongoing and envisioned projects.

Activities and Structure

We propose a half-day, 4-hour online workshop with up to 20 participants from academia and industry. In the workshop, we will combine a discussion of the position papers with hands-on activities around the selected set of case studies.

Prior to the workshop: We will circulate the accepted participants' position papers and case studies with a view of collecting critical questions based on the theme of the workshop.

Convene and introduction (60 min): The organizers will kick-off the workshop with a brief presentation of the agenda, goals, and format. They will then moderate a short round of flash presentations, providing each participant an opportunity to introduce themselves, their research interests and thoughts stemming from their position paper.

Large group discussion (45 min): The organizers will present the emergent challenges of transferable UX (based on the prior art as well as our own experiences) and introduce themes of the workshop. Participants will contribute to the discussion by revisiting relevant prior research and case studies, and suggesting any outstanding perspectives in addition to those we have initially outlined. This phase will generate material for the subsequent break-out group activity.

Break (30 min)

Breakout groups (60 min): Participants will be split into smaller groups (4-5 people) based on research interest and prior experience in each topical area. The goal is to identify distinctive opportunity areas and formulate detailed questions as to how CSCW/HCI research and practice can support the transferability of UX when it comes to product and service design beyond a single product cycle. The

facilitators will ensure that the groups are composed of both academic and UX practitioners and include early career researchers and graduate students.

Synthesis and Next Steps (45 min): The workshop will conclude with a group discussion reviewing what has been achieved from the breakout groups and outlining steps for further collaboration.

Organizers

Anton Fedosov, Ph.D. is a postdoctoral interaction design researcher at the People and Computing Lab at the University of Zurich in Switzerland. His research interests lie at the intersection of social aspects of ubiquitous computing, collaborative economy, and user experience design of interactive systems and services. Prior to his engagement with academia, Anton was working in applied research groups in the mobile industry in large companies in North America, Western Europe, and Japan.

Daniel Boos, Dr.sc ETH leads the User Experience team at the Swiss Federal Railways. He has strong practical experience in user research, socio-technical system design, and digital transformation. For more than a decade, he applied UCD approaches in organizations to increase their user-centricity and to improve the UX of their products and services. He co-organizes the Design Leadership Therapy, a platform for design leaders and managers, which discusses emergent challenges of how to practice leadership in companies building their design culture.

Susanne Schmidt-Rauch, Dr. Inform. is co-founder and C/UX consultant at evux AG, a Zurich-based UX consultancy firm. From her early doctoral studies at the Information Management Group at the University of Zurich focussing on CSCW, she incorporates human-centered research and design practices to software development processes into both waterfall and agile models. She facilitates the Swiss interest group on financial advisory support systems. One of her interests in research and practice is the transfer of scientific CSCW knowledge to organizational practice.

Jarno Ojala, Ph.D. is a lead UX researcher and designer at Vincit, a large service design and software development and consultancy company founded in Finland. His design and research interests include accessible and universal design, CSCW, and the sharing economy. One of his interests is to incorporate best practices into

design and development projects with varying clients, products, and different sizes of development teams.

Myriam Lewkowicz is a full professor of Informatics at Troyes University of Technology (France), where she heads the multidisciplinary research group Tech-CICO. Her research involves defining digital technologies to support existing collective practices or to design new collective activities. From 2020 she chairs the European Society for Socially Embedded Technologies (EUSSET).

Maximum Number of Participants Expected

We envision bringing together up to 20 participants from academia and industry. Our intended audience is primarily HCI and CSCW researchers who are looking at the breadth of design processes across UX teams, UX architects, who are working on large-scale projects in the industry as well as human factor experts. We will also encourage graduate students to participate in the workshop, who can be interested in developing their careers in the UX industry.

Participants Selection

Participants for the workshop will be recruited from the (E)CSCW community, attendees of previous workshops on the related topics (e.g., Christensen et al. 2020), and the extended research networks of the workshop organizers. We distribute the call for participation using the CSCW-related mailing lists (e.g., EUSSET, CHI-Announcements) as well as UX practitioners listservs (e.g., UX Schweiz, EuroIA) and specialized Slack channels (e.g., IxDA, ResearchOps). To promote broader participation from UX practitioners, product managers, and human factors experts, we offer the option of submitting alternative material in the form of a short case study, a white paper, a design portfolio, or alike.

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Mastering Design Case Studies for Grounded Design

Aparecido Fabiano Pinatti de Carvalho
Institute of Information Systems and New Media
University of Siegen; Germany
Fabiano.Pinatti@acm.org

Abstract. Understanding user contexts and practices for the design and development of useful and usable technologies has for long been acknowledged as relevant within the fields of Human-Computer Interaction (HCI) and Computer-Supported Cooperative Work (CSCW). Taking account of the growing interest in human practices for the design and quality assessment of digital technologies, Grounded Design (GD) has been introduced as a paradigm for design research and practice. As a research paradigm, GD focuses on investigating changes in human practices stemming from the use and appropriation of digital technologies. The results of such investigations are used as input for the design and development of new and innovative digital solutions. In this context, Design Case Study (DCS) serves as a framework to orient and document research and practice predicated on GD. The framework, which is organised in three interdependent phases – pre-study, design and appropriation –, provides useful guidance and infrastructure for successful GD initiatives. This masterclass sets out to demonstrate how DCS can be used to accomplish relevant and impacting GD projects. It will introduce the conceptual and theoretical grounds behind the framework, as well as discuss the different methods and methodologies which can be used for it.

Contextualisation

The interest of Human-Computer Interaction (HCI) and Computer-supported Cooperative Work (CSCW) professionals in human practices is not new. Especially within the European tradition of CSCW, practices have been playing a very important role in the way that socio-technical systems are designed and developed since its origins (Richter and Koch 2018). Overall, there is a common understanding that the world is in a state of constant becoming and that human actions are the main element gearing the process and bringing continuous changes upon the environment. These actions are often mediated by artefacts and are guided by purpose and knowledge (Rohde et al. 2016). Eventually, these mediated actions, which encompass both mental and physical forms of activities, turn into routinised patterns, which are in turn used to frame contingent activities normatively. This is what defines practices within Grounded Design (GD), and more generally, within CSCW research (Schmidt 2014; Wulf et al. 2015; Rohde et al. 2016).

Human practices have been often described in the literature as innately social (Wenger 1998; Reckwitz 2009), even when performed individually (Barnes 2005). The arguments towards this interpretation usually defend that practices always refer to something that is either socially acceptable – e.g., taking a shower every day –, socially agreed – e.g., carrying out a surgical procedure in a particular way –, based on some sort of social system, tool, mechanism or resource – e.g., writing something in a particular language – or meant to produce something to be used by other social actors – e.g., writing a book to a particular audience. So, even if practices are enacted in different places, in different points in time and by different body and minds, they would be meaningful to or impact upon different individuals in a society and hence should be considered social (Schatzki 1996; Schatzki et al. 2005; Reckwitz 2009).

Despite the strong arguments towards seeing practices as fundamentally social, some authors would still argue that practices should (or can) not be reduced to a socially-inherent condition (de Carvalho 2013) – unless, of course, the world is seen through an actor-network theory perspective, where everything, as for example artefacts, processes and ideas, is assigned the condition of actants and, therefore, of potential social actors (Latour 1990, 2007), which will interact while the practice unfolds. Lave (1997), for instance, argues that “everyday” cannot be described as a social role, occasion or setting for practice. Everyday practices would thus go beyond patterns of actions that involve different actors, are collectively accomplished or are associated with particular social settings. Yet, Lave, as all the above mentioned authors, describes practices in terms of the cyclical and routinised aspects of the involved patterns that happen ordinarily from time to time, as people go on to solve particular problems in particular contexts.

Therefore, even if practices are not to be seen as inherently social, it can be argued that they are essentially situated and context-specific. In addition to that, it is sensible to argue that they are the most elementary unit of analysis of a social phenomenon (Wulf et al. 2011, 2015; Rohde et al. 2016). After all, practices are what underlies the relationships and interactions between social actors (Wenger 1998; Barnes 2005; Reckwitz 2009), as those involved in cooperative processes, which are central to CSCW research (Wulf et al. 2018).

Practice-based computing pays particular attention to the dialogue between knowledge, artefacts and actions, which goes on as practice unfolds. Within this paradigm, design is conceived as (the results of) a creative activity, in which knowledge, artefacts and actions come together to produce something new (Stevens et al. 2018). Design emerges as a multi-layered intervention into practices, which results in useful and usable tools for achieving particular goals or accomplishing particular tasks (Rohde et al. 2016).

Studying interventions into practices to inform design has proven to be valuable in searching for solutions to wicked problems – or that sort of unique problems which cannot be resolved straightforwardly by scientific approaches and whose solutions may vary according to the context (Gaver 2012).While GD offers a theoretical perspective to study such interventions, Design Case Study (DCS) offers a vessel to this perspective (Wulf et al. 2018).

DCS is a framework built upon three well-defined phases, which can coexist in certain points of the design process. The framework allows researchers and practitioners to reconstruct practices observed in the field, which can be relevant to the design of new and innovative tools or to the understanding of how such tools can be or have been appropriated (de Carvalho et al. 2018; Hoffmann et al. 2019). Trough DCSs, situated findings are documented in such a way that a comparative knowledge base can be constructed to support transferability to new design contexts (Rohde et al. 2016; Betz and Wulf 2018; Stevens et al. 2018). Ogonowski et al. (2018) introduce PraxLabs as an infrastructure for such comparisons and potential transferability of DCS results.

The first phase of the DCS framework, traditionally known as *pre-study,* refers to a contextual study to understand the users, their contexts and the practices that can be supported by new technological artefacts. In general, the pre-study aims at defining the design space – or in a more ludic language, preparing the sandbox – in which all actors involved in the design process – users, designers, developers and other stakeholders – can play. In this phase, well-established research methods are employed following either a qualitative or a mixed methods research design, including ethnography (Randall et al. 2007), action research approaches like living labs (Ogonowski et al. 2013), among others. *In-depth interviews* (Hermanowicz 2002), *observational methods* – both mobile, like *shadowing* (Czarniawska 2007) or more stationary formats involving spending time in a place observing events and interactions (McKechnie 2008) – , and

cultural probes (Gaver et al. 1999) are a few data collection methods commonly used for this phase. The collected data is in turn analysed through techniques like thematic analysis (Braun and Clarke 2012) and qualitative content analysis (Mayring 2014), or through approaches which are characteristic of specific research designs as for example grounded theory (Strauss and Corbin 1998).

It is worth pointing out that, although the pre-study is mainly contextual – and therefore gives preference for qualitative methods –, nothing impedes that some sort of quantitative methods are integrated in a mixed methods approach, especially in cases where a certain level of generalisation is necessary, as common in pragmatic approaches (Rohde et al. 2016). The outcomes of the pre-study is usually a list of functional and non-functional requirements, which are further explored and pursued in the second phase of the framework, namely *design*.

The design phase is predicated upon several design methods and methodologies towards the development of a functional prototype that can be rolled out to natural settings. Here personas (Pruitt and Grudin 2003), scenarios (Carroll 2000), low-fidelity prototypes (e.g., sketches and storyboards) and medium fidelity prototypes (e.g., wireframes) are produced and tested in different iterations, until a stable version of a functional prototype is achieved. The elaboration and refinement of the designed artefacts usually follow a participatory design (PD) approach, involving representative users all along the process, who have the opportunity to actively contribute to shape the designed solutions in an inclusive and democratic way (Björgvinsson et al. 2010; DiSalvo et al. 2013; Wulf et al. 2015). Formative usability inspection and evaluation methods – e.g., Heuristic Evaluation (Molich and Nielsen 1990) or Cooperative Evaluation (Monk et al. 1993) – are used to guarantee that the major usability problems are eliminated before the tool is given to users, so they can integrate and use it as part of their everyday activities. Hence, the outcome of this phase is usually a fully functional prototype, which can be rolled out to the user contexts and effectively used.

The third and last phase of the framework, *appropriation*, focus on investigating how the designed tool will perform in the users' hands in naturalistic settings. The phase starts with the deployment of the technology to the user contexts. The usage of the technology is then closely observed, as are the changes that they will bring upon existing practices or the new practices that they will facilitate or trigger. As for the pre-study, interviews, observations and cultural probes are usually employed to collect the relevant data and particular data analysis methods are used to support the generation of accurate and relevant understandings. Here, the usefulness and usability of the system are further evaluated and it is not uncommon that problems which have not been identified during the evaluation activities of the design phase emerge. These problems can

feed back into the design activities, leading to a new improved version of the prototype. Put different, formative evaluation is still possible in this phase, providing the necessary resources are available. Further contextual studies can also be required and pursued. This means that the pre-study can also last until the very end of the project.

Goals and Activities

The main goal of this masterclass is to provide HCI and CSCW professionals who are interested in exercising practice-based computing with the necessary tools and knowledge to carry out successful design projects under the auspices of the GD research paradigm through the DCS framework. The masterclass will concentrate on the main conceptual and theoretical aspects of the paradigm as well as the relevant methodological aspects of the framework. By the end of the masterclass, participants should be able to plan successful DCSs, using the appropriate research design and methods for the design problem that they would like to address. This should support them to accomplish impacting results with their initiative, both in terms of research results as well as of the quality of the designed artefacts.

The masterclass will be conducted in a hybrid format based on short presentation sessions to introduce the relevant concepts, theories and methods, followed by brainstorming sessions to discuss their understanding, doubts and difficulties with any of the presented constructs. Examples from past DCSs carried out by the organiser will be introduced and alternative strategies will be discussed, so to give participants a better understanding of the options they have to carry out methodological sound GD projects.

Target Group

This masterclass targets young researchers planning to engage in practice-based computing as well as researchers who have already been exercising it, but still have doubts or reservations about any aspects of it.

Format and Duration

This masterclass is originally planned to happen as an in-person activity. Alternatively, an on-line version of it will be carried out, in case the conference turns out to be in a hybrid or complete online format.

Given the breath of the contents to be covered, this masterclass is planned as a full-day event. In the eventual case of a hybrid or online conference, the activities

will be carried out between 15h00 and 20h00 CET, in an attempt to accommodate people from different time zones.

Number of Participants

To assure focused discussions and exchanges, a maximum of 15 participants will be allowed.

Required Resources

In terms of infrastructure, a lecture hall capable of accommodating the maximum number of participants according to the social distancing regulations in place by the time of the conference due to the COVID-19 pandemics, provided with a projector, a proper space for projection, sound system and flipchart will suffice. Participants are not required to bring any particular resources for the activities.

Shall the conference and, consequentially, the masterclass happen online, a laptop or personal computer equipped with a webcam will be enough. In this case, the masterclass will run over Zoom.

Organiser's Short Bio

Fabiano Pinatti, PhD, is an Associate Researcher at the Institute of Information Systems and New Media of the University of Siegen (Germany), the EUSSET Community Building Chair and one of the EUSSET Competence Network Co-Chairs. He holds a BSc and a MSc in Computer Science from the Federal University of São Carlos, São Paulo, Brazil, and a multidisciplinary PhD developed within a joint project between the Interaction Design Centre of the Department of Computer Science and Information Systems, University of Limerick, Ireland, and the Department of Sociology at the same university. His interests span Human-Computer Interaction, Computer Supported Cooperative Work, Practice-based Computing, Interaction Design, Software Accessibility, Cyber-Physical Systems, Mobile and Nomadic Work and Informatics in Education. Since 2016, he has been leading and carrying out assorted Grounded Design projects predicated on the Design Case Study framework. The focus of his research is on technologically-mediated human practices, more specifically on the understanding on how practices can help identifying the design space of new and innovative technologies, and how they can shape and be shaped by their usage. He has published several articles on topics related to these fields of research in prestigious international conferences.

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Infrastructuring for organizational resilience: Experiences and perspectives for business continuity

Hussain Abid Syed[1]
Marén Schorch[2]
Sam Addison Ankenbauer[3]
Sohaib Hassan[4]
Konrad Meisner[5]
Martin Stein[6]
Sascha Skudelny[7]
Helena Karasti[8]
Volkmar Pipek[9]
University of Siegen, Germany[1,2,4,5,7,9]; IT University of Copenhagen, Denmark[8]; SME Graduate School, Siegen, Germany[4,5]; University of Michigan School of Information, USA[3]; Fraunhofer FIT, Sankt Augustin, Germany[6]
{hussain.syed, maren.schorch, sohaib.hassan, konrad.meisner, sascha.skudelny, volkmar.pipek@uni-siegen.de}, hkar@itu.dk, samank@umich.edu, stein@openinc.de

Abstract. This workshop discusses organizational resilience and resilient infrastructures by uniting researchers, professionals, and experts from various disciplines. Workplace studies and organizational settings have always been an integral theme in computer-

supported cooperative work (CSCW) research. This workshop hopes to broaden this research horizon by overlapping the multidisciplinary perspectives of resilience and crisis research with human-computer interaction (HCI), CSCW, organizational, and business studies. The COVID-19 pandemic and the subsequent physical and social constraints have been detrimental to the activities of different organizations, especially to small and medium enterprises (SMEs). SMEs must recognize and search for opportunities to adapt to this crisis by developing resilient organizational infrastructures. These adaptations can be crucial to overcoming the current disruptions challenging the continued existence keeping in view the intrinsic diversification of various business and industrial sectors. How organizational infrastructures can be designed to instill resilient properties like adaptive capacity, self-adjustment and continuity? We intend to focus on bringing this discussion under the umbrella of CSCW to explore the potentials of collaboration and cooperative work in organizational infrastructure. Through this workshop, we offer research prospects by applying organizational resilience theories to study organizational infrastructure and infrastructuring activities, which can be used for their prospective transformations into resilient infrastructures.

Introduction

With rapidly increasing disasters such as climate change and escalating cyber-crimes due to the digitally exposed nature of modern business, crisis is inevitable. The on-going COVID-19 pandemic has further escalated business concerns by altering daily routines and work practices around the world, ultimately disrupting how organizations conduct business. Especially notable is the small and medium enterprises (SMEs) sector that is extremely vulnerable in times of crisis and is often the least prepared of all the organizational sectors (Jones & Proverbs, 2008).

SMEs are integral to the modern economy and make up a significant portion of the world's businesses. In the European Union (EU), for example, 99% of all the enterprises are SMEs (European Commission, 2017). Due to their significant role in economic activity, SMEs are considered a key driver for the growth and economic development of countries, especially by stimulating innovation, job creation, and social integration of local communities (European Commission, 2017). An SME in the EU is defined as an organization with less than 250 employees and less than (or equal to) a €50 million turnover, whereas in the United States, SMEs are classified as firms having fewer than 500 employees (OECD, 2005). Despite having different definitions across economies, SMEs are noted for their liabilities of "smallness" and they often operate in uncertain environments (Damanpour, 1992). Further, in contrast to large organizations, SMEs are peculiar due to more superficial organizational structures, limited financial assets and funds, centralized decision-making, and the high reliability of employees' ability to get their job done (Thong & Yap 1995).

Crisis literature entails that SMEs do not have the resources and technical systems often equated with resilience capabilities amidst the ever-increasing threat of natural and human-made disasters. Despite being agile and flexible, SMEs may need to become more strategic driven in their approach to managing threats and extreme events (Sullivan-Taylor & Branicki, 2011). This ideology of organizational transformation is coordinated with the expectation in CSCW as calibrated in the reflections on 25 years of ethnography in CSCW research by Blomberg and Karasti (2013). The authors reflected on developing new concepts to help workplace and organizational studies understand collaboration in complex, widely distributed, temporally expanded, and large-scale settings. These settings are analogous to the challenges imposed on business organizations in emergent scenarios or recent times with an on-going pandemic, multiple phases and forms of lockdowns, and further limitations.

The lack of adequate preparation and resources exposes SMEs to threats and disruptions that may jeopardize organizational sustainability and individual welfare (Edward, 2010; Barnett & Pratt, 2000). Bhamra et al. (2011) connect the concept of sustainability with resilience. Holling (1973) introduced the term 'resilience' from an ecological context, and since then, it has been applied to various contexts and application domains. While the term may be defined in different ways depending on context, the concept of resilience revolves around the ability of the subject to return to a stable state after a disruption. However, the organizational point of view holds the idea of resilience, signifying its application to both individual and organizational responses to disturbances and threats (Bhamra et al., 2011; Braes & Brooks, 2010). It can be further defined as an organization's capability to prevent, respond effectively to, and survive an unforeseen situation. The ability to anticipate, adapt to, and take advantage of long-term trends, opportunities and challenges and potentially thrive in an environment of change and uncertainty. Also, fundamental learning from past disruptive or disastrous events is crucial for an organization's business continuity (Egner et al., 2015).

Under the lens of infrastructuring and comprehensive range infrastructure research in CSCW, the work infrastructure of an individual or an organization is the entirety of devices, tools, technologies, standards, conventions, and protocols on which the individual worker or the collective rely to carry out the tasks and achieve the goals assigned to them. (Pipek and Wulf, 2009). According to Star and Bowker (2002), infrastructures have a spatial and temporal reach and scope, are embedded in other social and technological structures, shape and are shaped by conventions of practice, and, most notably, are invisible and become visible upon breakdown. These intrinsic peculiarities of an infrastructure substantiate several aspects of an organization. Simultaneously, the notion of breakdown is inclined to the idea of disruption and change, hence indicating the context of resilience. According to Kjeld Schmidt (1994), the formal organization is merely a governance structure of certain aspects of cooperative work's multifaceted realities. Likewise,

the organizational infrastructures constitute overlapping layers of cyber, knowledge, information, communication, technological, collaborative, work-oriented, etc. infrastructures. A substantial amount of research in CSCW excavate the inner workings of cyber, information, and knowledge-intensive infrastructures, which are directly and indirectly applicable to organizational infrastructures (Korn et al., 2017; Ribes & Lee, 2007; Karasti et al., 2010; Karasti & Blomberg, 2017; Randall et al., 2015; Ribes, 2014; Pipek & Wulf, 2009, Bietz et al., 2012).

Different components within an organizational infrastructure are integrated through standardized interfaces enabling the work practitioners to channel merits like openness and heterogeneity (Hanseth & Lundberg, 2001), versatility and reflexivity (Pipek and Wulf, 2009), longevity and stability (Zimmerman & Finholt, 2007) and expertise sharing (Ley et al., 2014). Information technology (IT) adoption can make businesses adaptive and flexible, which is also coherent with the concept of organizational resilience (Pipek and Wulf, 2009; Ley et al., 2014). However, small enterprises do not clearly and fully understand the weakness of their IT capability, and this reason often decreases their willingness to adopt information technology (Chang et al., 2010, Lewkowicz & Liron, 2019).

Infrastructures can also be explored from the viewpoint of disruption or change (Wiedenhöfer, 2011; Soden & Palen 2016). Infrastructures remain transparent (and mostly invisible) once established, "reappearing" only at moments of upheaval or breakdown (Jackson at al., 2007). This inherent imperceptibility in infrastructure ensures continuity and flexibility in activity spheres. However, when a point of infrastructure is reached due to disruption or breakdown, it temporarily generates a stronger implicit tie between the activity spheres, causing the infrastructure to become an apparent resonating change in a stronger sense of urgency regarding infrastructure improvements (Ludwig et al., 2018). Many infrastructuring processes and phenomena emerge from the installed base (from what is already there) and are strongly influenced by the network of existing dependencies (Karasti et al., 2018). These infrastructuring features articulate the inherent traits of organizational resilience like vulnerability, situation awareness, and most importantly, adaptive capacity to respond to change, disruption, or breakdown (McManus et al., 2008; Hollnagel et al., 2011; Soden & Palen 2016; Coaffee & Clarke, 2017). The manifestations of organizational resilience and organizational infrastructures have overlaps and present unbound research opportunities towards developing robust, flexible, and adaptable infrastructures. The workshop aims to help build a richer understanding of issues related to the analysis and design of resilient infrastructures:

(1) bringing the discussion on organizational resilience under the umbrella of CSCW to explore the potentials of collaboration and cooperative work in organizational infrastructures

(2) discussing salient features of organizational infrastructures concerning resilience theories

(3) the issues, theories, and methods to improve organizational infrastructures make them self-adjusting and evolving networks of activities, knowledge, tools, services, etc.

Topics and Participation

To achieve these aims, the workshop will involve a collective sharing and analysis of case studies and experience from HCI, CSCW, business studies, organization theory, SME research, digital transformation, crisis informatics, and resilience research. We invite participants to submit short position papers between 2-4 pages comprising one or more case studies, empirical research, or at least some description of infrastructure or organizational setting that the workshop participant is familiar with and can discuss at the workshop. The position paper should also include some analysis of that setting. We hope to articulate research dimensions around organizational infrastructuring that is akin to the research arenas in organizational resilience.

The short position papers will be distributed to all the participants before the workshop to allow preparation beforehand and to foster intense discussions at the main event. The organizers will facilitate discussion by providing some prominent and overlapping themes identified in advance from the papers. To create a productive setting in the workshop right away, we would like to encourage you to reflect on the following issues: field of your research or/and development, SME or organizational context of the case study, the understanding of resilience strategies, theories, the concept of infrastructure, infrastructuring and methods concerning your research. We hope to address topics (questions) within this work such as (but not limited to):

- Barriers to resilient infrastructures
- Infrastructural evolution over time
- Disruption, change, and innovation as stimuli for infrastructural evolution
- Impact of resonance activities on organizational resilience
- Improvised collaborations for organizational resilience
- Collaborative organizational resilience
- Collaboration in coping and recovery work
- Collaborative innovation through and by infrastructural inversion
- Implications of digital transformation on organizational infrastructure
- Implications for resilient organizational infrastructure design
- Strategies for continuity in crisis
- Role of situation awareness in business continuity

- Digitalization and the increasing vulnerabilities in organizational infrastructure
- Internet of things for improved organizational resilience
- Infrastructural obsolescence

Workshop Schedule and Structure

The temporary event structure of our two-days interactive workshop will be as follows (might be changed based on the number of participants or in case of pandemic restricted online event):

Workshop initiation: The co-organizers will make the first pitch with a formal outline of the workshop, goals, and expected outcomes.
Interactive case study analysis: The presenters will present their case studies for discussion and brief meta-level analysis within the group in an interactive exercise. This exercise aims to familiarize the group with individual experiences and open discussion towards topics to be considered in later sessions. Intuitively, this does not allow in-depth exploration of the instances but is meant to build up subject motivation with the group while discovering rigorous discussion themes.
Interactive brainstorming session: We will then continue by picking as a group issues that warrant further discussion. We will brainstorm multiple exploration dimensions for the chosen topics and discover open questions, inclusion, and exclusion criteria for a thorough discussion.
Breakout group discussion: In the afternoon, we will break into smaller groups. Each group will be assigned a topic and will be moderated by a smaller set of co-organizers. The issues will be explored in slightly more depth, again running them through the example set of case studies and considering the different aspects that emerge.
Plenary session: We will get together after the group work, reporting shortly about the groups' different discussions and outcomes.
Wrap-up: The co-chairs will present concluding remarks and the takeaways from the workshop.

The organizers will also discuss the possibility of a joint publication with the participants to make the findings available for the CSCW research community. The event structure is not distributed between the working hours, refreshments, and lunch breaks. This information will be disseminated to the participants before the workshop, depending upon the workshop's mode (In-venue or online).

Workshop targets:

- Case studies of the participants will be explored.
- Key issues and workable concepts will be identified.

- A joint publication will be planned.

Duration of the workshop: Two day split sessions on 7th and 8th June (four hours each day with breaks), within conference preferred timeslots i.e., 3 -7 pm CET
Workshop format: Digital via Zoom and interactive tools like Miro etc.
Means of recruiting and selecting participants:
The call for participation will be advertised through the conference website (https://bcmecscw.kompetenzzentrum-siegen.digital/) and social media channels. The advert will also be sent to respective mailing lists. A Workshop website will be established where the workshop proposal is posted together with position papers and other workshop information. Position paper submission will be via email.
Maximum number of participants: 15

Workshop Organizers

These co-organizers have already committed to the workshop. We have pending requests from international organizers, which will be included in the camera-ready version and website.

Hussain Abid Syed (corresponding chair) is a Ph.D. researcher in the BMBF junior research group KONTIKAT at the University of Siegen, Germany. He is a computer scientist with a specialization in software technology and data science. His interests include human-machine interaction (HCI), computer-supported-cooperative work (CSCW), model-driven software development (MDSD), and machine learning (ML). He is keen on the application of computing techniques and software technologies for the enhancement of organizational resilience. His current research focus is to tailor resilience practices to the context of small and medium enterprises. He collaborates with the enterprises employing qualitative and quantitative research methods to generate steady requirements for resilient infrastructures.

Marén Schorch is a Postdoctoral Researcher and leader of the BMBF junior research group KONTIKAT at the University of Siegen, Germany. She is a sociologist specializing in qualitative research methods and disaster research. Her current research deals with continuity and (digital, social, economic) change, and emergency preparedness. She has published a wide range of articles on her varied research, co-edited the book "Learning and Calamities. Practices, Interpretations, Patterns." (Routledge 2015), co-organized several workshops such as on ECSCW 2020 and 2011, CSCW 2014 and CSCW 2017, COOP 2016 and GROUP 2016, held two masterclasses at ECSCW 2019 and also acts as AC and reviewer for those conferences (ECSCW, CSCW, CHI etc.).

Sam Addison Ankenbauer is a writer and qualitative researcher. His interests broadly investigate how technologies can mediate traditional spaces and how these physical spaces are currently adapting to newer technologies. His current research explores the tensions between technologies, physical spaces, and the people who utilize technologies and inhabit spaces. Sam is a doctoral student at the University of Michigan School of Information. He is also the author of The Wailing for Liverpool University Press.

Sohaib S. Hassan is a member of the BMBF junior research group KONTIKAT at the University of Siegen, Germany. He is a Postdoctoral Researcher at the School of Economic Disciplines, University of Siegen. He is also the Research Coordinator & Advisor at SME Graduate School, Faculty III, University of Siegen. His research interests include Strategic Management, SMEs, Innovation, Digital Transformation, Business Continuity Management

Martin Stein is a Post-Doc researcher at the Fraunhofer Institute for Applied Information Technology FIT, Germany and managing director of open.INC, a startup focussing on IIoT-solutions. He received his PhD from the School of Economic Disciplines at the University of Siegen in the department of Information Systems and New Media. His research is centred around the topics of mobility support, complex information processing and visualization and participatory design. In his most recent work, he focuses on the impact of industrial internet of things (IIoT) technologies on the organizational setting and qualifications needs of SMEs. He (co)-authored several conference and journal papers, including publications at ACM CHI Conference on Human Factors in Computing Systems, ACM Transactions on Computer-Human Interaction, International Journal of Human-Computer Studies, International Conference on Supporting Group Work, Conference on the Design of Cooperative Systems (COOP). Further, he served as associate chair for MobileHCI Late Breaking Work 2017 and as reviewer for, e.g. JCSCW, ACM CHI, ACM CSCW, ECSCW, COOP and IS-EUD.

Konrad Meisner is a Ph.D. student at the university of Siegen at the Chair for Entrepreneurship and Family Business and a junior researcher at the KontiKat researcher group. He worked in strategic management in an SME, preparing innovation and business development on a long-term orientation. He further on studied SME Management with a focus on family businesses. His current field of research lies within the digitalization of SMEs and family business, innovation management and gender-studies.

Sascha Skudelny is a research fellow at the Institute for Media Research and the iSchool at the University of Siegen. He studied media sciences and human medicine and is doing his doctorate at the Institute for Microsystems Technology. His

publications and research focus on security communication, collaborative technologies, process and communication modeling of complex systems, user experience/usability design and social media analysis/social network analysis as well as business resilience management and social (governance) resilience management.

Helena Karasti is Professor in the Department of Digital Design at IT University (ITU) of Copenhagen, Denmark. Her research interests include infrastructuring, information/knowledge/research infrastructures, critical data studies, and integrations of ethnography and design. She has widely published in the fields of Computer Supported Cooperative Work (CSCW), Participatory Design (PD) and Science and Technology Studies (STS). She leads the Responsible Infrastructuring research group at ITU.

Volkmar Pipek is a Professor of CSCW and HCI at the University of Siegen, Germany, and has widely published books and articles in CSCW, with a specific interest in infrastructuring. He is also the co-leader of the project "INF-Infrastructural Concepts for Research in Cooperative Media" at the Collaborative Research Centre 1187: Media of Cooperation and mentor of the BMBF junior research group KONTIKAT at the University of Siegen.

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Understanding research about software developers around the world amidst global pandemics and crises

Preethi Srinivas[1], Brad A Myers[2], Youyang Hou[1]
[1]Google Inc., [2]HCI Institute Carnegie Mellon University
presrini@google.com, bam@cs.cmu.edu, youyangh@google.com

Abstract. Multiple waves of the COVID-19 pandemic, social unrest, global economic crisis, and mental health issues have caused modifications to developer work practices, which presents an emergent need to understand its impact on research *about* developers. The aim of this workshop is to bring together researchers from academia and industry to discuss the current state of research about developers, questions asked or problems addressed, strategies applied, and to share successes and failures in the form of 'lessons learnt'. We are also interested in observations about new practices and processes adopted by developers in the field during these crises. We hope to capture a set of (i) observations in developer practices, consequently leading to shifts in research problems of interest, and (ii) suggestions for best practices and strategies that can be adopted by researchers to effectively plan and execute research about developers amidst and post global crises.

Background

Government-mandated lockdowns, global economic crises, and several other events have influenced a shift to an unconventional work setting, affecting the wellbeing and productivity of developers (e.g., software engineers, data scientists,

analysts, etc.) and researchers who study them. The world has switched to working from home, with an increased demand for supporting new technology innovations to keep the world functioning. Researchers studying developers focus on understanding developers' work practices, their perceived usability of programming language(s) and tool(s), their usage of collaborative tools, their learning approaches adopted to support programming, etc. (e.g., Al-Ani et al., 2008; Bird et al., 2009; Bjørn et al., 2014; Carter et al., 2015; Gupta et al., 2009; Gutwin et al., 2002; Myers et al., 2016; Tang et al., 2011; Wang et al., 2020). As such, a research study about developers would normally include both in-person and remote observations of developer behavior, oftentimes also including the capture of developers' perceptions and needs, using techniques such as surveying, semi-structured interviews, etc. A global shift to work from home has essentially pushed researchers to adopt methodologies that can primarily support remotely capturing research insights. For instance, observation of developers' workflow and collaborations are challenging as in-person and field research are prohibited in most situations. Remote research can be seen as an opportunity to scale research to regions that might have been difficult to achieve with in-person user research, but it can introduce planning and facilitation issues. For instance, setting up a programming environment with experimental tools that are early in development may not necessarily be publicly available, thus making the study setup cumbersome.

An emergent theme on remote work by developers alludes to the insight that working from home while being quarantined during a pandemic is *not* the same as remote work (Bao et al., 2020; Bezzera et al., 2020; da Camara et al., 2020; Ford et al., 2020; Ganguly et al., 2020; Ralph et al., 2020; Machado et al., 2020; Miller et al., 2021; Moster et al., 2021; Oz & Crooks, 2020; Rodeghero et al., 2020). This insight provokes the question on how the series of world events has influenced developer's work practices, research about developers, their approaches, and the questions/problems that are being addressed in this new world. The aim of this workshop is to bring together researchers from academia and industry to discuss the current state of research about developers, strategies applied, successes and failures in the form of "lessons learnt," and new practices and processes adopted by developers in the field in a world that is plagued by human and economic disasters. We hope to create a forum for researchers to

collaboratively brainstorm and generate a list of (i) new research questions/problems that are being addressed, and (ii) best practices and strategies that can be added to what is already known for effectively planning and executing research on distributed work amidst and in the post-pandemic world.

Workshop goals

This workshop aims to bring together researchers who study developers to examine, and discuss the current state of research about developers. Specifically, we have the following goals in the context of global crises:

- Identify the approaches researchers adopted for understanding and measuring developer needs, wellbeing, collaboration, and productivity.
- Reflect on how current practices for team bonding, coordination and collaboration have changed, and how the new practices have influenced and transformed research methodologies in the new, unconventional work settings.
- Provide inspiration from cross-geographical perspectives by sharing experiences, resources, and strategies researchers have adopted.
- Leverage discussions from the workshop to generate a list of (i) new observations made in developer practices, consequently leading to shifts in research problems of interest, and (ii) known best practices/strategies for planning and executing research about developers both during and post global crisis.

We believe our discussions will result in deeper understanding of strategies and techniques researchers can adopt, not only to lower burdens in their work but also to become aware of emerging research techniques from a global perspective to support their work.

Workshop structure

- The workshop will be open to everyone interested in and pursuing research about developers and specifically the goals listed above. In total, we expect to attract up to 20 attendees including the organizers.

- Position and works-in-progress papers will be made available to attendees in advance of the workshop. All attendees are expected to have read the papers to be able to actively engage in discussions.
- The workshop website will be used as a portal to make announcements and promote calls for participation: https://sites.google.com/view/ecscw21-research-in-crisis.

The workshop schedule is summarized in Table I. A summary of the results will be made available after the workshop on the workshop website. Further, the workshop organizers and the authors of the talks will compose a joint article, to report on the workshop and its outcomes, to be submitted to the Computer Supported Cooperative Work (CSCW) journal.

Table I. Workshop Schedule (CET)

16:00 - 16:15	Meeting all participants + Tech setup (ensure video conferencing works for remote attendees)
16:15 - 16:30	Welcome and introduction
16:30 - 17:20	10-minute talks (5 talks)
17:20 - 17:30	Break
17:30 - 18:15	Group work including discussions on current state of the research about developers, research in post-pandemic world, and other topics based on the submitted manuscripts
18:15 - 18:45	Final summary and discussions for working manuscript that will be an outcome of the workshop
18:45 - 19:00	Closing remarks

Call for participation

This 3-hour workshop will bring together researchers and practitioners studying developers to learn more about the current state of research amidst a pandemic, global economic crisis, and social unrest. Our intention is to examine and discuss strategies adopted, lessons learnt, and brainstorm how research about developers has changed.

We invite researchers from academia and industry pursuing research about developers to submit original contributions on the problem they were attempting to learn, the research methodology that was adopted, and the results discovered about how developer practices and processes have changed. This includes researchers studying work practices in programming environments, programming language design, API usability, usability of programming tools, onboarding of new developers into remote teams, etc. We specifically encourage participants to reflect on the importance of the research questions addressed in their research and lessons learnt from the methodology adopted.

The manuscripts should not be anonymized and will be reviewed by members of the program committee. Submissions will be selected based on their relevance to the workshop goals.

At least one author of accepted manuscripts will be required to register and attend the workshop. Manuscripts will be made available to attendees in advance of the workshop. All attendees are expected to have read the papers to be able to actively engage in group discussions.

Submissions can be 2-4 pages long (including references) and should follow the ECSCW template (RTF, MS Word, LaTeX). Manuscripts should be submitted as email attachments in PDF format to the workshop organizers at ecscw21.workshop@gmail.com by March 28, 2021. More details about the workshop can be found at the workshop website: https://sites.google.com/view/ecscw21-research-in-crisis.

Important Dates

Submission Deadline: March 28, 2021
Notification of acceptance: April 27, 2021
Workshop Date: June 7, 2021

Organizers

Preethi Srinivas has been a User Experience Researcher at Google since 2018. Her work focuses on understanding and supporting the needs of mobile application developers. Her research interests lie at the intersection of software developer experience, programming environments, API usability, computer supported cooperative work, mobile computing, and ubiquitous computing.

Brad A. Myers is a Professor in the Human-Computer Interaction Institute in the School of Computer Science at Carnegie Mellon University, and has been researching developers and programming for over 40 years. He was chosen to receive the ACM SIGCHI Lifetime Achievement Award in Research in 2017, for outstanding fundamental and influential research contributions to the study of human-computer interaction. He is an IEEE Fellow, ACM Fellow, member of the CHI Academy, and winner of 16 Best Paper type awards and 5 Most Influential Paper Awards. He has been a consultant on user interface design and implementation to over 90 companies, and regularly teaches courses on user interface design and software. His research interests include user interfaces, programming environments, programming language design, end-user software engineering (EUSE), API usability, developer experience (DevX or DX), interaction techniques, programming by example, mobile computing, and visual programming.

Youyang Hou has been a User Experience Researcher at Google since 2017. Her work focuses on developer experience and developer tools in mobile development and cloud computing services. Her research interests include computer supported collaborative work, developer experience, IDE experience, creative computing, and hackathons. She obtained her PhD in Human Computer Interaction from the School of Information, University of Michigan.

Program Committee

Steven Clarke (Microsoft)
Michael Coblenz (University of Maryland)
Youyang Hou (Google)
Shriram Krishnamurthy (Brown University)
Andrew Macvean (Google)
Brad A. Myers (Carengie Mellon University)
Steve Oney (University of Michigan)
Fabio Paterno (Consiglio Nazionale delle Ricerche)
Elli Ponomareva (JetBrains)
Martin P. Robillard (McGill University)
Preethi Srinivas (Google)
Chamila Wiyayarathna (University of Adelaide)

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Christina Pakusch[1], Alexander Boden[1,2], Henrik Korsgaard[3], Myriam Lewkowicz[4], Gabriela Avram[5], Susanne Bødker[3] (2021): 2nd Workshop on Studying Technical Mechanisms for Supporting Sharing Communities. In: Proceedings of the 19th European Conference on Computer-Supported Cooperative Work: The International Venue on Practice-centred Computing on the Design of Cooperation Technologies - Workshops, Reports of the European Society for Socially Embedded Technologies (ISSN 2510-2591), DOI: 10.18420/ecscw2021-wsmc01

2nd Workshop on Studying Technical Mechanisms for Supporting Sharing Communities

Christina Pakusch[1], Alexander Boden[1,2], Henrik Korsgaard[3], Myriam Lewkowicz[4], Gabriela Avram[5], Susanne Bødker[3]

[1]Bonn-Rhein-Sieg University of Applied Science, Germany, [2]Fraunhofer-Institute for Applied Information Technology FIT, Germany, [3]Aarhus University, Denmark, [4]Troyes University of Technology, France, [5]University of Limerick, Ireland
Contact Author: christina.pakusch@h-brs.de & alexander.boden@h-brs.de

Abstract. Sharing economies enabled by technical platforms have been studied regarding their economic, legal, and social effects, as well as with regard to their possible influences on CSCW topics such as work, collaboration, and trust. While a lot current research is focusing on the sharing economy and related communities, there is little work addressing the phenomenon from a socio-technical point of view. Our workshop is meant to address this gap. Building on research themes and discussion from last year's ECSCW, we seek to engage deeper with topics such as novel socio-technical approaches for enabling sharing communities, discussing issues around digital consumer and worker protection, as well as emerging challenges and opportunities of existing platforms and approaches.

Introduction

Technology is a key component in the emergence of the commercial sharing economy and community-oriented collaborative economy initiatives. Housing cooperatives, community gardens, food coops, tool libraries, skill swapping arrangements, and other citizen initiatives use digital technologies for collaboration, communication, and coordination purposes. Furthermore, they are all part of the collaborative economy. In the latter cases, reuse, recycling, mobilisation of existing resources, and initiatives have a real impact on the local economy.

This workshop succeeds last years' ECSCW workshop on the technical mechanisms for supporting sharing communities (Korsgaard et al., 2020), where we sought to examine and explore the relationship between these enabling technologies combined with emerging initiatives and communities. The aim of the follow-up workshop is to further engage with these research themes and work towards a better understanding of core technical mechanisms and issues we have identified. We invite submissions that build on work presented last year, particularly engaging with the following issues:

- How can we design mechanisms that enable effective and flexible sharing of digital goods and services, from simple low-tech approaches to highly sophisticated technologies such as blockchain?
- What governance and licence models can facilitate these mechanism's use?
- How can technical platforms be designed to protect the rights of their users (both consumers as well as gig workers)?
- Which role play different legal and cultural contexts, as well as general implications from the *datafication* of our lives?
- How can we address possible shortcomings of existing designs, for instance in terms of enhancing collectivity, sustainability and resilience?
- How can we raise awareness about those issues and values in sharing communities?

By 'mechanisms', we mean technological mechanisms that play a role in enabling, ordering, structuring, hindering, and shaping interactions that have various other impacts or effects on practices within sharing communities. We recognise that there is no causal effect between how a community uses a platform or how activities unfold and the technical mechanisms. However, we believe that it is possible to identify and discuss common use patterns, effects, and potential relations between several technological mechanisms as well as sharing and caring practices. Hence, our workshop is intended to focus on the technical features and infrastructures that support the collaborative practices and community aggregation regarding their effects on collaboration and economic relations.

Background

The opportunities and challenges of the sharing economy are controversially discussed in the discourse about collaborative communities. The analyses focus on the economic, legal and social effects (Kenney and Zysman, 2015) and regard possible influences on CSCW topics such as work, collaboration, and trust (Lampinen et al., 2016).

The emergence of the collaborative economy as we know and use it today has been enabled by the technical infrastructures relying on web and mobile technologies. The initial aim was to bring together peers and share partially or completely unused resources with one another - capitalizing these platform-mediated transactions has come to the fore as the most important economic driver (Geissinger et al., 2019). Since then, a substantial transformation of pricing and labour structures can be observed as a consequence of increasing platformisation. Still, there remains considerable potential for supporting new modes of (peer-to-peer) exchange by fostering trust among strangers in the collaborative economy by applying technologies, such as reputation and payment systems (Ikkala and Lampinen, 2015; Mcgregor et al., 2015; Teodoro et al., 2014). Platforms bear the opportunity to reallocate wealth across the value chain, specifically away from intermediaries and towards small producers and consumers (Schor and Fitzmaurice, 2015). This somewhat optimistic view of connected consumption is in stark contrast with calls for more equitable forms of organising platform labour, such as cooperatives and other social enterprises (Scholz 2014), and critiques of the emotional labour, body labour, and temporal labour that work under platform capitalism involves (Casilli and Posada, 2019; Raval and Dourish, 2016).

In the discourse about technical platforms, it is particularly interesting that the term itself has been understood rather broadly, as *"a set of digital frameworks for social and marketplace interactions"*, which *"organize and structure economic and social activity"* (Kenney and Zysman, 2016). While platforms have been analysed in their role as mediators for sharing goods and services in addition to facilitating those transactions (such as by offering means for payment), the technological basis, infrastructure or functionality that are underlying a particular sharing economy communities have been less discussed (Bødker et al., 2020).

Ongoing research mainly investigates the sharing economy and related communities such as food sharing (Ganglbauer et al., 2014; Malmborg et al., 2015), time banking (Bellotti et al., 2014; Seyfang and Smith, 2002), and local online exchange (Lampinen et al., 2016; Suhonen et al., 2010), as well as network hospitality (Bialski, 2012; Ikkala and Lampinen, 2015; Molz, 2012), on-demand labour (Teodoro et al., 2014), and crowdfunding (Bellotti et al., 2015; Gerber and Hui, 2013). In Contrast, work addressing the collaborative economy phenomenon from a socio-technical point of view is rare. Only few work in HCI or CSCW is addressing the technology behind these platforms, the reasoning behind their specification, their impacts on users and collaboration, and potential effects of

technology meant to support local sharing economies in their cooperative activities. This led us to organise a workshop on the topic as part of ECSCW 2020, where we sought to examine and explore the relationship between these enabling technologies and the emerging initiatives and communities (Korsgaard et al., 2020). The aim of this year's follow-up workshop is to further engage with these research themes, and work towards a better understanding of core technical mechanisms and issues that we have identified.

We think that in particular that technical features should be studied not only from the perspective of the support they provide for collaboration, but also regarding constraints and limitations they impose by observing how people work-around those constraints. We propose the following themes as possible topics for submissions.

Themes and topic areas

Adopting a socio-technical point of view allows to study both the social processes and set of governance mechanisms, and the technological architecture constituted of software modules, interfaces, and infrastructure. As CSCW researchers, we should take the opportunity to help shape the future with the technological architecture on which platforms are based (Orlikowski and Iacono, 2001). To do this, we have to look into the technical architecture of the platforms more closely. Our interest in this technological infrastructure is based on the five premises offered by Orlikowski and Iacono (2000) to carefully engage with technological artifacts: (1) information technology (IT) is not neutral or universal; IT is shaped by a variety of communities of developers, investors, users, etc. (2) IT is embedded in some time, place, discourse, community; (3) IT is made up of a multiplicity of components that require bridging, integration and articulation to work together. (4) IT emerges from practice, it can be used in different ways, adapted, expanded to accommodate different and evolving interests. (5) IT is dynamic; materials evolve, functions fail, standards are defined. In order to investigate the technological infrastructure, we need to invest in theorising the nature and the impact of this infrastructure and to work towards richer conceptualisations of IT (Tilson et al., 2010).

Based on the discussions we had as part of the initial workshop, we would like to emphasise the following issues for further discourse: Novel (socio-)technical concepts and approaches, issues around digital consumer and worker protection, as well as further emerging issues around the effects platforms have on communities, including possible blind spots such as a lack of support for collectivity (Bødker et al., 2020).

Novel socio-technical approaches

The best-known companies in the so-called platform economy share their assumption about a dominant market position in their respective fields. This aggravates the competition with these platforms for new companies (Barwise and

Watkins, 2018). Small companies often have no choice but to focus on niches where new value can still be created. Alos, smaller platforms often lack technical expertise to develop (and maintain) more sophisticated platforms themselves, and come to rely on simple solutions that only require few maintenance and administration work (Bossauer et al., 2020b). Another strategy of competitors is using the same technical infrastructures like the big players, or mainly copying these existing platforms. An example of this trend can be found with *coopcycle* in France, which is the coop (=retailer) alternative of deliveroo. In this copying strategy, what changes is only the governance model (Scholz, 2014).

However, we can observe that various forms of counter-movement are becoming established, ranging from low-tech solutions to sophisticated technologies such as blockchain. Since 2015, technical development aiming to democratise aforementioned structures and are grouped under this concept. Blockchain technology could counteract the problems mentioned by organising the transfer of information and value in a secure and decentralised manner (Bossauer et al., 2020c; Prinz, 2018). Here, the blockchain can act as a neutral intermediary without pursuing economic interests (Huckle et al. 2016). Initial examples of decentralised platforms such as dlive (video platform), steemit (social network) or Whisper (messaging), are still in the exploratory phase and are therefore still struggling to survive against the central platform giants in addition to facing the challenge of building up an appropriate user base. Nevertheless, the community for decentralised technologies is growing and working at high speed on innovative solutions that should offer added value compared to centralized platforms (Bossauer et al., 2020a).

Possible research questions: How can we design mechanisms that enable effective and flexible sharing of digital goods and services, from simple low-tech approaches to highly sophisticated technologies such as blockchain? What governance and licence models can facilitate their use?

Digital consumer and worker protection

The platforms bring together providers and consumers. To achieve optimal matching, reduce information asymmetries, and strengthen participants' trust in one another, platform operators make their participants reveal a lot of data about themselves and their online behavior (Clement et al., 2019). The participants usually have very few options to restrict or reject the use of their data – without consent, they are often excluded from using the platform. At the same time, the users often lack awareness about what kind of data are collected and how they are used by the platforms (Alizadeh et al., 2020).

It turns out, however, that users are becoming increasingly sensitive when it comes to willingness to share personal data (Conroy et al., 2014). Just recently, for example, the announcement that the largest messenger service WhatsApp would change the terms and conditions with regard to an in-depth exchange of data with Facebook resulted in alternative apps such as Threema, Signal and Telegram being

flooded with new users.[1] Prosumers such as gig workers feel exposed to the mechanisms of the platform operator. Gig economy platforms like Uber do not see their drivers as employees but as independent contractors. At the same time, however, they exert great pressure on the drivers through the 5-star-rating system, with their account threatened to be deactivated as soon as their rating falls below 4.6 out of 5 stars (Raval and Dourish, 2016). Involving workers that are affected or at least threatened by the repercussions of digitisation and platformisation of their work can open up interesting implications for the design of better workplaces.

Possible research questions: How can technical platforms be designed to protect the rights of their users (both consumers as well as gig workers)? What role play different legal and cultural contexts, as well as general implications from the *datafication* of our lives?

Emergent challenges and opportunities

Recent research has illustrated how most platforms are depending on a limited number of functionalities that focus mostly on transactions but lack in terms of binding communities together. This is reflected by the literature focusing mostly on larger *monotechnological* platforms, while small-scale local communities might have rather different needs. For instance, recent research has suggested that bottom-up, local communities need better support for collectivity when they work to design their technological platform (Bødker et al., 2020). Here, we can see a field of opportunities for improving the technical basis of the sharing economy but also have to deal with challenges such as making communities aware of possible improvements and supporting them in facilitating the changes needed.

This also points to the need for a better taxonomy about platform features, mechanisms, and functionalities. In doing so, we need to distinguish between the platform economy, the sharing economy that is often focusing on viable businesses (for somebody), and the bottom-up communities. The latter, we discuss in the cases that belong more specifically in the area of the *caring* economy and platform collectivism, that "regulates direct peer-to-peer collective activity and enables emergent local social structures" (Carroll and Beck, 2019, p. 280).

Possible research questions: How can we address potential shortcomings of existing designs, for instance in terms of enhancing collectivity, sustainability, and resilience? How can we raise awareness about those issues and values in sharing communities?

Further themes

Furthermore, we are inviting contributions about the topics from the initial workshop:

[1] See https://www.businessinsider.com/whatsapp-facebook-data-terms-conditions-privacy-signal-2021-1, accessed at 18.02.2021.

- Platform taxonomies: How can we analyse and categorise technical mechanisms from a socio-technical perspective?
- Ideals and conflict: What happens when community values and ideals conflict with those embedded in the tools they use?
- (Un)intended dark designs: What happens when a community appropriates commercial technologies in terms of unintended effects and emerging dark designs?
- Organising on and around platforms: How can communities deal with various organisation and governance models imposed by technical platforms?

Goals and activities

As a follow-up of last year's workshop, we aim at exploring opportunities and challenges for HCI and CSCW to engage with socio-technical perspectives on platforms and support tools within the sharing and collaborative economy from the perspective of researchers and practitioners. We are also interested in engaging with practitioners that are interested in participating and starting sharing economies to get a better understanding of the possibilities of already existing tools, as well as inform design researchers about possible gaps and room for improvement. The opportunities and challenges will be organised under four main aims:

- Collecting research on socio-technical aspects of sharing economy platforms. Here we emphasise perspectives and discussions aimed at connecting the two – the social and the technical – in discussing platforms and their underlying technologies as a follow-up of the discussions we had last year (which are reflected in the new topic areas).
- Identifying research themes, gaps, related work, in particular topics that are relevant to CSCW. This includes rethinking earlier trends in CSCW on groupware systems from a sharing platform perspective. This is meant to add to the list of themes we have listed above.
- Working towards a better understanding of core mechanisms and trade-offs in the design of platforms for the sharing economy, as well as implications in adopting and appropriating commercial solutions and platforms invented to support different kinds of work and collaboration. This requires a deeper engagement with studies about socio-technical aspects of different kinds of communities and contexts.
- Discuss and outline various abstractions across identified platforms, e.g. design patterns for community platforms, catalogues of proven mechanisms and enabling features. This is related to recent attempts to build a catalogue of technical mechanisms for sharing communities as part of the COST Action "Sharing And Caring" (see http://sharingandcaring.eu/).

Depending on the outcome of the workshop's discussions and on the interest of the participants, we may explore further publication outlets for the workshop papers. The contributions will be made available on the workshop website, given participant consent.

Activities and structure

Like last year, we propose a one-day, 8 hour workshop. In the workshop, we will combine discussion of position papers with fitting themes and aims. Some activities will be group-based and centred around generating contributions within the four aims of the workshop.

Preparation before the workshop We will circulate the accepted position papers, ask participants to read these, and reflect on the presented work based on the proposed themes. Depending on the scope and focus of the contributions, we will consider to ask a few guiding questions.

Morning: Introductions and short presentations The workshop will start with short presentations of the position papers. Depending on the clustering around the themes, this can happen in plenum or in two steps where the contributions are grouped around themes and then synthesised into a group presentation by the participants.

Afternoon (1) Generative group work: The afternoon will start with group work examining the themes with the aim of generating input to the main goals. This will involve mapping promising technological approaches, issues around digital consumer and worker protection, as well as emerging challenges and opportunities within the sharing economy.

Afternoon (2) Synthesis As the final step, participants will engage in a collective exercise with the task of synthesising the workshop and discussions into key directions for future research under the heading *"What has CSCW to offer to the sharing economy?"*

Organisers

Gabriela Avram is lecturer in Digital Media and Interaction Design, and senior researcher at the Interaction Design Centre of the University of Limerick (Ireland). Building on a CSCW background, her research currently focuses on the implications of the collaborative economy on urban communities, with an emphasis on DIY, civic engagement and cultural heritage. She is the Chair of the COST Action Sharing & Caring.

Alexander Boden is Professor at the Institute for Digital Consumption, Bonn-Rhein-Sieg University of Applied Science, and Fraunhofer-Institute for Applied Information Technology FIT. His work focuses on developing interactive tools in the domain of environmental and consumer informatics in a broad range of application domains ranging from smart factories to private households, as well as on ethical and social implications of technology. Alexander publishes in research communities such as CSCW, HCI, and Software Engineering.

Susanne Bødker is Professor of Human-Computer Interaction at the Department of Computer Science, Aarhus University. She works with activity theoretical HCI, Participatory Design and Computer Supported Cooperative Work. She is currently working on her ERC Advanced research project Common Interactive Objects, that takes a new theoretical focus on how we collaborate and make sense of the interactive objects in our everyday lives. Susanne is a scientific advisor for the COST action Sharing & Caring.

Henrik Korsgaard is Assistant Professor at the Department of Computer Science at Aarhus University. He works with activity theoretical HCI, CSCW and place-centric computing. He mixes empirical work on how communities adopt and appropriate technologies with constructing and deploying prototypes primarily focusing on supporting intrinsic development of local applications and services.

Myriam Lewkowicz is Full Professor of Informatics at Troyes University of Technology (France), where she heads the pluridisciplinary research group Tech-CICO. Her interdisciplinary research involves defining digital technologies to support existing collective practices or to design new collective activities. She chairs the European Society for Socially Embedded Technologies (EUSSET), and she is vice-chair of the COST Action Sharing & Caring, in which she in in charge of the working group focusing on technical platforms.

Christina Pakusch is post-doc researcher at the Institute for Digital Consumption, Bonn-Rhein-Sieg University of Applied Science. She is interested in innovative transport concepts in the sharing economy and examines their effects with a focus on the social and ecological consequences. Following a user-centered approach, her empirical studies aim to complement traditional technology assessment.

Maximum number of participants expected

We expect to bring together a maximum of 20 participants. Our intended audience is primarily researchers who are actively engaged in studies of sharing economy contexts, but also active members of such communities. We will encourage a mix of practitioners, graduate students, new faculty, and established researchers to participate.

Means of recruiting and selecting participants

The call for papers will be disseminated via CSCW-related mailing lists (e.g. EUSSET, CSCW). We will also publish the call via social media and community mailing lists of our COST Action in order to target a broader audience, especially active members of sharing communities. We will establish a webpage that we will use throughout the process to advertise and collect information, a tentative reader on the sharing economy and subsequently publish the position papers and insights from the workshop, with participant consent.

In order to attract practitioners, we will contact organizations involved in designing platforms with whom we already interacted in the framework of the COST action: E.g. Platform Design Toolkit (Simone Cicero) and Collaboriamo (Elisa Saturno).

Prospective participants are invited to submit short papers (2-4 pages) on their research using the ECSCW Exploratory Paper template. Submitted papers should relate to the research questions outlined in the call. We are especially interested in empirical studies of sharing economy platforms and their socio-technical implications. Both reports of research in progress and completed studies will be accepted. We are also inviting practitioners to submit experience reports about existing technologies.

The workshop organisers will select the position papers based primarily on their ability to generate fruitful discussion of important issues and also to provide examples of practice related, high quality case studies. At least one author of each accepted paper must attend the workshop. The accepted papers will be made available to the participants in advance and discussants will be assigned to each paper.

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