

CITIZENS' USE OF COLLABORATIVE MEDIA IN SOCIETAL CRISES

*Navigating chronic and
geographically distant
uncertainty*

Mari Karhu

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**CITIZENS' USE OF COLLABORATIVE MEDIA
IN SOCIETAL CRISES –**

navigating chronic and geographically distant uncertainty

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Abstract

Mari Karhu

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As the first half of the 2020s has drastically demonstrated, we are living in an era of a “permanent crisis” in which several societal crises, such as the COVID-19 pandemic and the climate and environmental crises, overlap. In these circumstances, media technologies can play an increasingly important role in creating constructive collaborations among citizens. Through constructive collaborations, this dissertation refers to how citizens foster mutual solidarity and engage in collective problem-solving.

Nevertheless, prior research on citizens' media-enabled crisis collaborations has mainly focused on people directly affected by immediate disasters and acute incidents. This dissertation, in contrast, provides a user-centred understanding of how citizens use collaborative media during societal crises characterised by chronic uncertainty and geographical distance. Specifically, it examines 1) how the platforms used for collaboration relate to a broader hybrid media environment, 2) the socio-technical framework within which collaboration unfolds, and 3) the outcomes that follow from such collaborations.

The research is based on six empirical case studies. The datasets have been collected through semi-structured interviews, online surveys, diary studies, and the experience sampling (ESM) method. In addition, the content produced by participants on collaborative media platforms, including posts and comments, has been analysed, utilising thematic analysis as the method. The conducted research draws a picture that connects lines

from the global youth for climate movement, craftivists' more-than-human solidarity collaborations, an open-for-all online hackathon that addressed COVID-19-related challenges, as well as the massive experiment that turned homes into offices and classrooms during the restrictions that aimed to curb COVID-19.

Based on the empirical case studies, this dissertation suggests that mediated crisis awareness and a sense of crisis may further channel into citizens' collaboration – in which circulating emotions and affects play a key role. Collaborative media functions as a socio-technical shaker, enabling crisis collaborations in a constant mix of human-human and human-computer interaction. Socio-technical shaker is a metaphor for the fluid interplay of social interactions and technological circumstances, where configurations emerge case by case, shaped by situational conditions. Regardless of how the use of collaborative media in societal crises is organised and managed, it emphasises a coincidence of human encounters as collaboration evolves on the fly without prior agreements. In collaborative media-based projects: 1) people gather around loosely defined shared goals in the intrinsically volunteer / externally imposed use of collaborative media, 2) leadership emerges within the group, establishing a structure that interweaves real-life and virtual networks, 3) participants make spontaneous contributions according to their interests, knowledge, and skills, 4) non-monetary contributions are preferred, with participants immaterially rewarded, 5) trust is essential in the shaping boundaries of collaborative efforts, and 6) the use of collaborative media has accompanying effects on offline spaces and face-to-face relationships.

From a technological viewpoint, citizens' use of collaborative media in societal crises is a sum of technological compromises and entails constant balancing between technology-related advantages and challenges. In societal crisis situations, existing platforms and tools are rapidly appropriated, as their reach, familiarity, ease of use, and real-time communication are valued. Consequently, the appropriated platforms and tools are a mismatch with operations, leading to divided application usage, a lack of transparency, information overload, and disorder. Together, these prop-

erties shed light on how collaboration does not follow “naturally” from the technologies, but rather stems from the interplay between social and technological factors. After all, the activities in the socio-technical shaker grow into use purposes, including collaborative crisis intelligence, collaborative crisis action, and collaborative crisis adaptation. Together, the use purposes describe new opportunities and hope in the spirit of a certain kind of techno-optimism.

The key contributions of this research are twofold. First, the dissertation provides a rich empirical understanding on citizens’ use of collaborative media in societal crises characterised by chronic uncertainty and geographical distance. Secondly, the empirical research findings fuse together in a conceptual framework as a theoretical research contribution. In the core of the framework is the concept of collaborative media. Applying the framework illuminates the role of collaborative media in the mediated crisis sphere, increases our understanding of the organisation and maintenance of collaborative activities through seizing the opportunities and tackling the constraints of the collaborative media platforms, and clarifies the use purposes of collaborative media as a part of versatile crisis settings. The results are useful for various societal actors – including sectors from business actors to public governance, associations, and self-initiated civil activities – who are willing to combat societal crises and build sustainable futures and welfare in cross-border collaborations.

Keywords: citizens, collaboration, collaborative media, COVID-19, crises, crisis informatics, social media, user study

Tiivistelmä

Mari Karhu

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Kuten 2020-luvun ensimmäinen puolikas on dramaattisesti osoittanut, elämme pysyvän kriisin aikaa. Pällekkäiset yhteiskunnalliset kriisit – kuten COVID-19-pandemia ja ilmasto- ja ympäristökriisit – luovat olosuhteet, joissa mediateknologioiden mahdollistamalla kansalaisten rakentavalla yhteistyöllä voi olla yhä tärkeämpi rooli. Rakentavalla yhteistyöllä tämä väitöskirja viittaa esimerkiksi keskinäisen solidaarisuuden edistämiseen ja yhteiseen ongelmanratkaisuun.

Aiempi tutkimus on kuitenkin keskittynyt ihmisten mediateknologiavälitteiseen toimintaan erityisesti välittömissä kriisitilanteissa kuten äkillisissä luonnonkatastrofeissa tai terrori-iskuissa. Usein tarkastelun kohteena ovat olleet he, joita kriisit suoranaisesti koskevat. Tämä väitöskirja puolestaan tarjoaa käyttäjälähtöistä ymmärrystä siitä, miten kansalaiset käyttävät kollaboratiivista mediaa yhteiskunnallisissa kriiseissä, joita luonnehtivat krooninen epävarmuus ja maantieteellinen etäisyys. Erityisesti väitöskirja tarkastelee 1) kuinka kollaboratiiviset mediat suhteutuvat laajempaan hybridimediaympäristöön, 2) yhteistyön sosioteknisiä puitteita sekä 3) kollaboratiivisten medioiden yhteiskunnallisissa kriiseissä saamia käyttötarkoituksia.

Tutkimus perustuu kuuteen empiiriseen tapaustutkimukseen, joissa yhdistyvät globaali nuorten ilmastoliike, Australian metsäpalojen eläinuhrien auttaminen käsitöin, COVID-19 verkko-hackathon ja massiivinen ”ihmiskoe”, jossa kodit muuttuivat etätoimistoiksi ja -luokahuoneiksi koronavi-

ruksen leviämisen hillitsemiseksi vain päivän varoitusajalla. Tutkimuksen aineistot on kerätty temaattisten haastattelujen, verkkokyselyjen, päiväkirjojen ja *Experience Sampling* -menetelmän avulla. Lisäksi tutkimuksessa on analysoitu osallistujien kollaboratiivisen median alustoilla tuottamia sisältöjä. Aineistot on analysoitu temaattisella analyysimenetelmällä.

Empiiristen tapaustutkimusten perusteella väitän, että median välittäjä kriisitietoisuus ja kriisitunne voivat kanavoitua tarpeeksi tehdä yhteistyötä – ja kriisisisältöjen synnyttämällä tunteilla on siinä keskeinen rooli. Kollaboratiivinen media toimii sosioteknisenä ”sekoittimena”, joka mahdollistaa kriisiyhteistyön jatkuvassa ihmisten ja teknologioiden välisessä vuorovaikutuksessa. Sosiotekninen sekoitin on metafora sosiaalisen vuorovaikutuksen ja teknologisten puitteiden vaihtelevalla vuorovaikutukselle, jossa kokoonpanot muodostuvat tapauskohtaisesti. Yhteistyön kehittyä lennossa ilman ennakkosopimuksia korostaen ihmisten välisten kohtaamisten sattumanvaraisuutta. Yhteen vedettynä kollaboratiiviseen mediaan perustuvissa projekteissa: 1) ihmiset kokoontuvat löyhästi määriteltyjen yhteisten tavoitteiden ympärille joko vapaaehtoisesti tai ulkoisesti ohjatussa kollaboratiivisen median käytössä, 2) johtajuus syntyy ryhmässä, jossa olemassa olevat ja virtuaaliset verkostot kietoutuvat yhteen, 3) ihmiset osallistuvat spontaanein panostuksin kiinnostuksen kohteidensa, tietojensa ja taitojensa mukaan, 4) rahallisten panosten sijaan suositetaan aineettomia kontribuutioita, ja osallistujat kokevat tulevansa myös aineettomasti palkituiksi, 5) kaikki tämä edellyttää osallistujien välistä luottamusta ja 6) kollaboratiivisen median käyttö vaikuttaa myös fyysisiin tiloihin ja kasvokkain suhteisiin.

Teknologisesta näkökulmasta kollaboratiivisten medioiden käyttö yhteiskunnallisissa kriiseissä on teknologisten kompromissien summa ja edellyttää jatkuvaa tasapainoilua teknologisten etujen ja haasteiden välillä. Yhteiskunnallisissa kriisitilanteissa otetaan käyttöön olemassa olevia alustoja ja työkaluja, joiden hyviä puolia ovat laaja käyttö, tuttuus, helppokäyttöisyys sekä reaaliaikainen viestintä. Seurauksena alustat ja työkalut eivät sovi yksi yhteen projektien tarpeiden kanssa, mikä johtaa hajautuneeseen sovellusten käyttöön, läpinäkyvyyden puutteeseen, tietotulvaan

ja yleiseen epäjärjestykseen. Kaiken kaikkiaan yhteistyö ei seuraa ”luonnollisesti” teknologioista, vaan se muovautuu sosiaalisten ja teknologisten tekijöiden vuorovaikutuksessa. Sosioteknisessä sekoittimessa tapahtuva toiminta muotoutuu kollaboratiivisen media käyttötarkoituksiksi, joita ovat yhteisälykkyyks, yhteistoiminta ja yhteissopeutuminen. Yhdessä käyttötarkoitukset kuvaavat uusia mahdollisuuksia ja toivoa tietynlaisen tekno-optimismin hengessä.

Tämän väitöskirjan keskeisin panos on kaksijakoinen. Ensinnäkin se tarjoaa rikasta empiiristä tietoa siitä, miten kansalaiset käyttävät kollaboratiivista mediaa yhteiskunnallisissa kriiseissä. Toiseksi empiiriset tutkimustulokset sulautuvat yhteen käsitteellisessä viitekehyksessä, joka on tutkimuksen teoreettinen panos. Viitekehysten ytimessä on kollaboratiivisen media käsite. Sovellettuna viitekehys valaisee kollaboratiivisen median rooli osana hybridimediaympäristöä, lisää ymmärrystä yhteistyön organisoinnista ja ylläpitämisestä sekä media-alustojen haasteista ja mahdollisuuksista. Lisäksi tutkimus selventää kollaboratiivisen median käyttötarkoituksia osana yhteiskunnallisia kriisitilanteita. Tulokset ovat hyödyllisiä monille yhteiskunnan toimijoille – yrityksistä julkiseen hallintoon, yhdistyksiin ja vapaaseen kansalaistoimintaan – jotka ovat valmiita taistelemaan yhteiskunnallisia kriisejä vastaan ja rakentamaan kestävää tulevaisuutta ja hyvinvointia rajat ylittävässä yhteistyössä.

Asiasanat: COVID-19, ilmastokriisi, kansalaiset, kollaboratiivinen media, kriisit, käyttäjätutkimus, sosiaalinen media, yhteistyö

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Additional thanks go to all those who participated in the research studies and generously shared their experiences and perspectives. Thank you for every interview, diary entry, and everyday moment captured in images

and words, as well as each of your survey responses. You formed the very foundation of this work and made its realisation possible.

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Although research is driven by passion, passion alone does not sustain it. Therefore, I want to thank my funders. This work received financial support from the Finnish Cultural Foundation's Lapland Regional Fund. I also had the privilege of working as a salaried doctoral researcher at the University of Lapland within the doctoral programme Arctic in a Changing World. In addition, the University of Lapland provided funding that enabled my participation in international conferences abroad. At the University of Lapland, I also want to thank the administrative staff – especially Marjo Majava – for all your help.

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Finally, it is time for my three most personal acknowledgements. Puusti, my more-than-human companion – the puppy who joined the crew just

before the final sprint – thank you for taking me outside multiple times a day and gently forcing an overstressed person to slow down.

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Kaius – the dearest, funniest, most insightful, and wisest person in the world – I dedicate this work to you. You and your generation have spent your entire childhood living with chronic uncertainty, in a time where crises are overlapping and entangled. For you, I choose to hold onto optimism.

Helsinki, 25th January 2026

Mari Karhu

List of original articles

The dissertation is based on the following original articles, which will be referred to in the text by their Roman numerals I–VII. The numbering of the studies follows a “triple lens” frame that guided the case selection (for more detail, see pp. 31–32). The author’s contributions are described after each article.

I Karhu, M., Suoheimo, M., & Häkkinen, J. (2021). People’s perspectives on social media use during COVID-19 pandemic. In *Proceedings of the 20th International Conference on Mobile and Ubiquitous Multimedia* (pp. 123–130). Association for Computing Machinery. <https://doi.org/10.1145/3490632.3490666>

Karhu took the lead in designing the study. She collaborated with her colleagues on data collection and analysis. For the resulting publication, she served as the principal author, contributing significantly to its planning, writing, and preparation for publication.

II Karhu, M., Häkkinen, J., & Timonen, E. (2019). Collaborative media as a platform for community powered ecological sustainability transformations: a case study. In *Proceedings of the 18th International Conference on Mobile and Ubiquitous Multimedia* (pp. 1–5). Association for Computing Machinery. <https://doi.org/10.1145/3365610.3368413>

Karhu was responsible for designing the study and collected the data independently. The analysis was conducted in collaboration with her colleagues. She was the principal author of the publication, contributing substantially to its planning, writing, and preparation for publication.

III Karhu, M., Rantasila, A., Olsson, T., & Häkkinen, J. (2024). Understanding animal-oriented social media collaboration in Australia's 2019-20 bushfire crisis. *Frontiers in Communication*, 9, Article 1440311. <https://doi.org/10.3389/fcomm.2024.1440311>

Karhu led the study design and carried out the data collection independently. The analysis was conducted in collaboration with her colleagues. She was the principal author of the publication, contributing significantly to its planning, writing, and preparation for publication.

IV Karhu, M., Karampela, M., & Häkkinen, J. (2022). Collaborating in a crisis: Perspectives on trust and technological framework in organising a COVID-19 online hackathon. In M. Muhlhauser, C. Reuter, B. Pfleging, T. Kosch, A. Matvienko, K. Gerling, S. Mayer, W. Heuten, T. Döring, F. Müller, & M. Schmitz (Eds.), *Mensch und Computer 2022: Facing Realities, MuC 2022 - Proceedings* (pp. 349–353). Association for Computing Machinery. <https://doi.org/10.1145/3543758.3547538>

Karhu was in charge of the study design and conducted the data collection independently. The data analysis was performed in collaboration with her colleagues. She was the principal author of the publication, contributing notably to its planning, writing, and preparation for publication.

V Häkkinen, J., Karhu, M., Kalving, M., & Colley, A. (2020). Practical family challenges of remote schooling during COVID-19 pandemic in Finland. In *Proceedings of the 11th Nordic Conference on Human-Computer Interaction: Shaping Experiences, Shaping Society* (pp. 1–9). Association for Computing Machinery. <https://doi.org/10.1145/3419249.3420155>

Karhu contributed to the planning of the study and collaborated with her colleagues on data collection and analysis. As the second author, she had a significant role in both planning and writing the manuscript.

VI Karhu, M., Häkkinen, J., Kalving, M., Mäkiranta, M., & Colley, A. (2024). Renegotiating work-home boundaries: Reconciliations of remote work and school during COVID-19. *Nordic Journal of Working Life Studies*, 14(2), 47–69. <https://doi.org/10.18291/njwls.143181>

Karhu contributed to the planning of the study and collaborated with her colleagues on data collection and analysis. She was the principal author of the publication, contributing significantly to its planning, writing, and preparation for publication.

VII Karhu, M. (2023). The use of collaborative media in societal crises – towards a conceptual framework. In D. De Sainz Molestina, L. Galluzzo, F. Rizzo, & D. Spallazzo (Eds.), *Proceedings of IASDR 2023: Life-changing Design* (pp. 9–13). Design Research Society. <https://doi.org/10.21606/iasdr.2023.857>

Karhu independently conducted the cross-study analysis and was the sole author of the publication.

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Abbreviations

CSCW	computer-supported cooperative work
GIS	Geographic Information Systems
HCI	human-computer interaction
HOT	Humanitarian OpenStreetMap Team
ICT	information and communication technologies
OSM	OpenStreetMap
VGI	Volunteered Geographic Information

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Preface

My academic background is rooted in media studies and audiovisual media cultures within the field of art and design. Since the 1970s, media studies have emphasised the situated and context-bound nature of research. It reflects a broader understanding that knowledge is always produced from a particular position, shaped by historical, cultural, and social contexts. Consequently, scholars have highlighted how factors, such as the researcher's age, gender, personal history, and broader background, inevitably influence the interpretations of media texts. This reflexive turn, influenced by developments in cultural studies and feminist theory, underscores the importance of acknowledging subjectivity in scholarly work (Ang, 1991; Hall, 1980; Haraway, 1988).

Reflecting on my position as a researcher requires attention to multiple layers of situatedness. The questions I ask and the ways I frame my analysis are informed by my personal, social, cultural, and professional background. I recognise that my position is shaped by a degree of privilege: I conduct research in a Nordic welfare state, as a white woman with access to education, healthcare, and democratic freedoms, among others. Furthermore, the ever-present global and national crises have not posed an immediate threat to my survival. This context frames how I perceive and interpret the world.

During the course of my research, I also became a mother. This pivotal life change has deepened my concern for intergenerational responsibility, sharpening my sensitivity to questions about what kind of societies we are leaving behind for future generations, altogether highlighting how emotion also plays a role in research. Frustration and concern – but also care and hope – are part of the affective terrain from which my work emerges. Alongside my academic career, I have worked in a communications consultancy. This dual role informs my approach to media and public discourse, with practical insights into how messages are crafted and circulated. My interpretations are therefore not only academically motivated but also

grounded in lived experience – as a citizen, a parent, and a communications professional. This multi-layered positionality ultimately shapes how I engage with media studies and other fields of research.

The selected theoretical framework of this research is socio-technical. In terms of the underlying research interest in collaborative media, the boundaries between research fields remain unclear, though researchers move in the intersections of media studies, human-computer interaction (HCI), as well as computer-supported cooperative work (CSCW) oriented crisis informatics. So does this dissertation, which stems from an inquiry into the interdisciplinary dimensions of citizens' collaboration in the mediated crisis sphere.

1 Introduction

1.1 Background and motivation

“I was visiting my friend on New Year’s Eve. We had a drink on the balcony and watched the rockets. I thought: 2020. The 20s. Happy 20s: this is going to be a good year. And can you think of a more terrible year than this? The only thing missing from this is a war.”

As lively described by one of my research participants in April 2020, there were people who expected a 21st-century version of the *Happy Twenties*, but little did we know. At the beginning of the decade, it soon became clear that we were living truly exceptional times in the unwanted sense of the word. The cited quote deals with the Australian Black Summer Bushfires that spanned nearly a full year from 2019 into 2020 (Davey & Sarre, 2020) – the most catastrophic bushfire season in the country’s history (WWF Australia, n.d.). During the Black Summer, a severe drought combined with unprecedented heat sparked extensive bushfires that burnt millions of hectares and claimed the lives of more than a billion animals. Countless species were left injured, orphaned, and without shelter (WWF, 2020a; WWF, 2020b). The Black Summer Bushfires demonstrate the accelerating climate and environmental crises that have gained growing – although still insufficient – attention in the public sphere.

However, the Black Summer Bushfires were not the only crisis the cited interviewee referred to, as the interview took place amidst the first wave of the global COVID-19 pandemic in April 2020. During the pandemic, we grew accustomed to hiding behind our face masks to flatten the COVID-19 epidemic curve, whose rise would be reflected in the burden of medical care and deaths. Just as the light came into view at the end of

the COVID-19 tunnel, the prediction of a war came true as other types of “masks have been taken off, and only the cold face of the war is visible”. These words, which are likely to remain in the history books, were said by former Finnish president Sauli Niinistö on 24 February 2022, when Russia launched its full-scale offensive in Ukraine – in Europe, in the 2020s. About a month later, the intergovernmental panel on climate change (IPCC) released its sixth assessment report. The feeds, already overflowing with catastrophe news, drowned out their underlined message about the urgency to combat the climate disaster. Our capacity was truly being tested.

This doctoral dissertation – conducted in the field of art and design – digs into phenomena emerging from citizens’ use of collaborative media in societal crises that pose chronic uncertainty and geographically distant uncertainty. It spans an era of a “permanent crisis” in which several crises overlap with ongoing disruption. My doctoral research path originally began in 2015, with an aim of researching how solutions promoting ecological sustainability are co-created in collaborative media. By the turn of the 2020s, the focus of the research shifted – partly due to the outbreak of the COVID-19 pandemic – and expanded to encompass societal crises in a broader scope.

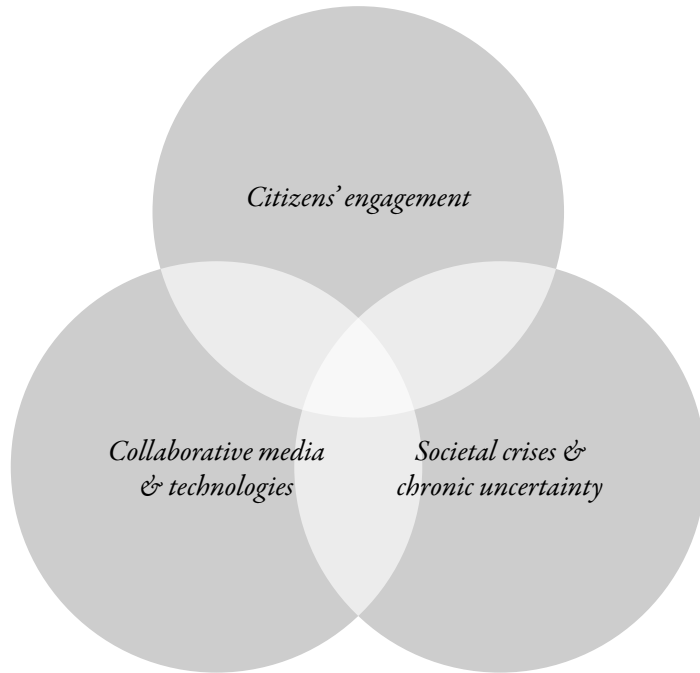


Figure 1. Citizens' use of collaborative media in societal crises characterised by chronic uncertainty and geographical distance: the intersecting domains.

Conceptually, I understand a societal crisis as an adversity that imposes a threat to life, well-being, or other significantly held values (Leidner et al., 2009). There are different types of crises – with different characteristics. Nonetheless, they all feature not only a threat but also uncertainty and urgency (Boin et al., 2018). The long-considered societal crises pertaining to issues, such as poverty and safety, have become accompanied by new threads which crosscut and affect the whole society – even on a larger scale. The discussion on societal crises no longer addresses topics that may be vague or distant to many. Their impacts have been recognised to touch every citizen's life, as demonstrated by the COVID-19 pandemic. It is also evident that society has been filled with a new kind of crisis talk. Still, our choice of words shapes reality and guides thinking. Because of

this, I have chosen to speak about climate and environmental *crises* instead of *change*, highlighting the alarming state of Earth. As Boin et al. (2018, p. 24) suggest, “speaking of a crisis is in an odd way deeply optimistic: it suggests that the threat in question may still be averted if people, communities, institutions, leaders or systems rise to the challenge.”

Luckily, we have various coping strategies, including a need to act for many. In the early days of COVID-19, people stockpiled commodities – such as hoarded toilet paper – in response to perceived threats (Garbe et al., 2020) and as a way of tolerating distress and uncertainty (David et al., 2021). That said, the need to act can also be seen elsewhere than on temporarily emptied store shelves. *People turn to each other*. This indicates how pressing problems “transcend the unaided individual human mind” and require participatory cultures capable of addressing these issues of such magnitude and systemic nature through the active engagement of people from diverse backgrounds in personally meaningful problems (Fischer, 2011b). These kinds of statements reflect how our time is marked by the ideals and dreams of *doing together* (Kuusela, 2020), the necessity of which seems to be emphasised by shared crisis situations. Together, we will find solutions to complex crises and ways to organise everyday lives in circumstances where the only certain thing is uncertainty. This togetherness does not only rely on face-to-face interaction, but also collaborative media – “a form of mediated communication whereby people collaborate on messages, content, and meaning” (Löwgren & Reimer, 2013a, p. 8) – an increasingly important platform for large-scale human collaboration. It pertains to how crises can amplify the use of information and communications technologies (ICTs) as people re-orientate towards community during exceptional times (Shklovski et al., 2008).

Overview of the research landscape

The key background is in how new media (Bolter & Grusin, 1999; Lister et al., 2009; Manovich, 2001) technologies, platforms, and tools have contributed to the shaping of not only participation (Castells, 1996; Jenkins,

2009; Fischer, 2011a & 2011b) but also collaboration (Löwgren & Reimer, 2013a). In the context of societal crises, global and ubiquitous information and communications technologies – including social media platforms, location-aware mobile devices, and open-source software – have tremendously affected how citizens can respond to crises with increased visibility, reach, and rapidity (Palen & Liu, 2007). For instance, issues concerning the use of social media in crisis situations have raised intense scholarly interest (Alexander, 2014) across various fields. Touching on the combinations of technologies and crises, it has been regarded that citizens' activities in crises are "an emerging form of societal-scale computer-supported cooperative activity that extends and challenges our knowledge of computer-mediated interaction" (Palen & Liu, 2007, p. 727). This research gap has expedited research encounters that are often positioned in the intersections of crisis informatics (Palen & Anderson, 2016) and computer-supported cooperative work (CSCW) (Bannon & Schmidt, 1989).

As social media enables communication and collaboration among people, it is used both in everyday life and during crises – which has gained increasing interest among researchers since 2006 (Reuter et al., 2018). It is clear that in times of crisis, individuals increasingly rely on social media to seek and share information, which circulates rapidly and dynamically across online networks (Albris, 2018), amplifying its reach. This phenomenon poses questions about knowledge creation during societal crises, i.e. how time-critical, accurate, and relevant situational information is created and disseminated. Consequently, there is a vast amount of research about collective knowledge creation and sense-making during societal crises (e.g. Hughes & Palen, 2009; Palen & Liu, 2007; Starbird & Palen, 2011; Takahashi et al., 2015; Yates & Paquette, 2011). In addition, researchers have focused on how social media and digital communication services enable citizens to self-organise (e.g. Albris, 2018; Kaufhold & Reuter, 2016; Starbird & Palen, 2011; Takahashi et al., 2015), form emergent groups (e.g. Auferbauer & Tellioğlu, 2019; Starbird & Palen, 2011; Twigg & Mosel, 2017), and volunteer digitally (e.g. Cobb et al., 2014; Reuter et al., 2013; Starbird & Palen, 2013) in crises.

Regarding how social media community services are often utilised as platforms for collaborative efforts in crises, it is also central to extend the gaze from the intersections of crisis informatics and CSCW and pay attention to the research on wider (collaborative) media cultures. In this framework, it is useful to examine the research that pays attention to the role of media in constructing crises (Chouliaraki, 2006; Patrona, 2018); social media as a tool for organising various forms of individual and collective actions (Enjolras et al., 2013; Lim, 2012; Tufekci & Wilson, 2012); self-initiated social movements, protests, and activism in social media (Bennett & Segerberg, 2012; Earl & Kimport, 2011; George & Leidner, 2019; Polletta, 2016); social media in terms of 'media solidarities': i.e. ways in which media conveys and strengthens solidarity through diverse forms of representation and interaction (Nikunen, 2019); as well as the concept of affective publics, highlighting how emotional expressions activate and link groups in the digital era (Papacharissi, 2015).

All in all, the internet – and social media platforms in particular – have become central channels for interaction both individually and societally (Seppänen & Väliverronen, 2024). At the time of writing the summary, the world looks remarkably different from when I first began this research journey. In the 2010s, social media was often viewed through a techno-utopian lens: it was imagined as a space where democratic participation could flourish, amplify marginalised voices, and enable grassroots mobilisation (Castells, 2012; Shirky, 2008; Jenkins et al., 2013). However, recent developments have challenged these assumptions. As Kuusela (2020, pp. 153–154) encapsulates it: the discussion around digital communication has taken a darker turn, and media theories have grown increasingly bleak over the years.

Today, we are witnessing an era where social media platforms increasingly serve opposite functions as these platforms can undermine democratic values (Gillespie, 2018; Persily & Tucker, 2020; Rose-Stockwell, 2023). The shaping of content on these platforms is now largely governed by systems that rely on algorithms and artificial intelligence (Bucher, 2018; Gillespie, 2018; Seppänen & Väliverronen, 2024; van Dijck et al., 2018;

Zuboff, 2019). This development is driven by a handful of dominant platform companies – often referred to as Big Tech – whose business models depend heavily on the collection and monetisation of user data (Couldry & Mejias, 2019; van Dijck et al., 2018; Zuboff, 2019). These companies not only determine which content gains visibility, but also tailor content flows based on user profiles, engagement patterns, and commercial incentives – influencing public discourse in opaque ways (Gillespie, 2018; Pasquale, 2015). Yet, these broader developments in the media landscape inevitably shape the relationships between media platforms and citizens. For instance, strategic information operations (Starbird et al., 2019) – such as the systematic spread of disinformation (Bennett & Livingston, 2018; Broda & Strömbäck, 2024; Chadwick & Stanyer, 2022; Hansson et al., 2021; Kapantai et al., 2021; Weikmann & Lecheler, 2022) and conspiracy theories (Bruns, 2020; Mahl, 2022; Starbird, 2017) – tend to become more pronounced during societal crises. These can involve significant collective and collaborative dimensions, as seen in the anti-vaccine (Johnson et al., 2020; Kata, 2012; Ortiz-Sánchez et al., 2020) and COVID-skeptical (Askanius, 2024; Roy & Gandsman 2023) movements. In sum, while social platforms facilitate the emergence of negative and destructive dynamics, they simultaneously serve as spaces for constructive, solidarity-based collaboration, as illustrated above. These seemingly opposing phenomena can – and do – coexist.

Identifying the research gap

The aforementioned research contributes to our understanding of how new media technologies reshape relationships between people and organisations, increase the capability of harnessing collective intelligence, allow innovative idea exchanges, seek and share skills to solve problems collaboratively, and how they are oriented towards action. Despite the useful perspectives and elements, none of the streams as such grasp the richness of the phenomena. Instead, the research in collaborative technologies and cultures is fragmentary, and the use of collaborative media

in societal crises is a relatively recent development still under analysis. In addition, the media landscape is in constant flux, shaped not only by technological developments but also by shifting political power relations and broader societal dynamics.

Altogether, research is lacking in its coverage of crisis settings that pose chronic uncertainty (about chronic uncertainty, cf. Palen et al., 2020). In general, immediate events, such as extreme weather, evoke stronger responses than abstract and large-scale threats like climate change (Bergquist et al., 2019; Konisky et al., 2016; Ogunbode et al., 2019). Hence, earlier research focusing on the use of social and collaborative media technologies in societal crises has primarily examined immediate incidents, such as earthquakes, climate extremes (e.g. hurricanes and floods), and terrorist attacks. Correspondingly, studies on people and local communities directly impacted by crisis events appear to hold a significant place within the research corpus.

In addition, information about different uses of collaborative media as a part of societal crises is limited, preventing the spectrum of uses from emerging. The preceding research focuses mainly on collective sense-making and increasing situational awareness (Vieweg et al., 2010), as well as lower-threshold microtasks, such as filtering and curating crisis-related data (Starbird & Palen, 2011; Cobb et al., 2014) and mapping crisis-affected areas (Liu, 2014). Also, it often seems that when we discuss collaboration, we are talking about participation/networking/coordination/cooperation. We need to better understand the nature and core of collaboration (Randrup et al., 2016), as well as to find new ways to understand and conceptualise the use of collaborative technologies in crises (Pipek et al., 2014) in socio-technical terms. For grasping the richness of the phenomena, the selected theoretical framework is socio-technical and combines perspectives in crisis informatics, computer-supported cooperative work (CSCW), and collaborative media cultures.

1.2 Research aims and questions

The novelty and contribution of this doctoral dissertation is in its aim to provide a user-centred understanding of how citizens use collaborative media in societal crises characterised by chronic uncertainty and geographical distance. This research deliberately focuses on the constructive uses of collaborative media, along with the aim to generate an understanding of how citizens can, e.g. build solidarity, solve problems, and create the common good in crisis situations. In contrast, while negative and destructive uses – such as the spread of disinformation, vaccine hesitancy, and conspiracy theories – are recognised, their deeper analysis is not the purpose of this research. By concentrating on the constructive dimensions, the research seeks to generate insights that can inform design approaches and strengthen the practices of collective resilience, without attempting to provide a balanced account of all possible uses of collaborative media in crisis contexts.

The overarching research question is as follows:

How do citizens use collaborative media in societal crises characterised by chronic uncertainty and geographical distance?

More specifically, the overarching research question is divided into sub-questions, including:

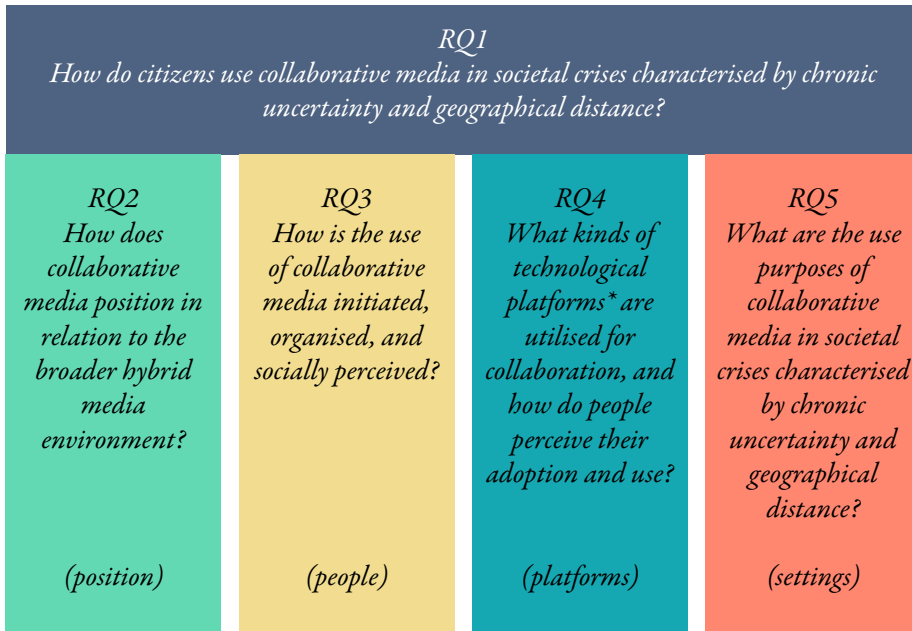


Figure 2. Research questions.

*) By asking, ‘What kinds of technological platforms are utilised for collaboration’, I am exploring whether the platforms are purpose-built technological solutions or appropriated social media services, as well as the types of tools these platforms provide for collaboration. The focus, however, is not on technical dimensions, such as software architectures or security protocols.

1.3 Studies and their objectives

Altogether, the dissertation includes six co-authored studies and a resulting conceptual framework, all of which have been published in international peer-reviewed conference proceedings and academic journals between 2019 and 2024. The numbering of the studies follows a “triple lens” frame that guided the case selection. This lens examines collaborative media use in societal crises across three domains: everyday social media interactions (Study I), leisure and volunteer activities (Studies II–IV),

and work and studies (Studies V–VI). Study VII synthesises insights from Studies I–VI, providing a comprehensive, user-centred perspective on collaborative media in diverse crisis settings.

Table 1. Studies included in the dissertation with the corresponding research methods.

<i>STUDY</i>	<i>TOPIC</i>	<i>DATA COLLECTION METHODS</i>
Study I	People’s perspectives on social media use during COVID-19 pandemic	Interviews (n = 29) Online survey (n = 172)
Study II	Collaborative media as a platform for community-powered ecological sustainability transformations	Content analysis of Youth4Climate collaborative media site, 266 ideas and 1406 comments posted on the platform
Study III	Social media collaboration in Australia’s 2019–20 bushfire crisis	Interviews (n = 12)
Study IV	Perspectives on trust and technological framework in organising a COVID-19 online hackathon	Interviews (n = 10)
Study V	Practical family challenges of remote schooling during COVID-19 pandemic in Finland	Interviews (n = 14) Online survey (n = 114)
Study VI	Renegotiating work-home boundaries: reconciliations of remote work and school during COVID-19	Interviews, ESM, diaries (n = 16) An online survey (n = 92)
Study VII	The use of collaborative media in societal crises – towards a conceptual framework	A synthesis of Studies I–VI

Every study contributes to the main research question (RQ1) and sub-question RQ2. The sub-questions RQ3, RQ4, and RQ5 receive varying emphases in the studies, which are specified below. Next, the aims and objectives of these studies are briefly presented.

Study I

Study I explores people's perceptions and usage of social media during the COVID-19 pandemic and how it had changed compared to the pre-pandemic times. While the article highlights several issues that characterise social media use in pandemic times – such as increased social media usage, promoting socially acceptable behaviour patterns, and keeping spirits up during the crisis – it also provides insights into how the general social media use is not collaborative. Such findings further generate a question about the relationship between social media and collaborative media. The study is based on the interviews of 29 people and an online survey of 172 people. **RQ3, RQ4, and RQ5 remarks:** RQ3, RQ4, and RQ5 are excluded from the study.

Study II

Study II explores a case in which people searched for solutions to the climate crisis through collaborative media by posting ideas, commenting, and voting on others' ideas. The aim of the study is to identify the foci or call-to-collaborative actions in the project, the phases of the project, and the roles of these phases. The research interests also lie in the tools the platform provides for collaboration and the content produced by participants. The work contributes to understanding and structuring collaborative media in citizen activism, as it presents a broad toolkit for seeking citizen-led solutions against the climate crisis. The study is based on an analysis of the body comprising 266 ideas and 1406 comments posted on the Youth4Climate collaborative media platform. **RQ3, RQ4, and RQ5 remarks:** Regarding RQ3, attention is given to the project infrastructure

and participants' versatile contributions, and with respect to RQ4, the question about the collaborative media use and adoption experiences is excluded.

Study III

Due to the accelerating environmental crisis, weather extremes, such as heatwaves, droughts, bushfires, and floods, have become regular occurrences. During the Australian Black Summer Bushfires, which lasted nearly a year from 2019 to 2020, an ongoing drought and record-breaking heat resulted in bushfires that burnt millions of hectares of land and killed more than one billion animals. Study III aims to find out why and how people far abroad collaborated in social media to help Australian animals in the bushfire crisis. By doing so, the study sheds light on long-distance crisis collaboration in more-than-human solidarity activities where the recipients of aid are animals. The study is based on 12 in-depth interviews with voluntary helpers. **RQ3, RQ4, and RQ5 remarks:** The study contributes to all research questions.

Study IV

The COVID-19 pandemic challenged the familiar ways of collaborating, both in terms of human interaction and the technological framework. Study IV asks how trust appears in online-only collaboration when it is viewed from both social and technological perspectives. It explores a case in which a team of volunteers gathered to organise a COVID-19 online hackathon with only three days' notice. The organisers' experiences offer a micro-level viewpoint on online collaboration at a time when people had just retreated to their homes, though online collaboration was still new to most people on this scale. The study is based on the analysis of ten in-depth interviews with the hackathon organisers. **RQ3, RQ4, and RQ5 remarks:** The study contributes to all research questions.

Study V

The use of collaborative media in societal crises requires adopting a technological set-up. In Study V, the aim is to investigate parents' viewpoints on different aspects regarding remote schooling arrangements during the early moments of the COVID-19 pandemic. The study especially charts the experiences and challenges related to the intensive adoption and use of information and communication technologies, and how remote schooling affected family dynamics. This study describes the findings from an online survey (n = 114) and an in-depth interview study (n = 14) conducted in Finland during the COVID-19 remote schooling phase. **RQ3, RQ4, and RQ5 remarks:** The study contributes to all research questions.

Study VI

The COVID-19 pandemic and the restrictive measures to curb the virus converged different social spaces into the home. Study VI aims to provide in-depth insights into Finnish parents' experiences in reconciling their own remote work and children's remote school happening simultaneously at home during the first COVID-19 spring in 2020. The study describes how the intensive adoption and use of collaborative media technologies cause a radical transformation of everyday life. The dataset comprises an online survey (n = 92) and interviews, online diaries, and sampled experiences from 16 Finnish remotely working parents. **RQ3, RQ4, and RQ5 remarks:** The study contributes to all research questions.

Study VII

Study VII fuses together the findings from Studies I–VI and suggests a conceptual framework for citizens' use of collaborative media in societal crises. The suggested conceptual framework sheds light on the role of collaborative media in a broader hybrid media environment, increases our understanding about organising and maintaining collaborative activities

through seizing the opportunities and tackling the constraints of collaborative media, and clarifies collaborative media use purposes in crisis settings. **RQ3, RQ4, and RQ5 remarks:** The study contributes to all research questions.

RQ1 How do citizens use collaborative media in societal crises characterised by chronic uncertainty and geographical distance?			
Studies I–VII			
RQ2	RQ3	RQ4	RQ5
Studies I–VII	Studies II–VII	Studies II–VII	Studies II–VII

Figure 3. Research questions with the corresponding studies.

Together, the studies comprise a rich dataset including:

- 81 interviews
- 378 online survey responses
- diaries and sampled experiences from 16 people – including, e.g. 89 photos and 243 emojis
- 266 ideas and 1406 related comments to tackle the climate crisis

The research maps out connections between the global youth climate movement, craftivists’ more-than-human solidarity collaborations, an open-for-all online hackathon addressing COVID-19 challenges, and the large-scale experiment that turned homes into offices and classrooms during the pandemic restrictions. These are only indicative examples of collaborative activities that seek forms in the technological sphere in times of societal crises. Nevertheless, the research provides a rich understanding of how to increase large-scale technology-enabled human collaboration

to resolve and adapt to shared crises, ensuring that people have the will and ability to be involved. It builds knowledge about how that collaboration is supported by both people and technology.

1.4 Structure of the dissertation

The dissertation is structured as follows. In the preface, I position myself as a researcher. Section 1 describes the background and motivation for the study, presents the research questions and aim, and briefly introduces the individual studies and their objectives. Section 2 outlines the conceptual foundations and reviews the prior research on the topic. Section 3 introduces the research paradigm, methodological choices, and ethical considerations. Section 4 presents the findings, after which Section 5 synthesises and discusses the main empirical results. Finally, Section 6 concludes the dissertation and summarises its limitations and suggestions for future research.

2 Literature review

This chapter synthesises prior research by first defining societal crises and positioning citizens as crisis actors. It then introduces the interdisciplinary field of crisis informatics and explains why the concept of collaborative media is adopted in this thesis. Building on this, the chapter examines the platform landscape in crises, distinguishing between social media and purpose-built technologies. Next, it outlines the sociotechnical foundations of collaboration – its definition, key motivations, roles, structures, and technological challenges. Finally, the chapter reviews the established outcomes of citizen-driven crisis collaboration.

2.1 Societal crises as urgent threats and sources of uncertainty

Societal crisis is one of the key concepts utilised in this thesis as it provides the overall context for the research. In broad terms, a societal crisis is an adversity that imposes a threat to life, well-being, or other significantly held values (Leidner et al., 2009). There are different types of crises – varying in, e.g. their cause, duration, and expansion – although they all feature a threat, as well as uncertainty and urgency (Boin et al., 2018). Aside from crisis, other relevant concepts, such as ‘disaster’, ‘emergency’, ‘extreme event’, and ‘hazard’, are occasionally used synonymously to describe these situations (Boin, 2005b; Hiltz et al., 2011; Quarantelli et al., 2018). On the other hand, Boin et al. (2018) emphasise that ‘crisis’ and ‘disaster’ typically refer to different kind of situations, the concepts of which have notable distinctions. Disasters are *episodic events* that cause human suffering and infrastructural damage (such as floods, hurricanes, terrorism, technological failure), whereas crises are *threats* perceived to be existential in one way or another (Boin et al., 2018).

Crises may consider a person, group, organisation, culture, society, and the world at large (Boin, 2005b). What makes a crisis ‘societal’ is a “serious

threat to the basic structures or the fundamental values and norms of a system, which under time pressure and highly uncertain circumstances necessitate making vital decisions” (Rosenthal et al., 1989, p. 10). On the other hand, crises have a subjective nature as a construed threat: it is not clear when policy makers experience a situation in terms of a crisis (Boin, 2005a). Instead, crises can be linked to strong conflicts of values and differences of opinion, as demonstrated by how a critical mass of people is skeptical that climate change is real (Hornsey et al., 2016) and how the global efforts to mitigate the risks of climate change remain stunted (Mildenberger & Tingley, 2019). Though crises are highly uncertain circumstances that necessitate *making vital decisions*, the decisions may be lacking due to the subjective nature of how threats are perceived.

Societal crises have occurred throughout the history (Quarantelli et al., 2018). Nevertheless, they are becoming more complex, common (Coleman, 2006; Eshghi & Larson, 2008; Pantti et al., 2012) and transboundary (Ansell et al., 2010; Quarantelli et al., 2018) occurrences that should be viewed, rather than events, as processes socially constructed and experienced differently by different people (Oliver-Smith, 2002). Crises are increasingly embedded in the contemporary media environment (Cottle, 2014), highlighting their nature as processual phenomena that generate multiple interpretations (Oliver-Smith, 2002). Overall, ICTs have changed people’s sense of connection to distant places and allowed people to respond directly to crises and disasters (Zook et al., 2010).

Prior research (Drabek & McEntire, 2003) has recognised a need for studies that span a wide range of crises, disasters, and emergencies. More recently, Palen & Hughes (2018) worry that the several meanings of “crisis” and “emergency” may flatten when all kinds of crises and emergencies are reported side-by-side in the burgeoning social media research on mass emergencies. They suggest the distinction between the endogeneity (e.g. bombings and other criminal events) and exogeneity (e.g. hurricanes and other natural hazards) of hazards for tackling the issue heralded as *the social media and crisis confound*, resembling the prior distinctions between human-induced, natural, and technological hazards (Olteanu et al., 2015;

Perry, 2007). Furthermore, the findings by Simsa et al. (2019) show that the environment of spontaneous volunteering in the European 2015 refugee crisis (categorised as a social crisis by Simsa et al.) differed from that in natural disaster situations. However, crises are intertwined by nature, as exemplified by how the climate crisis accelerated by human activity causes natural disasters.

2.2 Citizens as crisis actors

It is essential to define whose perspective is considered when examining crises, as mitigating, preparing, responding, and recovering in societal crisis contexts (Hiltz et al., 2011; Mileti et al., 1975) require collaboration between several different actors. In my research, I adopt a bottom-up lens and focus on collaboration among citizens. Although the involvement of citizens in crises is not a new phenomenon (Simon et al., 2015), information and communication technologies (ICTs) enable them to participate in new ways (Meier, 2015) – broadening the scope of their participation and increasing the visibility of their role (Palen et al., 2010).

Meier (2015) has coined the concept ‘digital humanitarians’ to refer to the global networks of volunteers who assist emergency responders during crises. To provide context, it is useful to look at the relationships between different crisis actors. Crisis response communities have been categorised according to their formal status (Purohit et al., 2014b), and researcher have differentiated between response organisations and citizens as crisis actors (Latonero & Shklovski, 2010; Schmidt et al., 2018). According to the taxonomy by Reuter & Kaufhold (2018), communication among citizens (self-coordination and help, emergent groups, (digital) volunteers), communication from authorities to citizens (crisis communication), communication from citizens to authorities (big data or social media analysis, crowdsourcing and crowd tasking), and communication among authorities (inter-organisational social networks) comprise the information flows of social media in emergencies. This matrix provides an understanding of the

broader picture in differentiating between citizens and authorities as actors in crises.

As acknowledged from prior research, social media and digital communication services enable citizens to self-organise (Jurgens & Helsloot, 2018; Kaufhold & Reuter, 2016; Starbird & Palen, 2011) and form emergent groups without a pre-existing structure (Auferbauer & Tellioğlu, 2019; Starbird & Palen, 2011; Twigg & Mosel, 2017) in crises. The citizens who act outside formal structures during crisis events in an impulsive and unplanned manner have been referred to with terms like spontaneous volunteers (Auferbauer & Tellioğlu, 2019; Ludwig et al., 2017; Starbird & Palen, 2011) and informal volunteers (Trautwein et al., 2020; Whittaker et al., 2015). In particular, prior research has paid attention to volunteers directly affected by the crisis events (Haworth et al., 2016; Kaufhold & Reuter, 2016; Semaan & Mark, 2012) that necessitate relief efforts, as well as coordinating help among local initiatives (Haesler et al., 2021).

Meanwhile, research encounters have identified how digital / virtual volunteers (Cobb et al., 2014; Hellmann et al., 2016; Reuter et al., 2013; Starbird & Palen, 2011; Whittaker et al., 2015) participate in crisis relief efforts without being physically present in an area affected by a natural disaster. Digital volunteers are unaffected individuals who assist in crisis response efforts through social media and other online tools. Often, they mobilise through an open call for volunteering (Howe, 2009), including participants from both crisis-affected and non-affected countries (cf. Brabham, 2013). While emergent groups/organisations have no pre-existing structure (Dynes, 1970; Stallings & Quarantelli, 1985), individuals come together, connect and begin to coordinate their efforts to pursue collective goals. Stallings & Quarantelli (1985) note that emergent groups are not necessarily comprised of only private citizens, as they may also include a mix of people from public and private sectors. Additionally, Park & Johnston (2017, p. 1309) argue that knowledge about digital volunteer networks is fragmented and siloed in various disciplinary literatures and end up defining them as “a volunteer-based, decentralized group formed by concerned publics across the globe who collaborate with one another

to address disasters and crises in a collective and innovative manner using information, communication, and computational technologies”.

In many cases, digital volunteers deal with information-focused tasks that can be done remotely as they monitor, filter, and map crisis-related social media data (Starbird & Palen, 2011; Palen et al., 2015), curating it into usable resources (Cobb et al., 2014). Batard et al. (2019) divide digital volunteers depending on whether they focus on information or action, and identify four types of focus: organising information, sharing information, managing action, and doing action. Though these digital volunteers are often organised in loose networks – with a relatively short lifecycle (Park & Johnston, 2017) – research has also paid attention to how they may develop into more formal organisations (Starbird & Palen, 2013).

2.3 Information and communication technologies in societal crises

The interdisciplinary field of crisis informatics

It is evident that we need technologies to extend our capabilities to cope with crises. The multidimensional relationships between information and communication technologies (ICTs) and crises have been in scholars’ interests for several years (Palen & Liu, 2007). The research is particularly connected to crisis informatics (Hagar, 2007; Palen et al., 2009) which is a multidisciplinary research field exploring the design, uses, and consequences of ICT (Quarantelli, 2005) – particularly the social media-featured technologies – in crisis situations (Palen et al., 2020).

Crisis informatics has become a critical tool in crisis preparedness, response, and recovery (Soden & Palen, 2018). The field’s interests lie in how people use “personal information and communication technology to respond to disasters in creative ways to cope with uncertainty” (Palen & Anderson, 2016, p. 224), along with an emphasis in empirical studies and the development and deployment of ICT (Palen et al., 2007). The increased use of social media has dramatically improved the potential for collabora-

tive action in societal crises (Pipek et al., 2014). As Palen & Liu (2007, p. 727) state: “Activities by members of the public in disaster situations are an emerging form of societal-scale computer-supported cooperative activity that extends and challenges our knowledge of computer-mediated interaction”. Therefore, crisis information is closely tied to computer-supported cooperative work (CSCW) and human-computer interaction (HCI) (Palen & Anderson, 2016).

CSCW aims to understand the “nature and characteristics of cooperative work with the objective of designing adequate computer-based technologies” (Bannon & Schmidt, 1989, p. 3). As highlighted by Pipek et al. (2014), the increased technology-enabled opportunities for collaboration urge us to find new ways to understand and conceptualise the use of collaborative technologies in crises. This pressing exigency is related to how research in the intersections of crisis informatics and CSCW strive to develop socially and behaviourally informed theories of information and communication technology (Pipek et al., 2014). CSCW is a specialisation for the HCI, which “has always been an arena where different disciplines mix, and where a variety of theoretical approaches and research methods have been used” (Kuutti & Bannon, 2014, p. 3543). The HCI theory often divides the history of the field into four waves, each reflecting the shifts in how humans and computers interact, the focus of research, and the technological environment. The third wave of HCI has extended beyond work settings and well-established communities of practice as technology spread to our homes and everyday life and culture – highlighting the broadened and intermixed use contexts and application types. ‘New elements of human life’ have been included in HCI as the focus has shifted to the cultural, emotional, and experiential aspects of interaction (Bødker, 2006). Overall, the importance of the HCI field has grown with the pervasive integration of ICT into daily life (Löwgren, 2001). The current fourth wave focuses more on the question of what the technology is used for, given the growing attention to broader concerns like the societal role of technology (Bardzell & Bardzell, 2015).

The rationale for using the concept of collaborative media

HCI has been criticised for centring on interaction (Fischer, 2011b) and the absence of media perspective – i.e. considering the computer as a medium through which people communicate with each other (Löwgren & Reimer, 2012; Löwgren and Reimer, 2013b). Though crisis informatics research often focuses on social media-featured technologies (Palen et al., 2020), I believe that combining crisis informatics with the research on collaborative media cultures creates an opportunity to complement and transcend the two approaches. Research in the field of collaborative media explores the intersections between digital technologies, social interaction, and media creation, focusing on how collaboration drives innovation in media practices and redefines the roles of individuals within media ecosystems. Researchers dealing theoretically and conceptually with collaborative media have primarily come from humanities and social sciences, such as media and communications studies or cultural studies. Still, the practice-based approaches to collaborative media are more a mosaic of fragments from different academic communities – like from the field of HCI – than attached to homogeneous academic disciplines (Löwgren & Reimer, 2013a). In this mosaic, it connects to a notion that new media can be described as a meeting point between humanists and engineers (Murray, 2003). These metaphors of ‘mosaic of fragments from different academic communities’ and ‘meeting point between humanists and engineers’ depict how this dissertation is an exploration of the disciplinary boundaries, which are – as said – not fundamentally clear-cut. As Löwgren (2015) argues, an effective way to advance collective knowledge on collaborative media is through transdisciplinary intervention and reflective practice.

During my research path, having collaborative media as the key research concept has almost invariably raised questions: What does it mean? How is it different from other media, especially social media? Why does collaborative media need to be explored as its own concept when we have (more) established ones? The underlying view in choosing to use

the concept of collaborative media in my research is that collaboration is not a key characteristic of news and social media. Regardless of the news media revolution – including, e.g. the changing nature / death of audiences (Livingstone, 2003; Pietilä & Ridell, 2008), a shift towards “produsage” (Bruns & Schmidt, 2011; Scott et al., 2015), a growth of citizen journalism (Aitamurto, 2015; Chernobrov, 2018; Gillmor, 2006; Norris, 2017; Wall, 2019), closer integration of news organisations and social media platforms (Bruns, 2016; Hermida, 2012), the evolving role of the journalist, and transforming journalistic practice (Dailey & Starbird, 2014) – news media still focuses on disseminating the news and analysis to the general public.

In terms of social media, Kaplan and Haenlein (2010) define the concept as “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content” (Kaplan & Haenlein, 2010, p. 61). The authors categorise six types of social media on the basis of their characteristics: collaborative projects (e.g. Wikipedia), blogs, content communities (e.g. YouTube), social networking sites (e.g. Facebook), virtual game worlds (e.g. World of Warcraft), and virtual social worlds (e.g. Second Life). In terms of social network sites, people utilise social media to create connections with other individuals with whom they can share content, discuss, and exchange opinions (Simon et al., 2015). Furthermore, Whiting and Williams (2013) identified ten uses and gratifications for using social media, namely social interaction, information seeking, pass time, entertainment, relaxation, communicatory utility, convenience utility, expression of opinion, information sharing, and surveillance/knowledge about others. Social media is also an intensively used tool for self-expression (Nadkarni & Hofmann, 2012; Reuter et al., 2012), facilitating people’s tendency to present images of their true, actual, or ideal self (Choi & Sung, 2018).

Though social media can be utilised to mobilise people (Enjolras, 2013) to achieve various objectives (Lerman & Ghosh, 2010), general social media use does not take a stance on collaboration on a large extent. This observation is well-aligned with Aichner et al. (2021), who have conducted

a systematic literature review (SLR) with an aim to identify and analyse the most quoted and dominant definitions of social media and alternative terms in the literature published between 1994 and 2019. Overall, none of the presented major definitions of social media and synonymous terms refer to collaboration (Aichner et al., 2021). When social media users' interaction and communications processes refer to collaboration, it is done in relation to the collaborative creation of information and knowledge (cf. Reuter et al., 2012). Still, the openness of social media facilitates the potential of mass-collaboration of individuals and groups (Leadbeater, 2008; Loader & Mercea, 2011).

Since the latter half of the 21st century, an expanding body of research – drawing on diverse disciplines and employing varied theoretical and methodological perspectives – has increasingly focused on the role of social media during crises (Alexander, 2014; Bruns & Burgess 2014; Palen & Hughes, 2018; Reuter & Kaufhold, 2018). Houston et al. (2015) introduces a framework that lists 15 uses of disaster social media, which focus on providing and receiving disaster-related information and/or mental support. When other researchers have coined lists that introduce the ways in which social media is used during crisis events, collaboration is sometimes mentioned as one characteristic of action (cf. Alexander, 2014; Bukar et al., 2022; Jurgens & Helsloot, 2018; Spence et al., 2015). However, collaboration seems to play a minor role in these typologies and describes processes that deal with gathering and disseminating information.

Furthermore, Jonas Löwgren and Bo Reimer (2013a) have argued that the concept of social media does not capture the salient properties of people's everyday media practices that are, to a great extent, collaborative. For this purpose, Löwgren and Reimer (2013a) suggest the concept of collaborative media, referring to forms of mediated communication whereby people *collaborate* on messages, content, and meaning. I have selected collaborative media as a conceptual backrest of this research, since it aims to capture the properties of mediated citizen *collaboration* in societal crises and therefore has collaboration as the core focus.

Collaborative media is a cultural form (Williams, 1974), meaning that it is always historically and contextually specific, shaped both by technological properties and historical, social, and cultural circumstances (Löwgren & Reimer, 2013a). These views resemble the notion of *socio-technical* as the mutual shaping of technology, social structure, and human action (Starbird et al., 2019). Collaborative media focuses – rather than technology – on the kinds of practices made possible by the cultural form (Löwgren & Reimer, 2013a). This view about ‘possible practices’ comes close to a concept of *affordance*, which refers to “the type of action or a characteristic of actions that a technology enables through its design” (Earl & Kimport, 2011, p. 10).

Possible practices also highlight the *media ecological* approach as the study of media as environments (Nyström, 1973; Postman, 1970; Strate, 2004) that include different media and technologies – that in turn specify what we can do and cannot do (McLuhan, 2003; Scolari, 2012). On the other hand, some researchers (e.g. & Azad, 2012; Sumiala et al., 2018) emphasise actors’ motivation and abilities for action rather than properties of the technological environment – concluding affordance as the possibilities of action that materialise in the interplay between the actor and technological boundaries. The notions pertaining to cultural form, socio-technical, and affordance are fruitful for understanding collaborative media as a relative concept. This principle relates to how Löwgren and Reimer (2013a) highlight that they do not define collaborative media as some specific mediums: mediums become collaborative when used collaboratively.

2.4 The platform landscape in societal crises

Appropriating existing social media services

The widespread adoption of mainstream social media platforms has expanded the pool of potential participants in online crisis communication, enabling access to a much larger share of the general population (Bruns & Burgess, 2014). Overall, Reuter et al. (2013) point out the advantages of

existing social media services – such as Facebook and Twitter (currently X) – as they already possess social networks and people have prior experience with the services at the onset of the crisis. Although prior research indicates that crisis events correlate with adopting platforms like Twitter (Hughes & Palen, 2009), most people tend to use technologies they are already familiar with (Simon et al., 2015). In a broader scope, the appropriation (Stevens & Pipek, 2018) of technologies is a central concern in the field of social and collaborative computing (Mark & Semaan, 2008). In practice, the existing social media services have provided a toolbox for citizens' crisis-related use and emergent volunteers (Palen & Liu, 2007; Smith et al., 2018; Starbird, 2011), though these platforms do not always align well with real-world activism (Hirsch, 2011). As summarised by Sophia B. Liu (2014), certain social media platforms are used to coordinate at micro scales, while others are utilised to communicate at macro scales. In sum, the key question concerns how communities fulfil their needs through the adaptation and innovative uses of ICTs (Shklovski et al., 2008).

Regarding the existing social media platforms, it is noteworthy that research on their use in crises tends to be methodologically narrow. Much of the research concentrates on Twitter (Palen & Hughes, 2018; Purohit et al., 2014b; Reuter & Kaufhold, 2018; Simon et al., 2015) – a microblogging platform designed to meet urgent demands for real-time information and situational updates (Valaskivi et al., 2019; Vieweg et al., 2010), as well as exchanging opinions, emotionally coping with a crisis, and coordinating activities (Qu et al., 2011). On the other hand, Twitter's limitations for collaborative use have been recognised (Honey & Herring, 2009).

From the research perspective, Twitter has a tremendous amount of circulating data (Sumiala et al., 2018) that is easy to collect and transfer in different formats. Crawford & Finn (2014) highlight how the crisis-related use of Twitter data raises questions about the ways in which crisis data act as a system of knowledge. Their analysis reveals the challenges and risks related to data collection, analysis, and deployment, highlighting the often-dismissed privacy concerns. Consequently, they argue for the integration of critical data studies into crisis research.

Though Twitter plays a major role in the research corpus, other platforms have been researched as well, including Facebook (Eriksson & Olsson, 2016; Palen et al., 2007), TikTok (Feldkamp, 2021; Khoury et al., 2023), and Wikipedia (Bubendorff & Rizza, 2020; Bubendorff et al. 2021; Ribeiro et al., 2021), to name a few. Though Wikipedia is often categorised as a collaborative project, very little has been studied on the use of Wikipedia during crises (Bubendorff et al., 2021). Bubendorff et al. (2021) compare Twitter and Wikipedia in the construction and dissemination of information veracity on social media during crises. They conclude that each social media platform follows its specific rhythm. Twitter is about the fast spread of information, whereas Wikipedia highlights the progressive construction of information.

Highlighting how the existing research mainly focuses on the use of individual platforms in crises and disasters, Reuter et al. (2015) have designed and implemented a cross-platform social media application to support volunteering citizens in disaster situations. Overall, researchers have visioned and developed their own technological solutions that enhance activities, such as situational information, collaborative sensemaking (cf. Anderson et al., 2016; Blum et al., 2014; Lanfranchi et al., 2014; Ludwig et al., 2017), and innovative and effective strategies for crisis preparedness (Blackler et al., 2024). In addition to these research-driven initiatives, established purpose-built crisis platforms have been created, which will be briefly introduced next to describe the scope of the field.

Purpose-built crisis platforms

In addition to the existing social media services, several purpose-built crisis platforms have influenced the evolution of citizens' collaboration in crises, all of which share a common goal: to transform fragmented volunteer efforts into coordinated, actionable operations. These platforms include, for instance, Humanitarian OpenStreetMap Team (HOT) and the

HOT Tasking Manager, Ushahidi, Safecast, Sahana Disaster Management System, and CrisisCleanup¹.

The Humanitarian OpenStreetMap Team (HOT), Tasking Manager and Ushahidi exemplify crisis mapping platforms. HOT is a global volunteer network that produces open map data to support disaster responses. It operates through the Tasking Manager, which in turn leverages OpenStreetMap (OSM). Both platforms are widely examined in crisis informatics research. Similarly, Ushahidi has been extensively used for disaster responses and humanitarian relief (Crawford & Finn, 2014), such as during the aftermath of earthquakes and COVID-19 recovery efforts. Initially founded in 2008 to monitor and map post-election violence in Kenya, Ushahidi allows people to submit geotagged crisis reports (Liu, 2014) and share and access critical, real-time information (Wachanga, 2012). Meanwhile, Safecast illustrates a different dimension: environmental monitoring. Created in response to the Fukushima nuclear disaster, Safecast enables volunteers to monitor, collect, and openly share environmental radiation data. It highlights how the internet and social media have given people new opportunities to create and share information about nuclear risks (Abe, 2014). Today, Safecast focuses on providing accessible environmental information, primarily gathered by volunteers using Safecast-designed hardware in areas deemed important. This demonstrates how digital science platforms empower individuals to participate in wider scientific activities (Palacin et al., 2020). In contrast, the Sahana Disaster Management System represents a formal open-source information management system. It provides critical functions, such as issuing alerts and warnings to affected communities, thereby enhancing situational awareness. The platform originated in Sri Lanka during the coordination of the response to the 2004 Tsunami. Moreover, CrisisCleanup focuses on volunteer coordination, connecting volunteers with individuals affected by disasters. In practice, CrisisCleanup is used to gather and share information on disaster

1 <https://www.hotosm.org/>; <https://www.ushahidi.com/>; <https://safecast.org/>; <https://sahana-foundation.org/>; <https://crisiscleanup.org/>

survivors' needs with relief organisations (Kapucu et al., 2021), thereby facilitating two-way communication between citizens and authorities.

Taken together, the purpose-built crisis platforms embrace the ideals of open data. They demonstrate how citizens mobilise during societal crises through structured platforms that emphasise communication, co-ordination, cooperation, and collaboration. They are firmly rooted in the traditions of crowdsourcing, crisis mapping, and disaster relief coordination. Their primary aim is to create situational awareness and enhance disaster preparedness, response, and resilience – particularly during the response phase. On the other hand, these platforms are predominantly used in immediate disasters – such as earthquakes – where they operationalise crowdsourcing by aggregating user-generated information and reports into unified maps of affected areas to support relief efforts (Poiani et al., 2016; Soden & Palen, 2014). In essence, they transform small tasks and fragmented inputs into actionable situational awareness that informs crisis relief initiatives, enabling volunteers to work in parallel and complete complex projects efficiently. In terms of the taxonomy by Reuter & Kafhold (2018), these platforms do not operate solely among citizens but also facilitate communication from authorities to citizens, and vice versa. Overall, they are often less well-known and less widely used compared to commercial social media services (Hirsch, 2011).

2.5 Socio-technical determinants of collaboration

Definition of collaboration

As prior research encapsulates, the “current collaboration paradigms are fragmented”, and we need to better understand the essence (Randrup et al., 2016, p. 905) and nature of collaboration (Criado et al., 2020). Often, collaboration is referred to as a self-explanatory concept without further defining how it is understood. Instead, the term collaboration is used broadly to describe a wide variety of behaviours (Roschelle & Teasley, 1995; Shah, 2012). It often seems that when we discuss collaboration, we

are referring to participation. In cultures of participation (Fischer, 2011a & 2011b; Jenkins, 2009), “everyone has the opportunity to be actively involved, make contributions, act as a decision maker, and share her/his creations with others” (Fischer, 2011b, p. 113). On the other hand, collaboration is also frequently confused with terms like coordination and cooperation (Shah, 2012). In hindsight, particularly in the CSCW community, the term ‘cooperative’ is more typically used than collaborative (Collis, 1993).

The origin of the term *collaboration* lies in the Latin word *collāborāre*, which refers to working together. Broadly defined, I understand collaboration as a process in which two or more people combine their efforts and work together (Briggs et al., 2006; Zigurs & Munkvold, 2014) to achieve a group/common goal (Camarinha-Matos & Afsarmanesh, 2008; Mattessich & Johnson, 2018; Randrup et al., 2016; Vreede & Briggs, 2006). However, this definition does not take a stand on the purposes of the collaboration. As stated in the introduction, I deliberately concentrate on the constructive use of collaborative media in this dissertation. These include, for instance, mutual solidarity and support, as well as collective problem-solving. To provide context, deconstructive and negative practices are briefly described in Section 1.1.

It is useful to distinguish collaboration from often-related terms because there certainly are ambiguities in their meanings, and the terms are often interchangeable in use (Camarinha-Matos & Afsarmanesh, 2008; Denise, 1999; Roschelle & Teasley, 1995). Drawing from the work by Denning and Yeholkovsky (2008) and Taylor-Powell et al. (1998), Shah (2012, pp. 12–13) synthesises a model of collaboration with five sets: *communication (information exchange)*, *contribution*, *coordination*, *cooperation*, and *collaboration*.

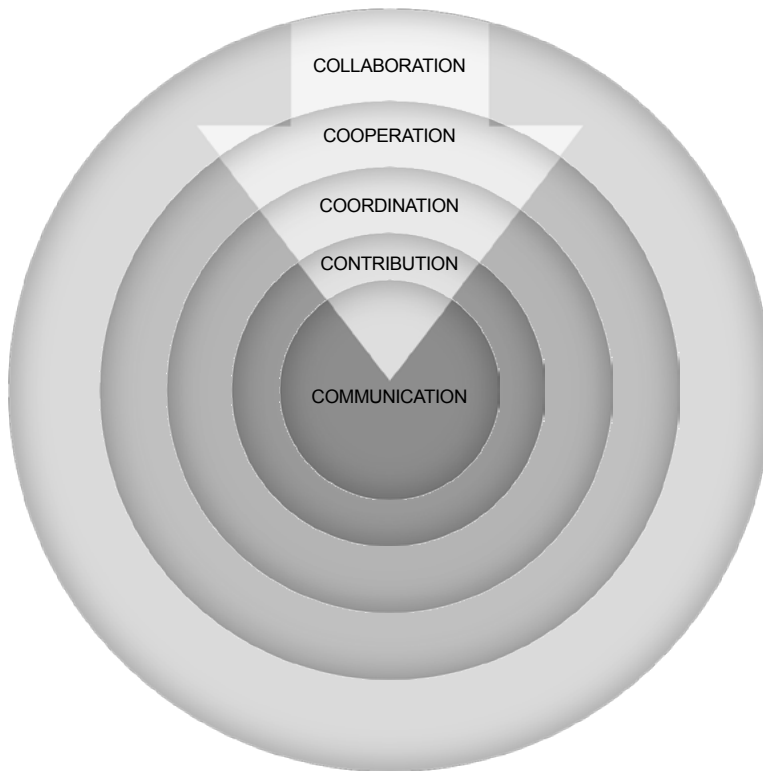


Figure 4. A set-based model of collaboration by Chirag Shah (2012).

In Shah's set-based model of collaboration, an inner set is both essential to and supportive of the outer set. In other words, collaboration requires cooperation, coordination, contribution, and communication. However, none of these four "inner sets" is collaboration as such. In more detail:

1. *communication* refers to sending and exchanging information,
2. *contribution* refers to individuals helping each other in achieving their personal goals,
3. *coordination* refers to connecting different agents for a harmonious action,

4. *cooperation* refers to a relationship in which different agents with similar interests take part in planning activities, negotiating roles, and sharing resources to achieve joint goals, and finally,
5. *collaboration* refers to a process involving various agents that may see different aspects of a problem and engage in a process through which they go beyond their own individual expertise and vision by constructively exploring their differences and searching for common solutions that are more than merely the sum of each party's contribution.

What differentiates collaboration from cooperation is that it involves all parties working together to solve a problem (Shah 2012, pp. 13–14). Shah's set-based model of collaboration shares similarities with Camarinha-Matos & Afsarmanesh (2008), who address networking (communication and information exchange for mutual benefit), coordination (aligning/altering activities to achieve more efficient results), and cooperation (working apart in complementary activities with some information exchange and coordination to achieve compatible goals) as the components of collaboration.

Motivational dimensions

Understanding motivational dimensions in citizens' crisis collaborations is essential, as a lack of motivation often prevents them from contributing to the common good (Rehm et al., 2018). In line with this, prior research has striven to understand why new behaviours appear in crises and disasters (Drabek & McEntire, 2003). One of the key questions concerning initiating and organising citizens' collaboration in crises is indeed related to motivational dimensions. Crisis situations generate altruistic motivations rooted in emotional solidarity, a need to help each other (Wolensky, 1979), and a desire "to "do something" in order to contribute something positive and find something meaningful in the midst of a disaster" (Lowe & Fothergill, 2003, p. 298).

According to Becker et al. (2017), the immediacy and directness of crisis experience strongly shaped people's motivation to respond in active ways. Similarly, researchers have highlighted how volunteers' inherent motivation for participation in crisis responses is catalysed by the proximity of the crisis (Palen & Liu, 2007; Palen & Vieweg, 2008). This may entail personal connections to the crisis area (Starbird & Palen, 2011), such as locations where volunteers formerly lived or where they had loved ones (Cobb et al., 2014). It becomes evident that the proximity of the crisis may also be emotional, i.e. an emotional connection to the people affected by a crisis or a sentimental association with the area of the crisis (Huang et al., 2015).

In times of crisis, social media are used to refocus on community (Shklovski et al., 2008), and online social networks help build resilient communities (Belblidia, 2010; Dufty, 2012). Taken together, a sense of community is perceived to play a significant role in harnessing the wisdom of the crowd and creating collaborative knowledge (Al-Omouh et al., 2021) during crises. Mukkamala & Beck (2017) also ask what role an online social presence – perceiving, sensing, and empathising with others – plays in building relationships, cooperating, and collaborating during disasters and emergencies. They argue that intimacy and immediacy for each other as forms of an online social presence create a sense of responsibility and common identity among social media users, further resulting in participation in grassroots relief efforts (Mukkamala & Beck, 2017).

Though prior research highlights the closeness of the crisis areas in bringing out action, an important question remains: does a sense of community and online social presence emerge in long-distance crises as well? In an era of social media, communities are increasingly defined in social rather than physical terms (Wellman et al., 2002). Nevertheless, people hunger for geographic communities in crises (Procopio & Procopio, 2007) and the physical place grows in importance when there is a threatened situation (Hagar, 2009). Overall, researchers argue that despite early predictions about the 'death of distance', local places continue to matter, strengthened by urbanisation and technologies that enable situated en-

gement and location-based services (Foth et al., 2013). On the other hand, Palen et al. (2020) argue that people who have a close relationship with the disaster region use social media differently when compared to global onlookers. Social media directed at locals by locals tends to focus on issues that are timely, action-oriented, and concentrate on local matters. On the other hand, “globals” tend to share high-level abstract content, including more dramatic photos of suffering and destruction.

Across various contexts, not exclusively crisis-related, researchers have highlighted a need to understand why people participate in social issues using social media (Rotman et al., 2011). Park & Johnston (2017) list values (altruism, empathy, and ethical obligations), enjoyment, learning opportunities, socialising, career-related benefits, and recognition and reputation as factors that tend to motivate individuals to participate in voluntary online activities. In addition, the authors highlight how the emergence and mobilisation of digital volunteer networks can deal with a lack of efficacy of formal response organisations in dealing with disasters and crises (Park & Johnston, 2017).

Structure and roles

Social media supports the formation of ad-hoc social networks (Jurgens & Helsloot, 2018) where anyone interested can participate and contribute openly (Park & Johnston, 2017). People are connected across diverse backgrounds (Park & Johnston, 2017), bringing varied expertise (Callaghan, 2016; Yates & Paquette, 2011) and a range of skills (Alexander, 2014; Jurgens & Helsloot, 2018).

Citizens’ crisis-related initiatives rely on participants’ spontaneous contributions (Alexander, 2014). According to Leong et al. (2015), social media increases connections among people, encouraging broader participation in communities’ crisis-related activities and leading to resource accumulation. This ‘resource empowerment’ enhances the value of the collective resource pool as individuals channel assets (e.g. localised information) onto social media platforms (Leong et al., 2015). In the context of

crisis-related Wikipedia use, prior research has identified how emergent response groups have varied resources, skills, and expertise to contribute (Keegan et al., 2013; Welser et al., 2011), and specific skills are mobilised and rearranged to support making sense of and coping with crisis events (Bubendorff & Rizza, 2020). Further, prior research highlights a distinction between key contributors and micro-contributors (Park & Johnston, 2017).

Overall, prior research has indicated that people can collaborate without a central control mechanism in crises (Shklovski et al., 2008). In contrast, Kaufhold & Reuter (2016) emphasise the moderator as a critical role in social media-based crisis response, noting its underrepresentation in prior research. Also, Keegan et al. (2013) highlight how centralised interaction patterns in promoting greater control and simpler information processing schemas result in the effectiveness of teams operating under conditions of threat and time pressure.

Technology-related issues

Technology-related issues play a critical role in shaping citizens' collaboration in crises, as ICT redefine how social practices unfold across space and time. As explained by Manuel Castells (1996), the shift towards networked-based communications changes the spatial and temporal patterning of social practices. Therefore, operations within space and time are linked to the opportunities and limitations of information and communication technologies. Castells further argues how digital social interaction occurs in "the space of flows", and is shaped by information, people, and artefacts brought together in new ways and under new circumstances. These theoretical perspectives highlight why technology becomes both an enabler and a source of complexity in crises. Overall, "the scope and scale of high-tempo, time- and safety-critical distributed information work has become quite complex" (Norris et al., 2022, p. 1).

Moreover, research consistently points to recurring obstacles. The use of social media in citizen-led crisis activities may pose challenges, such

as unclear prioritisation and communication overload (Smith et al., 2018). Cobb et al. (2014) highlight the need to coordinate and integrate the activities of distributed volunteers, as well as facilitate connections among different tools and tasks. Similarly, Reuter et al. (2015) provide insight into challenges associated with the use of existing social media platforms and tools in volunteer crisis response communities.

These include various issues, such as clarity and representation of relevant content in the inherently chaotic nature of social media use. On the other hand, Herranz et al. (2013) examine volunteer emergency management communities, revealing that these communities do not utilise social technologies to their fullest potential but rather focus exclusively on internal communication and coordination efforts. The authors further conclude that one explanation for this limited use could be the lack of specific tools that adequately meet communities' needs.

2.6 The uses of collaborative media in societal crises

Creating situational awareness

The importance of social capital as “resources embedded in a social structure which are accessed and/or mobilized in purposive actions” (Lin, 1999, p. 35) has been recognised in research pertaining to crises and disasters (Dynes, 2005; Nakagawa & Shaw, 2004). A vast amount of research has focused on knowledge creation during societal crises, i.e. how time-critical, accurate, and relevant situational information is created and disseminated. According to the systematic literature review by Eismann et al. (2016), sharing and obtaining information constitute the primary functions of social media usage across all disasters.

It is clear that in times of crisis, people increasingly rely on social media to obtain and share information in various formats like text, images, videos, and so forth (Alexander, 2014; Hughes & Palen, 2009; Olteanu et al., 2015; Jurgens & Helsloot, 2018; Palen & Liu, 2007; Palen et al., 2009; Reuter & Kaufhold, 2018; Starbird & Palen, 2011; Takahashi et al.,

2015; Yates & Paquette, 2011), that circulate across online social networks quickly (Albris, 2018), improving situational awareness (Stieglitz et al., 2018; Vieweg et al., 2010; Zhang et al., 2019). These massive-scale interactions in which situational information is shared (Gui et al., 2017; Stieglitz et al., 2018) often lead to information overload – i.e. big crisis data (Meier, 2015) – with varying levels of quality. Therefore, researchers have focused on individuals' and authorities' abilities to advance the understanding of the situations (Kaufhold et al., 2020; Mirbabaie et al., 2020; Stieglitz et al., 2018) – i.e. collectively make sense of them (Dailey & Starbird, 2015; Dailey & Starbird, 2016; Kou et al., 2017; Leavitt & Clark, 2014; Oh et al., 2015).

Although the scope of this research concentrates on the constructive uses of collaborative media in crisis times, some central destructive characteristics of current social media dynamics need to be noted. The change in the information sphere combined with crises also creates a fertile environment for 'infodemics' – an emerging challenge that has gained attention, especially during the COVID-19 pandemic. Infodemics refer to an "over-abundance of information' – some accurate and some not" (World Health Organization, 2020). Infodemics is linked to disseminating dis- (Starbird et al., 2019) and misinformation (Eriksson Krutrök & Lindgren, 2022; Zarocostas, 2020), such as false news (Alexander, 2014; Starbird, 2017) and conspiracy theories (Bruns, 2020; Mahl, 2022; Starbird, 2017), both intentionally and unintentionally (Mirbabaie, et al. 2020). These developments demonstrate that social media has been a key platform for efforts to create distrust (Johnson et al., 2022), as well as undermine the integrity of the information space (Starbird et al., 2019) and societal cohesion (Sarts, 2021) in crisis times. Meanwhile, there is also research about initiatives where misinformation is collectively debunked (Flores-Saviaga & Savage, 2021; Hunt et al., 2020).

Crisis crowdsourcing and crisis mapping

Crisis crowdsourcing is “a type of cooperative work emerging from improvised uses of ICT to leverage and manage the convergence of crowds, information, and resources to address emergency management needs” (Liu, 2014, pp. 393–394). Crisis crowdsourcing platforms have become significant in providing information (Kamel Boulos et al., 2011; Dittus et al., 2017), capturing distributed situation awareness (Rogstadius et al., 2013) and allowing crowds to participate in various tasks (Gao et al., 2011) during disaster events. Individuals create and share real-time data through location-based information-sharing technologies, such as smartphones and social media (Goodchild, 2007; Meier, 2012). This volunteered geographic information (VGI) (Goodchild & Glennon, 2010; De Longueville et al., 2010; Haworth et al., 2016; Haworth et al., 2018, Zook et al., 2010) can then be collated and mapped using open-source mapping software – and these activities are described with the term crisis mapping (Meier, 2012). More broadly, crisis mapping exemplifies *neogeography*, where Geographic Information Systems (GIS) are employed by non-experts to support community engagement (Foth et al., 2009).

OpenStreetMap (OSM) as “a volunteer-driven project that makes geo-spatial data free and openly available” (Soden & Palen, 2014, p. 311) is an extensively – often quantitatively (Palen et al., 2015) – researched platform in crisis mapping contexts. For instance, the 2010 Haiti Earthquake was a significant growth moment for OSM (Palen et al., 2015). This phenomenon demonstrates how crises recruit and reactivate contributors in crisis mapping projects (Dittus et al., 2017) and result in the expansion of “new cartographers” and “neogeographic” skillsets and practices (Liu & Palen, 2010). Overall, volunteer mappers can play a significant role in creating more situational awareness and supporting crisis responses in real-time (Meier, 2012). Individuals can make a tangible difference in the work of formal relief and aid agencies without being physically present in the disaster area (Zook et al., 2010). Meanwhile, research has paid attention to assessing the quality of the data mapped by peers in crises (An-

derson et al., 2018; Goodchild & Glennon, 2010), arguing that the risks of volunteered geographic information often outweigh the benefits of its use (Goodchild & Glennon, 2010). In addition to crisis mapping, crowdsourcing is a practice harnessed in collaborative translation for crisis information (Ogie et al., 2022). Nevertheless, crisis crowdsourcing initiatives are a matter of contributing a collective knowledge base in crises.

Citizen coordination in hybrid media environments

Beyond crisis-specific contexts, social media has been examined as a tool for mobilising and coordinating a wide range of individual and collective actions (Enjolras et al., 2013; Hirsch, 2011; Lim, 2012; Tufekci & Wilson, 2012). This capacity for organisation appears to be central to the emergence of new forms of movements (Bennett & Segerberg, 2012; Segerberg & Bennett, 2011; Theocharis, 2013). Such initiatives can scale up (Mundt, 2018) as social media facilitates communication not only within the affected regions but also with the rest of the world (Takahashi, 2015; Valaskivi et al., 2019), effectively bridging local and global spheres (Enjolras et al., 2013).

These dynamics are closely tied to how individuals coordinate and structure their crisis response activities (Albris, 2018; Sarcevic et al., 2012; Starbird & Palen, 2011; Takahashi et al., 2015) and how those in need can be connected with those offering assistance (Albris, 2018; Changyang et al., 2022; Kaufhold & Reuter, 2016; Li et al., 2019; Mukkamala & Beck, 2017; Purohit et al., 2014a, 2014b; Semaan & Mark, 2012; Zhang et al., 2019) through social media. People find community through ICT to actively seek people with similar needs and concerns (Shklovski et al., 2008). Often, people partake in online activities according to their geographical communities (Palen et al., 2020; Shklovski et al., 2008). On the other hand, using the European 'refugee crisis' in the mid 2010s as a contextual setup, prior research (Crepaz, 2022) has paid attention to how social media offers possibilities for collaborations that are quickly scaled from local and regional levels to transnational ones.

Overall, social media plays a significant role in organising volunteers' crisis response efforts. But it does not happen without problems. Additionally, prior research has focused on combining the crisis relief efforts between self-organised volunteers and disaster management authorities (Krüger & Albris, 2021; Ludwig et al., 2017; Purohit et al., 2014b), between virtual and real volunteers (Reuter et al., 2013), and in the convergence and blending of online and offline work (White & Palen, 2015). As such, the global distribution of volunteers sets challenges for collaborations, including socio-temporal coordination challenges of crisis volunteers who are simultaneously distributed across time and space (Norris et al., 2019; Norris et al., 2022). In sum, some studies highlight the “chaotic” use of social media (Kaewkitipong et al., 2012; Kaufhold et al., 2019) and dis-organised nature of volunteers' crisis-related work (Valecha et al., 2013).

2.7 Summary of research gaps

Contextual gap: Underexplored crisis contexts

Prior research on collaborative media in societal crises has largely focused on short-term, geographically bounded events (Tsai et al., 2021), such as natural disasters (Palen et al., 2020). Most studies emphasise immediate crisis response (Alexander, 2014) and resilience, broadly defined as the capacity to recover from extreme events (Blackler et al., 2024). The research corpus is dominated by cases from the USA (Reuter & Kaufhold, 2018), with fewer studies addressing European contexts. These examined crises include earthquakes (Goggins et al., 2012; Mendoza et al., 2010; Qu et al., 2009; Starbird & Palen, 2011), climate extremes like heat waves, wildfires, hurricanes, floods, and tsunamis (Hughes & Palen, 2009; Kongthon et al., 2012; Liu et al., 2008; Smith et al., 2018; Starbird & Palen, 2010; Sutton, 2010; Vieweg et al., 2010), as well as political uprisings, terrorist attacks, and wars (Burnap et al., 2014; Eriksson, 2018; Palen & Liu, 2007; Perng et al., 2013; Mark & Semaan, 2008; Mark et al., 2009; Semaan & Mark, 2011; Starbird & Palen, 2012; Vieweg et al., 2008; Wulf et al., 2013). However,

cross-local and long-lasting crises – often more abstract and characterised by chronic uncertainty – remain underexplored. Chronic uncertainty refers to prolonged hazards that lead to a flux with an uncertain end for all affected (Palen et al., 2020, p. 13). This dissertation addresses this gap by focusing on crises that pose chronic uncertainty and are geographically distant.

Actor gap: Limited focus on informal and distant actors

From the perspective of the actors under consideration, prior research typically focuses on the relationships between digital volunteers and formal crisis management actors (cf. Auferbauer & Tellioğlu, 2019; Hughes & Tapia, 2015; Palen et al., 2020; Reuter et al., 2013). According to Palen et al. (2020, p. 10), “research into digital volunteerism investigates the socio-technical structures and processes of emergent volunteer networks that arise during emergencies to support the formal humanitarian aid system”. When volunteers are studied without a link to formal humanitarian aid, research tends to emphasise people and local communities directly affected by crisis events. Still, there is limited research on purely informal digital volunteering in crises that are abstract and/or geographically distant to participants. In this dissertation, the case studies address crises that do not manifest in participants’ lived experience as a tangible threat. Instead, they examine the climate crisis with its chronic uncertainty, distant natural disasters, and the COVID-19 pandemic as invisible yet serious threats.

Platform gap: Positioning collaborative media in hybrid media system

Section 2.3 provides the rationale for considering collaborative media as a central concept of this research. However, collaborative media must also be positioned in relation to the mediatised crisis sphere to enable further conceptualisation. In terms of the intermedia dimension of media ecology, “no medium has its meaning or existence alone, but only in constant inter-

play with other media” (McLuhan, 2003, p. 43). In other words, different media coexist within the same ecosystem and establish relationships or cooperate with one another (Scolari, 2012). Contemporary societal crises highlight the hybrid character of media. Within the hybrid media system (Chadwick, 2017), meanings are produced through the ongoing circulation of texts and visuals across interconnected practices of professional, journalistic, and social media (Sumiala et al., 2018). Prior research lacks perspectives on how collaboratively used media connects to this broader mediatised crisis sphere – such as news and social media. Building on this gap, crisis-related collaboration occurs through both existing social media platforms and systems specifically designed for crisis contexts. Although this study does not compare these approaches, it focuses on existing platforms and tools. Overall, this dissertation asks how collaborative media is positioned within the broader hybrid media environment (RQ2).

Socio-technical gap: Understanding how collaboration is enabled and constrained

The question of what motivates people to act – and collaborate – in crises is crucial yet complex. Traditionally, individuals have reached out to neighbours and others nearby during emergencies (Dynes & Quarantelli, 1977), but technological frameworks have altered these conditions. Social media is used to refocus on community (Shklovski et al., 2008), and online social presence plays a role in collaboration during crises (Mukkamala & Beck, 2017), among other factors. Although prior research offers perspectives on motivational dimensions in an era shaped by mediated connections, contradictions remain. Among these, one contested issue concerns the role of physical proximity or distance to a crisis.

When people are initially motivated to collaborate, they often form ad-hoc social networks (Jurgens & Helsloot, 2018) that serve as a basis for a “resource pool” (Leong et al., 2015) combining expertise, skills, and spontaneous contributions. However, research presents varying views on how collaboration is organised, as well as participants’ roles in social-me-

dia-based crisis responses. Some studies emphasise the absence of centralised control mechanisms (cf. Shklovski et al., 2008), while others argue for the need for moderators (cf. Kaufhold & Reuter, 2016). The social dimensions of collaboration cannot be studied separately from the technologies that enable them; operations are tied to technological opportunities and limitations (Castells, 1996). Consequently, scholars across disciplines have examined how technology both enables and constrains collaboration in crises.

Yet, research remains fragmented and platform-specific, with a strong focus on Twitter (Palen & Hughes, 2018; Purohit et al., 2014b; Reuter & Kaufhold, 2018; Simon et al., 2015). Socio-technical aspects also intersect with earlier observations: the prior work highlights local communities directly affected by crises and their information-focused or micro-tasking-oriented practices. To conclude, more research is needed on how collaborative media use enables – and conversely, limits – crisis collaboration. Addressing this requires a socio-technical understanding that explores the intersections of citizens, technologies, and crises. This dissertation asks how the use of collaborative media is initiated, organised, and socially perceived (RQ3), and what technological platforms are utilised for collaboration, as well as how people perceive their adoption and use (RQ4).

Use purposes gap: Exploring the spectrum of use purposes

Social media can promote socio-technical innovations in crisis, including citizen reporting, community-oriented computing, collective intelligence, distributed problem solving, and digital volunteerism (Palen & Hughes, 2018). Prior research emphasises how information is gathered and shared via social media and how people collectively make sense of crisis events within online networks (Palen et al., 2010). Still, they are more a question about collective rather than collaborative efforts. Crisis crowdsourcing initiatives highlight “semi-autonomous micro-tasks” (Liu, 2014), the roles of “microtaskers” alongside sensors, social computers, and reporters (Poblet et al., 2018), and “self-organization around well-defined tasks” (Palen et

al., 2009). These lower-threshold microtasks include crisis mapping initiatives, for instance (Alexander, 2014). Palen & Hughes (2018) provide a history of social media activities in relation to crises, identifying major themes, such as collective intelligence and distributed problem-solving, exemplified by safety reporting and compiling lists of victims during the 2007 Virginia Tech shootings (cf. Palen et al., 2009; Vieweg et al., 2008). They also refer to research on how people share and seek information on platforms, such as Twitter and Wikipedia, to make sense of crises, and identify crisis mapping as a demonstration of collective intelligence. Moreover, Jurgens & Helsloot (2018) argue that social media enhances collaborative problem-solving by connecting people across time and space, aligning with the aforementioned examples. Overall, these activities are practical – information-focused and/or micro-tasking-oriented – responses to acute crises. Yet, research offers limited insight into how collaborative media is used in crises marked by chronic uncertainty. This dissertation seeks to fill that gap by exploring the spectrum of use purposes in such contexts (RQ5).

Next, I will present the selected methods, including the research paradigm and research strategy, choice of studies, data collection, and analysis methods, as well as reflections on ethical concerns.

3 Methodology

In this chapter, I introduce the selected methodology that enables the grasping of the user experience, as well as the complexity and richness of phenomena linked to the use of collaborative media among citizens in societal crises characterised by chronic uncertainty and geographical distance.

3.1 Research paradigm and research strategy

Constructivism is the worldview, i.e. the philosophical orientation (Creswell, 2014), behind this research. As a starting point, constructivism is built upon the premise that reality is socially constructed (Searle, 1995) and social phenomena – as processes which cut across the physical, social, and personal (self) worlds (Cupchik, 2001) – are products of individuals' and groups' meaning-making activities (Lincoln et al., 2018). Therefore, these socially constructed realities are always relative to the individuals involved in the particular context (Lincoln & Guba, 2013), and knowledge results from interactions between these two (Orlikowski and Baroudi, 1991; Creswell, 2014). Constructivism enables research participants to tell stories (Crabtree & Miller, 2022) describing their views of reality. Though these stories reflect relative values and interests, the existence of underlying phenomena does not rely on them (Cupchik, 2001).

This constructivist orientation also implies a particular epistemological stance. Knowledge is produced through interpretive processes grounded in context and language. As such, the research is embedded in a knowledge system that values subjective meanings and narratives over objectivist or positivist claims. This is to say, certain kinds of knowledge – such as statistically generalisable truths or causal explanations in the positivist sense – are not the primary aim of this study. Instead, the emphasis lies in understanding meaning-making in situated and contextual terms.

Relying on constructivism as a qualitative research approach (Guba & Lincoln, 1994), this dissertation is based on a qualitative research strategy with a case study as a methodological choice. Qualitative research is suitable for studying and understanding the multilayered nature of settings, processes, relationships, systems, and people (Leedy & Ormond, 2019), as it is often applied as a research strategy when the aim of the research is to explore, describe or explain (Leavy, 2017). The research interest may lay in persons' lives, lived experiences, behaviours, and emotions, and feelings, as well as in social movements and cultural phenomena (Corbin & Strauss, 2014). Moreover, the focus on individuals' experiences and interpretations situates knowledge production within socio-cultural and linguistic frameworks, potentially leaving out the non-discursive aspects of crises. These starting points are closely tied with my research questions, which seek to ascertain how citizens use collaborative media in societal crises by paying attention to people and their mutual relationships, platforms, as well as the overall settings.

Qualitative research often follows an inductive approach in which meaningful and descriptive data is generated (Leavy, 2017). In qualitative research, a rich picture of complex phenomena is constructed by collecting various forms of data and examining them from various angles (Leedy & Ormond, 2019; Muratovski, 2015) with a close-up view (Stake, 2010). By doing so, it culminates in attempts to portray the studied issue in its multifaceted form (Leedy & Ormond, 2019), thereby providing deeper insights into reality. In that regard, it should be noted that constructivism and qualitative research typically focus on the development of theories through an inductive analysis of empirical data. In this research, rich empirical materials are gathered from case studies.

Case study methodology is a form of qualitative research that provides tools for the in-depth research (Leedy & Ormond, 2019) of complex phenomena (Baxter & Jack, 2008) in their real-life contexts (Crowe et al., 2011). As case studies are based on a constructivist paradigm as their philosophical underpinning (Stake, 1995; Yin, 2014), they return to the worldview behind the study. The case study approach has been selected

for its ability to account for real-life contextual complexity and incorporate multiple forms of data. This flexibility supports the multifaceted nature of the research topic and aligns with the constructivist emphasis on situated meaning-making. As suggested by Yin (2014), case studies should be considered when the focus is to answer “how” and “why” questions. Yin also highlights the suitability of case studies when the researcher intends to cover contextual conditions in the belief that they are relevant to the phenomenon under study. As such, these contextual conditions are closely tied to my research, where societal crises define the research in contextual terms. At times, two or more cases are studied to build theories or propose generalisations (Leedy & Ormond, 2019). This doctoral dissertation consists of six studies, along with a conceptual framework that fuses together the findings from the studies.

3.2 Choice of case studies

The case studies have been selected with an “opportunistic” approach, which entails paying attention to phenomena emerging in time – and allowing an emergent access as well. The selected studies deal with climate and environmental crises and the COVID-19 pandemic – all of which are intertwined by nature as climate change also increases the risk of pandemics (e.g., Harvard T.H. Chan, 2024.). Overall, climate and environmental crises, as well as the COVID-19 pandemic, have received a whole new kind of attention in recent years. In that sense, the choice of case studies is also a picture of the times. This temporal context should also be considered when interpreting the results, as some phenomena may have evolved since the time of data collection.

In contrast to prior research that has primarily focused on communities directly affected by immediate disasters and emergencies, the studies represent societal crises marked with chronic and/or geographically distant uncertainty. These crises do not pose a direct, life-threatening immediacy for participants. For instance, the climate crisis, despite its profound implications for the planet and humanity, often feels remote for several

reasons. Temporal distance, indirect impacts, gradual progression, and invisible causes contribute to this perception. The most catastrophic effects of climate change are often framed as future events, while the direct impacts, such as heatwaves, floods, or droughts, may not have yet significantly disrupted the daily lives of many individuals, particularly those in regions less immediately affected. Furthermore, unlike sudden disasters or wars, the climate crisis unfolds slowly over decades, making it harder to perceive as an urgent or imminent threat. This abstraction is heightened by the invisibility of many of its drivers, such as greenhouse gas emissions.

Studies II and III address the climate crisis. Study II grasps the global youth climate movement profiled by Greta Thunberg. It examines the climate crisis as a whole, highlighting how it lacks a direct “life-threatening immediacy” in the lived experiences of participants. Study III entangles with a rapidly and globally expanded animal rescue craft guild. It focuses on a natural disaster occurring on the other side of the world, further emphasising geographical and experiential distance.

Studies I, IV, V, and VI explore the COVID-19 pandemic, a crisis that infiltrated daily life but often remained abstract and invisible in tangible terms. For several participants, the pandemic primarily became part of their lives through widely adopted measures, such as social distancing, and through news coverage. Although the pandemic was a tragedy for many, it often appeared as a distant crisis to the study participants, who were not directly fighting for their lives but rather adapting to restrictions and other disruptions.

Though the climate crisis and COVID-19 pandemic show different characteristics, one of the unifying elements is people’s collaborative online response to these events (cf. Palen et al. 2020). Specifically, this thesis focuses on instances of citizens using collaborative media in constructive ways. This scope has also guided the selection of cases connected to solidarity and collective problem-solving that contribute something positive amidst the crises. Therefore, the cases under consideration are not centred on activities or communities associated with disinformation or conspiracy theories.

The selection of studies is also guided by the aim to view everyday life through a “triple lens” that structured the research of collaborative media use in societal crises. This lens frames the exploration of collaborative media use in societal crises across three life domains:

1. everyday social media interactions (Study I),
2. leisure and volunteer activities (Studies II–IV), and
3. work and studies (Studies V–VI).

Finally, Study VII synthesises the findings from Studies I–VI.

The lens ensures diversity by capturing a rich picture of individual experiences and helps to frame complex phenomena within everyday contexts, thus shaping the research focus areas. Finally, the lens supports the synthesis of insights into a rich understanding. The sequence of articles reflects the logic of the triple lens, which guided the case selection and overall research design.

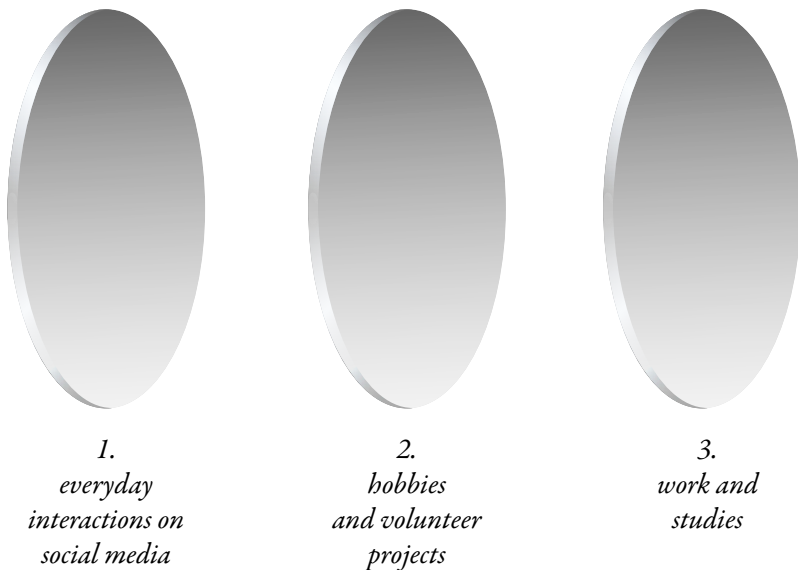


Figure 5. A triple lens guiding the choice of case studies.

The case studies are presented briefly in sub-section 1.3.

3.3 Data collection and analysis methods

The datasets of the studies have been collected using various data collection methods, including interviews, surveys, diary studies, and the experience sampling method (ESM). In addition, the content produced by participants on collaborative media platforms, including posts and comments, have been thematically analysed. The selected methods enable grasping the user experience, as well as the complexity and richness of phenomena linked to the use of collaborative media among citizens in societal crises. The table below – presented already in the introduction – summarises the data collection and analysis methods for each study, after which the methods are described in more detail.

Table 1 (presented already in the introduction). Studies included in the dissertation with the corresponding research methods.

<i>STUDY</i>	<i>TOPIC</i>	<i>DATA COLLECTION METHODS</i>
Study I	People's perspectives on social media use during COVID-19 pandemic	Interviews (n = 29) Online survey (n= 172)
Study II	Collaborative media as a platform for community-powered ecological sustainability transformations	Content analysis of Youth4Climate collaborative media site, 266 ideas and 1406 comments posted on the platform
Study III	Social media collaboration in Australia's 2019–20 bushfire crisis	Interviews (n = 12)
Study IV	Perspectives on trust and technological framework in organising a COVID-19 online hackathon	Interviews (n = 10)
Study V	Practical family challenges of remote schooling during COVID-19 pandemic in Finland	Interviews (n = 14) Online survey (n = 114)
Study VI	Renegotiating work-home boundaries: reconciliations of remote work and school during COVID-19	Interviews, ESM, diaries (n = 16) An online survey (n = 92)
Study VII	The use of collaborative media in societal crises – towards a conceptual framework	A synthesis of Studies I–VI

The chosen methods reflect the epistemological foundations of the dissertation. Semi-structured interviews, diary studies, and thematic analyses are well-suited for capturing individuals' lived experiences, perspectives, and interpretations. These methods also rely on language – both verbal and visual – and therefore highlight the constructivist approach that reality is mediated and constructed through participants' stories that describe their views of reality.

As a researcher, I acknowledge that my own positionality (see the preface) – including my personal background, as well as social and cultural context – may have influenced the way I approached the research settings, planned data collection, and interpreted the datasets. Reflexivity has been practiced through ongoing discussions with co-authors.

Interviews

Interviews are a suitable method for yielding a rich body of qualitative data (Leedy & Ormond, 2019). According to Silverman (1993), interviews are capable of dealing with varying questions about., e.g. people's beliefs and perspectives, feelings, motives, as well as present and past behaviours. For eliciting participants' individual reflections on the use of collaborative media in societal crises, interviews were used as a data collection method in all case studies, excluding case Study II. Altogether, 81 interviews were arranged as a part of the research.

The interviews were organised as semi-structured interviews. A semi-structured interview allows versatility and flexibility (Kallio et al., 2016) by proceeding loosely with a focus on pre-planned themes (Bryman, 2012; Hirsjärvi & Hurme, 2022). The method also enables reciprocity between the interviewer and interviewee (Galletta, 2012) as the interviewer can ask follow-up questions based on the interviewee's responses (Rubin & Rubin, 2011) and space is provided for discussions led by participants, along with their own interpretations and processes of meaning-making. Overall, semi-structured interviews are suitable for the exploration of in-

dividuals' lived experiences and respond to the qualitative analysis' aim to understand complex phenomena (Galletta, 2012).

The interviews were conducted as face-to-face interviews, as well as through virtual meeting platforms (Google Meet, Microsoft Teams, Skype Business) and phone. As an exception, two of the interviews were carried through email due to the participants' personal preferences in Study III. It is crucial to note that most of the data was collected during the spring of 2020 when the physical meeting restrictions caused by the COVID-19 pandemic were in force, which influenced the arrangements of the interviews. In addition, the interviewees were geographically dispersed across Finland. All the interviews were audio-recorded with each interviewee's informed consent and transcribed from the recordings for data analysis.

Diary study and experience sampling method

The diary study and ESM methods are conceptually related to each other (Palen & Salzman, 2002; Gouveia & Karapanos, 2013). They both aim to gather *in situ* data and capture occurring experiences and behaviours in real life settings (Palen & Salzman, 2002; Carter & Mankoff, 2005). In Case Study VI, qualitative data was collected using online diary entries and the experience sampling method (ESM) alongside semi-structured interviews.

In diary studies, participants independently select what and when to report (Gouveia & Karapanos, 2013). In Case Study VI, participants were invited to submit online diary entries over a period of two to three days. These diaries were implemented via Google Forms and included a background questionnaire, along with identical daily diary forms for each study day. Both the ESM and the diary questions focused on participants' experiences in reconciling remote work and remote schooling during the strict COVID-19 restrictions in the spring of 2020.

ESM involves prompting individuals to provide self-reports at random times throughout the day (Larson & Csikszentmihalyi, 2014). Mobile phones are particularly suitable for ESM because of their widespread use (Kang et al., 2022) and the minimal burden they impose on participants

during the data collection (Van Berkel et al., 2017). In Case Study VI, participants received WhatsApp messages from a prepaid research phone number. Each participant was sent seven prompts at varying times across three days. These messages asked participants to respond with photos, emoji symbols, or short explanations, depending on their preference.

Collaborative media-based materials

The advent of the Internet and social media have resulted in studies that utilise data derived from publicly available sites and platforms – such as online discussions (Seale et al., 2010; Hine, 2015). Online-derived data enables exploring everyday practices which are otherwise intractable (Hine, 2015). Methods associated with Internet and social media research are often described in terms of Internet ethnography or netnography, and data can be collected through online observation, for instance (Hine, 2015; Kozinets, 2010; Sumiala & Tikka, 2013).

Typically, a specific group, phenomenon or case is selected as the research object (Sumiala & Tikka, 2013) when the research interests are in the social and cultural practices of online communities (Isomäki et al., 2013) and in the ways individuals and communities use media (Sumiala & Tikka, 2013). Often, copying and saving conversations – such as texts, images, and other messages – from online communities (Kozinets, 2010; Isomäki et al., 2013, Sumiala & Tikka, 2013) plays a central role in data collection. In Case Study II, existing collaborative media-based materials were collected for further analysis. In practice, the posted ideas and related comments were collected manually (see, e.g. Laaksonen & Matikainen, 2013) from the Youth4Climate collaborative media site.

Online surveys

Though the core of this dissertation is in qualitative research, mixed methods (Brewer & Hunter, 2006; Creswell, 2014; Newman & Benz, 1998; Tashakkori & Teddlie, 1998) – the combination of qualitative and quan-

titative approaches (Tashakkori & Creswell, 2007) – are applied in Case Studies I, V, and VI. Case Study I explores people's perspectives on how their perception and usage of social media changed during the COVID-19 pandemic, whereas Case studies V and VI approach remote school and remote work experiences in families. Therefore, COVID-19 is approached as a widely shared contextual setting in these three case studies, allowing for quantitative data collection. In contrast, Case Studies I, III, and IV examine specific collaborative media-based projects with a more limited number of participants. The selected mixed methods approach provide greater breadth and depth in terms of information (Almalki, 2016), since larger sample online surveys were conducted together with limited sample qualitative methods (interviews, diary studies and sampled experiences). Therefore, the survey responses complement the gathered qualitative data, with a wider participant sample providing more quantitative insights.

Thematic analysis

A thematic analysis is useful when one wishes to bring out broader worlds of experience from the research material. It sheds light on different research participants' perspectives on the central topics of the research – highlighting similarities and differences and generating unanticipated insights (Braun & Clarke, 2006). Due to its flexibility, a thematic analysis can be used within most theoretical frameworks (Terry et al., 2017). In this dissertation, a thematic analysis is deployed as an analysis method for identifying, analysing, and interpreting different themes produced from the research data (Braun & Clarke, 2006).

As described above, my research data includes transcribed interviews, online diary entries, sampled experiences (text, photos, emojis), as well as manually collected online discussions and online survey responses. It is worth noting that the techniques applied to the textual analysis are also considered effective for examining visual data (Saldaña, 2015). I have approached the data inductively from “bottom up”, meaning that the contents of the data work as a starting point for the analysis (Terry et al.,

2017). A thematic analysis provides systematic procedures for generating codes that capture interesting features of the data and serve building blocks for themes as “(larger) patterns of meaning, underpinned by a central organizing concept - a shared core idea” (Clarke & Braun, 2017, p. 297). The themes emerge from the data and reveal “something important in relation to the research question and something salient to participants” (Riger & Sigurvinsdottir, 2016, p. 34). Though, in a thematic analysis, the research question is not fixed but can evolve throughout the set of analytical stages (Clarke & Braun, 2017).

Analysing qualitative (interview) data is a stage-by-stage process (Burnard, 1991). A thematic analysis proceeds with familiarising oneself with the data and initially coding (Saldaña, 2015) it, after which one begins searching, reviewing and defining the themes (Braun & Clarke, 2006; Terry et al., 2017). In the studies of this dissertation, the thematic analysis has been conducted by using an affinity wall method for organising the data. Using the affinity wall method, themes are derived by reviewing the detailed datasets line by line, grouping conceptually-related items together, and subsequently organising these groups into broader, higher-level categories. In a thematic analysis, both the coding and theme development are approached organically and the researcher has an active role in these processes (Clarke & Braun, 2017). In this dissertation, the studies have employed a similar process: the co-authors first familiarised themselves with the data and discussed emerging themes. The first author then developed a codebook, which the co-authors reviewed and agreed upon. Subsequently, two researchers independently coded the material thematically using the codebook. Any conflicts in coding were resolved by a third researcher. Overall, a thematic analysis aligns well with the constructivist paradigm of this research, as it emphasises the co-construction of meaning between the researcher and participants. Rather than treating themes as objectively “found” in the data, I acknowledge my active role as a researcher in shaping what was seen as meaningful and salient. This interpretive stance has been supported by co-authors’ collaboration and iterative discussions throughout the coding process.

In summary, the methodological choices in this research reflect constructivism as an underlying worldview and epistemological approach. While constructivism offers depth in understanding participants' experiences, it does not claim to offer comprehensive explanations of the societal crises themselves. Rather, it illuminates how these crises are lived through, talked about, and acted upon by people in mediated contexts.

3.4 Participant recruitment

All studies, except Case Study II, which relied on analysing the existing collaborative media-based materials and Study VII, which fused together the findings from the studies, involved participant recruitment. Participants were identified and recruited through multiple methods:

- **Study I:** Interview participants were recruited through an open invitation by the University of Lapland, shared widely on social media and via onsite posters. The invitation requested participants to make a fabric COVID-19 face mask and simultaneously volunteer for a research study at the University of Lapland. Themes identified in the interviews were later explored through an online survey, distributed via social media and at the university.
- **Study III:** Participant recruitment began by observing the 'Finnish crafters to help Australian animals' Facebook group to identify active members and potential interviewees. These individuals were contacted via private messages, and an open call for interviews was also posted in this Facebook group.
- **Study IV:** Participants were a selected group of organisers affiliated with Hack the Crisis Finland. The main organiser was first contacted via email to confirm willingness to participate in the study. This person agreed to be interviewed and provided contact details of other organisers. A diverse set of organisers was then recruited via email contacts.

- **Study V:** We conducted interviews with parents from different regions of Finland. The interviewees were recruited using a snow-ball sampling approach: initial contacts were established, after which these participants referred other parents, enabling us to reach a broader and more diverse group. The aim was to include parents of children of different ages and with varying work situations (e.g. remote work, working outside the home). Separately, the survey was distributed through email lists and school-related social media forums in Finland.
- **Study VI:** Participants for the qualitative user study (ESM, online diaries, interviews) were recruited through informal networks of colleagues across Finland, complemented by a call for volunteers in Finnish social media forums focused on remote schooling. For the quantitative online survey, distribution occurred via email lists by contacting school personnel nationwide and through posts in domestic social media forums dedicated to remote school topics.

3.5 Ethical considerations

Researching how citizens use collaborative media as part of societal crises raises numerous ethical concerns. At first, the choice of a research topic is an ethical question in itself: as a researcher, I have made the decision that the topic holds something worth investigating. At the same time, I am not separate from the context of the research – issues like the climate crisis and the COVID-19 pandemic, which are tied to the cases under study, inevitably impact my own life as well. To ensure a certain level of distance, I have aimed to select research cases in which I am not directly involved. These include collaborative media projects I did not participate in and settings that are not directly connected to my everyday life (such as combining children's remote school and parents' remote work in pandemic times). Moreover, it is important to acknowledge that my perspective on crises is shaped by my position as a Westerner living in a Nordic welfare state. While crises certainly have an impact here, the effects are, thus far, not

among the most severe. I have had the privilege to conduct my research without facing immediate danger. The research might look entirely different if it had been conducted from the heart of natural disasters. On the other hand, societal crises are a sensitive research context, since individuals may be experiencing heightened – and mental – vulnerability.

The research adhered to the ethical guidelines and norms of the institution where it was conducted, as well as those of the Finnish National Board on Research Integrity (TENK). Some of the key ethical considerations pertain to privacy and consent, as well as data collection and management. The user studies (incl. interviews, surveys, diary studies, and sampled experiences) were based on informed consent, collected after detailing to participants why the research is being done and what it involves (incl. the purpose of the research, study procedure, confidentiality, affiliations). The participants were also informed about voluntary participation and their right to decide to withdraw from the research at any time. The research data has been stored safely, and all studies were carried out anonymously and no personal data was collected. The dynamic nature of the digital landscape, along with growing complexities, such as advanced user capabilities, mobile technologies, and data aggregation, continually generate new ethical dilemmas (Ess, 2020). The collaborative media-based discussions and comments (Article II) have been treated as public information (Kozinets, 2015) due to them being publicly and openly available. In regard to guaranteeing privacy in the case, identifiers, such as participants' profile pictures and names/nicknames, have been anonymised in the data collection.

In addition, research ethics include a question about the choice of the user study participants. The sample of participants was considered in order to obtain truthful, reliable, and thus usable information, which was supported by publishing open participation invitations in relevant collaborative media communities and conducting surveys to complement the data with wider samples. Participant limitations are discussed in more detail in Section 6.2.

The principles of transparency and openness at the heart of research ethics are also emphasised. It is crucial that all the stages of the study and the choices made are clear, documented, and critically evaluated along the way. Moreover, the research results have been peer-reviewed and published in international high-quality research publications.

AI-based tools (ChatGPT, Grammarly, and Microsoft Copilot) were used in a minor role during the finalisation of the dissertation summary to support the linguistic refinement of text written by the author. The final proofreading and language editing were carried out by a professional language editor. The author bears full responsibility for the content of the text and its scholarly accuracy.

4 Findings

In this section, the color-labelled tables show how meta-analysed sub-themes from the articles are grouped and refined into key themes. These key themes are then clustered into broader theme categories, each connected to a corresponding research question (see Table 2).

Table 2. Color streams with the corresponding research questions and theme categories.

OVERARCHING RESEARCH QUESTION: How do citizens use collaborative media in societal crises characterised by chronic uncertainty and geographical distance (RQ1)		
RESEARCH QUESTION	KEY THEMES	THEME CATEGORY
How does collaborative media position in relation to the broader hybrid media environment? (RQ2)	See Tables 3–5	Crisis circulation in hybrid media
How is the use of collaborative media initiated, organised, and socially perceived? (RQ3)	See Tables 6–11	Collaborative media as a <u>socio</u> -technical shaker
What kinds of technological platforms are utilised for collaboration, and how do people perceive their adoption and use? (RQ4)	See Tables 12–16	Collaborative media as a socio- <u>technical</u> shaker
What are the use purposes of collaborative media in societal crises characterised by chronic uncertainty and geographical distance? (RQ5)	See Tables 17–19	The use purposes of collaborative media

4.1 Crisis circulation in hybrid media

In this section, I concentrate on how news and social media as interwoven hybrid media practices create crisis awareness and a sense of crisis that may further channel into collaborative media-based projects. Though the multidirectional linkages between the broader hybrid media environment and collaborative media become evident, the section ends in concluding that collaborative media requires its own conceptualising work for capturing the *collaborative* properties in how people use media during societal crises.

News and social media in creating crisis awareness

The current hybrid media environment highlights the role of “news and social media in creating crisis awareness” (Table 3). Article I explores people’s perceptions and usage of social media during the COVID-19 pandemic, and how it has changed compared to the pre-pandemic times. A central sub-theme from Article I is “an interest to improve crisis-related situational awareness through social media”. As face-to-face meetings were restricted, social media interactions became more important for maintaining contact and improving situational awareness. People increasingly browsed the social media channels of peers, influencers, and authorities to stay updated on COVID-19 information and recommendations. Meanwhile, it has also become evident from the study that social media is a ‘competed information space’ during societal crises, with participants reporting experiences of how they faced polarised information in social media where the opinions expressed were not always unified. Though destructive uses of collaborative media in crisis times do not fall into the scope of this thesis, the article reports how the participants acknowledged a spread of pandemic-related misinformation and conspiracy theories.

Though social media plays a key role in how people seek and share information during societal crises, it is more a question about “the role of hybrid media in creating crisis awareness”, as encapsulated in a sub-theme

from Article III. In Article III, participants describe how they received information about the Australian bushfires from both the news and social media, highlighting the perception that bushfires-related content seemed to originate from every available channel. This widespread flow of information emphasises the hybrid nature of media, referring to how professional, journalistic, and social media actors participate in the circulation of content in closely interwoven practices.

Table 3 presents the key theme “News and social media in creating crisis awareness”, along with two relevant sub-themes from the articles: “an interest to improve crisis-related situational awareness through social media (Article I) and “the role of hybrid media in creating crisis awareness” (Article III).

Table 3. Key theme “News and social media in creating crisis awareness” and relevant sub-themes.

<i>THEME CATEGORY:</i> <i>CRISIS CIRCULATION IN HYBRID MEDIA</i>	
Key theme: News and social media in creating crisis awareness	Sub-themes from the articles:
	An interest to improve crisis-related situational awareness through social media (Article I) The role of hybrid media in creating crisis awareness (Article III)

The created crisis awareness in turn results in a strengthening sense of the crisis, which will be further examined in the following section.

News and social media in creating a sense of crisis

The studies highlight how news and social media create crisis awareness that is strongly interlinked with “news and social media in creating a sense

of crisis” (Table 4). The sense of crisis gains different meanings based on how it emerges from the articles.

Initially, the sense of crisis is about a sense of community – being in the same boat and keeping spirits up during societal crises. In Article I, a sub-theme that emerged through various topics was “a need to be socially connected through social media” during the pandemic – both in terms of staying in contact and gaining peer support. The need to be socially connected manifested in collective actions, such as online events and gatherings, as well as in how people used social media as a coping mechanism, engaging in humorous social media challenges while complying with restrictions on face-to-face meetings. In addition, the sense of community was created by “crisis-related self-expression in social media”, another sub-theme from Article I. The crisis-related self-expression included, e.g. postings about face masks, their homes, and the outdoors as emerging social media content during COVID-19.

In addition to the sense of community, the sense of crisis is essentially a question about a sense of urgency. Based on the conducted studies, the sense of urgency refers to a feeling that something must be done here and now to cope with and adapt to the occurring crisis circumstances. In Articles III and IV, people’s motives to use collaborative media as part of societal crises have been researched in more detail. Both articles emphasise the sense of urgency as a driver for the use of collaborative media in societal crises. “The role of hybrid media in creating a sense of urgency” is a sub-theme from Article III. Notably, visual news reports and social media content presenting suffering yet attractive endemic Australian animals played a crucial role in arousing emotions – such as horror, anxiety, and fear – that catalysed action. In Article IV, the interviewed organisers of the Hack The Crisis Finland online hackathon highlighted “a sense of urgency as a driver for collaboration”.

Table 4 presents the key theme “News and social media in creating a sense of crisis” and outlines the relevant sub-themes. These sub-themes explore the role of social media in fostering social connections during crises (Article I), enabling crisis-related self-expression (Article I), shaping ur-

gency through hybrid media (Article III), and how urgency itself can act as a catalyst for collaboration (Article IV).

Table 4. Key theme “News and social media in creating a sense of crisis” and relevant sub-themes.

<i>THEME CATEGORY:</i> <i>CRISIS CIRCULATION IN HYBRID MEDIA</i>	
Key theme: News and social media in creating a sense of crisis	Sub-themes:
	A need to be socially connected through social media (Article I)
	Crisis-related self-expression in social media (Article I)
	The role of hybrid media in creating a sense of urgency (Article III)
	A sense of urgency as a driver for collaboration (Article IV)

The role of news and social media in creating a sense of crisis is connected to a question about the relationship between collaborative media and the broader hybrid media environment. Next, I will delve deeper into those complex linkages.

News and social media as a gateway to collaborative media

As described above, news and social media play a central role in creating crisis awareness and a sense of crisis that may further channel into collaborative activities. These crisis circulation practices highlight “news and social media as a gateway to collaborative media” (Table 5) and pertain to a question about multidirectional linkages between the broader hybrid media environment and collaborative media.

All case studies reported in this dissertation carry a sub-theme of “a relation to a current media phenomenon”. In Article III, the participants

of the study describe how audiovisual news and social media content presenting suffering Australian animals provided a tangible focus for the catastrophic events, followed the algorithmic logic of social media, filled people's social media feeds, and ignited motivation to not only share information, opinions, and experiences but also to take collaborative action. Meanwhile, the datasets of Articles I, IV, V, and VI were collected in the spring and autumn of 2020, when the COVID-19 pandemic dominated the hybrid media environment with its reoccurring waves. Article II is based on a case conducted in 2019, when global youth-led climate movements followed the Swedish climate activist Greta Thunberg and received extensive hybrid media coverage. It can be asked whether the relations to a current media phenomenon modify the attitudinal climate in favour of the introduction and use of collaborative media. For instance, in Article II, the "*Greta effect*" that gained space in hybrid media seemed to be a fertile environment for a collaborative media-based project.

As news and social media are a gateway to collaborative media-based projects, these projects in turn comprise 'a feedback loop' back to hybrid media. Article III highlights "the role of hybrid media in promoting collaborative crisis initiatives" as a sub-theme of the paper. The findings presented in the article underscore how hybrid media played a central role in both creating awareness about the bushfire crisis and promoting an opportunity to partake in the craft guild as participants became aware of the collaborative initiative through the information circulating in news and social media. Therefore, it has become evident from the study that 'Finnish crafters to help Australian animals' grew into a phenomenon recognised by, e.g. news media, which further raised awareness about the bushfires and this crisis-related collaborative initiative. In Article II, the feedback loop back to a broader hybrid media environment became visible as participants justified their proposed climate crisis solutions by providing "links from collaborative media to websites and social media services".

Table 5 presents the key theme "News and social media as a gateway to collaborative media" and outlines sub-themes that illustrate how the broader hybrid media environment facilitates collaboration in crisis con-

texts. These sub-themes explore the connection to a current media phenomenon (Articles I–VI), links from collaborative media to websites and social media services (Article II), and how hybrid media contributes to the promotion of collaborative crisis initiatives (Article III).

Table 5. Key theme “News and social media as a gateway to collaborative media” and relevant sub-themes.

THEME CATEGORY: CRISIS CIRCULATION IN HYBRID MEDIA	
Key theme: News and social media as a gateway to collaborative media	Sub-themes:
	A connection to a current media phenomenon (Articles I–VI)
	Links from collaborative media to websites and social media services (Article II)
	The role of hybrid media in promoting collaborative crisis initiatives (Article III)

Overall, I argue that citizens’ use of collaborative media in societal crises is dependent on crisis circulation in the broader hybrid media environment. Or the other way around: crisis awareness and a sense of crisis – born in the crisis circulation practices of hybrid media – are prerequisites for collaborative-media-based projects. The key question is why collaborative media needs to be explored as its own concept when we have (more) established ones, such as hybrid media and social media. Here, I refer to Jonas Löwgren and Bo Reimer (2013a), who argue that the concept of social media does not capture the salient properties of people’s everyday media practices that are to a great extent collaborative. For this purpose, Löwgren and Reimer suggest the concept of collaborative media. The use of collaborative media during crises has features that distinguish it from the general crisis-related use of social media – which is, as seen in Article I, mostly informative and phatic. To conceptualise the use of collaborative

media as a part of societal crises, I will next explore collaborative activities taking place in various online environments as ‘socio-technical shakers’.

4.2 Collaborative media as a socio-technical shaker²

In this sub-section, I will explore the boundary conditions for citizens’ use of collaborative media in societal crises. Together, the described properties shed light on how collaboration does not follow “naturally” from the technologies but is an outcome of the interplay among social and technological factors.

From the perspective of the ‘social’, in collaborative media-based projects: 1) people gather around loosely defined shared goals in intrinsically volunteer / externally imposed use of collaborative media, 2) leadership emerges within the group, establishing a structure that interweaves real-life and virtual networks, 3) participants make spontaneous contributions according to their interests, knowledge, and skills, 4) non-monetary contributions are preferred, with participants immaterially rewarded, 5) trust is essential in the shaping boundaries of collaborative efforts, and 6) the use of collaborative media has accompanying effects on offline spaces and face-to-face relationships.

Shared goals in intrinsically volunteer / externally imposed use of collaborative media

Articles II, IV, V and VI highlight a need for “a shared goal in intrinsically volunteer / externally imposed use of collaborative media” (Table 6). The use of collaborative media is organised around these shared goals. In Article II, the collaborative media-based project has a defined and clearly articulated objective to compose 15 citizen priorities (proposals, ideas,

² Socio-technical shaker is a selected metaphor for the fluid interplay of social interactions and technological circumstances, where configurations emerge case by case, shaped by situational conditions.

or measures) to submit to the Belgian government to save the climate. This objective – that seemed to be shared among the participants – set the foundation for the activities in collaborative media and defined the direction for the collaboration. The case regarding Hack The Crisis Finland (Article IV) illustrates how the organisers shared a goal to organise a COVID-19 online hackathon with only three days' notice. In that case, the interviewed organisers emphasised how the shared goal was enabled by the sense of urgency and the scope of the crisis. Though it is not explicitly stated in Article III, the joint donation from Finland to Australia was enabled by the shared goal to help Australian wildlife by making handicrafts.

It must be recognised that the use of collaborative media among citizens as part of societal crises can be “intrinsically volunteer” (Articles II–IV) or “externally imposed” (Articles V & VI). COVID-19 remote work and school are examples of externally imposed use, as the authorities advised people to shift their work and school-related activities to remote mode in these cases. Articles V and VI shed light on these circumstances, where the shared goal was to curb the COVID-19 pandemic. Altogether, the articles illustrate how people who use collaborative media as a part of societal crises have a general ‘roof level’ understanding about the objectives of the use.

Table 6 presents the key theme “Shared goals in intrinsically volunteer / externally imposed use of collaborative media” and outlines sub-themes that highlight the presence of shared goals (Articles II, IV, V & VI), the intrinsically voluntary adoption of collaborative media for crisis responses (Articles II–IV), and instances where its use is externally imposed (Articles V & VI).

Table 6. Key theme “Shared goals in intrinsically volunteer / externally imposed use of collaborative media” and relevant sub-themes.

<i>THEME CATEGORY:</i> <i>COLLABORATIVE MEDIA AS A <u>SOCIO</u>-TECHNICAL SHAKER</i>	
Key theme: Shared goals in intrinsically volunteer / externally imposed use of collaborative media	Sub-themes:
	Shared goal (Articles II, IV, V & VI)
	Intrinsically volunteer use of collaborative media (Articles II–IV)
	Externally imposed use of collaborative media (Articles V & VI)

Leadership of an emerging group of participants

As illustrated in the articles, “leadership of an emerging group of participants” is a key theme (Table 7) in collaborative media-based projects. The project may be led by “a pre-defined process” (Article II) or by a lead administrator/organiser (Articles III and IV).

In Article II, the project had five pre-defined project phases of which each had its own function that supported the shared goal. These phases were 1) idea collection, including supporting peers’ ideas by giving a ‘thumbs up’ or ‘thumbs down’ rating, 2) clustering and analysing the ideas into 15 policy recommendations, 3) voting among the 15 recommendations, 4) counting the votes, and 5) presenting a list of 15 priorities to politicians to save the climate. Though some people evidently led the project ‘behind the scenes’, leadership was not personified but rather structure-led.

In contrast, the leadership was strongly personified in the lead organiser in Article IV. While the other organisers worked flexibly as a highly responsive ‘task force’, the hackathon would not have been completed without the lead organiser, whose significant role was verbalised among the interviewed group of organisers. In the case study in Article III, the project was also led in person as the Facebook group administrators were

responsible for varying practicalities – such as communicating up-to-date information to group members, coordinating domestic product shipments, and negotiating transportation sponsors to the end destination in Australia. It has also become evident that leadership is not always taken for granted among participants. While being an administrator or conducting administrative activities was not self-evident in Article III, there were also struggles regarding the scope of responsibilities and rights for all persons involved.

On the other hand, Articles V and VI highlight “individual responsibility to organise the use of collaborative media”. In those cases, the use of collaborative media was externally imposed as the Finnish Government, in cooperation with the President of the Republic, declared a state of emergency over the COVID-19 outbreak. The activated measures included advising employees to work remotely if possible, closing down the premises of all education providers, suspending contact teaching, and reorganising teaching as distance learning. Only a day’s notice was given before the arrangements entered into force. The case studies in Articles V and VI highlight how the rapid transition to remote conditions left parents on their own to ascertain how to manage things at home.

Furthermore, there would be no leadership without participants to lead. In other words, citizens’ use of collaborative media in societal crises is also a question about who utilises collaborative media. As reported in Article IV, collaboration can be based on “interwoven real-life and virtual networks”. The case of Hack the Crisis Finland demonstrates how assembling the organising team was largely based on the real-life networks of the lead organiser, who turned to people he trusted and who trusted him; most of the organisers did not know each other but only knew the lead organiser beforehand. In contrast, the group of participants emerged online in the cases in Articles II and III.

Table 7 presents the key theme “Leadership of an emerging group of participants” and outlines sub-themes that examine leadership dynamics in collaborative media use during crises. These sub-themes include the presence of a pre-defined process (Article II), the role of a lead adminis-

trator (Article III) or a lead organiser (Article IV), individual responsibility in organising the use of collaborative media (Articles V & VI), and the interwoven real-life and virtual networks in organising crisis responses (Article IV).

Table 7. Key theme “Leadership of an emerging group of participants” and relevant sub-themes.

THEME CATEGORY: COLLABORATIVE MEDIA AS A <u>SOCIO-TECHNICAL</u> SHAKER	
Key theme: Leadership of an emerging group of participants	Sub-themes:
	A pre-defined process (Article II)
	A lead administrator (Article III)
	A lead organiser (Article IV)
	Individual responsibility to organise the use of collaborative media (Articles V & VI)
	Interwoven real-life and virtual networks (Article IV)

By turning the gaze to the participants, we see how collaborative media-based projects are built upon a combination of top-down and bottom-up practices that are in flux. The bottom-up practices become visible when paying attention to spontaneous contributions in projects that match with participants’ interests and skills.

Spontaneous contributions in projects that match with interests and skills

The reported case studies demonstrate how participants make “spontaneous contributions in projects that match with interests and skills” (Table 8), which apply to both structure-led and in-person-led projects. In Article II, “spontaneous contributions by participants” were made by using the tools

provided by the project ‘15 priorities to save our climate’. These contributions are illustrated by the identified eight functions on how collaborative media supports community-powered ecological sustainability transformations presented in the article. Moreover, Article IV highlights “collaboration evolving on the fly”, exemplified by a participant stating: “We didn’t have such clear roles in that group. Such that we would have said ‘this is your area of responsibility’. Everyone gave all their skills and anything else they could”.

Complementing with the same theme, Article III emphasises “a chance to utilise one’s knowledge and expertise” as one of the key drivers to take part in the collaborative effort to help Australian wildlife suffering amidst the bushfire crisis. In this case study, participants spontaneously took on different tasks, which resulted in “a spontaneous division of labour”. Participants knitted, crocheted and sewed aid items, while they administrated the Facebook group and took responsibility for various support tasks, such as coordinated material donations and product logistics, translated handicraft instructions, acquired sponsors for transporting products to Australia, shared information including updates on the spot from Australia on Facebook, and arranged offline events for crafting together – to name a few. Altogether, participants experienced that there was a clear and easy way to collaborate, as the crafting instructions were simple and using one’s own skills for the benefit of the project was like ‘putting shoes on’ – not a big effort at all. On the other hand, Article III illustrates how some participants were also willing to learn new skills, such as knitting or sewing, as they caught the craft enthusiasm of the initiative.

Table 8 presents the key theme “Spontaneous contributions in projects that match with interests and skills” and outlines the relevant sub-themes. These sub-themes highlight spontaneous contributions (Article II), opportunities for participants to apply their knowledge and expertise (Article III), the emergence of a spontaneous division of labour (Article III), and the evolving nature of collaboration (Article IV).

Table 8. Key theme “Spontaneous contributions in projects that match with interests and skills” and relevant sub-themes.

THEME CATEGORY: COLLABORATIVE MEDIA AS A <u>SOCIO</u>-TECHNICAL SHAKER	
Key theme: Spontaneous contributions in projects that match with interests and skills	Sub-themes:
	Spontaneous contributions from participants (Article II)
	A chance to utilise one’s knowledge and expertise (Article III)
	Spontaneous division of labour (Article III)
	Collaboration evolving on the fly (Article IV)

Altogether, the articles emphasise how there is no priorly sewn up *to-do-list* in collaborative media-based projects. Instead, participants experience a chance to deploy the appropriate set of interests and skills, resulting in the spontaneous division of labour and collaboration that evolves on the fly. Therefore, regardless of how the use of collaborative media as part of societal crises is organised and managed, it emphasises a coincidence of human encounters when the interests and skills of people from different backgrounds complement each other. In those encounters, no money is exchanged.

Non-monetary contributions and compensations

The articles underscore how participants experience “non-monetary contributions and compensations” (Table 9) as a preferred way to participate in the collaborative media-based projects. While non-monetary contributions and compensations apply to all the articles, they are verbalised especially in Articles III and IV.

The Finnish crafters participating to help Australian animals described their “desire for non-monetary contributions” (Article III). In the case study in Article IV, the organisers of the Hack the Crisis Finland hackathon emphasised how everyone had “a desire to work *pro bono*”. Although time is money, the organisers were pleased that no funding was asked from them. Instead, everyone donated their time and expertise for the project.

As compensation for their contributions, participants experience gaining individual rewards and benefits, both of which are more immaterial than material. In Article III, the participants describe a variety of “immaterial rewards and benefits as compensation for one’s efforts”. Those rewards and benefits work as a driver for participation as well, varying from getting rid of one’s own material storages to community appreciation. Compiled together, the experiences of participants delineate the ease of supporting collaborative media-based projects when there is no money at stake.

Table 9 presents the key theme “Non-monetary contributions and compensations” and outlines sub-themes that highlight the desire to contribute without financial incentives (Article III), the willingness to work *pro bono* (Article IV), and the role of immaterial rewards and benefits as forms of compensation for one’s efforts (Article III).

Table 9. Key theme “Non-monetary contributions and compensations” and relevant sub-themes.

THEME CATEGORY: COLLABORATIVE MEDIA AS A <u>SOCIO-TECHNICAL</u> SHAKER	
Key theme: Non-monetary contributions and compensations	Sub-themes:
	A desire for non-monetary contributions (Article III)
	A desire to work <i>pro bono</i> (Article IV)
	Immaterial rewards and benefits as compensation for one’s efforts (Article III)

The significance of trust in conflict-prone encounters on social media platforms

The above-described circumstances are linked to “the significance of trust in conflict-prone encounters on social media platforms” (Table 10). As suggested in Article IV, “the significance of trust” binds together the shared big goal, leadership of the project, interwoven structure of real-life and virtual networks, as well as the spontaneous – non-monetary – contributions of participants. Continuing from Article IV, the organisers did not meet face-to-face, and their mutual collaboration was carried out mainly through WhatsApp messages. Therefore, a certain depth of interaction was perceived as lacking, and trust-building was considered challenging. In these circumstances, it became evident that trust is built not only by the shared big goal and strong lead organiser, but also by participants’ pre-proven competences – as the organisers of the Hack the Crisis Finland online hackathon trusted in their own experience and capabilities, as well as those of the others.

Conversely, in Article III, there seemed to be a lack of trust, which bred “dissensions and heated-up emotions” among the participants. The participants discussed how the dissensions and heated-up emotions were related to the overall Facebook communication cultures that were perceived to be conflict-prone and toxic. On a broader scope, it appears that the dissensions and heated-up emotions are not only a dimension of distrust but also a question about Facebook’s communication cultures and technological boundaries. In contrast, Article II exposes a sub-theme of “surprisingly polite behaviour of participants” from ‘15 participants to save our climate’ – a project that was carried out on a purpose-built platform outside the main commercial social media platforms.

Table 10 presents the key theme “The significance of trust in conflict-prone encounters on social media platforms” and outlines sub-themes that highlight polite behaviour among participants (Article II), the presence of dissensions and heightened emotions (Article III), and the crucial role of trust in maintaining collaboration (Article IV).

Table 10. Key theme “The significance of trust in conflict-prone encounters on social media platforms” and relevant sub-themes.

<i>THEME CATEGORY:</i> <i>COLLABORATIVE MEDIA AS A <u>SOCIO</u>-TECHNICAL SHAKER</i>	
Key theme: The significance of trust in conflict-prone encounters on social media platforms	Sub-themes:
	Polite behaviour of participants (Article II)
	Dissensions and heated-up emotions (Article III)
	The significance of trust (Article IV)

The issues described above are largely a question about participants’ experiences on collaborative media technologies, which will be explored once the focus shifts to ‘the technical’ in the socio-technical shaker.

The accompanying effects on offline spaces and face-to-face relationships

The reported case studies also bring out how the use of collaborative media in societal crises is not detached from physical reality. Instead, it has “accompanying effects on offline spaces and face-to-face relationships” (Table 11). This is especially evident in Articles V and VI, reporting both the transition to remote school and the concurrent experiences of parents’ home office while children were learning remotely at home. Together, these articles describe how technological transformation results in a drastic “reconfiguration of everyday life”.

In practice, the reconfiguration of everyday life required “a dynamic reorganisation of the physical space” in the convergence of different social spaces (work, school, home). Families needed to revisit spatial issues, as well as seek new rhythms and routines amid the suddenly changed circumstances. It also became evident that parents were in a situation where “a management of multiple social roles” was required, as they juggled

between work and family commitments. Despite needing to reconfigure several aspects of their everyday family life, the general perception from these case studies was that the families successfully managed to adapt to the remote mode of living.

Table 11 presents the key theme “The accompanying effects on offline spaces and relationships” and outlines sub-themes that examine how digital interactions influence real-world environments and social dynamics. These sub-themes highlight the reconfiguration of everyday life (Articles V & VI), the dynamic reorganisation of physical spaces (Articles V & VI), and the management of multiple social roles in response to evolving circumstances (Articles V & VI).

Table 11. Key theme “The accompanying effects on offline spaces and relationships” and relevant sub-themes.

<i>THEME CATEGORY:</i> <i>COLLABORATIVE MEDIA AS A <u>SOCIO-TECHNICAL</u> SHAKER</i>	
Key theme: The accompanying effects on offline spaces and relationships	Sub-themes:
	A reconfiguration of everyday life (Articles V & VI)
	A dynamic reorganisation of the physical space (Articles V & VI)
	A management of multiple social roles (Articles V & VI)

Overall, the articles emphasise the intertwined and synergistic relationship between social and technological dimensions. Next, I will present the key technological findings in the ‘technical’ side of the sociotechnical shaker.

4.3 Collaborative media as a socio-technical shaker

From a technological viewpoint, citizens’ use of collaborative media in societal crises characterised by chronic and geographically distant uncer-

tainty is a sum of technological compromises, as well as constant balancing between technology-related advantages and challenges. In societal crisis situations, existing platforms and tools are rapidly appropriated as their reach, familiarity, ease of use, and real-time communication are valued. Consequently, the appropriated platforms and tools are a mismatch with operations, leading to divided application use, a lack of transparency, information overload, and disorder. As suggested in Section 4.2, the use of collaborative media has accompanying effects on offline spaces and relationships – further highlighting a spillover of online and offline environments.

Rapid appropriation of existing collaborative technologies in ad hoc needs

The articles shed light on the “rapid appropriation of existing collaborative technologies in ad hoc needs” (Table 12) due to a crisis-related time pressure. The case study in Article II makes an exception to this, as the project ‘15 citizen priorities to save our climate’ is organised on “a purpose-built technological solution”.

Articles III and IV showcase “an appropriation of existing platforms and tools” in circumstances where people need to be reached from the platforms used routinely in their everyday lives. Consequently, project administrators and organisers appropriate the widely used platforms and tools, including commercial social media services like Facebook and WhatsApp, to serve the collaboration purposes in societal crisis situations.

On the other hand, the existing platforms and tools may refer to how the platforms and tools ‘exist in the market’ but there is “a lack of devices and tools on an individual level”, as is the case in Article V. It sheds light on how Finnish families were required to undertake “a rapid adoption of devices and tools” in COVID-19 remote school context, where the families often needed to acquire and install the technologies.

In summary, the case studies emphasise the absence of best practices, thereby leading to ad-hoc technological solutions. This is well-demon-

strated in Article V, which describes how families were required to manage a suite of different devices, tools, and applications, resulting in an enormous “cross-device and cross-application usage”. Overall, appropriating the existing platforms and tools is a crucial theme that affects other key experiences about the technological frameworks for collaboration, and how the adoption and use of technologies are perceived.

Table 12 presents the key theme “Rapid appropriation of existing collaborative technologies in ad-hoc needs” and outlines sub-themes that explore how individuals and groups adopt technologies for urgent situations. These sub-themes highlight the utilisation of purpose-built technological solutions (Article II), the appropriation of the existing platforms and tools (Articles III & IV), challenges regarding the lack of devices and tools at the individual level (Article V), the rapid adoption of devices and tools (Article V), and the cross-device and cross-application usage (Article V).

Table 12. Key theme “Rapid appropriation of existing collaborative technologies in ad-hoc needs” and relevant sub-themes.

THEME CATEGORY: COLLABORATIVE MEDIA AS A SOCIO-<u>TECHNICAL</u> SHAKER	
Key theme: Rapid appropriation of existing collaborative technologies in ad-hoc needs	Sub-themes:
	A purpose-built technological solution (Article II)
	An appropriation of existing platforms and tools (Articles III & IV)
	A lack of devices and tools on an individual level (Article V)
	A rapid adoption of devices and tools (Article V)
	A cross-device and cross-application usage (Article V)

Requirements for technological familiarity and ease of use

Appropriating the existing platforms and tools also highlights the significance of “requirements for technological familiarity and ease of use” (Table 13). The technological familiarity and ease of use enables engaging with people with varying technological know-how and skills – and lowers the threshold of participation. This concept is well-illustrated in Article IV, which reports how the organisers of the Hack the Crisis Finland online hackathon ended up utilising WhatsApp as a platform for their mutual collaboration, as it was already used in their everyday lives and thus a low-threshold technological solution. Building on a similar experience, the group administrator states in Article III that Facebook was “the only platform they knew”. Here, it is central to note that though the ‘15 citizen priorities to save our climate’ project was run through a purpose-built platform, there were “familiar tools” that followed a logic similar to that of social media platforms and tools – including, e.g. posting, commenting, liking and creating a profile page.

The significance of technological familiarity and ease of use also becomes evident in Article V, which reports how families adopted new platforms and tools because they ‘had to’ but experienced “devices and tools as a cause of struggle and stress” during the early moments of COVID-19 remote schooling. Due to the rapid transition to remote schooling, the level of preparedness in families varied – illustrating “a lack of equipment and tools on an individual level”. On the other hand, lacking technological preparedness may also cause challenges in cases when widely used social media platforms, such as Facebook, are utilised. Article III depicts “a lack of participants’ digital literacy”, as not all participants fully knew how to use the platform and were not aware of its features.

Also, what is familiar to one may be unfamiliar to another. The case study in Article IV even surprisingly reveals “a divided application usage” when the organisers of Hack the Crisis Finland split to use either WhatsApp or Slack according to their previous experiences and preferences, further illustrating people’s tendency to use familiar platforms and tools. Therefore,

it cannot be assumed that people will stick to a particular platform. This kind of divided application usage may cause several challenges in terms of communication, organisation, efficiency, and transparency – to name a few aspects.

Compiled, the articles highlight how the citizens' use of collaborative media during societal crises is a question about engaging with people from varying backgrounds. Table 13 presents the key theme "Requirements for technological familiarity and ease of use" and outlines sub-themes that explore how users' familiarity with technology impacts their ability to engage in collaborative efforts. These sub-themes highlight the importance of using familiar tools (Article II), challenges posed by a lack of digital literacy (Article III), the preference for familiar and easy-to-use platforms and tools (Article IV), the divided application usage (Article IV), and the struggles and stress caused by technological devices and tools (Article V), including a lack of lack of equipment and tools at the individual level (Article V).

Table 13. Key theme “Requirements for technological familiarity and ease of use” and relevant sub-themes.

THEME CATEGORY: COLLABORATIVE MEDIA AS A SOCIO-<u>TECHNICAL</u> SHAKER	
Key theme: Requirements for technological familiarity and ease of use	Sub-themes:
	Familiar tools (Article II)
	A lack of participants’ digital literacy (Article III)
	Familiar and easy-to-use platforms and tools (Article IV)
	A divided application usage (Article IV)
	Devices and tools as a cause of struggle and stress (Article V)
	Lack of equipment and tools on an individual level (Article V)

In summary, the use of collaborative media as part of societal crises requires devices, platforms, and tools – and individual preparedness in these cannot be taken for granted. Therefore, technological solutions also need to consider people who are not ‘tech-savvy’. However, utilising the existing platforms and tools provide a flexible yet mismatching solution for collaborative purposes, which will be explored next in more detail.

Existing platforms and tools as a flexible yet mismatching solution

The reported case studies highlight appropriating the “existing platforms and tools as a flexible yet mismatching solution” (Table 14). Starting with the flexibility, Article IV demonstrates “flexible and scalable platforms and tools” as the organisers of the Hack the Crisis Finland online hackathon describe how the platforms and tools were shaped and modified by participants according to their practical needs along the way. Meanwhile,

“flexible tools” are also highlighted in the ‘15 citizen priorities to save our climate’ project, which was based on a purpose-built platform (Article II). In the same case study, the eight functions are based on how people use the same functionalities for different purposes.

Though the platforms and tools have proven to be scalable, flexible, and shaped from participants’ needs, it has become evident from the studies that the platforms and tools selected from an existing array work *well enough* for the purposes at hand. Nevertheless, Articles III and IV describe “platforms and tools as a mismatch with the operations”.

Table 14 presents the key theme “Existing platforms and tools as flexible yet mismatching solutions” and outlines sub-themes that explore the dual nature of digital platforms and tools in crisis collaboration. These sub-themes highlight the flexibility of certain tools (Article II), the flexibility and scalability of platforms and tools for varying needs (Article IV), and the challenges posed when these technologies do not fully align with operational requirements (Articles III & IV).

Table 14. Key theme “Existing platforms and tools as flexible yet mismatching solution” and relevant sub-themes.

THEME CATEGORY: <i>COLLABORATIVE MEDIA AS A SOCIO-TECHNICAL SHAKER</i>	
Key theme: Existing platforms and tools as flexible yet mismatching solution	Sub-themes:
	Flexible tools (Article II)
	Flexible and scalable platforms and tools (Article IV)
	Platforms and tools as a mismatch with the operations (Articles III & IV)

Notably, the technological choices have also been made under time constraints, leaving no chance – or even sense – to start building something from scratch. Next, the resulting challenges are examined in more detail.

Widely used real-time platforms and tools resulting in information overload and disorder

As highlighted in the case studies, the technological familiarity and ease of use play a crucial role in collaborative efforts. Article III emphasises the importance of “the reach of existing social media services” in engaging a large number of participants. Widely used platforms like Facebook and WhatsApp enable rapid, real-time information sharing, making it easier to mobilise people quickly. However, Articles III and IV reveal “widely used real-time platforms and tools resulting in information overload and disorder” (Table 15). While these platforms and tools facilitate quick communication, they often lack the structure needed for organised collaboration.

Articles III and IV described the difficulties of “information overload and communication ambiguities”. In Article IV, the organisers of the Hack The Crisis Finland online hackathon favoured certain platforms and tools because they simply considered them fast and real-time. However, relying heavily on instant messaging applications resulted in disorganised communication that was difficult to follow. As one interviewee put it, what was won in speed was lost in structure. A similar pattern emerged in Article III, where Facebook’s expansive reach led to the rapid growth of a collaborative group. The combination of a fast-paced crisis situation and constantly updating information contributed to communication challenges, making it difficult to maintain structured operations.

Overall, Article III exposes a chain reaction behind the difficulties in keeping the collaborative efforts organised: 1) Appropriating existing platforms and tools for collaborative purposes provides familiarity and ease of use - which in turn enables reaching a large amount of people, 2) Combining the former with the real-time and fast rhythm typically seen in social media platforms easily results in information overload and challenges in structuring operations. In other words, while large-scale participation and rapid communication are essential in crises, they can easily lead to chaos if not managed effectively.

Beyond organisational difficulties, Article III highlights that the stress of an ongoing crisis, a growing number of participants, and technological barriers contribute to heightened emotions and conflicts within groups. This context presents additional challenges, as trust-building becomes difficult in fast-paced environments where people do not know each other. Furthermore, platform-specific characteristics, such as information overload and conflict-prone interactions, can hinder structured collaboration.

While real-time social media platforms are valuable for rapid crisis response and broad engagement, their very nature introduces challenges that must be actively managed. Information overload, disorder, and communication ambiguities are inevitable when using these tools, particularly in high-stress environments. Acknowledging these limitations is crucial for designing more effective collaborative efforts in crisis situations.

Table 15 presents the key theme “Widely-used real-time platforms and tools resulting in information overload and disorder” and outlines sub-themes that highlight the extensive reach of existing social media services (Article III) and the issues of information overload and communication ambiguities that arise in crisis situations (Articles III & IV).

Table 15. Key theme “Widely-used real-time platforms and tools resulting in information overload and disorder” and relevant sub-themes.

THEME CATEGORY: COLLABORATIVE MEDIA AS A SOCIO-TECHNICAL SHAKER	
Key theme: Widely-used real-time platforms and tools resulting in information overload and disorder	Sub-themes:
	The reach of existing social media services (Article III) Information overload and communication ambiguities (Articles III & IV)

Blending online and offline environments

“Blending online and offline environments” (Table 16) become evident, especially from Articles V and VI that explore the rapid adoption of collaborative technologies during the COVID-19 pandemic. Families have reported a spillover of physical and online spaces, and a variety of “practical arrangements in guaranteeing peace of work and privacy”, highlighting the renegotiation of “rules” in terms of space usage, rhythm and routines, as well as social roles – among others – as the rules do not apply in the changed circumstances.

Article III demonstrates “an alternation between online and offline activities”, further illustrating the relationship between collaborative media and offline action. Moreover, Article III exposes how making handicrafts is not only an offline activity by nature, as participants also organised offline events for crafting donated products together – and emphasised the community feeling in these offline encounters. Here, the experiences illustrate how offline activities provide a different type of communality compared to the online environment. In other words, offline environments provide something online correspondents cannot.

Table 16 presents the key theme “Blending online and offline environments” and outlines sub-themes that explore the interaction between digital and physical spaces. These sub-themes highlight the alternation between online and offline activities (Article III) and the practical arrangements needed to ensure both peace of work and privacy (Articles V & VI).

Table 16. Key theme “Blending online and offline environments” and relevant sub-themes.

THEME CATEGORY: <i>COLLABORATIVE MEDIA AS A SOCIO-<u>TECHNICAL</u> SHAKER</i>	
Key theme: Blending online and offline environments	Sub-themes:
	Alternation between online and offline activities (Article III) Practical arrangements in guaranteeing peace of work and privacy (Articles V & VI)

4.4 The use purposes of collaborative media

Collaborative crisis intelligence

In this sub-section, I suggest that the use purposes of collaborative media in societal crises characterised by chronic uncertainty and geographical distance are divided into 1) collaborative crisis intelligence, 2) collaborative crisis action, and 3) collaborative crisis adaptation.

To begin from “collaborative crisis intelligence” (Table 17), Articles II and IV illustrate a use purpose in which collaborative media is utilised for “proposing and iterating crisis solutions” as people are brought together in an aim to address shared crises and seek potential solutions to tackle them. These two articles demonstrate how crisis intelligence initiatives are oriented towards ‘thinking together’ as people are invited to come up with ideas and solutions in creative ways. In collaborative crisis intelligence, collaboration takes the form of activities, such as crowdsourcing and hacking.

In Article II, collaborative media is utilised for creative peer-to-peer work. Using the Youth4Climate collaborative media site, participants shared proposals, ideas, and measures to present to the Belgian government in an aim to ‘save our climate’, altogether generating over 1,700

ideas, 2,600 comments and over 32,000 votes for the initiatives of their choice. The article reports a study in which the ideas with 20 or more votes and its relevant comments are selected for analysis. The analysis of the filtered dataset – comprising 266 ideas and 1,409 related comments – reveals how collaborative media serve several different functions for supporting community-powered ecological sustainability transformations. The functions identified are 1) seeking solutions, 2) evaluation, 3) inspiring and increasing awareness, 4) understanding people, 5) understanding local context, 6) call to action, 7) creating connections, and 8) measuring endorsement. In a nutshell, the functions describe how people propose solutions to the climate crisis, evaluate and iterate them further in collaboration with other participants, share inspiration and increase awareness on more sustainable lifestyles, shed insights on individual experiences and everyday life environments, catalyse action, provide possibilities for networking, as well as measure the reception of proposals among the wider public. Altogether, these interlinked eight functions delve deeper in what forms collaborative crisis intelligence can take.

Continuing from collaborative crisis intelligence, a large diffusion of events addressed the COVID-19 crisis and online hackathons gained a new momentum during the pandemic. As reported in Article IV, a group of people organised the Hack the Crisis Finland online hackathon with only three days' notice. The article further shed light on organisers' mutual collaboration, enabled by utilising collaborative technologies in an ad-hoc manner. Hack the Crisis Finland was a call to each and every one to participate in sparking solutions to the crisis caused by the COVID-19 outbreak. Anyone with an idea pertaining to any of the three challenge categories ('save lives', 'save communities', 'save businesses') was welcome to join. During the 48 hours of the hackathon, over 1,600 people teamed up and created 230 proposed solutions. Having said that, it must be considered that such collaborative crisis intelligence initiatives do not necessarily lead to any concrete action, but proposed solutions may remain conceptual, e.g. when hackathons come to an end. In this case, the organisers of Hack the Crisis Finland created a platform for collaborative crisis intelligence

to take place and shape. Therefore, their mutual collaboration had a very concrete outcome – the online hackathon itself. This demonstrates how intelligence and actions can be interwoven as the use purposes of collaborative media. Next, closer attention will be given to collaborative crisis action.

Table 17 presents the key theme “Collaborative crisis intelligence” and outlines a sub-theme that highlights the process of proposing and iterating crisis solutions through collaborative efforts (Articles II & IV).

Table 17. Key theme “Collaborative crisis intelligence” and relevant sub-theme.

THEME CATEGORY: THE USE PURPOSES OF COLLABORATIVE MEDIA	
Key theme: Collaborative crisis intelligence	Sub-themes: Proposing and iterating crisis solutions (Articles II & IV)

Collaborative crisis action

As described above, online hackathons do not necessarily aim for practical actions but rather collaborative crisis intelligence in the form of idea generation. On the other hand, organising a hackathon is a practical action itself. In “collaborative crisis action” (Table 18), collaborative media is utilised in an action-oriented way. Articles I, II and III describe “promoting/ catalysing crisis action”, such as planning and coordinating solidarity activities during environmental emergencies and connecting those providing help with those in need. Compared to collaborative crisis intelligence oriented towards *thinking together*, collaborative crisis action is oriented towards *doing together*.

Article III illustrates a case in which handicraft makers around the globe united and helped Australian wildlife during the 2019-20 bushfire crisis.

The actions of handicraft makers originated from the Australia-based Animal Rescue Craft Guild, which posted a call for volunteers in its Facebook group to make shelters and other products to aid animals, including pouches for young orphaned marsupials and mittens for koalas' burned paws. In only a couple of months, the group accumulated more than 230,000 members. The call for volunteers resulted in sub-groups as people organised on national and local levels in their own Facebook groups. One of these sub-groups was 'Finnish crafters to help Australian animals' [transl.], which inspired hundreds of Finns to knit, crochet and sew handicrafts for endemic Australian animals. The aim of the group was to share instructions and tips for helping Australian wildlife by making handicrafts and coordinating a joint donation from Finland to Australia. Their efforts produced concrete results: a total of 110 kg of 1,600 individual handicrafts was shipped to Australia. This action, detailed in Article III, sheds light on a long-distance crisis context as global and local responses are bridged in crisis action.

Elements associated with collaborative crisis action can be found from other articles as well. Article II demonstrates how the Youth4Climate project as a collaborative crisis intelligence initiative was interwoven with collaborative crisis action practices. In this case, collaborative crisis intelligence catalysed actions that had potential to grow beyond that particular project. This is described in the function 'call to action', where participants sent out action-oriented requests to companies or people, shared practical tips for a more ecologically sustainable life, inquired about the possibilities to act, and proposed further business ideas. All these bear the thought that crises require a change, and that change is created by concrete actions. In Article I, the participants of the study reported how socially acceptable behaviour patterns – i.e. action – was catalysed in social media during the COVID-19 pandemic. By doing so, parallel action was created through peer pressure to prove their usage of face masks and isolated leisure time at home. Furthermore, participants reported conducting 'self-censorship' as they were aware of posting socially acceptable content and leaving, e.g. party and travel photos unpublished in their social media

accounts. Together, these findings illustrate collaborative crisis action as practical contributions that aim to combat the shared crises.

Table 18 presents the key theme “Collaborative crisis action” and outlines the sub-theme that highlights the role of collaborative media in promoting and catalysing crisis action (Articles I, II & III).

Table 18. Key theme “Collaborative crisis action” and the relevant sub-theme.

<i>THEME CATEGORY:</i> <i>THE USE PURPOSES OF COLLABORATIVE MEDIA</i>	
Key theme: Collaborative crisis action	Sub-themes: Promoting/catalysing crisis action (Articles I, II & III)

Collaborative crisis adaptation

At last, “collaborative crisis adaptation” (Table 19) pertains to how collaborative media technologies provide ways to adapt daily life to crisis circumstances. The COVID-19 pandemic is a drastic example of the rapid diversion of daily life to a remote track through nation-wide recommendations and rules to stay at home in the aim to avoid physical contact between people and thereby reduce the spread of the virus. Dealing with these circumstances, Articles V and VI describe “an adaptation to crisis circumstances through a technological transformation”.

In the spring of 2020, the COVID-19 pandemic caused the rapid introduction of remote schooling in several countries. On 16 March 2020, the Finnish Government, in cooperation with the President of the Republic, declared a state of emergency over the COVID-19 outbreak. The activated measures included closing down the premises of all education providers, suspending contact teaching, and reorganising teaching as distance learning. A day’s notice was given before the arrangements entered into force on 18 March 2020. The study in Article V was conducted in circumstances

requiring Finnish families to adapt at a very rapid pace to children's remote schooling. The transition of school days from face-to-face education practices to computer-mediated teaching over distance required the rapid adoption of different collaborative technologies by a wide user group. Simultaneously, the Finnish Government gave the recommendation that all work should be conducted remotely, from home, whenever possible. Article VI continues from this setting by depicting parents' home office experiences alongside their children's remote schooling in Finland.

These two articles illuminate how collaborative media technologies enabled crisis adaptation. They concretely describe how everyday life shrank between the home walls when work and school switched to remote mode, and applications, such as Microsoft Teams and Zoom, turned homes into offices and classrooms. Families were required to adapt to sudden changes in central areas of everyday life. In particular, Article V reports the intensive adoption of collaborative technologies as families acquired and installed an array of platforms and tools to enable children to attend school remotely. Article VI contributes to the understanding of the radical transformation of everyday life to reconcile parents' remote work and children's remote school under exceptional circumstances. The article illustrates how different social spaces – i.e. school and the workplace – converged into homes through collaborative technologies. It had accompanying effects, as families were required to revisit spatial issues, organise everyday life in new terms (e.g. rhythm and routines) to run smoothly amid the changes, and manage multiple social roles while juggling between family and work commitments.

Together, the two articles, conducted within the remote school and remote work contexts during the acute phase of the COVID-19 pandemic, demonstrate how collaborative media technologies serve collaborative crisis adaptation, as the basic functions of everyday life need to be refigured during societal crises.

Table 19 presents the key theme “Collaborative crisis adaptation” and outlines the sub-theme that highlights the adaptation to crisis circumstances through technological transformation (Articles V & VI).

Table 19. Key theme “Collaborative crisis adaptation” and the relevant sub-theme.

<i>THEME CATEGORY:</i> <i>THE USE PURPOSES OF COLLABORATIVE MEDIA</i>	
Key theme: Collaborative crisis adaptation	Sub-themes: An adaptation to crisis circumstances through a technological transformation (Articles V & VI)

5 Synthesis – Discussion

5.1 Balancing (techno-)optimism and caution in pursuit of hope

The aim of this research is to answer the question of how citizens use collaborative media in societal crises characterised by chronic uncertainty and geographical distance. The underlying thought is that today's complex and systemic problems require collaboration (Fischer, 2011b) and call for a design that strives to address existential crises (Light et al., 2017) and improve the world (Löwgren & Stolterman, 2004). In the introduction, I refer to Boin et al. (2018, p. 24) in suggesting that 'crisis is in an odd way deeply optimistic'. It carries the notion that the threat at hand could still be avoided if we rise to meet the challenge. As a researcher, this dissertation is also my personal attempt to search for hope – change for a better – amidst unpredictable changes and growing insecurities.

In times of crisis, people often feel a need to reorient toward community (Shklovski et al., 2008), as well as to act and take initiative. Meaningful platforms for expressing and channeling these needs are essential. This research is grounded in the idea that collaborative media provides a foundation for shared encounters and connects to the ideal of networked collaboration – the notion that online collaboration can foster positive societal change (Kuusela, 2020). If 'crisis' is understood as a deeply optimistic term, the research adopts a techno-optimistic stance by viewing technology as part of the solution. However, it does not remove the need for a critical grasp.

In the introduction, I describe how techno-optimism is increasingly called into question considering the recent developments. Scholars argue that the visions of social media as a democratising force, prominent in previous decades, have given way to a growing sense of techno-pessimism (Couldry & Mejias, 2019; Seppänen & Väliverronen, 2024; van Dijck et

al., 2018). In this shifting landscape, my dissertation adopts a *cautiously* techno-optimistic stance. My ultimate interest is to understand and conceptualise the use of collaborative media during crises in an aim to empower communities to cope with and adapt to societal crisis settings. The six case studies and the resulting conceptual framework grasp the user experience, as well as the complexity and richness of the phenomena. The dissertation argues that media technologies, despite their challenges and limitations, still hold potential as tools for resilience in times of societal crisis. There, I share the view that we shape technology, and technology shapes us (Löwgren & Stolterman, 2004). Therefore, rather than abandoning these platforms, we must critically examine how they can be used and reimagined to support constructively oriented collaborative agency.

5.2 A conceptual framework for the use of collaborative media in societal crises characterised by chronic uncertainty and geographical distance

Based on a set of qualitative user studies, I suggest a conceptual framework for citizens' use of collaborative media in societal crises characterised by chronic uncertainty and geographical distance. In practice, the framework fuses together the findings of a set of empirical studies (Studies I–VI) conducted in the area with my colleagues between 2019 and 2024, as well as the literature insights. The studies range from craftivists' online collaborations to help Australian wildlife during catastrophic bushfires to COVID-19 online hackathons, involving the collaboration of hundreds of people to devise solutions to curb the virus and for remote work and school practices in times of COVID-19 lockdowns.

Today's societal crises emphasise a hybrid nature of media. In this evolving media landscape, information is continuously shared through a dynamic mix of professional journalism and social media. The constant flow of textual and visual content contributes to the construction of meaning, often eliciting strong emotional responses that are key to capturing and maintaining public attention. During crisis events, circulating

crisis content – from live monitoring news to social media content like photos, videos, and comment threads – creates crisis awareness and a sense of crisis that, in turn, may channel into a need for media-enabled crisis collaborations among citizens. That is when collaborative media comes into play. To conceptualise the use of collaborative media in part of societal crises, I have explored collaborative activities taking place in various online environments as ‘socio-technical shakers’.

These media-enabled collaborative activities require their setup, which sets the boundaries for crisis collaboration. Collaborative media is a socio-technical³ shaker in which people aim for a joint crisis response in a constant mix of human-human and human-computer-interaction. In collaborative-media-based projects: 1) people gather around loosely defined shared goals in intrinsically volunteer / externally imposed use of collaborative media, 2) leadership emerges within the group, establishing a structure that interweaves real-life and virtual networks, 4) participants make spontaneous contributions according to their interests, knowledge, and skills, 5) non-monetary contributions are preferred, with participants being immaterially rewarded, 6) trust is essential in the initially shaping collaborative efforts, and 7) the use of collaborative media has accompanying effects on offline spaces and face-to-face relationships.

From a technological stance, the use of collaborative media in societal crises is a sum of technological compromises and entails constant balancing between technology-related advantages and disadvantages. In societal crisis situations, 1) existing platforms and tools are rapidly appropriated, 2) as their reach, familiarity, ease of use, and real-time communication are valued. Consequently, 3) the appropriated platforms and tools are a mismatch with operations, 4) leading to divided application use and further, to a lack of transparency, information overload, and disorder. Furthermore, 5) the use of collaborative media blends online and offline environments. Together, these properties shed light on how collaboration

3 I understand ‘socio-technical’ in terms of the mutual shaping of technology, social structure and human action (Starbird et al., 2019).

does not follow “naturally” from the technologies but is an outcome of the interplay among social and technological factors.

After all, the activities taking place in the socio-technical shaker grow into use purposes, including collaborative crisis intelligence, collaborative crisis action, and collaborative crisis adaptation. Stemming from collaborative crisis intelligence, numerous initiatives have been launched to bring people together with an aim to address the environmental crisis and the COVID-19 pandemic as shared crises. Crisis intelligence initiatives are oriented towards thinking together, meaning that people are invited to devise ideas and solutions in creative ways. In crisis intelligence, collaboration is linked to activities, such as crowdsourcing and hacking. In collaborative crisis action, collaborative media is utilised in an action-oriented way, such as planning and coordinating solidarity activities during environmental emergencies and connecting those providing help with those in need. Finally, collaborative crisis adaptation pertains to how collaborative media technologies provide ways to adapt everyday life to crisis circumstances. The COVID-19 pandemic is a drastic example of the rapid diversion of everyday life to a remote track with the help of collaborative media technologies. Remote work and remote school are examples of practices that describe how collaborative media is used as a means of crisis adaptation. Together, the use purposes describe new opportunities and hope in the spirit of a certain kind of techno-optimism.

The suggested conceptual framework provides a user-centred view of the collaborative media in societal crises characterised by chronic uncertainty and geographical distance. Applied, the framework illuminates the role of collaborative media in the mediated crisis sphere, increases our understanding about how to organise and maintain collaborative activities by seizing the opportunities and tackling the constraints of the collaborative media platforms, and clarifies the use purposes of collaborative media as a part of versatile crisis settings.

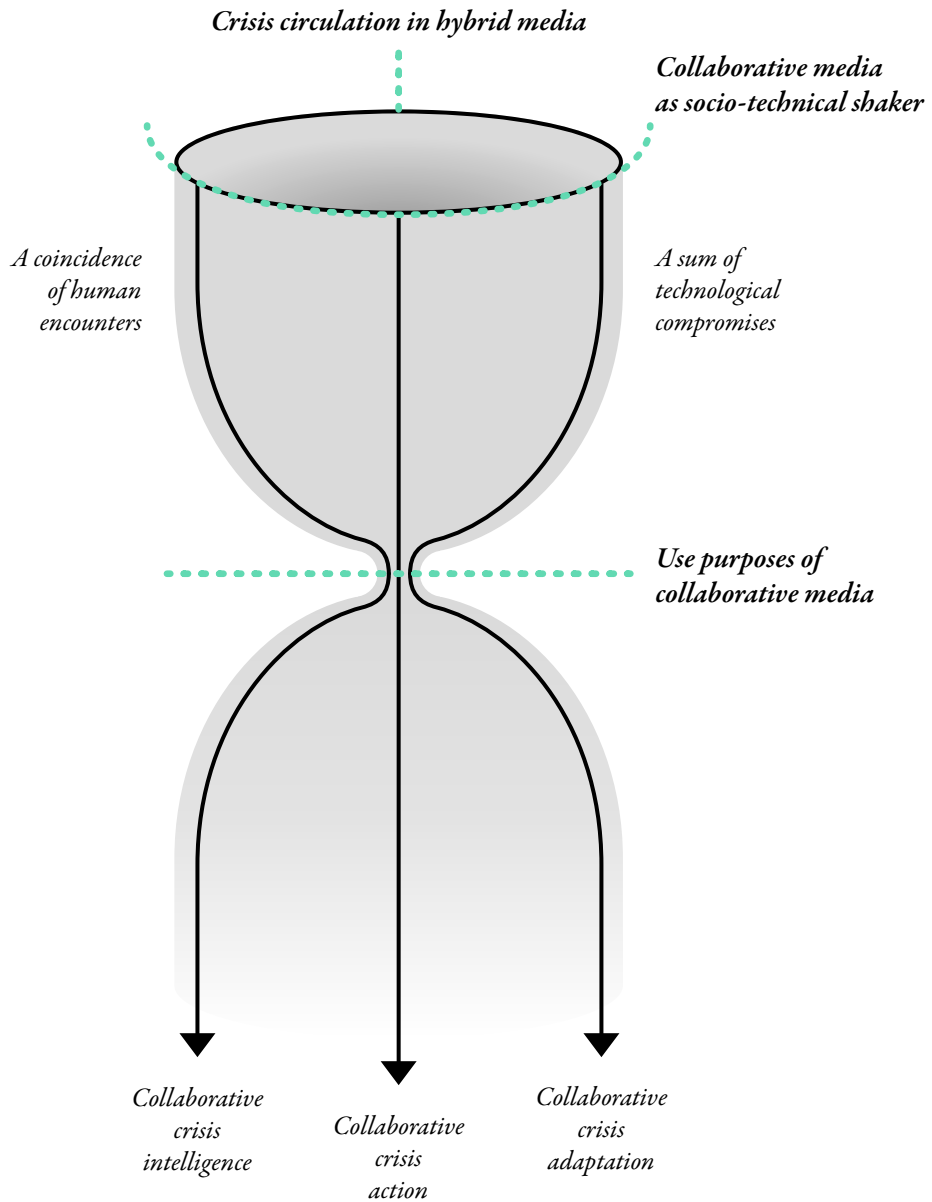


Figure 6. A conceptual framework for citizens' use of collaborative media in societal crises characterised by chronic uncertainty and geographical distance.

Next, I will discuss the proposed theoretical framework in greater detail. By revisiting the research questions, attention will be given to 1) collaborative media in the broader hybrid media environment, 2) the socio-technical framework for collaboration, and 3) the use purposes of collaborative media in crisis settings.

5.3 Collaborative media in the broader hybrid media environment

I have emphasised that media-enabled collaboration needs to be understood in its own terms and therefore selected collaborative media as a conceptual backrest for this research. The reasons for this decision are presented in more detail in Section 2.3. Nonetheless, the relations to news and social media need to be mapped as well. As suggested by Marshall McLuhan (2003, p. 43), “no medium has its meaning or existence alone, but only in constant interplay with other media”.

The role of news and social media in phenomenalising crises

Although news and social media do not primarily emphasise collaboration, they play a key role in bringing about collaboration and laying its groundwork in crisis times. The conducted studies report how social media and the broader hybrid media system have a key role in creating crisis awareness. Similar observations are reported in prior research (cf., Alexander, 2014; Hughes & Palen., 2009; Olteanu et al., 2015; Jurgens & Helsloot, 2018; Palen & Liu, 2007; Reuter & Kaufhold, 2018; Stieglitz et al., 2018; Zhang et al., 2019) as well. In other words, news and social media have a central impact on the informational foundations of crisis collaboration: what people know about crises and how they perceive the dimensions of them. While this thesis focuses on constructive crisis collaboration, it is important to recognise that collaboration cannot be detached from the potentially negative and destructive dynamics of social media.

There is a substantial body of research on disinformation in which individuals or groups intentionally spread false information (Bennett & Livingston, 2018; Broda & Strömbäck, 2024; Chadwick & Stanyer, 2022; Hansson et al., 2021; Kapantai et al., 2021; Weikmann & Lecheler, 2022) and conspiracy theories (Bruns, 2020; Mahl, 2022; Starbird, 2017) – often in crisis times. Starbird et al. (2019) highlight how strategic information operations – such as disinformation as a form of online manipulation – are a form of collaborative work involving orchestrated agents (e.g. bots and hired trolls) and organic crowds aimed “to undermine the integrity of the information space and reduce human agency by overwhelming our capacity to make sense of information”. This can be seen as a kind of “counter-collaboration”, where important information is drowned out by irrelevant content and chaos is created. Information spaces and communities that start with good intentions can also be taken over or repurposed – either through external disinformation campaigns, or through internal dynamics that allow toxic cultures to emerge – in order to push harmful political agendas (Massanari, 2015; Starbird et al., 2019). This shift in thought demonstrates that collaborative media is not a static entity but a constantly negotiated space in which power relations can shift.

In light of prior research, crisis-related situational information and expressing emotions are the major social media content types that deal with crises (Cho et al., 2013; Takahashi et al., 2015; Spence et al., 2015; Zhang et al., 2019). At times of crises, knowledge and emotions are closely intertwined. In other words, exposing to crisis information through social media can influence the emotions people are likely to feel (Jin et al., 2014). On the other hand, Steinert (2021) highlights that people tend to express and share their emotions, especially on social media platforms during crises – and how that in turn could facilitate an emotional climate in a society. Social media can be a site for seeking and providing emotional support (Al-Saggaf & Simmons, 2015; Eismann et al., 2016; Olteanu et al., 2015; Procopio & Procopio, 2007; Recuber, 2012; Takahashi et al., 2015), as well as collective affect management during crises (Valaskivi et al., 2019). Further elaborated, solidarity becomes articulated through emotions that so-

cial media makes use of (Nikunen, 2019). Prior research has also suggested that media exposure has a positive effect on behaviour that requires collaboration between individuals (Hong et al., 2019). The research cases in this dissertation demonstrate how news and social media *phenomenalise* crises. The “Greta effect” (Mede & Schroeder, 2024; Sorce, 2022), burning koalas and kangaroos, and a line of gravely serious ministers giving COVID-19 updates construct crisis awareness and a sense of crisis. The sense of crisis – which I understand in terms of circulating emotions – gains different meanings based on how it emerges from the case studies of this dissertation.

According to my understanding, the sense of crisis is about a sense of community as “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members’ needs will be met through their commitment to be together” (McMillan, 1986, p. 9). In one of the case studies (Article I), a central theme that emerged through various topics was how social media had a central role in creating a feeling of connection between people during the COVID-19 pandemic. Consequently, more active collective social media cultures emerged due to the pandemic. Alongside the sense of community, the sense of crisis is essentially a question about a sense of urgency (about sense of urgency cf. Kotter, 2008). Based on the case studies, the sense of urgency is about a feeling that something must be done here and now to cope with and adapt to an occurring crisis. People’s motives to use collaborative media as part of societal crises have been researched in more detail in two of the case studies (Articles III & IV). Both emphasise the sense of urgency as a catalyst for collaborative media use. One of the studies describes the sense of urgency manifested, e.g. in ‘sincere horror’ that the participants of a collaborative initiative experienced due to the Australian bushfire crisis. In the study, participants reported how the hybrid media environment spread audiovisual content from the spot – presenting orphaned and injured animals – appealed to their emotions and created a need to act. This phenomenon relates to how open collaborations are part

of the platform economy and its core logics, such as the continuous quest for attention (Kuusela, 2020).

However, it must also be noted that emotions can have both constructive and destructive effects. For instance, on social media, emotional manipulation and the incitement of negative effects, such as fear – often spread through conspiracy theories (Fong et al., 2021; Kim & Chen, 2022; van Prooijen & Douglas, 2018) – may heighten uncertainty during crises. This, in turn, can trigger mass psychological reactions, such as panic (Fletcher & Aunger, 2024), that may weaken individuals' capacity to act constructively. This chain of reactions illustrates how constructive and destructive practices can become intertwined within the same media environments, thereby challenging the possibilities for positively oriented collaboration.

In sum, I argue that the use of collaborative media as part of societal crises is dependent on crisis circulation in the broader hybrid media system (about hybrid media system, see Chadwick, 2017). Or the other way around: crisis awareness and a sense of crisis – born in the crisis circulation practices of hybrid media – are prerequisites for collaborative media-based projects, all of which pertain to *media convergence* that refers to how information flows across multiple forms of old and new media (Jenkins, 2006). Next, I will discuss collaborative initiatives as a 'crisis utopia' that may encounter the laws and logic of the hybrid media environment.

'Crisis utopia' encounters the laws and logic of the hybrid media environment

One might ask if the collaborative projects ever commenced without the referred audiovisual media collection capable of triggering emotions (Casas & Williams, 2018; Kharroub & Bas, 2015), or existing social media platforms where people are used to networking and engaging with different groups (Kane et al., 2014). On the other hand, the capacity of the hybrid media environment is limited. Often, it seems that news cover only one crisis at a time. As noted in prior research, the media coverage of crises is

typically event-focused (Pantti, 2019) and how media attention towards crises fades within a week or two (Cottle, 2009; Valaskivi et al., 2019). Here, it is notable that the early 2020s have been packed with overlapping crises from COVID-19 to the climate crisis and wars, saturating the media environment and dividing our attention.

However, it is noteworthy that collaborative media also plays a role in phenomenalising crises when collaborative media-based projects gain media attention and spread to social media to tempt more people to collaborate. This dynamic is connected to how the remediation of crises may expand the lifespan of crises-related media events (Valaskivi et al., 2019). Still, the decreasing media attention seemingly results in the inactivation of digital volunteer networks that have emerged in the immediate aftermath of crises (Park & Johnston, 2017). On the other hand, in today's media environment, algorithms largely determine which content gains visibility (Boulianne et al., 2020; Gillespie, 2014), shaping collective action (Etter & Albu, 2020; Milan, 2016) by influencing which projects attract attention and new participants. Those who manage to align with algorithmic preferences are more likely to dominate, while other initiatives are pushed to the margins. Consequently, visibility and power (Beer, 2017) can be distributed unevenly. Overall, the issues of media visibility are not the only challenges that collaborative initiatives may encounter.

As suggested above, crises create a sense of crisis as a sense of community. Overall, prior research has underscored how crisis situations generate altruism (Wolensky, 1979) and a willingness to contribute to something positive (Lowe & Fothergill, 2003) amidst the uncertain circumstances. In addition, individuals and groups tend to become more cohesive and prosocial when faced with a disaster (Helsloot & Ruitenberg, 2004; Stallings & Quarantelli, 1985). Similarly, Valaskivi et al. (2019, p. 34) discuss how the 'disaster utopia phase' (Solnit, 2009) appeared immediately after the Fukushima disaster as "the mode of survival, with people helping each other to try and find a way of overcoming the disaster". Though people re-orientate towards community during exceptional times (Shklovski et al.,

2008), such orientations can be short-lived and fleeting. Good intentions to collaborate may, in fact, end up leading to conflicts.

This dissertation illustrates a shift from an early “disaster utopia” toward polarisation, as discussed by Valaskivi et al. (2019), who show how social media initially offers benefits but gradually becomes a space for conflict. Similar dynamics have appeared in the case studies of this dissertation: during the COVID-19 pandemic, participants encountered polarised information and acknowledged the spread of misinformation and conspiracy theories on social media (Article I). In other crisis contexts, conflict-prone and toxic communication cultures fuelled dissension and heightened emotions in a collaborative project where Finnish crafters aimed to help Australian animals during an environmental crisis (Article III). In contrast, there was surprisingly polite behaviour among the participants of ‘15 participants to save our climate’ – a project carried out on a purpose-built platform outside the main commercial social media platforms (Article II).

Taken together, these findings reveal that using existing social media platforms for collaboration means operating under terms and practices not designed for such actions. Collaborative efforts are shaped by pre-existing communication cultures that can be polarising and toxic. The exacerbating effects of social media – such as polarisation (Bozdog, 2020; Harel et al., 2020; Iandoli et al., 2021), toxicity (Almerekhi et al., 2019; Pascual-Ferrá et al., 2021), and abusive behaviour (Maity et al., 2018) – are widely recognised in research and public discourse. Crisis informatics scholars echo these concerns: Reuter et al. (2020) note that while social media can mobilise during crises, it also enables fake news, hate speech, censorship, and discrimination. Furthermore, the disorganised nature of volunteer crisis work (Valecha et al., 2013) often leads to “chaotic” social media use (Kaewkitipong et al., 2012; Kaufhold et al., 2019).

This dissertation argues that these challenges emerge in a “socio-technical shaker,” where social and technological boundaries collide. A chain reaction unfolds, as (1) crisis-related stress, (2) rapidly growing numbers of collaborators, and (3) communication ambiguities and technological chal-

lenges collectively (4) generate chaos, heighten emotions, and fuel dissension.

In polarised environments, “echo chambers” (Barberá, 2020) may form, reinforcing like-minded beliefs while excluding alternative perspectives. Although the link between echo chambers and polarisation is debated (Bruns, 2019; Kreiss & McGregor, 2023), such dynamics foster “us versus them” thinking, undermining constructive collaboration. The role of platforms in enabling polarisation has been widely discussed (Bail, 2022; Khan & Idris, 2019; Kubin & von Sikorski, 2021; Melchior & Oliveira, 2024). Algorithms can amplify negative dynamics by favouring fake news (Corbu et al., 2021) and granting it disproportionate visibility. These mechanisms raise a critical question: to what extent is citizen collaboration authentic, and to what extent is it shaped by platform structures and logics? At the same time, the spread of negative phenomena can erode the credibility of certain platforms, which also affects positive actors: their messages may be drowned out by the noise, or they may be suspected of being part of disinformation.

In sum, we may ask what kind of circumstances rapidly fading media attention, short-lived crisis utopia, and polarised media cultures create for long-term collaboration in societal crises that pose chronic uncertainty. Or if the above-described circumstances are a fatal combination as such. To give an instance, though climate crisis is an existential threat, it might be challenging to create long-term collaborative action among citizens.

5.4 Socio-technical framework for collaboration: the common and coincidental in collaborative media encounters

Throughout the research, I have argued how collaborative media needs to be explored as its own concept to capture the salient properties of people’s everyday media practices that are, to a great extent, collaborative (Löwgren & Reimer, 2013a). For doing so, it is crucial to define what collaboration is. I have argued that collaboration is typically referred to as

a self-explanatory concept without further defining how it is understood. The chain of thought continues by arguing how it seems that when we talk about collaboration, we are talking about participation, networking, coordination, cooperation, or other similar terms. Next, I will examine how collaboration emerges at the intersections of citizens, media technologies, and crises, and how this process further defines collaborative media.

The formation of shared goals and common solutions in societal crises

Broadly defined, I understand collaboration as a process in which participants work together to achieve a shared/common goal. The research cases in this dissertation indeed point out the shared goal as a starting point and key identifier for collaboration. The shared goals became especially evident in the project-based use of collaborative media – represented by the projects oriented towards collaborative crisis intelligence and collaborative crisis action. Still, in the cases dealing with collaborative crisis adaptation, it may also be that the collaborative media-enabled extensive COVID-19 restrictions were ‘accepted’ because preventing the spread of the virus was a shared goal in the society at large. On the other hand, it is noteworthy that shared goals are upper-level big goals that are further divided into smaller goals. For instance, tackling the COVID-19 pandemic may be the upper-level big goal, whereas organising an online hackathon is a smaller and more pragmatic goal that enables concrete collaborative activities. In other words, societal crises themselves already present loosely defined objectives – such as the need to prepare, respond, and adapt. However, a more concrete goal is needed for organising collaborative initiatives.

Altogether, it seems that large-scale societal crises – such as the climate crisis and the COVID-19 pandemic – create favourable conditions for the formation of shared goals. Nevertheless, it should be noted that the datasets were collected in the acute phases of the crises – when the climate crisis gained wide media attention due to the recently released IPCC report and the ongoing bushfires, and in the early moments of the

COVID-19 pandemic. This timing may have highlighted parallel mindsets and a sense of being in ‘the same boat’ – easing the formation of the shared goals. As discussed earlier, social media increasingly becomes a space for expressing opinions (Fischer-Preßler et al., 2019) and conflicts that may construct social distance (Valaskivi et al., 2019) as crises progress over time. Nevertheless, highlighting the significance of the shared goal in exploring the essence of collaboration is well-aligned with the prior definitions for collaboration (cf. Camarinha-Matos & Afsarmanesh, 2007; Camarinha-Matos & Afsarmanesh, 2008; Mattessich & Johnson, 2018; Randrup et al., 2016; Vreede & Briggs, 2006). Conversely, collaboration is not necessarily constructive; it can also be negatively charged and destructive. In other words, the nature of collaboration depends on the context and underlying motives. Therefore, shared goals may also apply within forms of collaboration that are oriented in a non-constructive manner, as in the case of anti-vaccination movements (Johnson et al., 2020; Kata, 2012; Ortiz-Sánchez et al., 2020) that mobilise collective efforts toward harmful ends. One avenue for future research is to investigate whether the elements of collaboration, as conceptualised here, can also be identified in destructive forms of collaboration. The present discussion, however, proceeds to explore the manifestations of collaboration within the ‘socio-technical shaker’ from the vantage point of constructive collaboration.

In my interpretation, *shared goals* are closely related to *common solutions*. Shah (2012) defines collaboration as “a process involving various agents that may see different aspects of a problem and engaging in a process through which they can go beyond their own individual expertise and vision by constructively exploring their differences and searching for common solutions that are more than merely the sum of each party’s contribution”. What makes collaboration different from cooperation is that it involves all parties working together to solve a problem (Shah, 2012, pp. 13–14). I also observe that the most intriguing part of the definition is the search for “common solutions that are more than merely the sum of each party’s contribution”. Given this emergent quality, I suggest that it is connected to intertwined relationships and interactions between people.

In collaborative encounters explored in this dissertation, people were not isolated from each other and only added their personal contributions to a growing hill of contributions. The solutions would not have taken shape the way they did without people combining their knowledge and skills, or negotiating from their own and their family's starting points, to determine how to reorganise life in crisis circumstances.

Common solutions can be, for instance, solutions suggested by participants in combatting the climate crisis (Article II). They can be a jointly organised project where people knit, crochet, and sew shelters for Australian animals affected by the bushfire crisis (Article III). They can be an online hackathon to harness the expertise of thousands of people, collaborating to devise initiatives that address several challenges related to COVID-19 (Article IV). Moreover, they can also be individuals navigating how to organise their lives in the suddenly changed circumstances where a home should function simultaneously as a kindergarten, school, and workplace (Articles V & VI). Therefore, it is not only a question about searching for a solution but cumulating actions that grow into a synergistic solution that goes beyond individual efforts. Flattening the COVID-19 curve would not have been possible without people retreating to their homes and negotiating in their own *microcosmoses* with family members to keep life rolling.

Collaborative media creates the framework in the search for these common solutions extending beyond the sum of each party's contribution. Shah's (2012) set-based model of collaboration offers a useful framework for unpacking the different dimensions of collaborative activities. While this dissertation focuses primarily on collaboration in the full sense – defined by the search for common solutions that exceed the sum of individual contributions – it is also important to acknowledge that collaboration is built upon foundational practices, including communication, contribution, coordination, and cooperation. These foundational practices may appear differently in the studied cases. I have highlighted collaborative media as a socio-technical shaker that amplifies the coincidence of collaborative encounters. However, in crisis circumstances, these encounters do not occur in a vacuum: for instance, heightened uncertainty and urgency, as well as

emotional stress, place significant pressure on practices like communication. These foundational sets / layers of collaboration can become fragile under exceptional circumstances. Thus, the cases in this dissertation illuminate encounters that are not so much about refining 'state-of-the-art' collaboration, but rather about continuous social and technological balancing and compromising, where the shared goal serves as sufficient glue between people participating in collaborative encounters. Next, I will further explore the coincidental collaborative encounters taking place in the socio-technical shaker.

Coincidental collaborative encounters

We know from prior research that social media supports the formation of ad-hoc social networks (Jurgens & Helsloot, 2018) where anyone interested can participate and contribute in an open manner (Park & Johnston, 2017). People are linked from different background (Park & Johnston, 2017) with their different expertise (Callaghan, 2016; Yates & Paquette, 2011) and various of skills (Alexander, 2014; Jurgens & Helsloot, 2018). In this dissertation, I shed light on the 'accumulation of resources' and richness of participants' spontaneous contributions in crisis-related initiatives – from crafting to developing new innovative solutions and completely reorganising one's daily life. Keegan et al. (2013) suggest that the emergent crisis-response groups are unable to rely on prior expertise. In contrast, the case studies in this dissertation underscore how the participants spontaneously take on different tasks, depending on their own interests, knowledge, abilities, and skills. Consequently, digital-age 'assembly lines' emerge, where tasks are distributed based on individual know-how. Overall, people have a desire to collaborate in societal crisis situations where their potential is met. Interestingly, participants are also willing to learn new skills as a part of the projects, which provides insight into how collaborative media-based projects create an inspiring infrastructure that mobilises people to partake in collaborative efforts. On the other hand, Article III demonstrates how traditional skills gain new value and acquire new

meanings. In the article, craft skills are integrated into collaborative media platforms, emphasising the spirit of remediation (Bolter & Grusin, 1999) as the representation and incorporation of one form of media within another.

In the context of spontaneous volunteering in crises, prior research has highlighted a constant balancing act between self-organisation and coordination. Though spontaneous volunteers want and need open and fluid structures, it is necessary to establish clear orienting structures, such as rules, tasks, and responsibilities (Simsa et al., 2019). Through the studies of this dissertation, it is evident that structures do matter in collaborative media-based projects. Altogether, I have highlighted the presence of lead organisers/administrators or utilising structure-led projects in managing collaborations in this research. These arrangements function as focal points around which collaboration takes shape in a loose and low-hierarchical manner. Similarly, Kaufhold & Reuter (2016) argue that the role of moderator is underplayed in prior research that deals with social media-based crisis responses. Meanwhile, emphasising the necessity of leadership aligns with prior research that highlights how the ethos of openness in online collaboration does not eliminate the unequal distribution of power (Kuusela, 2018). Further elaborated, leadership can also mean an emphasised need for self-leadership, as seen in Articles V and VI. To give another instance, during the COVID-19 pandemic, children's remote schooling – and reconciling it with parents' remote work – was largely left for individuals to resolve to keep daily life running smoothly. Altogether, the top-down and bottom-up practices are in flux in the case studies⁴. Projects are shaped from participants' spontaneous contributions for which the structures give an initial framework. Actions can be guided to a certain extent, but the unpredictability of encounters must be accepted. Instead, the collaborations are a question about the great co-incidences in the identities of who are involved in the collaboration and the nature

⁴ Altogether, it needs to be noted that though I have had a bottom-up lens in focusing on collaboration among citizens, bottom-up approaches are interlinked with top-down characteristics. This became evident especially in remote school and work studies, where the use of collaborative media was top-down imposed.

of what everyone does. In any case, leadership or some guiding structures for collaboration are needed.

In examining the technological side, the research cases highlight how the existing platforms and tools are appropriated (Stevens & Pipek, 2018) in crises. Similar observations have been made in the relevant research as well (e.g. Auferbauer & Tellioğlu, 2017; Mark & Semaan, 2008). Though crisis events may correlate with adopting new technologies (Hughes & Palen, 2009), most people tend to use technologies they are already familiar with (Simon et al., 2015). In this dissertation, it becomes evident that the existing platforms and tools are favoured due to their rapid availability, reach, familiarity, and ease of use, creating low-threshold collaboration opportunities. Conversely, the technologies might be 'existing' on a general level but unfamiliar to individual people. Article V exposes how families were required to set up a technological infrastructure with one day's notice to switch to remote school mode, which caused struggle and stress for many. In sum, existing technologies are being appropriated, but it is not without challenges.

As pointed out in prior research, the existing social media platforms – such as Facebook and Twitter – often do not align well with the needs of real-world activism (Hirsch, 2011). This thesis reveals how the challenges range from chaotic communications to a lack of transparency – as well as divided application use and a need to manage an array of different applications and tools, as the 'technology box' is built by combining a set of different services. Meanwhile, it is not only a question about technologies specifying what we can do and what we cannot (McLuhan, 2003; Scolar, 2012) but peoples' motivation and abilities for action (Faraj & Azad, 2012; Sumiala et al., 2018). Though the technologies are experienced to be a certain kind of mismatch with the operations, they work 'well enough' for the purposes at hand. This paradox poses a question about whether we should favour technologies dedicated to crisis-related use (about the distinction between activist technology projects and commercial social media, see, e.g. Hirsch, 2011) or if it is better to appropriate technologies that people already use when eyes turn to, e.g. social media community

services. The case studies (especially Articles III and IV) of this dissertation emphasise how people are reached from the platforms routinely used in their daily lives. The choice of platform is connected to a question about whom we want to reach, such as Facebook to reach craft makers in Article III. In contrast, Article IV shows that the use of platforms can also be divided within individual projects.

Overall, the COVID-19 pandemic led to a very rapid transition to remote arrangements, and this urgency resulted in the use of ad-hoc technological solutions and a wide variety of practices, particularly during the initial moments of the pandemic. Now that we have returned to on-site work, it is crucial to critically evaluate the technologies adopted during the acute crisis phase to avoid encountering the same issues again. Although the coronavirus has loosened its grip, future disruptive events, such as new pandemic outbreaks or natural disasters, may again necessitate a similar shift to remote arrangements. In crisis situations, things are often done in great haste: the time frame of 'only a few days' notice' repeats itself across the case studies. However, in crises characterised by chronic uncertainty, there is also time to plan, ultimately revealing a paradox of urgency: there is pressure to act quickly, but at the same time, there is an opportunity to take time for thoughtful planning and effective execution.

To conclude, collaborative media, first and foremost, is a cultural form (Williams, 1974), shaped by technological properties, as well as historical, social, and cultural contexts (Löwgren & Reimer, 2013a). Technologies derive their meaning in relation to their use – and the use of technologies reveals different dimensions of sociality. There, trust is one intriguing dimension of reflection. Article IV explores different dimensions of trust in online-only-collaboration and indicates how social trust compensates for gaps in technological trust. Therefore, having strong social trust among the collaborators offsets technological handicaps. Social trust is enabled in the case study by the strong leader who turned to people he knew from real life – who he trusted and who trusted him. In contrast, social trust seems to be weaker in Case Study III, where the participants were mostly unknown to each other prior to the project and repeatedly brought up

the toxic characteristics of social media present in the project. Is it the case that in such circumstances, the technological challenges also gain greater importance? However, there is a risk that people will not want to join collaborative media-enabled projects if there are negative spirits. The intertwined and destructive dimensions of hybrid media environment are discussed more thoroughly in the synthesis section. Overall, collaborative media projects require either strong social or technological trust. Problems become pronounced when both types of trust are weak. Further elaborated, the above-discussed socio-technical shaker signpost how *online* and *offline* convergence and blend in collaborative media-based projects.

In the convergence and blending of online and offline

Prior research suggests how communities are increasingly defined in social rather than physical terms (Wellman et al., 2002). In contrast, this dissertation sheds light on the convergence and blending of online and offline spaces (Eklund, 2015) in collaborative media-based projects, which emerges in various ways from the case studies. I have highlighted how collaboration moves across the boundaries of online and offline environments, even on an individual level. In Article III, participants combine online and offline engagement in creative ways. It raises the question of how technological environments do not replace face-to-face encounters but rather complement and enrich them. Adding another perspective to the convergence and blend of the online and offline communities, Article IV poses a question about how virtual and real-life networks may layer, support and complete each other in societal crisis situations. This becomes evident in Articles V and VI, which underscore how the use of technologies had indirect effects on the family unit in remote schooling and work conditions – and how family members, for instance, became satellite members of school and work communities.

As suggested by Castells (1996), the shift towards networked-based communications changes the spatial and temporal patterning of social practices. Based on the case studies of this dissertation, it seems that the

use of collaborative media in societal crises is about a continuous renegotiation of spatial, temporal, and social practices – and how the old rules no longer apply when collaborative technologies are harnessed to new use contexts. Especially Articles V and VI emphasise how collaborative technologies – when widely adopted – can have very tangible effects on how we organise our spaces, manage our time, and structure our social relationships. There, it highlights collaboration as a “space of flows” where information, people, and artefacts are brought together in new ways under new circumstances (Castells, 1996). Papacharissi (2010, p. 138) discusses the private sphere in enabling a citizen to connect with other citizens and to function civically “without requiring entry to public spaces that compromise the flexibility of a private and personal sphere”. Article VI especially encompasses the spillover and blurring effects in the work-home boundaries as different social spheres converged into homes. By doing so, the article also highlights homes as ‘the micro units of crises’ and further raises the question of how the private becomes public and the personal becomes collective. There, it underscores Papacharissi’s idea about the private sphere in “facilitating multi-tasking of civic and other behaviors” (Papacharissi, 2010, p. 138).

As an after-thought, this dissertation would look very different without the spark of the coronavirus in early 2020, which rapidly changed life as we knew it. Social and collaborative media-enabled interactions became emphasised as face-to-face meetings were limited or forbidden. While writing the summary of this dissertation, there have been broad discussions about how organisations struggled to get employees back to on-site work after the widespread adoption of remote work due to the COVID-19 pandemic. Face-to-face interactions have gained new importance, as exemplified in Amazon’s complete ban of remote work for its employees (Wingard, 2024). In a broader scope, we may ask if mass remote work have created conditions that reinforce the ideal of face-to-face interactions and thus lead us to question media-enabled collaboration. Instead of wanting people online, they are wanted back to in-situ life and engaging in face-to-face interactions. Although internal collaboration within work

communities and open-to-all collaboration are two different things, the ongoing societal discussion reflects broader questions about the value we give to face-to-face interactions. And vice versa: about the role we want to give for collaborative media-based encounters. In the end, why do we need large-scale collaboration in societal crises? Next, the use purposes of collaborative media as a part of societal crises are discussed in more detail.

5.5 The use purposes of collaborative media: in the intersections of intelligence, action, and adaptation

Similarly with Löwgren & Reimer (2013a), I have been interested in collaborative media as practices made possible by the cultural form. Finally, the purposes for which collaborative media are used are discussed. Open questions remain, for instance, regarding the impact of collaborative encounters and the paradox of chronic uncertainty.

Broadening the understanding of collaborative media use purposes

It is acknowledged from prior research that social media and digital communications services enable citizens to self-organise (Jurgens & Helsloot, 2018; Kaufhold & Reuter, 2016; Starbird & Palen, 2011) and form emergent groups without a pre-existing structure (Auferbauer & Telliğlu, 2019; Auferbauer et al. 2019; Starbird & Palen, 2011; Twigg & Mosel, 2017) in crises. However, the ways to understand how citizens collaborate in crises circumstances have been narrow. Largely, the use purposes have been understood in terms of information-focused and/or micro-tasking-oriented tasks. These tasks include research gazes on how people monitor, filter, and map crisis-related social media data (Starbird & Palen, 2011; Palen et al., 2015) and curate it into usable resources (Cobb et al., 2014). In addition, as I highlighted in the literature review, the research focusing on the use of social media in crises is methodologically uniliteral as much of the research concentrates on Twitter (Palen & Hughes, 2018; Purohit et al., 2014b; Reuter & Kaufhold, 2018; Simon et al., 2015).

To my best knowledge, there are no previous attempts to map the use purposes of collaborative media among citizens in a bigger crisis-related picture, enabling the spectrum of the use purposes of collaborative media to emerge. In the methods section, I have presented how the 'triple lens' to daily life guides the choice of case studies in this doctoral dissertation. As a result, the six case studies draw a rich picture of how the crisis-related use of collaborative media becomes part of everyday interactions and domestic spaces, hobbies and volunteer projects, as well as work and studies through various platforms, from social media to existing and custom-fit collaborative platforms and tools. Through this approach, it is possible to meet the research aim of providing a user-centred understanding of the use of collaborative media in versatile societal crisis settings. In this dissertation, I have suggested that the use purposes of collaborative media in societal crises are divided into 1) collaborative crisis intelligence, 2) collaborative crisis action, and 3) collaborative crisis adaptation. Together, these use purposes signpost the roles the use of collaborative media may take in societal crises. Altogether, the results show how private and personal become intertwined with the public and collective in an aim to combat crises that pose chronic uncertainty. According to my interpretation, the three use purposes of collaborative media in societal crises are paths toward crisis resilience, which is regarded as an exciting and promising future direction in crisis informatic research (Palen & Hughes, 2018). Often, these paths may cross, but they come with their own accents.

I would like to once again emphasise that the nature of collaboration depends on the context and the underlying motives. It is easy to see that collaborative media can also be used in destructively oriented ways, such as in the case of the systematic spread of disinformation (Bennett & Livingston, 2018; Broda & Strömbäck, 2024; Chadwick & Stanyer, 2022; Hansson et al. 2021; Kapantai et al, 2021; Weikmann & Lecheler, 2022) or the incitement of an anti-vaccine sentiment (Johnson et al., 2020; Kata, 2012; Ortiz-Sánchez et al., 2020). From the perspective of collaborative action (and adaptation), the COVID-19 era demonstrates how the freedom convoy movement (Askanius, 2024; Roy & Gandsman 2023) emerges

in opposition to pandemic policy restrictions. Therefore, it is important to remember that although this research focuses on constructive collaboration, destructive phenomena may exploit the same platforms and socio-technical mechanisms.

The question of impact in collaborative media -based initiatives

The explored studies leverage momentary gatherings and people's momentary willingness to work together. Still, the suggested use purposes do not state much about the actual results that are achieved. If we take a look at the case studies, we see how collaborative crisis intelligence-oriented initiatives generated hundreds of ideas and proposed solutions to tackle the shared crises. In terms of crisis action, the use of collaborative media resulted in hundreds of handcrafted items to help the Australian wildlife suffering from the Black Summer 2019-20 bushfires. However, collaborative crisis intelligence and collaborative crisis action-oriented initiatives seem to be one-off and short-lived initiatives, which do not necessarily have continuity. In the field of solidarity-related research, previous research has posed a question about whether the actions are only momentary experiences of solidarity (Nikunen, 2019) and the pragmatic management of suffering or whether they offer a basis and carry a vision for a meaningful social change (Chouliaraki, 2018). Overall, citizen activism often fails to mobilise large numbers of ordinary people, instead engaging small groups that are deeply committed to their cause (Hirsch, 2011). At the end of the previous section, I have posed the question of why we need large-scale collaboration in societal crises. According to Fischer (2011b), there are no "average" users in cultures of participation (Nielsen, 2006) – and viable and successful cultures of participation require a sufficient number of participants to undertake more active and more demanding roles (Porter, 2008; Preece & Shneiderman, 2009). I would say that it applies in cultures of collaboration as well.

However, is there any sense in generating enormous amounts of ideas and proposals if their further development is not ensured? In relation to

this question, it is central to note that this research focuses on citizens' mutual collaborations that are only one part of the crisis actor ecosystems taxonomised, e.g. by Reuter & Kaufhold (2018). Though these collaborations are important, they are insufficient. For example, Article II depicts the iteration of ideas presented to the Belgian government to tackle the climate crisis, which signposts how the use of collaborative media can strive to influence policy measures as well. This case also pertains to how the green transition requires an interplay between different actors (citizens, policy-makers, businesses, etc.). The above-mentioned article is also an example of how sustainable development and green transition require negotiation between interests, as the participants of the particular collaborative media-based projects did not have a shared understanding of what sustainability means. As Pram Gad et al. (2019) point out, though prominent stakeholders agree on the need for sustainable development, there is no agreement over what needs to be sustained but rather competing visions for the future. Still, I would like to highlight the significance of creating collaborative mobilisation and movement surrounding crisis-related issues. By doing so, I underscore how the term crisis historically refers to "a critical point, a fork in the road of development, a moment of decision". The term crisis also suggests that the threat in question, be it a climate crisis, can still be averted if we collectively rise to the challenge. (Boin et al., 2018, p. 24).

On the other hand, the case studies in the dissertation are connected to large-scale phenomena that spread across borders, such as the Youth4Climate movement, climate crisis -related craftivism, and COVID-19 hackathons. The potential impacts of collaborative projects are thus broad and scalable. In addition, collaborative media also takes on a role of a 'mediator'. In Article II, collaborative crisis intelligence catalysed actions that had potential to grow beyond that particular project. This is described in the function 'call to action', which refers to how participants sent out action-oriented requests to companies or people, shared practical tips for a more ecologically sustainable life, inquired about the possibilities to act, and proposed further business ideas. All these bear the thought that crises

require a change, and that change is created by concrete actions. In Article I, the participants of the study reported how socially acceptable behaviour patterns – i.e. action – were catalysed in social media during the COVID-19 pandemic. By doing so, the article describes how parallel action is created through peer pressure to prove their usage of face masks and isolated leisure time at homes. This signposts how similar behaviour patterns highlighting social acceptance could result in environmentally relevant behaviour choices too. Together, these findings illustrate collaborative crisis action as practical contributions that aim to combat shared crises.

In contrast to crisis intelligence and crisis action, the impact of crisis adaptation is perhaps the most concretely visible in the case studies of this research. Overall, I see crisis adaptation as a matter about how people live their everyday lives during (long-term) crises. Crisis adaptation is a collaborative media use purpose that has not received much attention in research. Some central contributions in this area have been made by Mark & Semaan, who have studied resilience in collaboration during the prolonged disruption caused by the wars in Israel and Iraq (cf. Mark & Semaan, 2008; Semaan, 2019). As demonstrated by Articles V and VI, homes were suddenly turned into classrooms and offices with the help of collaborative media technologies during the COVID-19 pandemic. By doing so, they offer valuable insights on how collaborative infrastructure was created in an ad-hoc manner in the rapidly changed circumstances. The articles emphasise how individual adaptation enabled collective adaptation in the crisis circumstances. It poses a question about what I as an individual can do to organise my life in a crisis-compatible way, and what we can do as communities and collectives. Further elaborated, they highlight the changes we are capable of conducting, if imposed. Meanwhile, in the context of remote schooling and remote work, many practices have persisted, and some people have not fully returned to their workplaces. Overall, an interesting question that arises is how to generate and sustain long-term action in prolonged crises. As one of the directions for future research, it would be fruitful to conduct longitudinal studies among collaborative media-based crisis initiatives.

The paradox of chronic uncertainty

My research interest lies in crises that pose chronic uncertainty. Crises are existential threats, whereas disasters are episodic events that cause human suffering and infrastructural damage (Boin et al., 2018). On the other hand, this dissertation highlights how within the crises, the research cases are connected to episodic moments that generate episodic actions. By doing so, they emphasise how crises and disasters are closely intertwined, and clear boundaries cannot be drawn. The case studies also raise the question of whether it is possible to initiate action without episodic events that turn our attention to crises.

I have also emphasised throughout the dissertation how prior research focusing on the use of social and collaborative media technologies as part of societal crises have mainly given attention to geographically bounded crises (cf. Tsai et al., 2021). Though my research interests are in geographically distant / cross-local / abstract crises that pose chronic uncertainty, I also believe, on the basis of the case studies, that in every crisis, local microcosmoses are created. It poses a question whether there is global without local. However, prior research has mainly paid attention to volunteers directly affected by the crisis events (cf. Haworth et al., 2016; Kaufhold & Reuter, 2016; Semaan & Mark, 2012). There, this dissertation makes an exception by focusing on crises that do not pose a direct, life-threatening immediacy for participants but rather indirect impacts, gradual progression, and invisible causes.

I also argue that the traditional distinction of affected / non-affected individuals does not apply in societal crises that pose chronic uncertainty. For instance, in a climate crisis, there is no person who would not be affected – even though the effects would not be realised in the lived moment as ‘an escape or die’ situation. Digital / virtual volunteers (Cobb et al., 2014; Hellman et al., 2016; Reuter et al., 2013; Starbird & Palen, 2011; Whittaker et al., 2015) do not only assist victims but also share a global agenda, which is highlighted in Article II that presents a case in which people post an idea for tackling climate change, and comment and vote

on others' ideas. Meanwhile, Article III depicts 'a more traditional digital volunteer setup' where participants help in crisis relief efforts without being physically present in the area affected by a natural disaster. Palen et al. (2020) argue that individuals with a close connection to a disaster-affected region use social media differently compared to global onlookers. In crises characterised by chronic uncertainty, however, there are no true global onlookers. Yet, given the insufficient response to issues like the climate crisis, we all paradoxically remain global onlookers. From there, we return to the question about how to create sustained collaboration during prolonged crises.

As a concluding remark, no (media) technologies do not solve societal crises without us humans collaborating and making an impact. Above all, this dissertation highlights that we have an ability to act, ability to be intelligent, and ability to adapt – and an ability to do all this in collaboration with each other. Nonetheless, what is lacking is *chronic behaviours* in chronic crises. As Rebecca Solnit puts it, “the real question is not why this brief paradise of mutual aid and altruism appears but why it is ordinarily overwhelmed by another world order” (Solnit, 2009, p. 97). My call to action is to get rid of episodic attention that results in episodic action. Chronic crises require chronic behaviours. That is a call to research as well: How do we create chronic behaviours in chronic crises by collaborating in a contemporary media environment?

5.6 Contributions of the research

Contextual contribution

The multidimensional relationships between ICTs – including media technologies – and crises have long been of interest to scholars (Palen & Liu, 2007). This study addresses a contextual gap in earlier research on collaborative media during societal crises, which has largely focused on short-term, localised events (Tsai et al., 2021). It examines the chronic crisis years of the early 2020s marked by the COVID-19 pandemic, long-dis-

tance disasters, and global climate movements, such as Youth4Climate. Not only have these circumstances created unprecedented conditions for mediated collaboration, but they also offer a unique lens for both scholarly inquiry and practical reflection.

Empirical contribution

The research provides rich insights into citizens' use of collaborative media in societal crises characterised by chronic uncertainty and geographical distance. The empirical findings show how increased crisis awareness and a heightened sense of crisis acted as a catalyst for initiating and sustaining mediated collaborative initiatives. The study identifies key enablers and barriers shaping such collaborations and highlights strategies employed to overcome the limitations. Furthermore, the findings illustrate how individuals maintained collaborative activities when physical gatherings were impossible and daily life moved into the home environment.

Conceptual and theoretical contribution

I have argued that if we are interested in collaboration, more descriptive concepts – apart from, e.g. social media – are required. The thesis elaborates the concept of *collaborative media* (Löwgren & Reimer, 2013a) as a sociotechnical crisis construction, addressing a phenomenon that has been poorly understood and understudied in prior research.

The empirical research findings fuse together in a conceptual framework as a theoretical research contribution. The framework sheds light on the role of collaborative media in the mediated crisis sphere, increases our understanding about how to organise and maintain collaborative activities by seizing the opportunities and tackling the constraints of the collaborative media platforms, and clarifies the use purposes of collaborative media as a part of versatile crisis settings. By doing so, the framework informs the interaction design as shaping digital artefacts/things for people's use (Löwgren & Stolterman, 2004; Löwgren, 2014), as well as the design of

human interfaces for civic and urban engagement, helping citizens take action for change (about human interfaces for civic and urban engagement, see, e.g. Foth et al., 2013).

Moreover, this dissertation bridges two traditionally separate research domains: media studies and HCI-oriented crisis informatics. By conceptualising collaborative media as a socio-technical phenomenon, it creates a shared theoretical ground that enables dialogue and integration between these fields. This interdisciplinary contribution expands the understanding of mediated collaboration beyond disciplinary silos and opens new pathways for joint research and design practice.

Methodological contribution

The study demonstrates how qualitative, interpretive approaches can be applied to examine mediated collaboration in crisis settings. It provides user-centred perspectives and shows how empirical material can be synthesised into conceptual frameworks. This methodological approach offers guidance for studying socio-technical phenomena in dynamic and uncertain environments, where traditional research designs may fall short.

Practical and policy contribution

Building on the empirical and conceptual findings, this research offers actionable insights for strengthening mediated collaboration during future crises. Societal actors – from public governance to grassroots initiatives – should create spaces where crisis awareness can be transformed into collaborative intelligence, action, and adaptation. Sustaining collaboration requires leveraging the heightened sense of crisis fostered by hybrid media environments and setting clear, achievable shared goals that motivate collaboration. Investments in collaborative platforms should prioritise flexibility, ease of use, and accessibility. In doing so, it is essential to carefully evaluate whether to adopt existing large-scale platforms (such as commercial social media) or to rely on purpose-built solutions, weighing

factors, such as popularity, accessibility, and the specific needs of targeted collaborators. Leadership must be balanced with opportunities for spontaneous contributions that harness participants' interests, skills, and knowledge. Trust – both social and technological – must be actively cultivated to mitigate polarisation and encourage constructive interaction. Finally, effective crisis-driven collaboration benefits from integrating online and offline practices.

6 Concluding remarks

6.1 Conclusions

During the first half of the 2020s, the COVID-19 pandemic, the climate and environmental crises, and the Ukraine war, among others, are intertwined – both in real life and in the hybrid media environment. Nevertheless, prior research on media-enabled collaboration among citizens in crises has mainly focused on people directly affected by immediate disasters and incidents.

This dissertation addresses this gap by providing a user-centred view of how citizens' use of collaborative media in societal crises characterised by chronic uncertainty and geographical distance. Negative or destructive uses – such as disinformation and conspiracy theories – were acknowledged but deliberately excluded from the scope of this thesis. This focus enabled an in-depth exploration of constructive dimensions, which are particularly relevant for design practice by generating actionable insights into how collaborative media can strengthen collective resilience in future crises.

Aware of social media criticism, I rely on the concept of collaborative media to capture the salient properties of people's collaborative practices during crises. A key contribution of this dissertation is the development of a theoretical framework centred on the concept of collaborative media. This framework not only structures the analysis but also provides a foundation for future research and design practice; it sheds light on the role of collaborative media in the mediated crisis sphere, clarifies how collaborative activities can be organised and maintained by leveraging opportunities and addressing platform constraints, and identifies distinct use purposes of collaborative media in versatile crisis settings.

Understanding what drives media-enabled collaboration is significant when people need to cope with and adapt to chronic and geographically distant crisis circumstances. I argue that mediated crisis awareness and cir-

culating emotions play a key role in triggering collaboration. As part of the conceptualisation, the socio-technical dimensions of collaboration should be better understood. This dissertation demonstrates how collaborative media functions as a socio-technical shaker – a metaphor for the fluid interplay of social interactions and technological circumstances, where configurations emerge case by case, shaped by situational conditions. This socio-technical perspective clarifies how collaborative practices are initiated, organised, and sustained online, highlighting the mechanisms that enable citizen collaboration during crises. It also provides signposts for improving collaboration in these environments. After all, the activities taking place in the socio-technical shaker grow into three key use purposes: collaborative crisis intelligence, collaborative crisis action, and collaborative crisis adaptation. Together, these purposes represent concrete opportunities and hope, grounded in a pragmatic form of techno-optimism.

In sum, this dissertation positions collaborative media as a socio-technical phenomenon that enables constructive civic engagement in times of chronic uncertainty and geographically distant crises. Beyond its empirical and conceptual contributions, the work offers practical signposts for practice, and policy to strengthen collaboration during crises and advocates for a human-centred approach to crisis media technologies. Moreover, it fosters dialogue between media studies and HCI-oriented crisis informatics, paving the way for more integrated research and design.

6.2 Limitations

This doctoral dissertation has limitations that should be acknowledged. First, the research cannot be replicated in the same way as quantitative studies. Thus, credibility and trustworthiness can be accomplished in other ways – for instance, by citing prior research and being transparent in the selection and usage of methodologies (Saldaña, 2011), as is the goal of this dissertation and its case studies.

On the other hand, case studies may be broad or narrow in scope (Creswell, 2013), thereby resulting in datasets that can be rigorous – further

potentially affecting the generalisation, transferability, and reliability of the results (Merriam & Tisdell, 2015). As presented in the introduction, the cumulative dataset of this dissertation is comprehensive, incorporating 81 interviews, 387 online survey responses, diaries and sampled experiences (incl. 89 photos and 243 emojis sent) from 16 people, as well as 266 ideas and 1406 related comments to tackle the climate crisis. Still, the datasets in the individual studies may be limited, such as in the participant sample. Meanwhile, some studies have sought to compensate for this by employing different data collection methods to gain both depth and breadth in the findings (such as interviews and surveys).

However, the surveys conducted during the COVID-19 crisis – and its early waves – did not aim to achieve a (nationally) representative sample. Rather, participants were recruited through channels that allowed access to individuals with an interest in the topic. It is important to acknowledge that the COVID-19 pandemic necessitated numerous ad-hoc solutions across various domains, including research. The abrupt and uncertain nature of the situation meant that time-intensive recruitment processes were not always feasible. Consequently, we had to rely on the channels that were available and operational at the time, adapting swiftly to the constraints imposed by the evolving circumstances.

Furthermore, the dissertation profoundly emphasises understanding phenomena from the perspective of individuals. As the studies rely on people's own expressions, respondent bias may appear (Lincoln & Guba, 1997). Also, it needs to be considered that user behaviour and preferences differ across cultures (Hofstede, 2011) and the socio-economical contexts vary between different countries. In these terms, I acknowledge the geographic and cultural limitation of the research, as the studies were run in Europe –mostly in Finland. There are also other potential respondent biases in terms of gender, age, socio-economical background, and reaching marginalised people, to name a few.

The biases are presented in more detail in the reported case studies, but here I highlight that they potentially affect the research findings and the resulting theoretical framework. The case studies tend to foreground

the experiences of white people living in welfare states, whose participants were often women. Educational backgrounds were not reported in the case studies. However, one of the studies was conducted among university staff and students, who are evidently either highly educated or pursuing a higher degree. Overall, the research participants had access to digital technologies and demonstrated both the capacity and willingness to engage in constructive collaboration in response to crises. While the insights provided by these groups are valuable and should not be underestimated, it is crucial not to treat them as the whole truth. Instead, we must remain attentive to whose worlds and experiences these findings actually reflect.

It should also be noted that the research is closely intertwined with collaborative media platforms. In many cases, collaboration takes place via social media applications, such as Facebook, WhatsApp, and others. As technology is constantly evolving, it cannot be captured as a static snapshot. It is therefore possible that the technological features have since developed. On the other hand, participants' experiences often relate to universal phenomena – such as fast-paced interaction – that are not fundamentally altered by version updates of specific applications. Nevertheless, technological development introduces potential limitations for research.

In the end, I humbly believe that this dissertation provides a rich understanding on citizens' use of collaborative media in societal crises characterised by chronic uncertainty and geographical distance. Still, the case studies offer an overview of the versatility of themes – many of which are only touched upon in the resulting articles. In the summary of the dissertation, I have conducted a meta-analysis of the themes that result in the suggested conceptual framework as a theoretical research contribution. There, the multidisciplinary nature of crisis research must be considered.

This dissertation is situated in the intersections of HCI and CSCW orientated crisis informatics and collaborative media culture studies. I note that the multidisciplinary approach is both a strength and weakness of the dissertation. Inevitably, one could always dive deeper into the disci-

plinary-specific theoretical discussions. On the other hand, the research fields face fundamental ambiguities, starting with the use of concepts. In terms of crisis, relevant concepts, such as 'disaster', 'emergency', 'extreme event', and 'hazard', are occasionally used synonymously to describe these situations (Boin, 2005b; Hiltz et al., 2011; Quarantelli et al., 2018). I have sought to elaborate on and justify these theoretical foundations of the work in Chapter 2, in the hope that it will help with future researchers in the field.

Finally, the selection of cases influences the results. I have studied diverse cases that offer different perspectives on the use of collaborative media in societal crises characterised by chronic uncertainty and geographical distance. On the other hand, Palen & Hughes (2018) worry that the many meanings of "crisis" and "emergency" may flatten when all kinds of crises and emergencies are reported side by side. As a partial solution, they suggest to distinguish endogenic and exogenic hazards. Still, human-induced and natural hazards are closely intertwined. In this dissertation, the cases deal with the climate crisis and COVID-19 pandemic. In these two, the linkages between human action and crises are evident: human activities have caused the climate crisis and biodiversity loss, which are also linked to pandemics.

Palen & Hughes also emphasise that "lessons learned from one kind of emergency may not apply to other kinds of emergencies, even when the medium of social media is the same" (Palen & Hughes, 2018, p. 507). Fraustino et al. (2012, pp. 26–27) have made similar statements, underscoring how research on social media during disasters "tends to examine one catastrophic event (...) and then imply that the findings are generalizable to other disasters." Meanwhile, a systematic literature review by Eismann et al. (2016, p. 7) highlights how "the duration, scope, and magnitude of disasters influence the extent of social media usage in a disaster, but not necessarily the structure and function of usage." This dissertation is based on six empirical case studies and the resulting theoretical framework. Moving forward, the framework should be validated by applying it as a structure for new empirical studies, as it would reveal how well

and comprehensively the different aspects of the framework would map into a case study with field research data. However, as the framework has emerged based on quite an extensive set of prior empirical research, I firmly believe this grounding has led to a well-applicable result.

6.3 Suggestions for further research

The overlapping societal crises and their chronic uncertainty are not going anywhere. Neither are the dominance of hybrid media environments in everyday life and the volume and variety of bottom-up collaborative initiatives they enable. Therefore, citizens' use of collaborative media in societal crises characterised by chronic uncertainty is an intriguing arena for further research encounters on theoretical, methodological, and empirical levels. These include, among others, the above-mentioned *future explorations with the suggested conceptual framework*, as well as *explorations of new crisis context*. One avenue for future research is to explore *the similarities and differences between constructive and destructive use on collaborative media in crises*. Such an inquiry could shed light on the extent to which the dynamics of collaboration are structurally similar across constructive and destructive contexts.

Methodology-wise, I have argued that much of the research concentrates on Twitter (X) (Palen & Hughes, 2018; Purohit et al., 2014b; Reuter & Kaufhold, 2018; Simon et al., 2015), although people collaborate on multiple networks and platforms during societal crises. In this research, the case studies deal with various platforms, from social media in general to Facebook, WhatsApp, a purpose-built platform, and an array of remote communication applications and tools. Though the perspective has been socio-technical with an emphasis in the socio-prefix, *more cross-platform studies* are needed to create a nuanced understanding of the bottom-up crisis collaboration dynamics in a hybrid media environment. Moreover, generative AI has become a hot topic at the time of writing the summary of this dissertation. It signposts interesting questions about the *inclusion of AI-assistants in more-than-human collaborations* in crises. In addition,

cross-cultural studies would offer interesting comparisons and insight into the topic at large from a wider perspective.

This dissertation is about studying the collaborative media-enabled contributions of ordinary people during crises. The conducted studies are only indicative examples of collaborative activities that seek form in the media technological sphere in times of societal crises. As mentioned in the limitations section, the versatility of themes they expose opens *a range of possibilities for future researchers to continue to investigate the identified themes*. One of the topical themes is 'blending online and offline environments'. Research is always a reflection of its time. This dissertation initially adopts a techno-optimistic approach, carrying with it a belief that through mediated communication, we can collaborate to be more intelligent, take action, and adapt to crises. However, during the dissertation process, a massive shift to remote conditions has occurred, and technology-mediated interaction has increased even further – prompting many to long for more face-to-face interaction, particularly in workplaces. On a broader scale, this raises questions about *attitudes, values, and appreciations related to open-to-all online collaboration* as well. What do we want from online collaboration, and what role do we wish to assign to it? On the one hand, this study focuses on those who take on an active role and engage with collaborative media platforms to carry out the crisis collaboration. But what about those who do not participate? What would motivate them to join, what would they like to do, and what obstacles or limitations are currently perceived in such activities? The empirical case studies in this doctoral research demonstrate that crisis awareness, as mediated by news and social media, can translate into a need for collaboration among individuals and communities. Emotions generated by crisis-related content play a central role in catalysing those collaborations. Overall, a potential avenue for further research is *the study of affects in the context of societal and political engagement*. As affect theories (see, e.g. Gregg & Seigworth, 2010) emphasise, affects are not merely emotions but also have material and relational dimensions, which connect to a broader “new materialist” research approach. This perspective could offer valuable insights into how

mediated crisis experiences shape collaborative action. As Sara Ahmed (2004) argues, emotions are not merely personal but also play a significant role in political movements and the construction of cultural politics on both global and local scales.

At last, this dissertation has addressed crises that do not pose a direct, life-threatening immediacy for participants but rather chronic uncertainty, temporal and geographic distance, indirect impacts, gradual progression, and invisible causes. However, as suggested in the discussion, this dissertation highlights how within the crises, the research cases are connected to episodic moments that generated episodic actions. By doing so, they emphasise how crises (as an existential threat) and disasters (as episodic events) are closely intertwined, and clear boundaries cannot be drawn. The case studies also raise the question of whether it is possible to initiate action without episodic events that turn our attention to crises. Still, chronic crises require chronic behaviours to bring about a meaningful change. This observation is a call to *longitudinal studies* as well: how to create chronic behaviours in chronic crises by collaborating in a contemporary media environment. Through longitudinal studies, *the impact of collaborative media-enabled crisis encounters* would also be a compelling avenue for inquiry.

This research has been a long journey, during which the climate crisis, pandemics, and wars have drawn ever closer to us, even as residents of Nordic welfare states. These events have influenced not only the research questions and the cases 'available' for study but also personal resilience amidst uncertainty. Many times, the world has seemed bleak, and during the countless solitary hours of research, it has been impossible to avoid feelings of despair and anxiety. As a closing remark, I want to return once more to the deeply optimistic nature of crises. The world is not as hopeless as it sometimes feels. We researchers also have a role in shaping the tone of public discourse. Let us, then, focus on our inherent need to connect with one another and collaborate – striving to understand how this can be nurtured and strengthened.

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Article I

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People's Perspectives on Social Media Use during COVID-19 Pandemic

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ABSTRACT

In this paper, we explore people's perceptions and usage of social media during the COVID-19 pandemic, and how it had changed compared to the pre-pandemic times. As salient findings, we report increased activity in social media, which followed both from the increased opportunity to spend time in social media, the need to be socially connected, and the motivation to follow pandemic related updates. The perceived emerging content visible in social media postings were face masks, home and outdoors activities, remote events, and different challenges. Social media also made people aware of the divided opinions related to the pandemic, and could lead to more careful self-censoring of own postings. Our study is based on interviews of 29 and online survey of 172 people.

CCS CONCEPTS

• **Human-centered computing** → *Empirical studies in collaborative and social computing.*

KEYWORDS

COVID-19, social media, pandemic, user studies, online culture

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1 INTRODUCTION

The COVID-19 pandemic which in spring 2020 took a form of a global health emergency changed many aspects of everyday life on a rapid pace. It caused many transformations on everyday practicalities, including mobility restrictions, shift to remote school and work, and recommendations for social distancing and face masks. This created a set of challenges for running everyday life [21, 31]. A survey conducted in nine European countries showed that the COVID-19 lockdown caused a 65% increase in screen time [31]. Increased screen time includes a vast COVID-19-caused increase in

digital communication such as text messaging, voice and video calls, and social media usage [28]. Also quarantine mobile applications have emerged, contributing both to tracking of the virus but also to the community feeling [39].

Communication technology has penetrated to all sectors of life, being now an omnipresent part of our everyday life. In the era of social media and smart phones, we can be connected to our social networks and different information services 24/7. Especially, in social isolation, where face-to-face meetings were limited or forbidden, the role of the social interactions happening through technology platforms became emphasized. In this paper, we investigate people's perceptions of their social media use during COVID-19 pandemic, focusing especially if they perceived changes in the usage and content. Our research is based on dataset of 27 interviews and online survey with 172 participants, and focuses on the holistic user experience on social media use.

2 RELATED WORK

2.1 Social Media as a Central Communication Phenomenon

Social media usage has become a central phenomenon of technology mediated communication, and due smart phones, its use has become omnipresent in our society. There is a vast amount of research on social media and different aspects of it, research databases containing thousands of publications on the topic for each recent year. Research on social media ranges from motivations, consuming, sharing, and content types, and focusing on different use cases such as marketing [5], e-governance [25], citizen activism [23], and news services [30]. Already a decade ago, Whiting and Williams identified ten uses and gratifications for using social media, namely social interaction, information seeking, pass time, entertainment, relaxation, communicatory utility, convenience utility, expression of opinion, information sharing, and surveillance/knowledge about others [38]. It has been shown that much of the communication in Facebook can be regarded as phatic communication, i.e. filling a social function rather than being informative [33]. Social media is also an intensively used tool for self-expression, facilitating both people's tendency to present images of their true, actual, or ideal self [12]. The selfies culture is also a predominant trend of social media use today [26, 37]. Sung et al. have identified four motivations for posting selfies, these being attention seeking, communication, archiving, and entertainment [37].

Recent years have witnessed an increasing amount of research, which addresses the critical aspects of social media use. There is a serious concern that the increased screentime will create health

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problems [36]. According to the research findings, social media exposure also has a significant relationship with information overload and information anxiety [34]. A large scale study among young adults in US showed that participants with high social media use felt more socially isolated than the ones with lower social media use [32].

2.2 Social Media during Pandemic

During COVID-19 pandemic, people excessively used social media for not only following recent information about COVID-19 [6, 24], but also in terms of obtaining emotional and peer support [41]. There are studies aiming to identify COVID-19 related topics and sentiments in Twitter. According to the results, people are tweeting for example about the origin of the virus, its sources, its impact on people, countries, and the economy, and ways of mitigating the risk of infection [1, 40].

Due to its reach, social media has become a powerful platform to spread information and affect on people's behavioural patterns. A study analysing Twitter content related to face masks during the COVID-19 pandemic resulted with a finding that Twitter was utilised by a wide range of users in order to encourage others to wear masks [3]. Basch et al. have studied how TikTok has been used to promote mask use to various segments of the population [7]. On the other hand, social media is not only employed for spreading official public health messages, but also e.g. humorous COVID-19 mask memes [14]. Humorous memes have also found to provide a coping mechanism for the pandemic, especially for individuals suffering from anxiety [4]. Also other research efforts have been put in examining the effects of social media on people's emotions and mental wellbeing during the pandemic times. Respondents who participated in a survey conducted in Iraqi Kurdistan reported that social media had a significant impact on spreading fear and panic related to the COVID-19 outbreak [2]. The findings are opposite with a survey conducted among Cypriots, where respondents' social media use did not create any panic or anxiety amongst them [24]. However, a larger scale study in China revealed that mental health problems, which did occur in high prevalence, were positively associated with frequent social media exposure during the COVID-19 outbreak [16]. Increased screen time goes hand in hand with addictive social media use, which is positively linked to the burden of COVID-19 [9]. Research findings imply that taking a social media break has a role in improving people's mental wellbeing in pandemic times [41].

As one of the key research topics, a relatively large number of research has been published about COVID-19 misinformation on social media. Indeed, for this the parallel spread of misinformation, the term infodemic has emerged [11, 15]. Two survey studies with more than 1,700 U.S. adult respondents give evidence that people share false claims about COVID-19 partly because they simply fail to think sufficiently about whether the content is accurate or not [29]. Misinformation deal with conspiracy theories that started to spread on social media alongside COVID-19. About conspiracy theories during COVID-19, see e.g. [10]. As Karen M. Cook concludes in her article, the pandemic has created perfect circumstances for conspiracy theories that flourish in crisis times due to experiences of

threat, uncertainty and insecurity, and have negative consequences for people's compliance with preventive behaviours [13].

2.3 Positioning and Contribution of Our Work

A large portion of the COVID-19 related social media research has focused on quite narrow themes, such as memes, infodemic, or mental health. Moreover, the research methods in existing publications heavily rely on survey data. Although large datasets provide useful information about the large patterns related to social media use, they often fail in grasping the richness of the phenomenon. In our paper, we seek to focus on the holistic user experience, and focus on their personal experience on social media use during COVID-19. Differing from the prior art, our research emphasizes the qualitative nature of the findings, collected through interviews and an online survey.

3 RESEARCH METHOD

3.1 Context of the Research

The research consisted of two studies, face-to-face interviews and an online survey. The data was collected in October-November 2020, when the second wave of COVID-19 epidemic had begun in Finland, Europe, and national and regional social distancing restrictions had been agreed to prevent a new spread of the epidemic [17]. People had a fresh memory about a state of emergency declared by the Government on mid-March 2020 in Finland over coronavirus outbreak. It had introduced a load of restrictive measures including e.g. closing down the premises of educational institutions and suspending contact teaching; an instruction to work remotely whenever possible; closing all national and municipal cultural and sports facilities and limiting public gatherings to no more than ten persons. [18]. Through the restrictive measures the coronavirus epidemic had been halted, and the measures gradually lifted starting from mid-May 2020 [19] - leading to a couple of months enabling more 'normal' life routines before the new escalation of the epidemic.

3.2 Interviews

The interviews were conducted face-to-face, and organized jointly with a face mask making workshop at the premises of the University of Lapland, Finland, in October 2020. An open invitation was distributed through social media and posters for the event, organized with up-to-date social distancing measures, to bring people to make a fabric face mask for themselves and at the same time participate in a research study. The participants first signed a consent form and filled in a form about background information before the interview. In total, there were 29 participants, ranging from 19 to 39 years with the average age of 25. The participants consisted of university students and staff with different backgrounds, with 10 % being men and 90 % women. All participants reported that they were active social media users. The most common social media channels used were Instagram, Facebook, Snapchat, and WhatsApp. The interviews were audio recorded.

The study consisted of the following steps:

- Filling in the consent form and background questionnaire
- Interviews (voice recorded)

- Showing example(s) of social media posting(s) on the smartphone

In the interviews, the participants were asked to describe how COVID-19 pandemic is visible in the social media channels they use, and what kinds of COVID-19 related social media content they have produced and/or shared by themselves. In relation to the both questions, we also asked the participants to show social media posting examples from their smartphones.

The interviews were transcribed from the audio recordings according to the thematic coding principle. One researcher established the codebook, reviewed by two other researchers. Two researchers then independently went through the interview data and coded it according to the codebook. A third researcher was used to decide on the code with the cases, where the two researchers had given different codes to a data item.

3.3 Online Survey

The themes that emerged in the interviews were further investigated in online survey, which was organized after the interviews. The survey responses complement the data gathered through interviews with a wider sample, and provide more quantitative insight to social media use and content during COVID-19 times. Thus, the interviews provided a background for the selection and formulation of the survey questions. The survey was distributed through social media and at the University of Lapland. The survey consisted of five sections. The first section gathered background information, and the second about the amount and habits of social media use during COVID-19 pandemic. The third section continued to examine the awareness and visibility of COVID-19 pandemic in social media, after which the content related to the pandemic was charted. Lastly, the participants answered questions related their own behaviour in social media during the COVID-19 pandemic. The survey consisted of both Likert scale and open text field questions.

In total, 172 participants completed the survey (76 % women, 21 % men, and 3 % other or not wanting to their gender). The participants' age ranged from 20 years to 70 years, with the average of 32 years. Altogether, 78 % reported to use social media several times during the day, and 17 % once a day. The most used social media applications were WhatsApp, Facebook, Instagram, Youtube, and Spotify.

4 FINDINGS

In this section, we report the combined findings from our online survey and interviews. We refer to individuals as survey *respondents* (e.g. R21) and interview study *participants*, (e.g. P3).

4.1 Increased Social Media Usage during COVID-19

4.1.1 More Usage due Available Time and to Access Pandemic Information. People reported experiences and observations about their increased social media usage both in the interviews and in the survey (Figure 1). In the online survey, two thirds (67%) of respondents reported an increase in social media use, while almost one third (29%) estimated that it had remained the same. One reason behind the increased social media usage was simply that participants were more at home and had more time while less other activities to do.

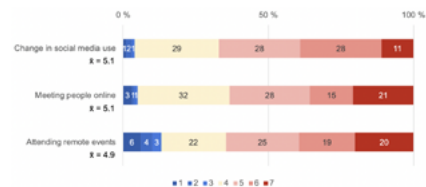


Figure 1: Survey responses of participants' social media behaviour during COVID-19, ranging from 1 (less activity) to 7 (increased activity).

This was reflected in the comments for instance as, "But anyway I spent more time in there [in social media] because there is nothing much to do otherwise" (P23), or by another: "The use of social media has increased: when I'm at home, especially on bad days, I grab the phone more easily" (R46). There were also perceptions of increased amount of posts in social media feeds: "People started spending more time at home, and the routine was broken. I observed more activity on Instagram and Facebook" (P1), "And then people also post more. I have noted that people have more time to post." (P24).

Participants browsed for information about the COVID-19 situation through social media channels: "I follow more of what is being discussed in there [in social media]. On a general level, but also for fun. I gather information about the [COVID-19] situation." (P23). What also increased the usage was that social media became a key channel to be in touch with others during COVID-19 restrictions and physical distancing: "People have started using it [social media] more. They have had to learn it for being able to keep in contact with, for example, old relatives or other risk groups." (P22). In the next subsection, we report detailed results about distance meetings and events forms of interaction and participation during pandemic times.

4.1.2 Remote Meetings and Events. Remote meetings and events became a central form of interaction and participation during COVID-19 pandemic (Figure 1). In the survey, a majority (65%) of respondents had met their close ones remotely more than usually. The experiences are described in respondents' open field answers: "Before the corona, for example, I never made video calls with friends or arranged remote evening parties" (R86). The phenomena is also highlighted in the interviews as described by a participant telling: "Even though I communicated with them with audio only previously, I started to have those video chats with my friends and family." (P1). Also personal events that have traditionally been face to face gatherings were now arranged remotely: "I have participated in e.g. for funerals and two different birthdays remotely" (R72).

The shift to remote mode concerned also wide audience events as event organizers searched for special arrangements in the exceptional times. From the survey, 64% of respondents had increasingly participated in remote events such as virtual concerts or theatre shows. People had versatile observations and experiences about participating in remote events. For example: "The pride parade was organized very differently than usually. There was only a limited number of people who were allowed to participate in the actual parade. Otherwise, it was a virtual event." (P2). Or as described by



Figure 2: Examples of typical COVID-19 social media posting displayed by participants in the interviews: Using face masks; remote attendance in meetings and events; spending time outdoors, and participating in a workout challenge.

a respondent: "I attended virtual concerts, which was an amazing experience!" (R24).

Remote conditions opened up new opportunities to participate as well in special occasions as in everyday life activities over long distances. This was well reported by a participant who had recently moved from Poland to Finland. "To me personally, what was interesting, was to participate in a performance even if I was two and a half thousand kilometres away. [...] And also the same with yoga classes. I can participate in the [yoga] school back in Poland." (P29).

COVID-19 pandemic also introduced several live social media sessions for people to jump in and participate. "There were people who started to make some live content. [...] There was this one I was following, two guys who had a live session everyday." (P1). "There have been many such live events especially for children and young people. For example a TikTok person with a lot of followers has been engaged. And you were then supposed to come at a certain time to do something there [in TikTok] live." (P26). "Especially in last Spring, all communality, Instagram lives etc. were really invigorating and brought content to the days (R40)."

4.2 Pandemic in Social Media Content

4.2.1 Face masks as Icons of Pandemic Times. According to the participants' experiences, it is obvious that face masks have become one of the main icons of COVID-19 pandemic in social media. Participants shared an experience that photos consisting face masks had conquered social media feeds: "The top thing that came to my mind [of COVID-19 era social media] was the face mask use in images and videos" (P6). Participants also shared face mask content by themselves, as illustrated by a participant who told: "I was on my way to south by train, and there is a strong mask recommendation, so I had to put on the mask then. And then I wanted to take a picture of it for friends." (P24). Using a face mask was something people also wanted to emphasize in the social media content they produced: "Now, I've noticed a lot face mask use [in social media content], and people also might want to bring it up" (P14). "I've published snapchat pictures from a store where I have a mask on my face (R27)". In addition, face masks were also literally a way of self-expression, as described by a participant: "[Showing a picture at own social media account in the interview:] There is me and my friend. Both of us use face masks, self-sewn fabric masks" (P17). Or by another: "[Shows a piece of social media content:] And they have just ordered fabric masks made by a domestic small entrepreneur from the Etsy online store and are now introducing them in use.

How they work in real life and what they look like." (P27). Overall, face mask pictures seemed to become normal in social media content along the pandemic: "Half a year earlier, if someone had posted such a mask image, people would have been quite confused. But now it's the new normal." (P21).

4.2.2 More Home and Outdoors, Less Events. COVID-19 pandemic had changed the way how people expressed their everyday life in social media. The key themes emerged in the interviews, and the survey responses provided more quantitative insight to the key social media content topics and the perceived change when compared to the pre-COVID times, Figure 3.

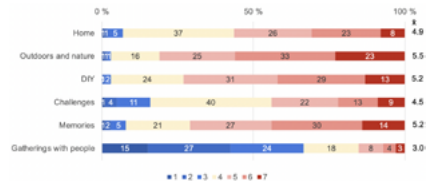


Figure 3: Survey participants' experiences of social media content during COVID-19 when compared to pre-pandemic time, ranging from 1 (much less postings) to 7 (much more postings).

Increased time at home creates more home-centred posts: "Now more of that kind of home stuff is being done. The change in the [social media] content is evident." (P10). This home-centred content includes e.g. cooking: "This is the content I shared on Instagram [shows a picture]. It's basically cooking. I started to spend more time at home." (P1). In addition, COVID-19 pandemic caused an increase in outdoors related content: "Outdoors trip photos. Here are the latest [shows content with a phone]. We were in Pyhä-Luosto National Park." (P19). "There are outdoor images on Instagram. In the way that 'yes, it is still good to be here in the woods'" (P20). "Nature pictures come from every place, I have a bad conscience that I myself don't use the corona times to be in nature" (R6). Changes in content are also related to COVID-19 specific experiences such as quarantines: "Especially in the spring [2020], the situation was even more new, and it was a strict lock-down. That's when people posted such humorous pictures of their remote mode lives." (P9).

The reported social media content representing home and outdoors centred life and COVID-19 specific experiences replaced the content related to activities that COVID-19 pandemic had restricted. According to participants' experiences, this was visible especially in the lack of content posted from physical gatherings such as public events and spending nights out with friends. "[...] there are no festivals or anything else. That kind of content has diminished." (P10). Spending nights out has turned to spending nights at home: "Less pictures of events, more of personal home evenings" (P13). Participants also brought out the question of acceptable content in the sense of what they chose to post, e.g.: "There is no content like being in a bar dancing or in crowds. At least you don't want to publish it, if you have one." (P19). People practised self-censorship as illustrated by comments in the survey: "I know people who are thinking aloud whether pictures of the New Year celebration can

be published at all if it can be deduced that there have been more than ten people present. That person decided to post photos only of themselves and their partner and omitted the group photos." (R47). "We've been to a cottage / ski resort with a group of friends, and I haven't posted anything from there so that no one would know about it" (R40). The social media content describing 'life in the crowds' were rather posted as memories from the pre-COVID-19 times: "When they have not been able to travel during the corona period, people publish their old travel experiences and images. One acquaintance published them for several weeks." (R4).

4.2.3 Creativity and Social Media Challenges. Changed everyday life expressions were as well related to certain COVID-19 time activities posted and spread in social media channels. "In the spring [2020], it seemed that people came up more of different ways to spend their free time. There were all those really weird activities people came up with and were creative about." (P9). These activities included e.g. an increase in DIY content: "In the beginning [of the pandemic], [...] various DIY stuff became more common" (R92), or channel-specific phenomena such as "these [COVID-19] TikTok dances [were visible in social media]" (P28). Participants reported also observations about other COVID-19 related phenomena such as huge amount of social media challenges. According to the participants' general observations, social media challenges consisted e.g. yoga and other workout challenges, as well as humorous ones. The latter included such as the *Toilet Paper Challenge*, which required people to juggle a roll of toilet paper with their feet, or the *Quarantine Pillow Challenge*, where participants used a belt to wear a pillow like a quarantine couter. "There was such a change in trends in the spring that a challenge culture emerged again. [...] There were so many of them that one could no longer keep up." (P22).

4.3 Affecting Opinions and Behaviour

4.3.1 Following Authorities for Information. Social media had a central role in increasing awareness of the COVID-19 pandemic with timely instructions and recommendations. From the survey, 70% of the respondents reported that social media increased their pandemic awareness, Figure 4. The experiences revealed, how social media was a key channel to follow up-to-date COVID-19 instructions and recommendations in order to live accordingly. In the first place, participants reported how they followed authorities' social media accounts: "I started to follow THL [Finnish institute for health and welfare] when the worst isolation time came. There I received such good quality information." (P2). For some, social media was even the only source of information: "Social media is my only source of news at the time, so I get information about the COVID-19 mostly through Instagram" (R54).

People had an experience that a wide variety of organisations shared content about the preferred behaviour in the current situation: "For example, the university's Instagram account will tell you well when the COVID-19 guidelines change" (R53), "Especially companies remind you to wash your hands and wear a mask" (P11). It was also remarkable how social media celebrities and influencers had a major role in sharing COVID-19 related information, as illustrated by participant who told: "[shows a piece of social media content:] It features actress Jennifer Aniston taking a picture of

herself wearing a mask. In the caption she urges the use of face mask and talks about how to behave safely in public places during these times." (P8). One participant had experience about acting as an influencer herself: "I belong to a producer group that shares fact-based corona content on Instagram. It is such an influential collaboration with the government. [...] The intention is that through influencer marketing, the facts are spread, not the gut feelings." (P17).

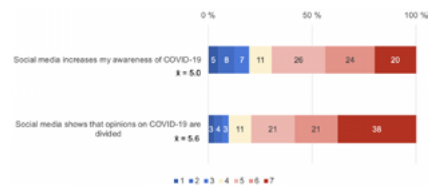


Figure 4: Survey responses of participants' awareness of COVID-19 in social media, ranging from 1 (not at all) to 7 (very much).

4.3.2 Peers as Information Channel. People as well used social media to share up-to-date information among peers: "I have shared fact-based information" (P18). In addition, social media was a channel to speculate COVID-19 related up-to-date information and experiences with friends: "If there is a friend coming to visit [in this town], she then asks what is the situation in there, and how to behave. [...] Mostly thinking about how's the situation right now. And how it affects your own doings." (P22). People also shared their experiences from COVID-19 tests: "Many of my relatives and such might write if they have taken a corona test. They might write about it on Facebook and that way inform a little about how it's going." (P15). Sharing COVID-19 related content also deals with peer example and peer pressure: "I try to appear exemplary in the content published by others. e.g., in a mask in a public place" (R63), and "Now I wear a mask. Also because others do. I feel stupid if I don't wear one. And on the other hand, with those who don't wear a mask and I do. I a bit resent those people. I take it seriously and annoy those who don't." (P19).

4.3.3 Facing Polarized Voices and Misinformation in Social Media. Overall, people's experiences revealed that there was not a shared consensus about COVID-19 situation in social media. This came up both in the interviews and survey responses, Figure 4. Instead participants and respondents had noticed rival voices and polarised opinions dealing with corona topics. "[In the beginning] when experts recommended something, it was not challenged. But clearly now [half a year later] it feels like different voices are emerging, and different conspiracy theories, and different kinds of questioning. In a way, maybe it has started to be more politicised." (P20). "People are surprisingly even fanatical in their positions e.g. against masks and vaccination" (R4). "I have stopped following many people in social media because of corona-related disinformation and corona denialism" (R150). The rival voices and polarised information was visible for instance in the confrontation of 'alternative' and 'fact based' information: "[The content I have shared] hasn't been, well, such

wingnut stuff.] " (P21). "This is what I find really scary. Somehow just the fact that she [a social media influencer] is talking about not having to wash her hands. So it's a very scary extreme. I find it very destructive, and I hope people don't learn from her. But it's scary that she has a lot of supporters. " (P21). On the other hand, people had experienced that the situation and the divided opinions were not stable but changing over time "In the beginning, it was very much a question whether masks were necessary. [...] Now it has become a pretty mundane thing. " (P17).

5 DISCUSSION

5.1 Increased Role of Social Media

Similarly to results reported in earlier research [28], also our findings revealed increased social media use during COVID-19. The increased use of social media during pandemic was generally found to be due the combination of improved opportunity for the usage, as well as the social needs, and the interest to get more COVID-19 related information. A central theme that emerged through various topics was how social media had a central role in creating the feeling of connection between people during the pandemic. Also, the condition that people were forced to spend more time at home provided an easy opportunity and facilitated the increased social media use. In the absence of physical meetings, social media offered means to stay in contact and gain peer support, and people took the opportunity to use it more extensively. It has been reported that the effects of COVID-19 lockdown on people's life went beyond the practicalities, causing e.g. uncertainty and loneliness [27]. Our participants reported, how social media was a central channel for keeping in touch, and how they had come up with much more online meetings and video calls with family and friends.

The results also show how people were widely exposed to COVID-19 related information through social media, and often also started following new channels to gain up-to-date and reliable information. On the other hand, it was evident that the participants had noticed also how the opinions expressed in the social media were not always unified, and how different conspiracy theories and misinformation spread through social media channels. The same phenomenon has also been reported in prior art, see e.g. Bruns et al. [10]. The increased use of social media makes it also to an easy place to catch people and their attention. Different actors in social media, such as authorities, influencers, communities, and peers compete on the user's attention.

5.2 Collective Social Media Cultures during Pandemic

Based on our participants' experiences, social media was found to gain a stronger role in collective actions, and more active collective social media culture emerged due the pandemic. This was evident not only from the more frequent attendance to different online events, but also in starting organizing online gatherings e.g. among a geographically distributed family. The lockdown times also inspired different campaigns and challenges, which people could participate from home. This had a social function as being part of the community, but also in keeping the spirits up during the pandemic.

Bodrunova (2020) has argued how online mass-participation activities during the COVID-19 lockdown have grown into examples of contributive action, which focus on online projects where people participate by contributing into socially and/or politically meaningful action such as virtual protests, and which as means of social coping with the crisis [8]. Our study provided some similar findings, although this was not a dominant theme in people's reports on their social media actions. A study about wellbeing and fear of missing out (FOMO) on digital content in the time of COVID-19 showed that FOMO has not disappeared during the pandemic, but has been replaced by related feelings towards new online activities such as online concerts and virtual gatherings [22]. In our study, participants did not report negative feelings, but the appearance of and the participation in online events was reported as a positive phenomenon. However, the online events were not seen to be as appealing as attending to their physical counterparts would have been.

5.3 Peer pressure, Self-censorship and the Question of Acceptable Content

The findings also highlighted the role of peers both as information source and in promoting socially acceptable behaviour patterns during pandemic. Marketing research has reported how social media networks create peer support and increase the trust in the context of consumer behaviour [20]. Prior art has shown how friends' opinions matter in social media, and influence on an individual's mindset [35]. Peer postings have thus an opportunity to influence on the behaviour of the user in the social network. Our results reveal how peer opinions were sought e.g. when determining the safety of some area or activity. The participants also seemed to actively use the role of peer as an influencer, when they were promoting e.g. face mask use in the social media for their friends and followers.

The study also revealed that there was a peer pressure to publish socially acceptable content in social media. This included, for instance, showing that one was using a face mask, and that they spent their freetime at home or in an isolated environment. The absence of party or travel photos was seen primarily to occur due to stopping of such activities altogether, but it was also commented that such content would not be socially acceptable to post. It was clear that people realized this, and self-censorship was taking a place or expected. This would be an interesting research direction for a deeper investigation.

5.4 Limitations

We acknowledge that our research is limited by the method, which relies of people's own expressions and self-reporting. In addition, we acknowledge the bias due to the geographic limitation of the participant sample, as the study was run in Finland, Europe. Also, the sample of participants highlights university students and staff, as the interviews were arranged at the university premises. The widely distributed online survey partially tackles this issue. We also do acknowledge that there is a gender bias, as out of 29 interview participants, 90% were women. This was somewhat less in the online survey, but even there three quarters of the participants were women. In addition, it should be noted that the interviews were

organized jointly with a face mask making workshop. From this it can be concluded that all participants recognize the importance of wearing face masks as a means of preventing the virus from spreading. As presented in the findings, there are many polarized voices in social media, including people who are anti-mask. These voices have been unintentionally excluded from the study. To sum up, the participant pool is not representative of all social media users. However, we believe our research provides interesting viewpoints from the holistic user perception point of view and on the subjective experiences what people had.

Our research contributes to the research discussion on the role of social media during pandemic, so far largely dominated by large scale quantitative studies which do not dig deeper into the rich experience base and holistic view by the social media users. Our research provides a user perception angle, and overview of the versatility of themes perceived by people in their overall social media use.

6 CONCLUSION

In this paper, we have presented people's perceptions of social media use during COVID-19 pandemic, based on 29 interviews and a survey with 172 participants. The findings report on increased social media use, which is linked to 1) increased opportunities due to the time spent at home, 2) to the increased need to be in contact with the people in the absence of face to face meetings, and 3) on the need to follow pandemic related information. The visibility of COVID-19 pandemic in personal social media content was due posting with face masks, increased posting made from home and outdoors activities, and attendance to virtual events instead of physical ones. In addition, participants had started following new information channels in social media in order to gain up-to-date information on pandemics. They faced also the polarized opinions visible in social media, where they also acknowledged the spreading of pandemic related misinformation and conspiracy theories. Other emerging findings revealed the themes of self-censorship and participants being aware of posting socially acceptable content in social media.

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Article II

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Collaborative Media as a Platform for Community Powered Ecological Sustainability Transformations - a Case Study

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ABSTRACT

We explore collaborative media as a tool for empowering people towards sustainability and seeking solutions against climate change. As a case study, we investigate the Youth4Climate collaborative media site, where people can post an idea for tackling climate change, and comment and vote on others' ideas. By analysing the body of 266 ideas and 1406 comments posted on the collaborative media platform, we identify eight functions on how collaborative media supports community powered ecological sustainability transformations. Our work contributes in understanding and structuring collaborative media in citizen activism.

CCS CONCEPTS

• **Human-centered computing** → *Empirical studies in collaborative and social computing*.

KEYWORDS

Collaborative media, citizen participation, activism, social movement, sustainability, climate change

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1 INTRODUCTION

Climate change is one of the most dominant current themes that has rapidly become increasingly visible in media and public discourse. August 20th 2018 marks an important step in the beginning a global climate movement pushing politicians to act against climate change. On that day, a 15-year-old Swedish climate activist, Greta Thunberg, sat down in front of the Swedish Parliament building with a sign protesting inaction against climate change. During the course of the upcoming weeks and months, people joined the protest on streets all over the world [12]. In early 2019, Belgian youths started protesting every Thursday, and the organisers of Youth for Climate Belgium saw a need for a tool to channel the energy and ideas being expressed [16]. In January 2019, the Youth4Climate platform was

set up and people from Belgium and beyond were invited to submit ideas on how to tackle climate change [16].

The internet has enabled social movements to operate globally [15]. The platform of the internet presents a new scale and capabilities for channeling participatory and collaborative cultures for greater social purposes. Thanks to developments in media technology, collaborative media can establish communities that bring together people from differing contexts, disciplines, professions and vocations. Collaborative media can pool the experiences, knowledge, skills, ideas and visions in order to address, re-frame and find solutions to the problems of our time. In the Youth4Climate case, collaborative media is used to address the obstacles to improving ecological sustainability.

Collaborative media is oriented towards action and open interaction [9]. This is different from general social media use, which, according to Nadkarni and Hofmann [10] is grounded on two social needs, the need to belong, and the need for self-presentation, and where the content is often a product of phatic communication [13]. The use of internet and social media has been harnessed for citizen participation, and research has examined its use both for e-governance [5], citizens-governance collaboration (e.g. [8, 11], and for self-initiated social movements, protests, and activism (e.g. [1, 2, 7]). Dolata and Schrap [6] distinguish between non-organized collectives exhibiting loosely-coupled collective behaviour, and collective actors, which have strategic capability and a separate identity. Collaborative media has also been adopted as a tool for organizing social activism. Bennett et al. [2] have investigated organizing participation in large-scale protests through the internet. They identify three peer production modes that operate together to enable organization of crowds: the production, the curation, and dynamic integration of various types of information content [2].

Focusing on Youth4Climate as a case, our research asks, how people contribute to community-powered ecological sustainability transformations through collaborative media. Especially, for this case study, we seek to identify, what are the foci or call-to-collaborative-actions in the project, what phases the project has and what roles these phases play. We are also interested in the tools the platform provides for collaboration, and what content participants produce. The results of the case study will inform on the structures and dynamics of collaborative media in this problem space.

2 RESEARCH DATA AND METHOD

The object of our case study research is the project entitled '15 citizen priorities to save our climate' established on the Youth4Climate [18] platform. The project and the platform are an initiative of an independent group of volunteers behind Youth For Climate [4] and it utilizes technology provided by CitizenLab [3]. Youth4Climate

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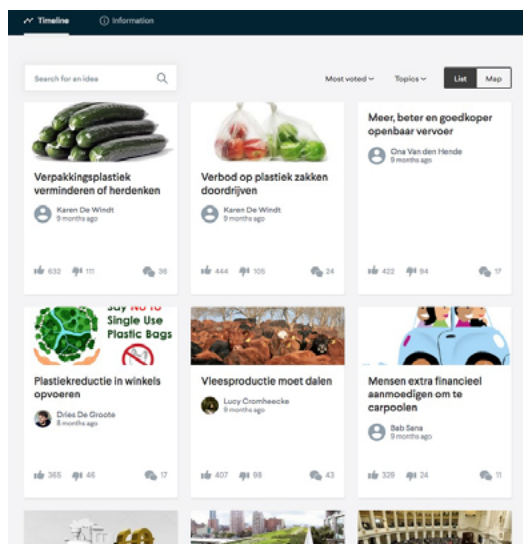


Figure 1: Examples of the ideas presented at the tool [17].

invited people to join a movement that reflects on climate topics. The overall call-to-action was to share proposals, ideas and measures its participants would like to present to the government [17], Figure 1.

The Youth4Climate platform, and the collaboratively produced content on it, provides the data for our research. On the Youth4Climate platform, in just under three months, people posted over 1700 ideas, 2600 comments and voted over 32.000 times for the initiatives they wanted to support [16]. In order to turn these ideas into meaningful actions and recommendations, Youth4Climate then processed the ideas, and, to achieve a concise and actionable report to be submitted to the elected officials, Youth4Climate together with CitizenLab organised the ideas on the platform into top priorities for the climate. Citizens were invited to vote for the topics they thought mattered the most. Once the prioritization was finalised and votes were counted, the Youth4Climate organisers shared the proposals with the officials [17]. The project was ran from January 2019 to May 2019 [17]. The platform and all the inputs are still accessible online at the time of writing this paper in September 2019. The Youth4Climate platform is available in Dutch, French and English, and the key content of the project is provided in all three languages. In addition, the platform provides an in-built translation option for ideas and comments. For the analysis, participant input was translated into English by utilizing the tool.

For our study, ideas that gained 20 or more votes and the related comments were selected for analysis. After this filter, the resulting research dataset consisted of 266 ideas and 1409 comments related to them. Content-based qualitative analysis was used as a method in describing and analysing the ideas and comments. Manually conducted thematic analysis was applied to the ideas and comments.

Different themes were identified from the data corpus. The themes were then compared, clustered and combined further. Altogether, 38 subcategories were identified. Out of those, eight main categories emerged, each grouping together between 2 and 8 subcategories.

3 THE YOUTH4CLIMATE PROCESS

The case Youth4Climate indicates that a collaborative media based project is built upon a combination of top-down and bottom-up practices that are in flux. In this case study, the following characteristics were identified:

- (1) The shared objective of the project (top-down)
- (2) Predefined project phases that are planned to support the objectives (top-down)
- (3) Ways how participants harness the platform and its tools to support their goals (bottom-up)

Together these three collaborative media characteristics serve the community-powered ecological sustainability transformations.

3.1 The Shared Objective of the Project

In the case of Youth4Climate, the defined and articulated objectives of the project set the foundation for the activities in the collaborative media, and defined the direction for the collaboration. In this case, the objective was to compose 15 citizen priorities (proposals, ideas or measures) citizens would like to present to the government to save the climate. This objective created the scope for the collaboration, and participants submitted ideas and comments that were well aligned with it. The project reported that out of the 1744 submitted ideas, only 78 contributions were such that they could not be considered as an idea [17]. This shows that the objective was well shared among the participants. In addition to the shared main objective, the participants occasionally harnessed the platform also for their own personal aims and objectives, e.g. by promoting their own initiatives.

3.2 Predefined Project Phases Planned to Support the Objectives

The collaborative media based project was structured in pre-defined phases that gave it structure. Each phase had its own function that supported the shared objective.

In the case of Youth4Climate, the first phase was idea collection. In this phase, the participants could share ideas, comment, and vote for the ones they liked the most [16]. The role of this phase was to gather the key inputs and contributions from the participants for further analysis, to guide the work, and to create understanding about the different priorities. In the second phase, the CitizenLab team clustered and analysed the ideas. The end result of this phase was 15 policy recommendations, that had been formulated based on all the ideas, comments and votes. The role of this phase was to streamline and structure the participants' inputs and contributions. [17]

In the third phase, the 15 policy recommendations were published and people voted for the topics that mattered most to them. Each policy recommendation included a short summary, the ideas with the most votes, and some key numbers. All the underlying data was also made available as an attachment. The role of this project

phase was to introduce the results analysis and to collect feedback on them before delivering the key outcomes to the politicians. In phases four and five, the CitizenLab team counted the votes each recommendation received, and presented politicians with a list of 15 priorities for sustainability that the participants wanted them to work on. [17]

3.3 Ways of Harnessing the Platform

The platform tools were simple and originated from well-established social media practices. The idea submission tool provided the core for the collaboration, and the commenting and voting tools were built on that. The format for an idea submission on ‘how to save our climate’ was loose and provided the possibility for participants to harness the tool to support their specific goals and aims. Posting an idea required a title plus body text, and the additional possibility to include a topic tag, photo, map location tag, links and attachments, were provided. The second tool supported leaving a comment to a single idea with text and/or links, either generally or in a targeted manner. The function of the tool was to strengthen the ideas and measure the level of their endorsement. The third tool for collaboration was voting. Voting played a role in two different phases of the project: In the first phase, participants gave their support for their peers’ ideas by giving a thumb up or thumb down rating. The votes decided which ideas were included in the following analysis phase. In the third phase, participants voted on the 15 citizen priorities based on the analysis of participant input collected in the first phase and placed them in the priority order. The function of the tool was to identify the ideas and priorities, and to filter the ideas for further analysis.

4 THEMATIC ANALYSIS

Analysis of the filtered ideas dataset revealed how the collaborative media tools served several different functions supporting the community-powered ecological sustainability transformations. The themes identified were:

- (1) Seeking for solutions
- (2) Evaluation
- (3) Inspiring and increasing awareness
- (4) Understanding people
- (5) Understanding local context
- (6) Call to action
- (7) Creating connections
- (8) Measuring endorsement

4.1 Seeking for Solutions

Seeking for solutions is the key function on which other functions are built. There was no structural standard for the ideas that participants suggested. However, general elements that the idea submission consisted of can be identified. The elements were, 1) background information and description of the problem, 2) introduction of, or reference to, a more ecologically sustainable solution, 3) concrete means how to get there, and 4) evaluation (e.g. benefits, barriers, feasibility). Only some of the submitted ideas included all these elements, and most included only a subset of them. The posted comments typically aimed to add the elements missing from the originally posted idea and to suggest new perspectives related

to the idea. In particular, comments especially related to the element of evaluation.

4.2 Evaluation

The suggested ideas were constantly evaluated during the project. Participants often highlighted the benefits and challenges related to the ideas already when submitting them. Additionally, the evaluation function was integral to the way participants commented on the ideas. They highlighted benefits and challenges as well as considered the means, barriers and suggested alternative solutions, which helped further develop the ideas. Participants also challenged the original poster (OP) of the idea: asked further questions and explanations, criticised and questioned them, and were eager to start a debate on the idea. The evaluation activities helped to strengthen the ideas, as it gave a possibility to see them from different perspectives and provided opportunity for iteration. The evaluation revealed which ideas might work and which required further development.

4.3 Inspiring and Increasing Awareness

The ideas and comments aimed to inspire and increase awareness about ecologically sustainable lifestyles. They aimed to connect the item to the wider context of ecological sustainability, which provided background information to support, strengthen and justify it. Background information included, e.g. links to editorial content, research sources, benchmarks, YouTube videos and TED talks. Text-based background information and pictures, e.g. infographics, were also shared as attachments to the submitted ideas. The function of inspiring and increasing awareness also included providing tips for ecologically sustainable practices. The tips were targeted for everyday life as well as towards companies and organisations. Participants occasionally also used the opportunity to promote their own initiatives or services. These actions link with the function ‘inspiring and increasing awareness’ but also with ‘call for action’ and ‘creating connections’.

4.4 Understanding people

Ideas and comments posted on the Youth4Climate platform gave understanding of peoples’ activities on a wider scale. Participants provided stories from their everyday lives, revealing personal experiences about their preferences, everyday life conditions and barriers that accelerated or decelerated ecologically sustainable transformations. The barriers were either personal or related to general perceptions of the operating environment. This revealed that there are no one-fits-all solutions. However, gaining insight on people, and the obstacles between them and a more sustainable lifestyle, through collaborative media will guide seeking solutions that respond to the true needs.

4.5 Understanding Local Context

The option to include a location tag in the submitted ideas facilitated opportunities to suggest solutions that arose from the participant’s local context and answered to local needs. The option was however not widely utilised, and instead, most ideas and comments considered national or global contexts. In addition to the location tags,

local characteristics were also sporadically introduced in textual descriptions.

4.6 Call to Action

The ‘call to action’ function includes items such as participants sending out requests to companies or people, sharing tips for a more ecologically sustainable life, inquiring on the possibilities to take action, and proposing business ideas. Call to action functions demonstrate how collaborative media has the potential to nourish ecologically sustainable life by catalyzing new actions.

4.7 Measuring Endorsement

In the case study, the collaborative media had a built-in function to measure the endorsement of suggested solutions for preventing climate change. Here, the voting tool had a central role. Participants had the possibility to give a thumb up or down signal according to which ideas they wished, or did not wish, to support (in the first phase of the project) or prioritise (in the third phase of the project). Comments also provided information on how the ideas were received and therefore indicated the endorsement level for individual ideas. Analysis revealed that supporting comments were common, but also criticism and questions were often verbalised as comments. Measuring the endorsement level gave a guideline for citizen priorities. It helped to filter and organise the large amount of participant input, and to move from one project phase to another, towards drafting the final objectives.

4.8 Creating Connections

Participants had the possibility to introduce themselves in their profile. This created an opportunity e.g. to present oneself as a legitimate expert on a specific topic. Yet the profile alone did not create connections between people. Instead, connections were made when participants presented ideas that were clearly based on their own expertise, or promoted their own initiatives, products or services. This helped others to get know the activities, products and services that were already available. Creating connections also included match-making. Participants found like-minded people, which provided the possibility to create new connections and start new actions. Creating connections also had the potential to catalyze face-to-face meetings and actions. This, however, required the participant’s own effort and active attitude.

5 DISCUSSION

It has been acknowledged that the internet has provided an improved and broadened toolkit for social activism [15]. Our analysis also reflected the same finding. Collaborative media had a supportive function to introduce existing activities and practices to thousands of people, as demonstrated in the participants’ comments providing hints or promoting activities. Providing links and attachments to the proposed ideas demonstrated how collaborative media can be bigger than the platform itself. It grows beyond its own limits in its content, and provides touchpoints to many additional internet sources and audiovisual materials.

While analysing the data, we noted that participants behaved mostly peacefully and politely towards each other, even surprisingly so. This was despite the fact that there was a lot of debate with

a clash of different experiences, opinions, priorities and presentation of (so-called) ‘facts’. This illustrates how there was no shared understanding about climate change and the actions required to address it. The participants did not even always share the same understanding about topics belonging to climate related issues. Yet, the active and wide participation showed that there was interest and shared concern related to climate change among the youth. We suggest that the generally polite tone of the conversation may also relate to the function of the collaborative media, as the postings were not general social media posts, but the campaign had a goal and purpose related to sustainability. Thus, the issues of hate talk often reported in social media [14] were not present in this case study.

We were somewhat surprised with the lack of local content in the postings. This however may be due the overall objective of the project, which was to share proposals, ideas or measures one wished to present to government level authorities. The identified function category ‘understanding local context’, however, demonstrates that collaborative media also offers possibilities for scaling and tailoring solutions also on a local level. It also highlights how ecologically sustainable transformations are a continuous dialogue between local, regional, national, and global level.

Our work contributes to understanding collaborative media for citizen activism, especially on the topics of sustainability and climate change. We believe our analysis and categorisation of different functions of collaborative media help in analyzing and framing other datasets and collaborative media use on similar topics. We acknowledge that our work is limited by its dataset and method, and it would be interesting to complement our evaluation e.g. with in-depth interviews. As future work, our plan is to focus on individual users of collaborative media and gain insight on their citizen activism through the channel.

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Article III

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Understanding animal-oriented social media collaboration in Australia's 2019–20 bushfire crisis

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In the past decade, social media has served as a vehicle for sharing information and coordinating actions during sudden crises. However, much of the research has focused on local communities directly affected by crisis and the human recipients of aid. This paper explores a case where handicraft makers across the globe collaborated on social media—namely Facebook—to help Australian wildlife during the 2019–20 bushfire crisis. Based on 12 semi-structured interviews, we report how animal-centered visual content spread through a broader hybrid media system, arousing emotions that played a crucial role in increasing awareness of the crisis and catalyzing action. The findings highlight how participants actively sought possibilities for utilizing their knowledge and expertise within the project and experienced receiving immaterial rewards and benefits as compensation for their efforts. The findings also show how participants had various roles in the collaborative initiative—alternating between online and offline environments. However, the ongoing crisis coupled with the related pressure and stress, the rapidly increasing number of helpers, communication ambiguities, and technological challenges, led to chaos, heightened emotions, and fueled dissension within the group. These factors posed challenges to collaboration, further highlighting the negative and toxic communication cultures of social media. This paper enriches our understanding of how social media can enable, but also challenge, bottom-up community-driven, animal-oriented solidarity actions and long-distance crisis collaboration.

KEYWORDS

animals, collaboration, collaborative media, craftivism, social media, societal crises, solidarity, volunteering

1 Introduction

Due to the accelerating environmental crisis, weather extremes, such as heatwaves, droughts, bushfires, and floods, have become increasingly common. This has been demonstrated in Australia, where weather extremes have emphasized how human suffering cannot be seen in isolation from the suffering of non-human others. During the 2019/20 Black Summer Bushfires – the catastrophic bushfire season in scale and impact – an ongoing drought and record-breaking heat resulted in bushfires that burnt millions of hectares of land and killed billions of animals (WWF Australia, n. d.). In addition, numerous species, including endemic koalas and kangaroos, became injured, orphaned, and homeless (The University of Sydney, 2020; WWF Australia, 2023).

As one of the bushfire rescue initiatives, the Australia-based Animal Rescue Craft Guild put on its Facebook group a call for volunteers to make shelters and other items to aid animals. The group expanded rapidly and globally as the call brought together volunteer crafters who knitted, crocheted, and sewed mittens for koalas' burned paws and pouches for orphaned marsupials, among others (Animal Rescue Craft Guild, 2020; Reuters, 2020; The Guardian, 2020). The call for volunteers resulted in multiple sub-groups as people organized at national and local levels in their own Facebook groups. One of these sub-groups was established by one individual in Finland, on the opposite side of the Earth, named Suomen käsityöläiset Australian eläinten avuksi [transl.: Finnish crafters to help Australian animals]. The group expanded rapidly and aimed to share instructions and tips for how to help Australian wildlife by making handicrafts and to coordinate a joint donation from Finland to Australia. As a result of the joint effort, a total of 110 kg, including 1,600 individual handicraft items, was shipped to Australia, which is a significant amount considering the relatively small Finnish population (Iltalehti, 2020; Suomen käsityöläiset Australian eläinten avuksi, 2020).

The action described above is a part of the development where people's environmental crisis awareness and engagement are constantly increasing due to the prominent role of social media (Filho et al., 2018; Mavrodieva et al., 2019; Östman, 2014). The prominent role of social media in increasing environmental crisis awareness and engagement is reflected by various scholarly interests in interdisciplinary academic fields. Social media's diffuse, diverse and even conflicting information (Skoric et al., 2016), enables public discussion (Fernandez et al., 2016; Gil de Zúñiga et al., 2012), facilitates environmentally conscious behavior by information acquisition and attitude formation (Anderson, 2017; Melville, 2010; Oakley and Salam, 2014; Williams et al., 2015), and mobilizes individuals around their personal lifestyles and values to engage with environmental activism and participation (Bennett and Segerberg, 2012; Karhu et al., 2019; Zhang and Skoric, 2018), to name a few. The volume of aid to Australian wildlife—from Finland as just one of many countries—illustrates how Australia was inundated with crafts aiming to help the animals suffering from the ecological crisis. This crafting phenomenon demonstrates how social media and the social networks relying on it make it possible to turn environmental crisis awareness into response action where people can contribute collaboratively.

The present case study explores social media-based environmental crisis collaboration through interviews with Finnish crafters who contributed their skills to help the Australian animals. It is not new that people help those in need through social media. However, typically, the recipient of help (often monetary) is a human being. In this case, collaboration takes place outside official infrastructures and organizational coordination attempts to offer non-monetary help to animals far abroad. Whereas related work has focused mainly on crises occurring in people's immediate surroundings, we aim to provide a rich empirical understanding of social media-based collaboration cultures in a long-distance crisis context where the crisis does not immediately affect the participants themselves.

In this study, we analyze interviews of 12 voluntary helpers to ask: 1) What drove the collaborative actions, i.e., what made people knit, crochet, and sew huge quantities of shelters and other items to aid Australian wildlife? 2) What forms of effort were identified? 3) How was social media—and the Facebook group—perceived as a platform for collaboration? Understanding these drivers and sociotechnical

conditions makes it possible to nourish social media projects and platforms that increase bottom-up communities' capacity to collaborate in societal crises.

2 Related work

2.1 Animal-oriented solidarity

Our study is strongly related to “solidarity with animals,” i.e., a feeling about being connected with other animals and a greater desire to help animals as well as to engage in collective actions on their behalf (Amiot et al., 2020). Researchers have emphasized a need to expand the lens of solidarity from domesticated to wild animals in an aim to reflect our multi-species communities (Cojocaru and Cochrane, 2023). Overall, people's capacity to empathize is important in concern and care that people have for the conservation of wildlife and nature (Myers et al., 2009; Taylor and Signal, 2005). In our study, the volunteer crafters knitted, crocheted, and sewed mittens for koalas' burned paws and pouches for orphaned marsupials, among others to provide protection and shelter (Animal Rescue Craft Guild, 2020; Reuters, 2020; The Guardian, 2020). Due to the quickly scaling efforts, local communities in Australia become overwhelmed with donated goods (BBC, 2020). On the other hand, one might ask if the crafted items really help animals or not (e.g., Time, 2015). Although the necessity and concrete benefit from the crafted items can be disputed, the phenomenon shows that people have a large-scale desire to help animals in distress.

Visual communication can trigger a strong emotional response (Casas and Webb Williams, 2018; Jenni, 2005; Kharroub and Bas, 2015; Whitley et al., 2021) and it has been recognized that visuals play a significant role in viewer's awareness and mobilization in animal advocacy issues (Cherry, 2016). On the other hand, prior research indicates that there is a great variation in people's attitudes toward animals, which depends, both animal and individual human attributes as well as cultural factors (Serpell, 2004). According to the research evidence, people show more concern for animals they perceive aesthetically appealing or “cute” (Gunnthorsdottir, 2001; Prato-Previde et al., 2022; Stokes, 2007). That is related to the concept of “charismatic megafauna”—i.e., particularly appealing animals—that are utilized in media for directing public attention toward conservation and preservation of the natural environment (Barney et al., 2005). In their research, Albert et al. (2018) ranked a list of the most charismatic animals and emphasize how most of the ranked species are large exotic, terrestrial mammals.

Research literature also emphasizes how humans prefer and show more concern for “human-like” animals (Batt, 2009; Herzog and Burghardt, 1988; Serpell, 2004). That is linked to people's tendency to project human thoughts, feelings, motivations, and beliefs to nonhuman animals—i.e., anthropomorphism (Serpell, 2003). Prior research suggests anthropomorphism increases prosocial behaviors toward animals (Butterfield et al., 2012; Williams et al., 2021) and is a key factor in stimulating a wildlife value shift in which wildlife are seen as part of one's social community (Manfredo et al., 2020). Further elaborated, Tam (2019) concluded that people who anthropomorphize nature are more likely to feel guilty for environmental degradation and in turn to take more steps toward environmental action.

To understand what drives citizens' crisis-related (animal-oriented) solidarity activities on social media, it is useful to look at the concept of 'post-humanitarian solidarity', coined by Chouliaraki (2013). Post-humanitarian solidarity describes how contemporary solidarity has moved from "common humanity" towards a morality of 'the self' as the main motivation for action" (Chouliaraki, 2018). Therefore, post-humanitarian solidarity emphasizes solidarity as a pursuit of personal interests, self-fulfillment, and minor gratifications in a spirit of what's-in-it-for-me ethics (Chouliaraki, 2013). All these perspectives may have an explanatory potential for what drives people to use social media collaboratively in crises in an aim to help animals, but the information is fragmented and based on different contexts.

2.2 Social media use in crises

Today's crisis events emphasize the hybrid nature of media. In the hybrid media system (Chadwick, 2013), meanings are formed through the endless circulation of texts, visuals, and meanings in closely interwoven practices of professional, journalistic, and social media (Sumiala et al., 2018). In other words, social media is part of a broader hybrid media environment. Since the second half of the 21st century, a rapidly growing research field represented by scholars from different disciplines with different theoretical and methodological approaches has drawn attention to the role of social media in crises (Reuter and Kaufhold, 2017). The research cases are especially related to natural disasters (Liu et al., 2008; Starbird and Palen, 2011; Yates and Paquette, 2011), terrorist attacks (Palen and Liu, 2007; Perng et al., 2013; Wiegand and Middleton, 2016) as well as political uprisings (Starbird and Palen, 2012; Wulf et al., 2013). However, most studies have focused on local communities directly affected by these crisis events. Less is known about the use of social media in crises that are physically distant to the participants.

Altogether, it is evident that social media has broadened citizen participation in crises and made it more visible (Palen and Liu, 2007). When paying attention to communication among citizens as a social media usage pattern in crises (Reuter and Kaufhold, 2017), research interests in how social media enhances crisis awareness and how people make sense of the crisis events within an online network get particularly emphasized. It becomes evident that during crises, people turn to social media to look and share information (Hughes and Palen, 2009; Palen and Liu, 2007; Starbird and Palen, 2011; Takahashi et al., 2015; Yates and Paquette, 2011) that spreads through online social networks rapidly and dynamically (Albris, 2018) broadening its reach. In this informational sphere, social media also serves as a platform for collective emotion formation (Valaskivi et al., 2019). Overall, social media has been researched as a means to organize different types of individual and collective actions (Enjolras et al., 2013; Lim, 2012; Tufekci and Wilson, 2012), and this organizational capacity of social media seems to play a significant role in the creation of new movement forms (Bennett and Segerberg, 2012; Segerberg and Bennett, 2011; Theocharis, 2013). These movement endeavors can be scaled up (Mundt et al., 2018) as social media enables communication not only within the affected areas but also with the rest of the world (Takahashi et al., 2015; Valaskivi et al., 2019) by bridging the local and the global (Enjolras et al., 2013). All this is closely linked to how people can coordinate and organize their crisis response efforts (Albris, 2018; Sarcevic et al., 2012; Starbird and

Palen, 2011; Takahashi et al., 2015), and how the ones in need of help can be connected to those offering it (Albris, 2018) through social media.

When paying attention to syntheses about the use of social media in crises—it is central how collaboration is mentioned as one aspect among the lists introducing how social media are used during these events (e.g., Alexander, 2014; Bakar et al., 2022; Spence et al., 2015). Nevertheless, when the research focuses on citizens' collaborative activities during crises, these activities are often lower-threshold micro-tasks, such as crisis mapping (cf. Liu, 2014). Also, most of the research focusing on the use of social media in crises concentrates on Twitter (Reuter and Kaufhold, 2017)—a microblogging service that serves the immediate needs for information (Valaskivi et al., 2019) and thus again emphasizes the above-highlighted interests that are related to making sense of the crisis events. However, little is still known about crisis collaboration, which requires more extensive efforts from its participants.

2.3 Spontaneous solidarity and craftivism on social media

The efforts that enhance mutual support and help, particularly during crisis events, can be understood in terms of 'media solidarities'. According to Nikunen (2019), media solidarities refer to how media expresses and enhances solidarity through various representations and engagements. The activities include, e.g., creating, "liking" or sharing content about social issues, signing online petitions, and donating to a cause (Gil de Zúñiga et al., 2013; Miller, 2015; Vicente and Novo, 2014; Warren et al., 2014). Though the described types of contributions have been referred to with terms such as "micro-activism," "slacktivism" (Dennis, 2019), or post-humanitarian solidarity (Chouliaraki, 2018), small gestures get multiplied when done by substantial amounts of people and create an environment that can inspire people to mobilize in larger and more coordinated ways (Miller, 2015). The mobilization is related to how digital volunteers form 'emergent groups' to support crisis response (Cobb et al., 2014; Palen and Liu, 2007; Reuter and Kaufhold, 2017; Starbird and Palen, 2011, 2013). Following the logic of "connective action" (Bennett and Segerberg, 2012), these groups are self-organizing, quickly scaling, and highly flexible bottom-up movements. However, the criticisms verbalized in terms such as slacktivism are well-aligned with the above-described notions about how low-threshold micro-tasks get emphasized in crisis collaboration—and apparently in solidarity actions as well.

On the other hand, people actually do things together in terms of solidarity by making use of social media in different ways (Nikunen, 2019). For instance, there are social media groups organized around craftivism (Black, 2017; Clarke, 2016; Nikunen, 2019)—a practice that draws on new social movements and social media and focuses on the use of crafts for activism (Nikunen, 2019). In contrast with today's digitally native social movements that are "initiated, organized, and coordinated online without any physical presence or pre-existing offline campaign" (Li et al., 2021), craftivism is participation that is "mobilized and enhanced through media but extends beyond media." Social media has expanded craftivism, and there are various social media sites where craftivists plan and organize their projects. Craftivism

highlights the importance of makings and entails many different versions, from demonstrations to art exhibitions and aid work (Nikunen, 2019).

Combined, these research contributions form a background for understanding the phenomena related to our case study in which we explore how handicraft makers united by Facebook collaborated to help Australian wildlife during the Black Summer Bushfires. Although crisis-related social media movements have been actively studied, prior literature includes few empirical cases that combine the use of social media to show animal-oriented solidarity in a remote crisis, particularly looking into the motivations of collaboration, the forms of collaboration in practice, and perceptions of technological affordances for collaboration.

3 Methods

3.1 Data collection

The data collection began by becoming familiar with the 'Finnish crafters to help Australian animals' Facebook group in Spring 2020. The first author did not participate in the community but acted as an outside observer (Rafaeli et al., 2004) for identifying active participants and potential interviewees (Hine, 2015, pp. 79) among the group. Identified potential interviewees were then contacted initially through private messages for requesting an interview. In addition, an open call for interviews was published in the group. After the initial contacts, the interview arrangements and practices were agreed upon with the interviewee by phone or email according to the interviewee's preference.

The research has followed the research ethics procedures of University of Lapland, Finland. With communication technology mediated interviews, conducted remotely with participants, the informed consent for participation is retrieved orally, before starting the actual research study interview part. The study participants do not represent a vulnerable participant group and the interview does not address any sensitive personal information. This procedure is valid accordingly to the local legislation and the university research policies.

For eliciting participants' individual reflections on social media-based environmental crisis collaboration, altogether 12 interviews were arranged in March–April 2020: ten via online meeting platforms or phone and two via email. Interviewees included the founder of the group, other group admins as well as 'ordinary' participants. The semi-structured interview was selected as an interview method as it allows openness and flexibility by proceeding loosely and focusing on pre-planned themes (Bryman, 2012; Hirsjärvi and Hurme, 2022) but leaving room for participant-driven discussion as well as participants' own interpretations and meaning-making. The interviews were conducted in Finnish and covered four main themes: the role of news and social media in increasing crisis awareness and engagement, drivers for collaboration, forms of efforts, and the role of Facebook as a platform for collaboration. Though two of the interviews were conducted through email, they allowed the above-mentioned 'participant-driven discussion' in a written format. The 10 interviews conducted via online meeting platforms or phone were audio recorded with the interviewees' consent. The duration of those interviews was, on average, 35 min, varying according to the interviewees' openness and number of examples discussed.

3.2 Data analysis

The interviews were transcribed from the recordings, and the data was anonymized at this stage. The dataset was subjected to thematic analysis (Burnard, 1991) for identifying, classifying, and analyzing different themes that arose from participants' individual reflections. One researcher identified the initial codes and emerging themes and established a thematic codebook by searching, reviewing, refining, and naming the themes. The codebook was reviewed by two other researchers. After that, the researcher who established the codebook conducted the first analysis round. To enhance the reliability of the analysis, a second researcher independently went through the interview data and coded it according to the codebook. A third researcher decided on the codes in cases where the two researchers had given different codes to a data item.

4 Findings

In this section, we report key findings from the interviews. After presenting the drivers for collaboration, we present how collaboration was organized and maintained, and how participants perceived the technological framework for their collaborative efforts. The participant quotes have been translated from Finnish to English when writing the paper.

4.1 Drivers for collaboration

4.1.1 Visual communication of suffering animals as catalysts for the sense of crisis

The case study highlights how news stories and social media content – as a broader hybrid media environment – generated both crisis awareness and the sense of crisis as well as promoted a chance to take part in the craft guild initiative.

"It was hard not to notice that news coverage [...] Those koalas and others were on the forefront of the [social media] feed" (P4).

"Someone linked the Facebook group to me, then another one, and then a third one... And it had been talked about in a newspaper. It kind of jumped to my eyes from many different media" (P2).

Following the bushfire crisis through hybrid media raised emotions that drove collaboration in the craft guild. Participants described the horror caused by the situation.

"People were sincerely horrified by the situation, and I think this sincere horror caused the positive movement. People felt a sting in their hearts and wanted to do concrete things in an aim to help" (P6).

Visual communication of Australian animals in distress played a crucial role in arousing the described emotions. The participants of the group shared continuously plenty of images related to suffering animals by themselves too. The images were shared from news stories as well as other social media sources, including the main

Australia-based Animal Rescue Craft Guild group. There were also photos that presented the handcrafted aid “in action”: kangaroos in pouches and koalas with mittens among others. According to participants, photos and videos presenting suffering animals got them to act.

“There were posts and news from every channel about how koalas had burnt themselves and how kangaroo puppies were without a mother. I got hopeless and needed to do something” (P12).

Overall, this is attached to an animal-related emotional bonding which was a central driver in getting participants to collaborate as a part of the craft guild. Participants emphasized their close relationship with nature and animals. Also, Australian animals’ uniqueness and certain kind of cuteness played a role in catalyzing participants’ actions.

“I was aware of how unique flora and fauna is in there, and how great loss it would be to the Earth if they were permanently destroyed” (P11).

“Even though Australia is very far away, everyone knows what a koala looks like. And everyone knows what a kangaroo looks like” (P2).

“It was also affected by such cuteness. I believe that if they had asked to craft something for crocodiles in there, people would not have been so much activated” (P9).

Participants also emphasized how animals are innocent beings that must be helped in human-made crises.

“For some reason, it is easier for people to start helping animals than other humans. [...] Compared to elderly people, for example, many may think that they have their relatives and money, let them buy their blankets” (P2).

“Animals and children are those who are completely innocent in this world. They should be helped. [...] Grownup people here do what they do, and that has certain consequences. [...] Yes, this Australian disaster is, in a way, human made. [...] It was a matter of time before this bomb exploded” (P3).

4.1.2 A chance to deploy the right combination of interests and skills

A chance to deploy the right combination of interests and skills was a central driver for collaboration in the craft guild. As one of the participants summed up:

“It is great in these projects that you can combine all the tools you have on the table” (P6).

At first, making handicrafts was a beloved hobby for many.

“Sometimes, I cannot come up with what I could craft for myself when I have already done so many things” (P4).

In addition to crafting as a hobby, some participants had an education or profession in the field, willing to deploy their skills for the volunteer project.

“I have a craft education as one profession, and I craft a lot anyway. So, it kind of clicked immediately that ‘okay there, I am going to participate in this’” (P9).

Therefore, participants felt there was a low threshold to participate in the project that matched their interests and skills.

“For me, sewing is a bit like putting shoes on. It is not an effort of any kind” (P2).

Participants generally emphasized the significance of clear and easy instructions that lowered the threshold for participation. The instructions were visual and, in addition, plenty of photos of finished crafts were shared in the group.

“It was easy to get involved because there were clear instructions on what kind of pouches the kangaroos should have. [...] It made it very easy to get excited” (P5).

Though most participants had a background in handicrafts—a hobby or even a profession—some learned new crafting skills in the project that they perceived exciting.

“Everyone who knows me said, okay—now you have even started knitting. I have been the worst in the world to make any crafts. But I got a new hobby, and I am excited about it” (P6).

Crafting skills were just some of the skills that participants got to utilize in the craft guild. Many had previous background and experience in, e.g., (animal) volunteering and that thus worked as a driver for collaboration.

“I do a lot of charity work in any case. [...] So the first thought that came to my mind was what kind of help Australia needs in this situation. What would be a concrete, useful way to help” (P6).

Specific skills were needed in the craft guild, and those participants whose skills matched the needs recognized themselves and offered to help. The group administrators asked whether there were participants able to, e.g., translate the instructions or craft sewed items.

“There was a discussion among the administrators that the instructions should be translated. So, I wrote there [in the Facebook group] that if you needed a translator, I could translate too” (P4).

“The administrators asked whether there was anyone who was able to sew because there were already loads of knitted and crocheted items. [...] It was such an alarm to me” (P2).

Overall, participants experienced that collaborating in the craft guild was a concrete way to contribute with their interests

and skills and help Australia in the bushfire crisis. Participants also emphasized that they were willing to help in non-monetary ways.

“Financially, I would not have an opportunity to help. For once, it was such ‘yay’, I can do something too” (P5).

4.1.3 Rewards and benefits

In the interviews, participants described versatile rewards and benefits they experienced receiving, and that therefore drove them to take part in the collaborative effort. At first, participating in the craft guild was a way to channel one’s craft enthusiasm. Participants brought up how they craft a lot in any case for the joy of doing—whether the items were needed or not. Now handicrafts had recipients awaiting them.

“It is good that the frenzy of doing can now be gutted into something necessary” (P2).

In addition, one of these rewards and benefits was a chance to utilize material stocks that participants had, according to their own words, “cabinets in full.”

“I had extra fabric, which fits well with such a purpose. [...] I like the idea that no stuff and no fabrics are wasted, but some purpose must be found for them. [...] That was my motive” (P10).

Also, the rewards and benefits wrapped around various immaterial aspects: from getting a theme for a kid’s birthday party to finding pedagogical synergies with work in early childhood education.

“This year, we held birthdays on this theme [crafting aid items together with guests at kid’s birthday party]. So, in a way, it also had such a selfish perspective that I got a solution to one of the birthday parties” (P2).

For some, the reward was simply to get to do things together.

“Then I believe in the power of the community. And in doing something together. It is always really motivating” (P6).

4.2 Organizing and maintaining the collaboration

4.2.1 A need for administrators

Participants had various roles in the craft guild. In the first place, administrators were responsible for setting up the group. In addition, the group of administrators took care of practicalities, such as communicating up-to-date information to group members, coordinating domestic item shipments, and negotiating transportation sponsors to the end destination in Australia. As one of the administrators described in the interview:

“I was mainly involved in the group’s maintenance activities and provided technical support. I ensured that all the information

needed was found in the group, it was easy to find and understand, and everything went smoothly online” (P11).

As a detail, being an administrator or conducting administrative activities was not self-evident, but there were also struggles regarding who had the right to do what in the group.

“They started to solo—for instance, asking all kinds of sponsors and did not collaborate with us [named administrators]. We administrators had the big picture about what should be done and how” (P1).

4.2.2 A variety of different roles

Making handicrafts was at the core of participation for many. Participants crocheted, knitted, and sewed items for Australian animals:

“I started knitting small animal bag covers. In particular, I crocheted bird nests” (P9).

In addition, participants took care of various support tasks. These included, e.g., coordinating material donations and item shipments, translating crafting instructions, and sharing information and news among the participants as well as in participants’ networks outside the group.

“People started sending me messages that they would like to bring used sheets and towels [...] because there was a wish that recycled materials are used for crafting the items” (P3).

“I collected the donations in our region and mailed them to the domestic collection point [hub]” (P9).

“I translated a large part of those crafting instructions” (P4).

“I was pretty active [in the Facebook group]. I shared much news in there” (P5).

“It [information about the crafting event] was shared into different [Facebook] groups. [...] I also shared information, for example, to *marthas* [a Finnish non-profit organization that engages in advocacy work] and seniors in the area” (P6).

Participants described how visual communication played a central role in documenting and sharing the activities.

“In the group, there was a picture of a large pallet, which was full of cardboard boxes of the same size, tightly packed. It was probably 2.5 meters high. So, there were quite a lot of handicrafts from Finland overall” (P3).

“I published a picture on my social media of the girls sewing the items. Many said that oh no, I would have liked to participate too. But it was already too late” (P2).

Some participants also arranged offline events for crafting the items together. Next, this form of participation will be looked at in more detail.

4.2.3 From online to offline participation

Making handicrafts is an offline activity by nature, and people arranged gatherings and events for crafting the items together. Interviewed participants' experiences describe the variety of these get-togethers, from meetings with friends to children's birthday parties and open events with a wide audience.

"I organized an event here in my residential area with a local knitting cafe. People were allowed to attend—to come to the place to knit, exchange ideas, and bring their ready-made items within a certain time" (P6).

Experiences from offline events further illustrate the ability to participate in different roles.

"There was so much that people could do. Some said that I cannot sew; I have never sewed. So, I said okay, but you can cut. There were some tasks for everyone" (P3).

The interviewed participants emphasized the significance of experiences from offline events. The significance arose from, e.g., community spirit. Participants also felt it was essential to increase awareness about the bushfires when meeting people face to face.

"Many thanked us all for the warm-hearted discussion and such power of community. [...] We all come from different paths in life. Nevertheless, it is not what matters. What matters is that we are in that situation and doing something for good together" (P6).

"I also noticed that there are people who just do not know about things. Some were quite unaware about the bushfires" (P3).

4.3 Experiences from the technological framework of collaboration

4.3.1 Reach and rapid expansion of the group

Participants emphasized how Facebook was an incomparable channel to reach people. It is descriptive that the group was established on Facebook because it was the only platform that was familiar to the administrator who established the group.

"I cannot use anything else. I am so foolish that I do not know any other [platforms] than Facebook" (P1).

In addition, participants brought up how craft-makers can be reached from Facebook as a particular platform.

"It seems that a lot of middle-aged people have joined Facebook. Furthermore, those people also have more crafting skills [...] Like-minded people then find each other" (P4).

On the other hand, news media reporting supported the reach of the Facebook group as news pieces about the craft guild were published. That highlights the hybrid nature of media. Many people joined the group due to the reach supported by these news pieces, as one of the administrators described in the interview:

"At first, there were about a hundred people, but when there was a story in a tabloid, it kind of exploded, and there were quickly over 5,000 people" (P1).

4.3.2 Sharing and structuring up-to-date information

At first, crafting instructions were shared in the Facebook group. In addition, utilizing Facebook as a platform for collaboration offered the possibility to ask and give advice, serving as a site for peer support and an interactive and communal way of doing things.

"Australia[n authorities] had come up with instructions on what to do. [...] It felt straightforward. [...] You can just print the patterns and instructions" (P3).

"If someone asked that she does not get how this should be done [...] there were people who immediately told how to do it" (P5).

In terms of sharing and structuring up-to-date information, the amount of volunteer crafters did not explode only in Finland but also globally. Due to that, the situation was in flux all the time in Australia. No one could have expected such an amount of donations, and volunteers in Australia had to sort the avalanche of crafts to give up-to-date information about the items that were still needed. The challenges caused by the enormous volume of aid affected the activities of the Finnish group.

"I would have done more, but there were announcements that you must stop crafting; nothing can be done now because there were so many items already. [...] The situation of whether to craft or not was constantly monitored" (P7).

Sharing up-to-date information describes how the Facebook groups enabled a multidirectional flux of information from the Australian parent organization to and within local craft guilds around the globe. Participants told how one of the benefits of Facebook was the ability to share real-time (*in-situ*) information.

"I think this group did an excellent job of constantly informing people that 'do not do this, do this, now there is a need for this'" (P6).

"There were also members from Australia, who sent photos and updates from the spot to see the situation in there. It somehow diminished the world and made it more relatable" (P4).

Visual communication played a key role in sharing and structuring up-to-date information. As mentioned above, the group shared, for instance, a lot of pictures of animals in distress as well as crafts and instructions for making the crafts. Moreover, visuality was present in the group's communication, for example, in the form of emojis.

"And if there was terribly sad news, there were those teary-eyed signs" (P5).

4.3.3 Dissension and heated emotions

Due to the ongoing crisis, the situation and conditions were constantly changing in Australia. Simultaneously, the number of crafters sending aid increased exponentially and globally. Aid was delivered simultaneously from many continents and time zones. Though updates about the crafts needed were constantly published in the group, providing up-to-date information was challenging and confusion easily arose. At the same time, the acute crisis created pressure and stress—and made people long for quick action. Together, the circumstances created a challenging equation that caused dissension and heated emotions in the group.

“Some are such that give everything to me immediately and does everything not progress in a second. What is now needed, and what is not needed, and am I doing it in vain? There was such a commotion. [...] Many were upset that this was not going faster, and now there is a rush. There the forests burn, and we here do not even get the package sent” (P2).

Participants described how people in the group expected real-time communication and rapid response that, on their part, contributed to above-described dissension and heated emotions.

“Some get angry when they do not get an answer. [...] You join the group and do not get the answers you seek. So then comes the frustration that you are not being listened to, what is happening now, and this is a badly organized project” (P4).

Participants also described actual trolling and bullying that occurred in the group.

“Then there was one, well, a troll. It was such terrible harassment and making personal remarks against me” (P1).

“The administrators received harassing messages. It seems that even when we try to do something good, there are always side effects like this” (P4).

On the other hand, participants discussed that the described dissension and heated emotions reflected the overall Facebook communication cultures that they perceived as negative.

“You cannot expect any great reception or constructive discussion on Facebook, which is not the forum for that. To put it ugly, it is more for those who want to bicker. Or otherwise, mix things up in some way” (P6).

Overall, the described aspects connect to participants' perceptions that Facebook is not a state-of-the-art platform for this kind of collaborative action.

4.3.4 Facebook is not designed for collaborative action

Overall, participants felt that Facebook is not designed for collaborative action demonstrated by the craft guild.

“Although it is a good place to connect people, it seems that it is not designed for such collaborative activities. In fact, this action and this platform do not fit together” (P4).

At first, participants described how Facebook does not adapt to the needs of individual groups.

“Facebook group page is designed for a general use. Harnessing it to a particular purpose is trickier. [...] It lacks the flexibility that would have been needed” (P4).

Often, participants were looking for the latest information, and Facebook's algorithmic logic confused them.

“That system has changed so much. The posts are not in a chronological order [...] The challenges get even more emphasized when you should stay up to date. And Facebook messes that up” (P4).

There were also challenges in Facebook's communication practices as people constantly asked the same questions in new comment threads. The challenges got emphasized as the group rapidly expanded.

“When people get excited, they ask all kinds of things. They did it by posting or commenting. Then there were loads of side chains that repeated the same things” (P9).

“If you are an active Facebook user, you may read every comment and all the conversations. Surely it is quite confusing” (P2).

In addition, reasons for Facebook's impracticality as a collaboration platform were found in participants' skills in IT and social media.

“For some reason, not all people could find or retrieve those files and attached publications” (P9).

“However, I am already over 60, so for me, using Facebook and understanding where everything is located is not always so clear” (P7).

5 Discussion

We first highlight the trinity of drivers for collaboration, followed by a discussion on the division of labor in the interplay between global and local and between online and offline action. Finally, we discuss balancing between the reach of Facebook and its adaptability for crisis collaboration.

5.1 The trinity of drivers for collaboration: appealing to emotions, reason, and values

Concerning participants' motives, the chance to help the affected wildlife by crafting appealed to this unique interest group's emotions, reason, and values. Participants emphasized how they received visual news reports and social media content about suffering endemic Australian animals from multiple channels—highlighting the hybrid nature of media – and how that offered a relatable manifestation of the distant events. Reinforced by the algorithmic logic in recommendations on social media, the flood of alarming information on people's social media feeds inspired individuals to not only share information, opinions, and experiences but also to act. Participants'

vivid expressions of burning koalas and fleeing distressed kangaroos seem to be significantly related to suffering as a cause for emotion and action (Chouliaraki, 2010, 2018), and how imageries of pain and emotional language of emergency play a key role in that (Calhoun, 2010). Regarding emotional dimensions, it has been argued that circulating affects play a crucial role in gaining attention in hybrid media (Sumiala et al., 2018). Further elaborated, Papacharissi (2014) has focused on how the expression of sentiments mobilizes and connects crowds in the digital age – and coined the term affective publics to describe these practices. This is related to how solidarity becomes articulated through emotions that social media makes use of (Nikunen, 2019) and how social media can be a site for collective affect management in the immediate phase of a disaster (Valaskivi et al., 2019).

Historically, images of attractive and appealing animals are widely used, e.g., in NGOs' animal advocacy campaigns (Milton, 2011). Our findings illustrate how visual content of suffering yet attractive animals was central to arousing emotions such as anxiety, horror, and fear. According to widespread scholarly understanding, people find cute furry animals attractive and appealing, and therefore worth protecting and conserving (Colléony et al., 2017; Gunthorsdottir, 2001; Milton, 2011). Still, as pointed out by Milton (2011), the appearance of animals (e.g., cuteness or ugliness) is related to how animals are made as objects of concern and protection following changing cultural priorities. In Milton's example, Australians and New Zealanders perceive possums differently though it is the same animal. That is interestingly interwoven with a question about whether people are more concerned about the environmental crisis if it threatens cute animals than unappealing ones (Milton, 2011). In our study, the participants experienced that it was important to help endemic Australian animals—without underrating their cuteness. As one of the participants pointed out, a certain kind of cuteness of Australian animals such as koalas played a role in driving the solidarity actions. She believed that people would not have been activated if crafts had been asked to do, for example, for crocodiles. In general, Finnish people are known for their close relationship with nature. According to a survey conducted in 2021, 90% of Finnish people consider nature important to themselves (The Finnish Innovation Fund Sitra, 2021). It is remarkable how, in our study, many participants argued to have a special bond with animals: for example, some had prior volunteer experience in animal rescue work.

Invoking reason was based largely on participants' experiences about matching skills and needs. They had relevant interests and skills – be it a hobby or profession among handicrafts, experience in volunteerism, or collaboration expertise such as translation skills. That is related to how social media provides an opportunity to become active in issues close to one's heart and use one's skills (Nikunen, 2019). What is also interesting here is how Finns are traditionally craftspeople. A hobby that is important to one was now even more important, and participants got to help with this 'superpower' they had. As suggested by Nikunen (2019), craftivism combines technological individualism with collaborative collectivity and emphasis on care, and by doing so, seems to respond to the current calls for solidarity. Joey poaches and koala mittens crafted by the participants may be understood in terms of optimistic emissaries of the solidarity of strangers (Malkki, 2015). What also supported the dimension of reason was a perception of an easy way to participate and offer concrete aid instead of donating money. Nevertheless,

selfless activities were combined with self-interest when participants experienced getting rewards and benefits from the action. These were, for example, getting rid of accumulated material storage or simply getting praise from others. It describes how altruist pursuits were combined with egoist dimensions. Combined, these drivers for collaboration describe the ethos of post-humanist solidarity, which emphasized a morality of 'the self' as the primary motivation for humanitarian action (Chouliaraki, 2013).

It was noticeable that participants did connect the bushfires to broader global themes, such as the climate crisis, but this was not remarkably verbalized in the interviews. Instead, the animal emergency gave a concrete form of occurrence to an environmental crisis and invoked, e.g., participants' ecological values. As suggested by Tschakert (2022), more-than-human solidarity and multispecies justice are interesting approaches to encompass both the human and the natural world and the interconnections between them in the environmental crisis. One might think that people have more empathy for animals than they do for other people. For instance, the participants in our study emphasized how innocent animals suffered from the human-caused crisis. The empirical research by Cameron et al. (2022) shows that context plays a major role when people's willingness to choose empathy for animals versus humans is researched. According to their findings, people emphasize with animal suffering but disregard it when it conflicts human needs (Cameron et al., 2022). We may ask if people empathize with animals as long as it is not out of their interests. In other words, whether the suffering of animals leads to actions to prevent climate crisis and thus extreme weather events when people should compromise for their achieved advantages. Also, previous research has posed a question about whether these kinds of actions are only momentary experiences of solidarity (Nikunen, 2019) and pragmatic management of suffering or do they offer a basis and carry a vision for a meaningful social change (Chouliaraki, 2018). Nikunen has suggested that craftivism as a means of making things together may result in more lasting ties for political participation than social media activism often does (Nikunen, 2019). This is a question that would require long-term studies and remains therefore intriguing.

5.2 Dividing labor in the interplay between global and local and between online and offline action

Overall, the case demonstrates an inspiring project that successfully mobilized individuals. Participants' roles in the craft guild describe a division of labor in the collaborative action. Participants did not only knit, crochet, and sew items but also administered the Facebook group and took responsibility for various support tasks, such as coordinating material donations and item logistics, translating handicraft instructions, acquiring sponsors for transporting the items to Australia, sharing information including updates on the spot from Australia on Facebook, and arranging offline events for crafting together—to name a few. Visual communication was connected to each role in one way or another. The participants described how crafts and instructions for making them, as well as other group activities such as donated materials and organized offline events were documented in photos shared in the group. On the other hand, this division of labor illustrates how

collaborative media creates collaborative communities oriented towards shared goals and action. Various activities were built around the core activity that needed their authors. A suitable way of participation was found for everyone. Previous research has suggested that “slacktivist” cultures are “rife in the era of social networking [...] and encourage people to click and contribute to online polls and issues, but that does not enable an engagement with real issues in the world of the here and now.” (Thomas, 2014). In our case, people were empowered to do concrete things to help Australian wildlife. What was also interesting was how there were also participants who learned new skills to make handicrafts. This poses a question about how these phenomena inspire people to participate, even it requires extra effort.

On the other hand, the project emphasized ‘the ease’ of giving material aid. Although making handicrafts requires an effort, some participants brought up how rewarding it was to get rid of their material storage. The ‘hubs’ were drowned in old sheets and other material donations that people eagerly wanted to give away. This is related to (also criticized) forms of solidarity, where people are used to getting rid of, e.g., their old garments by donating them to countries “in need.” Also, e.g., in the Ukraine war, it has been seen how people eagerly donate goods and act outside of official structures, e.g., giving rides to Ukrainians fleeing the war to other countries.

The research also illustrates the interplay of actions on global, national, local, and individual levels. The volunteers were organized on a national level, as illustrated by the case study on hand. In addition, national groups were further divided into local units where people, for example, gathered donations in the region and made handicrafts together in face-to-face events. At the heart of it all, individual efforts—be it making handicrafts or helping in the above-described support tasks—were combined to achieve a collective goal. This interplay demonstrates in a very concrete way how environmental crisis as a global phenomenon creates global movements that act locally. The relationship between collaborative media and offline action was also notable in the research case. This is aligned with the notions about how craftivism as participation that is mobilized and enhanced through media but extends beyond media—settling in the intersections of digital and material realms that are increasingly intertwined due to the ubiquitous media (Nikunen, 2019). The donated number of handicrafts illustrates how the online platform catalyzed offline action with a remarkable global volume. Making handicrafts is not only an offline activity by nature, but participants also organized offline events for crafting donated items together. That poses a question about the role of online spheres in these kinds of collaborative crisis action cases. In this research case, it was mainly building awareness, reaching people, sharing information, planning collaborative activities, and coordinating the joint effort.

5.3 Balancing between Facebook reach and its adaptability for crisis collaboration

The findings indicate how reaching and engaging people in a crisis initiative requires a use social media platform that people use anyway in their everyday lives. In our case study, Facebook was an incomparable way to reach people, and participants saw that it could reach the mass with which the right participants could be found and engaged. This is also the case considering the statistics. In 2020,

Facebook was the most followed community service in Finland where 58% of the population used the service. In comparison, 39% of Finns used Instagram, 13% Twitter, and 6% TikTok (Tilastokeskus, 2020). Often, people belong to Facebook groups according to their hobbies and other interests. In this case, many participants were members of different kinds of nationally and globally organized craft groups where they learned they could help Australian animals by making crafts. This points out how these groups created around these preexisting hobbies and interests have a role in bringing about action. Facebook also serves as a means to reach older adults (Sinclair and Grieve, 2017), which also often includes the makers of handicrafts. Reaching people is also a question about the linkages between social media and a broader hybrid media environment as news stories generated both crisis awareness and the sense of crisis as well as promoted a chance to take part in the craft guild initiative.

The reach of Facebook is linked to sharing and obtaining information as a primary function of social media in crisis situations (Eismann et al., 2016). Our case study demonstrates a multidirectional flux of information from the Australian parent organization to and within local craft guilds around the globe. That enabled the above-discussed interplay between global and local levels and peer support among participants, e.g., asking and giving advice and dealing with the situation together. Overall, visual expressions played a key role in the group communication. For example, lots of pictures were shared of suffering animals, crafted items, as well as instructions for making the crafts. The communication of the participants in the group was otherwise visually emphasized. The participants referred, for example, to the use of emojis in the group communication.

However, participants experienced that it was problematic to successfully organize the information that was in constant flux during an ongoing crisis. Fast-paced communication led to challenges, that were especially emphasized in cross-continental cooperation where people were in different time zones. As a result, it took much work for participants to find the answers needed. They expected rapid responses to their questions, which was not always possible when sorting out information from a country on the other side of the world in a completely different time zone. At the same time, the acute crisis created pressure and stress. All in all, the rapidly growing group was in chaos at times. The described circumstances caused dissension and heated emotions in the group. In a bigger picture, that is related to the toxicity of social media (Almerekhi et al., 2019; Pascual-Ferrá et al., 2021) as a broader phenomenon, and the participants also discussed how these negative communication practices of social media were present in the project. Dealing with crisis contexts, it has been regarded that as crises progress over time, social media becomes increasingly a space for conflicts that may construct social distance (Valaskivi et al., 2019).

In sum, our case study highlights balancing between Facebook's reach and its adaptability for crisis collaboration. The findings illustrate the potential of utilizing and harnessing existing social media community services as platforms for collaboration during societal crises. In general, social media have been successfully used in crisis response due to their adaptability. This means that people adapt social media to fit their needs during a crisis (Yates and Paquette, 2011). Consequently, the rise of new media formats and practices may speed up during crises. For instance, the Fukushima nuclear disaster in 2011 was a breakthrough moment for Twitter in Japan as people actively sought new information channels (Valaskivi et al., 2019). However, our case study demonstrates how this type of collaborative action and Facebook as an existing social media

community service did not fit together. Our participants' experiences highlight how the action takes place according to terms and legalities not designed for the specific action in principle—and how the action is affected by the pre-existing social media communication practices and cultures that may be toxic. In contrast, craftivist projects are often operated on smaller self-organized platforms outside the main commercial social media (Nikunen, 2019). On the other hand, participants brought up how everyone involved did not have sufficient technological skills to use Facebook. That poses a question about whether the technological challenges were an issue with the platform itself or with the group moderators' and members' social media literacy. In the light of our research results, both factors played a role, and the question is interesting for further research. However, the results indicate that it might be challenging to introduce entirely new platforms for the needs of crisis-related collaborative projects. Overall, the research sheds light on collaboration as a social media affordance that refers to the possibilities of action that materialize in the interplay between the actor and technological boundaries (Faraj and Azad, 2013; Sumiala et al., 2018).

5.4 Limitations

We acknowledge the bias due to the participant sample and its geographic limitation, as the study was run in one European country. In addition, we acknowledge that our research is limited by the method, which relies on people's own expressions. However, we believe our research brings interesting viewpoints from people's subjective experiences. We provide an overview of the versatility of themes related to participants' experiences of the drivers for collaboration, organizing and maintaining collaboration, and technological framework for their collaborative efforts. In doing so, our research contributes to the research discussion on social media-enabled collaboration in (long-distance) crisis contexts.

6 Conclusion

In this paper, we have presented why and how craft-makers far abroad united and helped Australian wildlife in the 2019–20 bushfire crisis and how they perceived the technological framework of the collaboration. Based on 12 semi-structured interviews with Finnish helpers, the findings report the trinity of drivers for collaboration as the chance to help the affected wildlife by crafting appealed to this unique interest group's emotions, reason, and values. Visual news reports and social media content—i.e., hybrid media environment—presenting suffering yet attractive endemic Australian animals played a crucial role in arousing emotions—such as horror, anxiety, and fear—that catalyzed action. Overall, the participants experienced that visual expressions played a key role in group's communication. The crucial role of visual content emphasizes how representations are employed to support human collaborations that are catalyzed by non-human actors. In terms of reason, participants actively sought possibilities for utilizing their knowledge and expertise within the project. Further elaborated, selfless activities were combined with self-interest when participants experienced getting rewards and benefits as compensation for their efforts. The animal emergency gave a concrete form to the environmental crisis and invoked participants' ecological values, pointing out their willingness for more-than-human solidarity actions.

Participants' roles in the craft guild describe a division of labor in the collaborative action, where activities in online and offline environments alternated. Facebook enabled an incomparable reach and led to a rapid expansion of the group. On the other hand, the ongoing crisis with the related pressure and stress, rapidly increasing number of helpers, communication ambiguities, and experienced technological challenges caused chaos, heated emotions and fueled dissension in the group. This posed challenges to collaboration, further highlighting the negative and toxic communication cultures of social media. While the research illustrates the potential of utilizing and harnessing existing social media community services as platforms for collaboration during societal crises, it highlights how the action takes place according to terms and legalities not designed for the specific action in principle. It became evident from the study that toxic social media communication practices challenged collaboration and negatively affected the group's atmosphere. Overall, the paper enriches understanding of how social media enables, but also challenges bottom-up communities' animal-oriented solidarity actions and long-distance crisis collaboration.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the patients/participants or patients/participants legal guardian/next of kin was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

MK: Writing – original draft, Writing – review & editing. AR: Writing – original draft, Writing – review & editing. TO: Writing – original draft, Writing – review & editing. JH: Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Article IV

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Collaborating in a Crisis: Perspectives on Trust and Technological Framework in Organising a COVID-19 Online Hackathon

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ABSTRACT

This paper explores trust in online-only-collaboration, where a team was gathered to organise a COVID-19 online hackathon with only three days notice. The study is based on the thematic analysis of ten in-depth interviews with the hackathon organisers. The findings report how trust among the organisers was encapsulated in 1) the shared big goal, 2) the significance of real-life networks, 3) a strong lead organiser on the collaboration forming on the fly, and 4) the lack of face-to-face contact in relation to becoming familiar or staying unknown. Technology related findings showed that the collaboration platforms were selected based on familiarity and ease of use. The chosen communication channels created a split between age groups, and transparency of the communication suffered somewhat from one-to-one communications in the background and divided application use. However, trust between the organisers helped them to overcome the transparency challenges. The findings are applicable to societal crisis situations in which technologies are used to build collaboration in aim to address shared challenges.

CCS CONCEPTS

• **Human-centered computing** → *Empirical studies in collaborative and social computing*.

KEYWORDS

COVID-19, pandemic, crisis, online collaboration, collaborative technologies, hackathon, trust

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1 INTRODUCTION

The COVID-19 pandemic created a global emergency in Spring 2020. Alongside the explosive infection and death rates, the world had to rapidly adopt social distancing practices, resulting in working from home [7, 16] often balanced with the demands of the

co-located family [19], increasing social media use [22, 24], and spending generally more time looking at screens [25]. A multitude of businesses and communities struggled to keep their daily operations running in the conditions where face-to-face meetings were restricted or forbidden. Versatile initiatives, such as online hackathons, were launched to bring people together in an aim to find solutions addressing the shared crisis.

Online hackathons gained a new momentum during the pandemic times [4], and there has been a large diffusion of events addressing COVID-19-related challenges [34]. Online hackathons provide time-bounded spaces where participants collaborate together to explore and develop solutions to a predefined problem [8]. Though these spaces can connect people to a competitive environment providing an opportunity to exchange ideas, they have also been criticised for the lack of concrete solutions and experts' feedback [13]. While online hackathons have been organised for various purposes, such as addressing challenges in healthcare [31], education [3], participatory urban development [26], or to trigger startup acceleration [10], it has been noted that research studies on online hackathons are still largely missing [20]. Due to COVID-19, there have been recent attempts in various fields of research to fill this gap. These endeavours have explored, e.g. an implementation road map for conducting an online hackathon [6], challenges and best practices in online hackathons [31, 37], fostering co-production with governments and citizens [14], as well as the team-building and innovation processes of hackathon participants [35], and the hackathon outcomes [18, 23, 31].

The present study explores a case in which a team is gathered to organise a COVID-19 online hackathon with only three days notice. It addresses a research question about how trust appears in online-only-collaboration when it is viewed from both social and technological perspectives.

2 POSITIONING AGAINST RELATED WORK

When organisations' motivations for running hackathons have been researched in pre-pandemic times, engagement and awareness of the topic as well as the value of networks and relationship building have been regarded as pervasive motivational factors [30]. In Spring 2020, numerous COVID-19 focused online hackathons - including e.g. BuildForCoVID-19 (global), EUvsVirus (EU), and a series of Hack The Crisis hackathons (country specific) - were rapidly arranged. However, research on these events [4, 6, 23, 27, 31, 33, 37] has not addressed the organisers' motivations for organising the activities on such a short notice. While recent studies on (COVID-19) online hackathons have paid attention to the processes [6, 31, 35, 37] and outcomes [18, 23, 31] of these events, they have only briefly

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touched on the event organisers' mutual collaboration in the suddenly changed circumstances.

Prior research on broader online collaboration has identified trust as a crucial factor for collaboration [2, 12, 21, 29, 36]. Nevertheless, empirical studies with a detailed focus on the role of trust in online collaborations are still lacking (see e.g. [2, 11, 15]). It has also been indicated that trust in online collaboration involves both interpersonal evaluations and evaluations of the systems that enable the interactions [12, 28], but research that incorporates both of these aspects is still scarce [12].

Also, there were no best practices, general guidelines or models of how to proceed, as this was not the original way of organising hackathons [20]. Organisers ended up deploying various technologies - e.g. Slack, MS Teams, Zoom, WhatsApp, DevPost, and Miro - to facilitate these events [4, 35]. This resulted in disoriented user experiences, as participants needed to manage multiple online platforms [4].

This paper provides novel insights to an initiative in which an infrastructure for collaborative crisis-solving was created in an ad hoc manner. It contributes knowledge about the interplay between social and technological trust in online collaboration (about social and technological trust, see e.g. [17]) in circumstances where the pandemic challenged the familiar ways of collaborating both in terms of human interaction as well as the technological framework. The organisers' experiences offer a micro level point of view to online collaboration at the time when people had just retreated to their homes, but online collaboration was still new to the majority of people on this scale.

3 RESEARCH SETTING, METHOD, AND DATA

3.1 COVID-19 Online Hackathon

Hack The Crisis Finland was part of a larger movement, which started in Estonia, where the first Hack The Crisis hackathon (13–15 March, 2020) focused on sparking solutions to the crisis caused by the outbreak of coronavirus [1]. A week later (20–22 March, 2020), Hack The Crisis Finland was run by local companies, startups and technology communities, and supported by the Finnish government. Anyone with an idea related to any of the three challenge categories ('save lives', 'save communities', 'save businesses') was welcome to join. The event was organised completely online with WhatsApp (organisers' mutual collaboration), an open Slack workspace (main communication platform during the event), and Junction App (registration and project submissions) as its main platforms. Over 1,600 people participated by teaming up and created altogether 230 solution proposals. [32].

3.2 Data Collection and Analysis

In order to gain an in-depth understanding of the nature of the crisis collaboration, the technological choices made, and the experiences in using them, thematic interviews were conducted with the organisers of the Hack The Crisis Finland. Altogether ten semi-structured interviews were conducted, the participants included representatives from the field of technology events (P7, P8), business development (P1, P6), venture funds (P9, P10), communications and marketing (P4, P5), ICT industry (P2), and city administration (P3). The interviews were conducted by phone or Microsoft Teams,

each lasting for ca. 45 minutes. Five themes were discussed with the interviewees: 1) background and organisation of collaboration, 2) platforms and tools for collaboration, 3) the advantages and positive aspects of collaboration, 4) challenges of collaboration, and 5) crisis pressure as a part of collaboration. The interviews were audio recorded and transcribed.

The dataset was subjected to thematic analysis [9]. The initial codes and emerging themes were first identified by one researcher, who established a codebook by searching, reviewing, refining and naming the themes. The reliability of the analysis was enhanced by a second researcher who independently analysed the dataset by grouping the responses according to the developed themes. A third researcher then arbitrated any conflicts.

4 FINDINGS

4.1 Perspectives on Trust

4.1.1 Confidence in the Shared Big Goal. The organisers of Hack The Crisis Finland had confidence in the shared big goal: to create a platform for sparking solutions to the COVID-19 crisis with only three days' notice. The shared big goal was enabled by the combination of the *sense of urgency*: "What made this possible at all was our sense of urgency, which was extremely good for all people at that early stage of the crisis. We realised that things had to be done now" (P1), and the *scope of the crisis*: "If we had talked about any crisis of a smaller class, we would not have had such a clear shared goal and common ambition" (P10). This confidence in the shared big goal got the organisers to act for the common good *pro bono*: "I was extremely pleased that he [the lead organiser] did not ask for any funding. [...] Every organiser donated his own time and effort pro bono to this cause" (P3). The organisers had a benchmark from a similar COVID-19 online hackathon, and that made the goal more tangible: "This had been successfully implemented in Estonia and a lot of good experiences had been gained" (P5).

4.1.2 The Significance of Real-life Networks. According to the interviews, assembling the organising team was to a large extent based on the real-life networks of the lead organiser, who turned to people he trusted: "I started calling certain trusted people and testing my thoughts. And I immediately realised that also others had a strong need to do something" (P1). The trust was verbalised to be mutual: "He [the lead organiser] called the people he trusted and vice versa. If there had been someone I didn't trust, then I wouldn't have gone along" (P3).

Dealing with the significance of the real-life networks, the interviewees highlighted how pre-proven competences played a key role in the organisers' mutual trust. The organisers trusted in their own experience and capabilities, as well as those of the others: "We brought the skill of organising hackathons into this [...] Not a lot of people have organised hackathons on the same scale as we are" (P8). "Organisers involved real professionals [...] people who were the top in Finland in all areas - I dare to say" (P5).

4.1.3 Strong Lead Organiser, Collaboration Forming on the Fly. The hackathon organisers highlighted the role of the lead organiser within the organising team, e.g. "I had a clear responsibility to get the whole thing through [...] In a way, my vision was trusted all

the time" (P1) and, "He [the lead organiser] took care of it. In a way, he was the prime engine. I was there helping what I could" (P6).

Otherwise, the collaboration formed on the fly: "We didn't have such clear roles in that group. Such that we would have said 'this is your area of responsibility'. Everyone gave all their skills and anything else they could" (P1). The organisers spontaneously took on different tasks: "We came up with an idea that this should be accompanied by a mentoring program [...] The structures formed very randomly in there" (P10). Collaboration formed in an ad hoc manner without prior agreements: "Not knowing exactly where I am involved, what we are committing to, how much it will cost, who others are involved - these things will never happen if one does not join in" (P2). "There was no prior manual [...] but we constantly applied things on the fly" (P5).

4.1.4 The Lack of Face-to-Face Contact: Becoming Familiar, or Staying Unknown. The interviewees discussed the effects caused by the lack of face-to-face contact, as most of the organisers did not know each other but only knew the lead organiser beforehand. There were interviewees who felt that the other organisers remained unknown: "Despite such a sprint, the people remained pretty unknown to each other even in the organising group [...] that depth may evolve differently in a face-to-face contact" (P10). The lack of physical contact was also commented to bring challenges in terms of building trust: "Building trust with other people and other actors is more challenging without a physical encounter. [As now] when for the most part there are people you have never heard of" (P7). In contrast, there was a feeling among some of the interviewees that the organisers merged into one solid group during the first arrangement sprint. As one of the organisers described: "Sometimes I had a feeling that we have always known each other. I haven't met that person 'live' at all, but he's like an old acquaintance. [...] It was great to see that people can, under pressure, quickly merge into one group together with previously unknown people" (P5). Overall, it was evident that the exceptional circumstances created an exceptional way to collaborate, e.g. "Without these circumstances that forced us into these digital channels [...] this could have not been accomplished without getting people to meet each other" (P7).

4.2 Perspectives on Technological Framework

4.2.1 Deployability and Scalability vs. One-to-One Compatibility with the Operations. The organisers made a decision to deploy existing platforms and tools instead of 'custom fit' solutions in preparing and running through the hackathon, stating e.g. "After all, it's not worth starting to build up tools. Pick the ones that work and move on with it" (P6). The interviewees highlighted how the existing platforms and tools offered scalability for the purposes at hand, e.g. "We had not tried it [open Slack workspace] on this scale ourselves. The similar event in Estonia had used Slack and from there we benchmarked that it works just fine" (P8).

A flip side of utilising existing platforms and tools was that they were not one-to-one compatible with the operations, e.g. "We had a few challenges with it [Junction app] as it was primarily designed for on-site hackathons. Pretty quick changes were made to make it to work online. Of course, not everything was one-to-one compatible" (P7), and "But the fact that nothing was done for that

purpose left quite a lot of things that I hoped would work differently or a better together" (P10).

4.2.2 Familiarity and Ease vs. Adherence to a Single Platform. The choice of platforms and tools was also guided by how familiar, and thus easy to use, they were to the organisers, e.g. "It [WhatsApp] was probably the most familiar, and the closest, and the lowest-threshold, communication tool" (P4). The significance of familiarity was emphasised because organisers with various backgrounds were involved. "There is no need to adopt any new technology if it is not familiar. [...] Not nearly all of those organisers and partners were in any way tech-oriented" (P4).

Related to the adherence on a single platform, the interviews revealed how the organisers selected different platforms according to what they were individually used to, e.g. "The production crew separated for a natural reason because they were used to use Slack. So they started to work there then" (P1). Interviewees' comments highlight organisers' conflicting preferences: "When we made the Slack workspace available to [hackathon] participants, we aimed to move the communication between organisers [...] there too. Some organisers adapted to it really well. But some did not send any messages in there but stuck using WhatsApp" (P7). The organisers searched for explanations for this division based on the varying familiarity with specific applications, e.g. "That communication was divided. Saying it straight, that older age group was easier to reach from WhatsApp, while these people from Junction could be caught up with Slack much faster" (P10).

As a consequence, blind spots occurred due to the collaboration and communications being split between different platforms: "A great deal of the work was based on [anonymised person] calling different people in person and drawing lines together. [...] It was a challenge, an information imbalance" (P7), and "[One did not hear] those messages that did not go through via a common channels such as WhatsApp. Of course, it made organising difficult that some information was left only between some people" (P8). This posed certain challenges in terms of transparency, e.g. "Transparency was a little weak at times. But because of the very hectic nature of the arrangements, [...] we did not make it an ego question like 'why we have not been told or where this has been decided'" (P7). "

4.2.3 Speed and Straightforwardness vs. Organised Communication. Organisers also advocated certain platforms and tools because they simply considered them fast and real-time: "WhatsApp was, of course, the fastest communication tool" (P5), "WhatsApp ran all the time, the conversation didn't stop at any point" (P3). This was emphasised due to the short time allotted for arrangements. The platforms and tools made collaboration very straightforward, e.g. "I sent WhatsApp messages like 'Will we get a high-profile patron? Aiming for the president or prime minister.' [...] People picked it up from there: 'Hey, I'll catch that. Then it happened right away'" (P1).

On the other hand, collaborating mainly through instant messaging applications resulted in disorganised communication that was not always easy to follow: "Things drown really easily on WhatsApp. You are not really able to search for those messages, and the threads get mixed" (P8). As one of the interviewees crystallised, what was won in the speed was lost in the structure.

5 DISCUSSION

It is clear that COVID-19 with its recurring waves is not the only nor the last societal crisis that will require technology-enabled large-scale collaboration. Therefore, it is important to have a retrospective as to how a collaborative infrastructure was created in an ad hoc manner in the rapidly changed circumstances.

The organisers were united behind the shared goal, and there the study supports previous research findings about how goal congruence enhances trust in virtual teams [12]. It all started from the lead organiser who created the organising team by contacting from his existing networks the people who he trusted, and who trusted him. This reveals how online mediated collaboration did not emerge from scratch but was heavily based on real-life contacts and networks. Overall, the importance of 'super-networked' people as initiators and implementers of such projects becomes emphasised. It also poses further questions about how real-life and virtual networks may layer, support and complete each other in societal crisis situations. The study points out the role of the lead organiser in other terms too. Even if people worked flexibly as a highly responsive 'task force', the hackathon would not have been completed without strong leadership personified in the lead organiser. Overall, it became evident that people's previously demonstrated competencies built mutual trust. Similar findings have been reported from prior studies [12, 15]. More broadly, the question of competences describes how different skills are harnessed in technology-enabled collaboration during societal crisis situations. Further elaborated, the organisers worked somewhere in the border between of their official organisations and leisure, interestingly illustrating a blurring line between formal and informal.

The organisers did not meet face-to-face, and their mutual collaboration was carried out mainly through WhatsApp messages. Therefore, a certain depth in interaction was felt to be absent and trust building was not considered unproblematic. This finding is well-aligned with prior research which has reported that trust is a challenge when collaboration takes place without a face-to-face contact [2], faces the most difficulties when text chat is used instead of audio or video as computer-mediated communication channels [5], and is weaker or develops more slowly in virtual teams [21, 36]. The study sheds light on the aspects of technological trust in other terms too. The findings underline how the deployed platforms and tools were picked up from the existing offering instead of building 'custom-fit' solutions. As one of the organisers described, why to spend time in building something from the scratch when you can use the available ones that work 'well enough' for the purposes at hand. The existing platforms and tools had a certain flexibility as they were shaped by practical needs along the way. But still, they were not a 100 percent fit with the operations.

Deploying existing platforms and tools also highlights the significance of people being familiar with certain technology, as it lowers the threshold to participate and enables engaging with people that are not 'tech-savvy'. But what is familiar to one may not be to another. The study even surprisingly reveals how the organisers split to use either WhatsApp or Slack according to their previous experience. Therefore, it cannot be assumed that people will stick to a particular platform. This kind of platform-related division may cause several challenges in terms of communication, organisation,

efficiency and transparency – to name a few aspects. In this study, we have only touched upon this interesting theme paving the way for further investigation. However, it seemed that the trust between the organisers helped them to overcome the technological challenges. The study indicates how social trust compensates for gaps in technological trust.

6 CONCLUSION

The findings highlight the significance of the organisers' confidence in the shared big goal enabled by the sense of urgency and the scope of the crisis. Virtual and real-life networks were layered as the group of organisers did not know each other but knew only the lead organiser, who proved to be a super-networked link within the team. Pre-built trust in the lead organiser as well as in each others' demonstrated knowledge, skills and competences enabled collaboration which evolved on the fly, without advance agreements. Existing virtual platforms and tools were chosen and combined to a set which offered deployability and scalability, familiarity and ease of use. Different age groups utilised different communication tools and one-to-one communications in the background. However, trust between the organisers helped to overcome transparency challenges.

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Article V

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Practical Family Challenges of Remote Schooling during COVID-19 Pandemic in Finland

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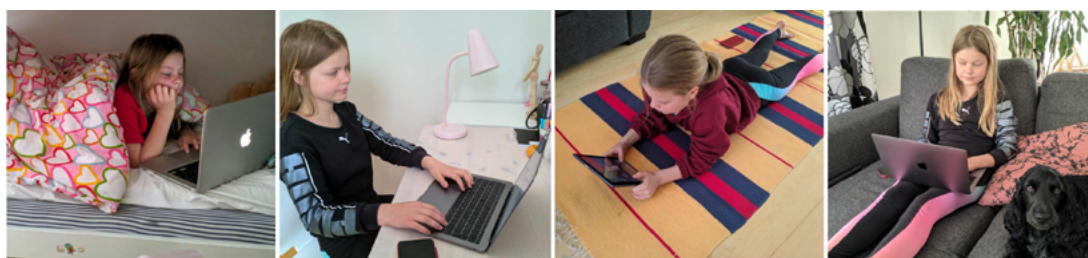


Figure 1: Typical remote schooling technology usage contexts reported in the online survey: In bed (reported by 31%), child's own desk (68%), on the floor (21%) and on the sofa (11%). Not illustrated - shared table (57%). Photographs posed by an actor

ABSTRACT

The COVID-19 pandemic in spring 2020 caused the rapid introduction of remote schooling in many countries. This transition caused a variety of challenges to families, encompassing organizing home workspaces, setting up computing equipment, and, for many parents, managing their own remote working in parallel with the schooling arrangements. This paper describes the findings from an online survey ($n = 114$) and an in-depth interview study ($n = 14$) conducted in Finland during the COVID-19 remote schooling phase. Focusing on issues surrounding technology usage in the family setting, we report on the array of applications parents and children were required to manage, strategies to share ICT equipment within families, spatial organizational issues and the high levels of flexibility needed from parents and other stakeholders to enable the remote schooling.

CCS CONCEPTS

• **Human-centered computing** → *Empirical studies in collaborative and social computing.*

KEYWORDS

distant education, remote schooling, COVID-19, home, family, children, parents

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1 INTRODUCTION

The global spread of the COVID-19 pandemic in spring 2020 changed the way we live, and, in many sectors, everyday life was rapidly diverted onto a different track. The need to avoid physical contact between people, to reduce the spread of the virus, led many countries to introduce rules and recommendations to stay at home. Consequently, this resulted in the closure of school buildings and moving to the mode of remote schooling of children at home. In Finland, this massive transition to distant education happened rapidly and with little notice, and for the vast majority of families, as well as for teachers, was the first experience of distant education. Questions related to remote school education and the integration of

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technology into teaching, which have previously been of major discussion points (e.g., [5]), were instantly bypassed by the nationwide activation of the remote schooling mode.

The transition of school days from face-to-face education practices to computer-mediated teaching over distance required the rapid adoption of different information and communications technology (ICT) tools by a wide user group. After this change, there began intense public discussion about families' resources to cope with the exceptional and uncertain situation. Parents reported being on an emotional roller coaster, where feelings of dealing with remote schooling varied from novelty to exhaustion. Families struggled to create new everyday routines in the suddenly changed circumstances – to balance between the adults' work, children's remote schooling and other daily tasks and duties [35].

In this paper, we address the phenomenon of remote schooling during the COVID-19 pandemic in spring 2020, and focus on the practical challenges caused in the families of primary school children (ages 7 - 12). The research was conducted in Finland, which has a very homogeneous school system and follows a well defined national curriculum for teaching. The ceasing of contact education and the activation of remote schooling in Finland happened simultaneously country-wide on Wednesday 18 March 2020 [12]. At the same time, the the Finnish Government also gave the recommendation that all work should be conducted remotely, from home, whenever possible [11]. Therefore, families were required to adapt to simultaneously changed circumstances in central areas of everyday life. We investigate parents' viewpoints on different aspects related to the remote schooling arrangements. Especially, we chart the experiences and challenges related to technology use, and how the remote schooling affected family dynamics. Although there has been extensive prior research addressing distance learning [2, 43] and computer mediated learning [20, 40], the circumstances during the COVID-19 pandemic suddenly brought the issue society-wide. This presented a unique research setting to investigate the phenomenon of remote school education adoption in practice in families. Rather than focusing on the educational efficacy of the new mode of teaching, we focus on issues surrounding the impact of the required technology usage in the family setting. We report on the array of different applications parents and children were required to manage, strategies that were adopted to share ICT equipment within families and the high levels of flexibility needed from all stakeholders to enable the remote schooling.

2 RELATED WORK

Clearly the situation caused by the COVID-19 pandemic, and specifically the sudden adoption of remote schooling and working, was without precedent. However, insights on the challenges faced, and potential approaches to address them, can be drawn from prior research on ICT use in remote schooling and on technology use in family contexts, during more normal times.

2.1 HCI and Remote Schooling

Finding the correct focus for relevant related work on HCI and distance schooling requires careful consideration. For example, the large body of work reporting on e-learning [28] may be of limited applicability in the current context, if teachers primarily utilize ICT

only as a communication channel. Whilst it has been reported that teachers need to adopt new approaches for distant teaching [18], given the time constraints on beginning distant education during the pandemic lockdown period, it is expected that teachers primarily shifted their existing contact teaching lessons and materials online, rather than specifically developing asynchronous learning materials.

Similarly, works exploring homeschooling, i.e. parent-led home-based education [36], where a parent fully adopts the role of teacher, may feel of little use to a parent suddenly thrown into the role of supporting their child's remote education while themselves struggling to work from home. Prior work has noted parental concerns about the distribution of responsibilities required by e-learning, highlighting the need for renegotiation of the school–parent partnership and highlighting the benefits of peer support among parents [24]. The implementation of such processes would require school organizations to make considerable investment, both financially and in terms of teachers' time [1].

A primary tool in remote schooling is the laptop computer. Prior work has informed that children's' laptop usage in the home environment is likely not situated at an ergonomically designed workstation [15]. Based on a survey, Harris et al. reported that postures such as laying prone on the floor, sitting on the floor, sitting with laptop on the lap, and other non-table configurations, accounted for nearly 70% of school children's laptop computer usage. Usage in such postures, particularly laying prone on the floor, has been identified as potentially causing discomfort and future musculoskeletal complaints [10].

2.2 Technology Use in Families and Family Coordination

Under normal circumstances, technology use (particularly smartphones) in families has been reported as a point of conflict and cause of stress, both from the point of view of children's addiction [21], and parents handling work-related tasks during family time [6]. It is likely that the acute pandemic circumstances will highlight many of the pain points identified in prior work. While the majority of research addressing the culture of technology has focused on adults as a user group, also technology use in families has gained attention. Technology has emerged to be omnipresent and is today commonly used in different places at home, including e.g. kitchens, bathrooms [22], and in bed [37]. Research has looked at how technology use at home influences on the interpersonal relationships in families [17, 26, 37, 41]. Research on adolescents' technology use has particularly focused on problematic use [14, 33] and the negative effects of technology, e.g., how parents' technology use impacts on children's behavior [23]. A number of research works have addressed the family rules and expectations related to technology use, such as parental apps to control children's smartphone use or screen time [9]. Setting family rules on technology use are encouraged [19, 29], but often become undermined by the practices of everyday life [29]. Hiniker et al. reported that both parents and children feel that certain family times should be devoted to being time without smartphones, even if they struggle to obey this ideal [19]. Safety related practices have also gained attention in research

focusing on families and technology use. Technology use for children's safety monitoring purposes has not only addressed the risks related to children's online behavior [42], but also, e.g., allowing parents' to monitor their children's independent outdoors mobility [7].

HCI research has also addressed the family coordination activities, how technology entwines with it, and how different coordination tools support the family in both functional and socio-emotional ways [27]. Much of the research has taken a functional angle, addressing tools such as family calendars or messaging [30, 34, 38]. It has also been reported that technology supported awareness of each other's location and activities strengthens the emotional connection between family members [3]. Considering organizational practices, Davidoff et al. investigated dual income family practices on transporting children to and from their different activities, and report on how established routines ease the smooth execution of the activity [4].

2.3 Positioning of Our Research

In our research, we focus on the family experiences with remote schooling during the spring 2020 COVID-19 pandemic in Finland, taking a HCI research approach to the topic. The scope of the research excludes the pedagogical and educational content in the remote schooling experience.

3 RESEARCH SETTING AND METHOD

In the following, we shortly describe the research environment surrounding the introduction of remote schooling in Finland in spring 2020, and outline our research method.

3.1 Remote Schooling in Finland during COVID-19 Pandemic

On March 16 2020, the Finnish Government, in cooperation with the President of the Republic, declared a state of emergency over the COVID-19 outbreak. The activated measures included closing down the premises of all education providers, suspending contact teaching, and reorganizing teaching as distance learning. One day's notice was given before the arrangements entered into force on March 18 2020[12]. As an exception, for parents working in sectors critical to the functioning of society, contact teaching for school grades 1–3 was still provided, but not recommended [13]. According to a survey by the Finnish Ministry of Education and Culture, only 9% of schoolchildren in this age group continued to participate in contact teaching [32]. The study was conducted at the end of April 2020, at which point the homeschooling had been in operation for approximately 6 weeks. Contact teaching in primary and lower secondary education in Finland resumed on 14 May 2020 [31]. Thus, our research is positioned in a unique 2 month time window, where remote schooling was taken into use and used as the almost-exclusive teaching mode through the whole country. In Finland, all schools follow a national core curriculum, which sets the objectives and the core contents in different subjects [8]. Hence, Finland provided a rather uniform sample where likely similar challenges resonated across the whole country.

3.2 Research Method

Aiming to explore the impacts of the remote schooling on affected families, we adopted a mixed methods approach, including a large sample online survey and in-depth interviews with a limited sample size. Through this approach we aimed to collect both broad and rich data, which when combined would provide valid insights to the topic.

3.2.1 Online Survey. The online survey targeted parents with children in primary school grades 1–6, i.e., aged 7–12 years. The survey included six background questions about family circumstances and the adults' work situation during the remote school day. This was followed by questions related to the technology use and sharing in the family, how remote schooling conditions were practically organized at home, and the overall remote schooling experience. The survey was piloted before distributing it through email lists and school related social media forums in Finland. The survey included compulsory multiple choices questions, complemented with open text questions to get more detailed information. The survey took approximately 10 minutes to complete.

Altogether, 114 responses were received to the survey, 78% of respondents being female, 21% male and 1% other/preferred not to state. The majority of respondents were aged between 36–45 years (65%), with the remainder being 46–55 (18%) and 26–35 (18%). Most households had a single primary school age child (66%), others having two (25%) and three or more (9%). Approximately half of the households had older siblings (56%) or younger siblings (40%). As expected, at the time of the survey most respondents were working from home (70%). Of those that reported a second parent living in the home (89%), two-fifths (38%) were also working from home. Respondent engagement with the online survey was high, the eight optional free text questions receiving a total of 638 responses, with 236 of these being more than one sentence in length.

3.2.2 Interviews. To gain deeper insights, we conducted interviews with 14 parents from different areas of Finland. The interviews were held using online meeting platforms such as Skype and Microsoft Teams, consisted of background questions and eight interview questions, and lasted for approximately 15 minutes. The interview focused on the same aspects as the survey: technology use and sharing, organizing family practicalities, and the overall experience with remote schooling. The interview results were transcribed and thematically coded. The emerging themes and codes within themes were identified, after which, two researchers independently analyzed the interviews, grouping the responses according to the developed codes. A 3rd researcher then arbitrated any conflicts. Details of the interviewees are provided in Table 1.

4 FINDINGS

In this section, we report the combined findings from our online survey and in-depth interview based studies. We refer to individuals as survey *respondents* and interview study *participants*, e.g., P3 as the third participant in the interview study and R21 as respondent 21 of the survey.

Table 1: Participants in the in depth interview. Children attending primary school are underlined. Work situation key: RW = At home - Remote work, TL = At home - Temporarily laid off, AH = At home normally, OH = Working outside home. a) = Plus 3 other pre-school children.

Participant reference	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Adults in household	2	2	2	2	2	2	2	2	1	2	2	2	2	2
Children's ages	<u>4,8</u>	<u>8,10</u>	<u>8</u>	<u>9,11</u>	<u>7,9</u>	<u>10,13,15</u>	<u>3,5,7,11,11,13</u>	<u>5,8</u>	<u>7,10</u>	<u>5,8</u>	<u>7,10</u>	<u>13,14</u>	<u>8</u>	<u>9,10, a)</u>
Parental work situation	RW	OH	OH	TL	RW	OH	RW/OT	OT	TL	AH	AH	OT	RW	OT
	AH	OH	OH	OH	OH	OH	RW	RW		OH	RW	RW	RW	AH

4.1 ICT Hardware and Software

4.1.1 ICT Tools in Use. From the online survey, children were reported as using a variety of ICT devices as part of their remote schooling (Figure 2). Almost all using a smartphone (94%), in conjunction with tablets (57%), laptop computers (84%) and desktop computers (25%). The most common collaborative tool used, reported by 96% of respondents, was video calls, in either smaller or whole class sized groups. Collaboration in an online shared text document was also a common approach reported by 64% of respondents. Text based chat tools were reported to be used for schoolwork based communication between classmates or the teacher by 36%. One fifth of respondents (19%) reported not knowing if chat apps were used as part of school work by their child or not.

Not surprisingly, the remote schooling required a heavy use of ICT tools. From the survey, a wide range of average daily ICT device usage time for school tasks was reported, with 20% spending one hour or less, 32% two hours, 22% three hours and 26% four or more hours. This was also reflected in the interview findings – the use of ICT tools was expected and accepted by parents, and was regarded as the natural way of remote schooling. Whereas it was common that the child needed to use different tools, e.g. video calls, Teams meetings, chat and shared documents, both survey and interview responses revealed large differences between individual teachers and classes on the particular usage. Whereas some interviewees responded that they had not been required to install anything (see Section 4.1.2), some reported a myriad of applications that had been needed. For example commenting, “We have Google Meet. Then of course Wilma [the national messaging application between home and school] which is automatically in use. Then Classroom. [...] Then YouTube, that’s installed already. [...] Then there are three or four different games, which support learning. There’s math games and English games, some work, some don’t. And then you get instructions to use 10 minutes this or that game, as for instance today. Then there are book apps, which you should download. But we didn’t download them all” (P3). Similar challenges caused by the large number of different applications needed were raised by survey respondents. This led to specific problems with the amount of passwords children needed to handle, e.g., “The second grader (8 year old) had problems with the passwords of various programs, and needed help. The fifth grader handled this without help” (R5).

As some of the applications could be run on alternative devices, e.g. smartphone or laptop, participants reported needing to first

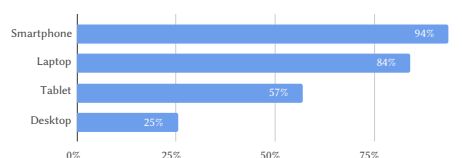


Figure 2: Percentage of online survey respondents (n=114): ICT equipment used for remote schooling. Multiple choices allowed.

experiment to find the optimal device for each application, “Initially, there was a challenge to find the right device for every application...” (R35). Overall, respondents reported that the children (and supervising parents) were required to manage a suite of devices and applications to complete their school work. In some cases this cross-device usage was particularly challenging, “There were too many different places where we were supposed to be at any given time. Links were given in a WhatsApp group, which they [the child] had to manually type in the address bar on the computer. This was a challenge, especially when the child was very often alone during the home school day, while the parents were at work” (R74).

Several interviewees also mentioned that the practices of how ICT tools were used had changed and developed during the remote schooling period, e.g., “The school tasks come to parents through the Wilma tool, and then in Meet the teacher goes them through with kids, and then they do them in Meet or Classroom. During the past weeks, the teachers took Classroom forms into use, and now give feedback through that, and [kids] do the self-reflection and sign out the tasks. In the beginning [...] it was so that parents needed to sign the tasks done through WhatsApp. [...] So altogether that’s quite a multi-channeled thing.” (P11).

4.1.2 Managing and Sharing the Tools. Remote schooling had also resulted in the need to acquire new equipment in some families. From the survey, 18% of respondents had bought new equipment or software to support the remote schooling, ranging from new laptops (5%), to headphones and webcams. One respondent reported upgrading their internet connection to support the increased number of concurrent users. Problems with the internet connection, i.e., insufficient bandwidth for many users, or simply cutting off,

were raised by numerous respondents, e.g., “Everything has gone surprisingly well – the internet connection is sometimes a bit of a problem” (R55). The interviews revealed only two cases where the family had needed to buy new equipment, being headphones (P1, P14) and a microphone (P14). Additionally, three families (P2, P7, P14) were loaned a laptop or tablet by the school, and a smartphone (P3) and laptops (P6) were borrowed from relatives. One participant commenting, “We had to get, to borrow, laptops from grandparents, so that everyone can have their own laptop in use. Because those compulsory Teams lessons could happen at the same time with everyone. The own laptops in the family wouldn’t have been enough for everyone” (P6).

Access to computers, either laptop or desktop, is of particular interest as these are generally required for good user experience with the remote schooling tools in use, particularly when there is need to multitask across several applications at once (as previously noted). From the survey, during the school day, a majority of children (68%) had a laptop or desktop computer for their own use, (27%) shared one with another child or adult, and (4%) were without a computer. A typical comment in this respect being, “A laptop, desktop and tablet are shared and circulated among adults and children” (R16). Also, 9/14 of the interview participants reported sharing of computing equipment within the family during the remote schooling, either a laptop (6/14) and/or tablets (5/14). For example commenting, “[Before getting a laptop from the school] the child used my laptop, and I tried to juggle with my phone and laptop and so on. So we took turns, kind of.” (P2), and, “Now we have a Chromebook, a Mac and a iPad. With those we take turns. Sometimes it happens that I also have a meeting, and we use [the devices] one person after another. The devices are of different age and condition, so we do it so that everyone gets to have the best one sometimes” (P11). For one survey respondent the circulation of ICT equipment was based on different applications working only on specific machines, “Zoom works from one computer, Google Meet on three, Kahoot [app] on the phone, ... and a couple of other apps on the desktop PC, ... It is disorganized because we have a Mac and a PC, Linux and Windows machines, and not all applications work on all machines, or the smartphone needs more memory than is available” (R43).

To support the remote schooling, 75% of the survey respondents and 9/14 of the interviewees reported needing to install one or more applications to their child’s smartphone, tablet or laptop. The most commonly installed apps according to the survey were Google Meet (installed by 25%), Microsoft Teams (17%) and Google Classroom (4%). Families seemed to have different experiences on whether the app installations had gone smoothly, e.g., “[Downloading apps] has gone pretty well, no particular problems with that” (P1), vs., “Yeah, we have installed those apps, and it has been, in the beginning, quite a hassle” (P2). However, none of the interview participants reported that they had not succeeded in installing something that was deemed necessary, and, altogether, the comments revealed that families had managed to organize both hardware and applications for remote schooling as needed.

The use of ICT technology had set also other challenges, including the parent’s new role as technical support. The majority of survey respondents (67%) had needed to provide technical support to their children more than once per week. For 43% of respondents this was required once a day or more often. Switching to remote

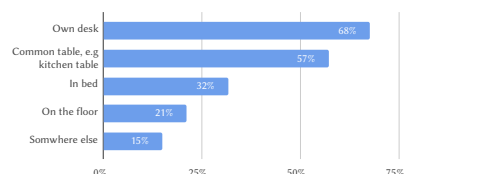


Figure 3: Percentage of online survey respondents (n=114): ICT usage location for remote schooling. Multiple choices allowed.

school had created pressure for parents to be more up to date with technology, and some interview participants verbalized how this had caused stress. For example, one interviewee commenting “I don’t have the nerves to endure this kind of inventing multiple passwords and such” (P2), and, “My mind gets muddled if something fails, and then everything gets messed up. Yes it has been surprisingly stressful for me. A small stress throughout the whole school day” (P10). Occasionally it just got too much, “Sometimes you have to go to the backyard to shout, because yes, it brings out those feelings of both good and bad” (P13).

4.2 Usage Context

4.2.1 Space Usage. The survey responses related to the physical context of the remote schooling exposed the practicalities and dynamics of the family work days. For most survey respondents, the school work with ICT equipment was done in multiple places (Figures 1 and 3). Almost all (97%) respondents used a table of sorts, with 68% using the child’s own desk and 57% a shared table, such as a dining room table. Less ergonomic usage locations included in bed (31%), on the floor (21%) and on the sofa (11%).

For exactly half of the survey respondents (50%), the remote schooling had affected their use of shared family space, e.g. requiring moving furniture around to accommodate the schooling, or dedicating certain areas for the school work. The organization of the use of physical spaces of the home to support remote school and work was a common theme, with respondents having applied a range of different solutions. Overall the situation was well summed up by one respondent, “It seems like the entire home would be a school” (R28). Considering the young age group of the school children in question, it is not surprising that rather than being alone in their bedroom, “The child wants to work there, where the adults are” (R45). For many, the kitchen (table) had become the main schooling location, e.g., “The kitchen is now a classroom 9am to 1pm... I have to organize my meetings, teaching and calls to the bedroom” (R1). Also in the interviews, the kitchen or living room table, located at a central spot in the house, was a common location for remote schooling. It was perceived as a place where the parent could easily keep an eye on the school work and provide support when needed, e.g., “When he is here in the living room, I can hear for instance if there is a problem with the microphone or something. So then I can help him” (P5).

4.2.2 Quiet and Separation for Video Calls. Overall, the general challenges of noise were noted by survey respondents, e.g., “In every room someone is studying, this limits freedom and one must be wary of causing commotion” (R37). Particularly, creating suitable spaces for, often multiple simultaneous, video calls was highlighted as a common challenge, e.g., “If 3 or 4 people in the family are in video or phone calls, the voices echo around the house. We have to think about who is in which room, so not to disturb the others” (R6). Even when using headphones a quiet space was still sought, “Each worker should find a quiet nook, even if headphones are used” (R35). As well as audible interference, the avoidance of any visible background activity in video was also noted, “For video calling we try to organize a quiet space / corner without background interference (sound and picture)” (R111). The prevention of disturbance links to the following theme (Section 4.2.3), of how families dynamically used and reorganized the home space.

4.2.3 Dynamic Reorganization of the Space. A clear theme arising from the survey was that the use of space in the home was not static, but needed to change during the day. For example, respondents commented, “Sometimes someone needs a desktop computer, in which case the other one has to move elsewhere, etc” (R16), and, “The children have video meetings in the kitchen, so when they are running, the kitchen is out of use for the rest of us. My working from home is in the living room (R13)”. Also, interview participants reflected on the same theme, e.g., “[The children do school work] in practice at the kitchen table or on the living room sofa. [...] They both have a video call meeting at ten, so of course then one is in another room. [...] If I am also doing a remote work day, I also have some remote meetings. But of course I know when they are taking place, and then I divide the kids according to that to different rooms” (P2). Similar reorganization was made, “If my partner has his own remote meetings at the same time, he goes to elsewhere [to another room] for that time. But not otherwise. Things have gone quite smoothly, we haven’t had to give way to others an awful lot. Only at the simultaneous remote meetings, then we move to different rooms” (P1).

Others had adopted a week vs. weekend reorganization of the space at home. This was commented related to the use of the common family space: “During the week the kitchen table, which is now in the living room, is covered with textbooks. Finally, we clean up at the weekend when the school is out” (R87). Interviewees had implemented a similar division, “Our kitchen table is the school desk. It has been completely overtaken by that purpose from Monday to Friday, and cleaned for the weekend” (P5).

4.3 Reconfiguring Family Schedules

4.3.1 Family Daily Schedule Adjustments. As well as modifications to the physical spaces of the home, remote schooling required respondents to adjust the timing of family activities. For example, due to limited space availability, “When I’m taking care of one child at the kitchen table, and the others give us some peace, then tasks of other children, such as arts and crafts, paintings, etc. can not happen at the same time” (R23). Some reported adjusting mealtimes to fit in with the school and work schedules, “Organization of mealtimes and silent times for meetings” (R20). Overall, respondents gave a sense that they had adapted their daily routines to fit the new

requirements, exemplified by, “There is not enough time to do your full work day ... and handle the challenges of remote school. On the other hand, everyday life has now formed a rhythm and rules, so let’s go with these” (R1).

4.3.2 Adjusting the Parents’ Work. As well as remote schooling, COVID-19 also resulted in the requirement for home working whenever possible. However, in some occupations it was still required to work outside home. The interviewees revealed that such parents aimed to be present during the remote school days as much as possible, and had made special shift arrangements with their employers to do so, “I aim to have days off [from work]. I always work a longer shifts at a time, and then there are longer periods off” (P2), and, “I told my employer that now I will only work evenings, and it has indeed succeeded. My employer has postponed all my shifts to the evening” (P3). Special arrangements made with employers also included decisions to utilize part-time working or vacation days in order to stay home alongside remote schooling children. One participant commenting, “I used to do 100% working time, now I opted for 60% to make this [remote schooling] work” (P7).

Also, parents who worked remotely modified their working schedules to be able to help their child’s remote schooling, or, on the other hand, to maximize their own ability to concentrate on work. Many participants reported utilizing flexibility in their working hours, e.g., “I can adjust my work so that I can do it either in the morning, in the evening, at night, or during the day” (P5). In particular, balancing the remote schooling and remote working required scheduling work-related online meetings in an optimal way. One participant stating, “I try to arrange all such Teams meetings and others for the afternoon [after school hours], just because I know that then you can be more at ease” (P5). In addition, the participants described staggering their work, so that parents could take turns in helping the kids and concentrating on work, resulting in, e.g., evening working. An interviewee describing the evolution, “At first, it was a bit impossible, trying to think about how to get them all [work and remote school] combined. [...] quite a lot of work is done in the evening after the school day or after the other parent finishes work. You can’t really do everything at once. It really made it easier when you realized you can continue your workday in the evening” (P8). Survey participants had also adopted the same solution, “We take it in turns to be the school parent on alternate days, so the other can do some work. The one who handles the school, then does their work after school until midnight” (R43).

Participants admitted that there were challenges to get into the work mode and concentrate in the home office, “It has been a challenging situation that when you are at home, you can’t connect to such a way of working. Maybe you can concentrate for a quarter of an hour, and then someone taps you on your shoulder” (P5). The working arrangements were challenged by the overall situation at home too, especially in families with children under school age, “We have children under school age and my spouse has a really hard time in doing his work” (P7). In the given circumstances, the participants seized the opportunity to retreat to their own peace, or to escape to the office if possible. For example a participant commenting, “When you alternate those days [parents take turns to work], you can then be in the office room [at home]. My spouse has even visited the office outside home” (P13). Some respondents

admitted that they were not able to complete all of their work, “We have the solution that only one parent can make full time work remotely, even if both are officially working. We have attempted to divide so that the other can handle their duties, but the full amount of work can’t be done” (R35).

4.3.3 Flexibility in Schooling Schedules. Even though parents made efforts to reorganize their work and family life around the remote schooling, the setting had also allowed some flexibility the schedule of school activities. In many of the interviewed families the school schedule was less rigid, e.g. so that only the video meetings with the teacher or class were at fixed times or generally less frequently. This flexibility was appreciated by the parents, allowing them to adjust the school rhythm so that the timetables matched better with the family routines, e.g., “The school started at nine. So I messaged to the teacher that hey, we can’t [start], I am not in my full senses at nine... I explained the situation, that I am working a night shift and the kid is sleeping until I wake him up, so that I can sleep too. So our morning starts after ten, after we get breakfast done and all” (P3). Another commenting, “And when you don’t have to be every hour [present online], we can go outdoors in the morning in peace, and then come back to eat and do the [school] work” (P7).

The flexibility in schooling schedules combined with the extensive technology use also raised some concerns from the parents. As the school children had smartphones in active use continuously during the school day, survey respondents highlighted the ease (and lack of visibility) with which their children diverted to entertainment applications, commenting, e.g., “At times it has been difficult to stop the use of entertainment between schoolwork” (R69). As a consequence, parental control of the child’s screen time had become impossible, “...the total time spent on the phone is a terrible lot, and it is difficult to limit what they are doing and for how long” (R118).

5 DISCUSSION

As a discussion we draw together the various themes opened by our research findings, highlighting the need for parental juggling, the high intensity of ICT use, and the requirements set by the speed of the transition to remote schooling. Finally, we discuss the limitations of our work and highlight opportunities for future research.

5.1 Remote Schooling Requires Parental Juggling

It was evident from the online survey and particularly from the interviews, that remote schooling at home has required much re-configuration and juggling of different things by parents and within families. Parents tried to modify their work hours and work in shifts, in order to be present with their children for the school day. They tried to match their work schedules and negotiate, both with their workplace as well as with the other parent, to ensure their presence and support for the remote schooling of children at home. This was demonstrated through, e.g., scheduling work meetings to less busy times with the children, and, in the families with two parents working, taking turns to concentrate on work. It is important to also reflect on the employers’ reportedly positive response to such requests for flexibility, providing implicit support to home schooling in the exceptional situation. This is an important requirement

on a societal level, and is something that deserves wider public discussion going forwards.

Although the parents’ remote work was not in the scope of our research as such, our data shows that juggling between the newly set home life and working from home was at times challenging. The factors affecting this were, e.g., interruptions caused by children’s needs for support in school tasks, computing tools, organizing breaks or lunch, and for sharing ICT tools. Sharing the same physical location created the potential for background noise, and the need for frequent changes from one room to another. Davidoff et al. [4] studied family coordination in dual-income families, focusing on parents driving children to school and hobbies, and reported that any deviation from routine easily causes the complete collapse of busy family schedules. Such a collapse has now happened in families in the context of remote schooling, where families were suddenly required to organize many aspects of their daily lives in a new way. Our datasets give insights into how new routines were sought, established and built on over time, in order to run family life smoothly with increased focus on schooling and work tasks.

5.2 Intensive Use of ICT Tools

Not surprisingly, the remote schooling included a vast amount of ICT use. In Finland, according to the EU Kids Online 2020 report [39], 97% of children have access to a smartphone, with most having their own, and 80% of pupils at upper comprehensive schools are online multiple times a day. Consequently, the children in our sample were already quite familiar with the idea of using technology. As a result, the technology-intensive approach to remote schooling that was adopted, seemed to be taken as the norm by families, and, according to our findings, families adapted well to its ICT requirements. However, remote schooling had required family actions in setting up the ICT tools, ranging from the common action of installing applications, to the less common laptop purchase (according to the survey, 75 % and 5%, respectively). This step of setting up the technology infrastructure was the cause of struggle and stress in many families, even though the actions were successfully concluded. It should still be noted, that the requirements to handle the technology easily puts families and children in unequal positions, based on the family finances and parents’ experience, interest and skills with technology. This is a point which should be taken into account if, or when, remote schooling schemes are activated in the future society. Also, our results also highlighted how differences between the parents’ technology skills may cause a perception of inequality or friction within the family.

It is interesting to note, that family rules around smartphone use and e.g. the use of screen time applications (e.g. Apple Screen Time) to limit children’s use, became difficult to apply in the new context of remote schooling. Managing and restricting screen time is already a complex issue within families [25], and with ICT intensive remote schooling, the amount of time spent in front of a screen skyrockets. In addition, the simultaneous activation of social distancing during the COVID-19 pandemic time, made social media and smartphones almost the only channel through which children can socialize with friends. Related to smartphone use, Hiniker et al. concluded that families often struggle to live up to their own ideals in regard of contextually appropriate technology use [19].

We believe that, with this new context, fundamentally revisiting the whole issue of technology use and overuse in families would be an interesting direction for future research.

5.3 Rapid Transition to Remote Schooling

The COVID-19 pandemic caused a very rapid transition to remote schooling in Finland, and this hurry manifested as the use of ad hoc solutions and in the wide variety of practices that took place, particularly at the beginning of the remote schooling period. The level of preparedness in families varied, e.g. with the availability of equipment and internet connection speed. Our dataset also revealed how changes were rapidly made to improve the situation, purchasing or borrowing ICT tools, such as laptops or upgrading the internet connection. Parents also reflected on how some of the practices, both from the school and family side, were improved over time. Clearly, moving to heavily ICT based education requires also new approaches from teachers, many of which have been addressed by prior work, e.g., Hennessy reported on the pedagogical evolution required by teachers integrating ICT supported learning [16].

The rapid transition to remote schooling also meant reorganization of family spaces, as reported by approximately half of the families we questioned. However, even though families had created a space dedicated to the children's school work, e.g. in their room or on the kitchen table, a considerable amount of technology usage was still reported to happen in other places, such as on the sofa or bed. Clearly this is not optimal for work ergonomics. Earlier research on 10-17 year old's laptop use has also reported on the use of various locations and postures, with 60% of participants reporting discomfort in laptop use [15]. With a longer preparation time for remote schooling it would be important to provide families with guidance also on the ergonomic aspects of the remote school work.

5.4 Limitations of the Study and Future Opportunities

We acknowledge that the transferability of our research is potentially limited by its geographical location and cultural environment. Finland profiles as a country with a high level of technology adoption. Thus, even the lower grades of school children are already typically quite comfortable using ICT tools. We still believe that many of our findings reflect common experiences in families on the rapid transfer to remote schooling that was in progress in many countries at the time of writing of this article. Another limitation arises from the research methods employed, an online survey and interviews. Here, we were glad to notice that engagement with the online survey was very high, indicated by the number and quality of answers received in the survey's optional text fields. We acknowledge that there may be positive bias, particularly in the interviews, when a parent describes their child's school time activities. For example, children playing video games when they were supposed to be doing school work and challenges in limiting screen time, were only reported in survey responses. We believe that by combining the two research methods, we managed to find a good balance and gain both breadth and depth in our findings. We also note that our volunteer based sample selection method probably did not reach the families suffering from the harshest difficulties. More focused research is needed to explore issues within this segment.

Our research opens up a range of possibilities for future researchers to continue to investigate the identified themes. For instance, the parent's experiences in work-home life balance deserve investigating in more detail, as well as the children's use of technology and screen time, and family coordination practices. In our research, we have not focused on the pedagogical aspects or educational content of the remote schooling, which naturally is a huge research area in its own right. The remote schooling, which came as a forced, large scale experiment on the nation, also opens future possibilities for societies and education systems to develop further. For example, whilst classroom based education is paced by the teacher, the remote learning during the COVID-19 pandemic exposes new opportunities and challenges for student self-pacing. We believe that the reported experiences and lessons learned offer valuable information when future remote schooling practices are planned.

6 CONCLUSION

In this paper, we have presented the findings of a study investigating Finnish parents' perceptions on remote schooling, especially related to ICT technology usage, during the spring 2020 COVID-19 pandemic. Based on a combined dataset from an online survey ($n = 114$) and interviews ($n = 14$) we report on the intensive adoption and use of ICT technology. Our findings provide insight to the challenges faced by parents, juggling work and family commitments to provide children with the needed support and presence during the remote schooling. Spatial issues within the remote schooling home are also challenging, often requiring family members to continuously move between different rooms during the work/school day, and leading to dynamic reorganization of the family space. Despite needing to reconfigure many aspects of their everyday family life, the general perception from our research is that the families had successfully managed to adapt to the remote schooling context.

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Article VI

Karhu, M., Häkkinen, J., Kalving, M., Mäkiranta, M., & Colley, A. (2024). Re-negotiating work-home boundaries: Reconciliations of remote work and school during COVID-19. *Nordic Journal of Working Life Studies*, 14(2), 47–69. <https://doi.org/10.18291/njwls.143181>

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Renegotiating Work-Home Boundaries: Reconciliations of Remote Work and School During COVID-19¹

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ABSTRACT

This article contributes to understanding the radical transformation of everyday lives when parents' remote work and children's remote school were reconciled in homes during the early moments of the COVID-19 pandemic in 2020. The dataset comprises an online survey ($n = 92$) plus interviews, online diaries, and sampled experiences from 16 Finnish remotely working parents. Identified challenges to the parents' remote work included interruptions and fragmentation of work tasks, non-optimal work ergonomics, and rescheduling of work times. We present the strategies parents used to create new rhythms and routines, a shared space under the same roof, peace, and privacy for daily work and school, as well as managing multiple simultaneous social roles. Parents' rich experiences provide insights into the early steps of COVID-19-catalyzed remote work. Thus, the paper offers a reference point for exploring potential development trajectories in the increasingly common hybrid work setting.

KEYWORDS

COVID-19 / family / home / remote school / remote work / work-life balance

Introduction

In Spring 2020, the COVID-19 pandemic strained daily life all over the world. The measures to stop the virus spread by adopting social distancing broke the everyday infrastructures as we know them. Countries quickly began to implement restrictions

¹ You can find this text and its DOI at <https://tidsskrift.dk/njwls/index>.

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for citizen mobility and face-to-face gatherings, and a recommended or enforced switch to a remote mode in work and school life took place globally. As a result, different social spaces converged in the home (Fuchs 2020; Häkkinen *et al.* 2020; Iivari *et al.* 2020). Everyday life shrank between the home walls when work and school were switched into remote mode, and communication applications such as Microsoft Teams turned homes into offices and classrooms.

Our paper encompasses the spillover and blurring effects in the work-home boundaries as we ask how reconciling parents' remote work and children's school in Finnish families during the COVID-19 pandemic affected the entire family setting, especially parents' remote work arrangements. We focus on the viewpoint of working parents and investigate how they experienced and practically handled the situation when different spheres converged in the home. Our research is based on a rich dataset comprising a user study ($n = 16$) employing interviews, diary entries, the experience sampling method (ESM), and an online survey ($n = 92$). The work contributes to understanding the challenges of work-life balance in remote work (e.g., de Wind *et al.* 2021; Felstead & Henseke 2017; Rodríguez-Modroño & López-Igual 2021; Shirmohammadi *et al.* 2022a & 2022b) by investigating a setting where parents must simultaneously handle different spheres. Although a need for further research concerning remote work combined with the presence of children has been previously identified (e.g., Bellmann & Hübner 2021), performing one's work while caring for one's children remains an underexplored challenge in daily working life.

In addition, we shed light on the early moments of COVID-19-catalyzed remote work. In that sense, the explored experiences serve as an essential retrospective to remote work, which has become more common due to the pandemic. Parents' experiences reconciling remote work and children's remote school describe a memorable historical period when people struggled with the new situation and remote work practices were taking initial shape. It is expected that parents will carry these experiences with them for a long time and that they have potentially shaped further remote work arrangements and attitudes. Therefore, we believe that providing a rich understanding of these initial experiences can help in understanding later remote work trajectories. Also, though COVID-19 seems to have loosened its grip at the time of writing this paper, disruptive events such as new pandemic outbreaks and natural disasters may require a similar shift to remote arrangements in the future.

Theoretical framework

(Remote)-Work-life balance

During the COVID-19 pandemic, the shift to remote work was a common trend globally. A study with more than 5000 participants conducted in the Netherlands showed that before the pandemic, people spent an average of 29 working hours at the workplace and 4 hours working at home. In contrast, by the end of March 2020, the hours were equally divided between the two locations (Von Gaudecker *et al.* 2020). Researchers have analyzed Twitter-based data to investigate public sentiment toward working from home during the COVID-19 pandemic. According to the findings, the work-from-home experience created a positive perception (Akash & Tripathi 2020; Daneshfar *et al.*

2022). Similar insights have been gained through other methods. For instance, a survey conducted in 29 countries highlights how respondents were more positive than negative about working from home (Ipsen et al. 2021).

However, the question of remote work related experiences is not that simple. In general, not limited to the COVID-era, people experience that working from home both positively and negatively affects work and private life. Although opportunities to combine work and private life increase (Samuelsson et al. 2022), it does not necessarily lead to an improved work-life balance, which can be understood in terms of overall satisfaction with the balance between work and nonwork (Mellner et al. 2014). Already, pre-pandemic research argued that the impact of remote work on work-life balance is generally negative due to, for example, negative work-home spillover and increasing work-family conflict (Bellmann & Hübler 2021; Felstead & Henseke 2017; Higgins et al. 2014). However, seeking to further understand the impact of working from home on work-life balance, many researchers found it beneficial to study the issue during pandemic times (Shirmohammadi et al. 2022b). Researchers argue that remote work during the pandemic reduced work-life balance (Sandoval et al. 2021; Saragih et al. 2021), in which both women and men had management difficulties (González Ramos & García-de-Diego 2022). But opposite observations have been made as well. For instance, Ipsen et al. (2021) highlight increased work-life balance as an experienced advantage that resulted in positive sentiments toward working from home during the COVID-19 pandemic. Further elaborated, work-life balance is tightly bound to the question of boundaries between these two spheres.

Blurring boundaries between (remote) work and home

Generally, stronger boundaries between work and nonwork are related to a better work-life balance (Spieler et al. 2018). Although the subjective and variable nature of work-life balance must be considered (Wattis et al. 2013), people mostly prefer a boundary strategy where work and family are kept apart (Ammons 2013; Mellner et al. 2014; Ojala 2011). Still, there are different degrees of effort to separate work and home life (Moazami-Goodarzi et al. 2015), and only a few clearly maintain work-home boundaries (Ojala 2011; Mellner et al. 2014). Sull et al. (2020) have pointed out a need to manage the *paradox of remote-work-life balance*, indicating how remote work allows adjusted schedules and gives more time with families, but on the other hand, blurs the boundaries between professional and personal lives. Altogether, the omnipresence of ICT technology has blurred the boundaries between work and home life (Bødker 2016; Mazmanian et al. 2013), resulting in a negative work/home spillover (Berkowsky 2013) and technology-mediated interruptions occurring in after-work hours (Chen & Karahanna 2018). The prior art has shown, for instance, how technology-assisted work after office hours at home has implications for work-life balance (Adisa et al. 2017; Bauwens et al. 2020), is prone to lead to family conflicts (Fenner & Renn 2010) and is significantly associated with technostress (Leung & Zhang 2017).

In the context of the COVID-19 pandemic, there is a strong indication of how the pandemic-era blurred the boundaries between work and private life (e.g., Cannito & Scavarda 2020; Karjalainen 2023; Otonkorpi-Lehtoranta et al. 2021) and remote



workers experienced a constant presence of work (Karjalainen 2023). Interestingly, parents of children under 12 and women were the groups most vulnerable to increased work-family conflict when work-family conflict was examined in the context of the COVID-19 pandemic (Kuśnierz et al. 2022). Systematic reviews by Shirmohammadi et al. (2022a, 2022b) analyze studies examining work-life balance among those who worked from home during the COVID-19 pandemic. Housework and care intensity emerge as one of the key themes. However, there is a lack of research on how working parents practically handled the situation when the different spheres converged into the home. Instead, the focus is, for instance, on the overall work-family arrangements (i.e., whether to work remotely or not) (Goldberg et al. 2021), gendered realities of work-life balance (Del Boca et al. 2020; Hjalmsdóttir & Bjarnadóttir 2021; Parlak et al. 2021) as well as the psychological well-being of working mothers who managed both work and home duties during the pandemic (Clark et al. 2020). In sum, blurred work-home boundaries point out a need to pay closer attention to how the boundaries are drawn and negotiated.

Drawing and negotiating (remote)-work-life boundaries

Researchers have pointed out a need for person-centered approaches in understanding work-life boundary management styles (Kossek et al. 2012). People have habits and ritualized behavior for drawing boundaries between work and home, including, for example, clothing, commuting, and how we engage with family, friends, and colleagues (Nippert-Eng 2008). As work-family conflict is related to temporal and spatial transitions and to transitions between work and family roles (French et al. 2022), individuals' *perceived control* of the boundaries between work and private life is crucial for the experience of work-life balance (Mellner et al. 2014).

In terms of managing the boundaries between remote work and life, research has highlighted the issues of time pressure and time use control (Thulin et al. 2019), how remote work is associated with a reconfiguration of daily work, family and leisure activities (Hilbrecht et al. 2013), managing work-life boundaries with ICT (Sayah 2013), as well as the use of ICT in negotiating the temporal and spatial dynamics of the working-home (Nansen et al. 2010). Earlier research has also pointed out a lack of research focusing on how the physical conditions of the house and family contribute to the effectiveness of home offices as a workplace (Inalhan & Fan Ng 2010). When paying attention to reconciling parents' remote work and children's remote school, there needs to be a special focus on family coordination. Generally, the practical everyday life in families requires coordinating and balancing the demands of the parent's work life, children's schooling, and leisure time activities. Here, established routines have been found to ease the smooth execution of the activities (Davidoff et al. 2011). Families use different tools to support coordination both in practical and socio-emotional ways (Brown et al. 2007; Leshed et al. 2014), and for example, the design of different tools for supporting family communication and coordination has gained much attention (e.g., Neustaedter et al. 2009; Plaisant et al. 2006; Sellen et al. 2006).

As pointed out by Bødker (2016), the boundaries of life are not static but are constantly being renegotiated. We use artifacts to define and negotiate different boundaries

in collaborative work (Lee 2005), and technology has a role in both boundary drawing and opening (Bødker 2016). This is an exciting and relevant framework in the pandemic-driven remote circumstances. When reconciling remote work and children's remote school happening simultaneously at home, the established transition patterns and routines naturally did not apply. Instead, working parents had to adapt to support the organization and practicalities of children attending school from home while keeping their own work running. It is evident that reconciling remote work and children's remote school during the COVID-19 pandemic set challenges for achieving work-life balance, and there was a need to readjust the work-life boundaries. Therefore, we need to understand how the boundaries between work and family were negotiated in exceptional circumstances.

Positioning our research

Prior studies have addressed remote work and remote school during COVID-19 times, but few focus on the combination of these two. Already before the COVID-19 pandemic, researchers (e.g., Bellmann & Hübler 2021) highlighted a need for further research concerning remote work combined with the presence of children. The conditions created by the pandemic further emphasize the need for such research. Fuchs (2020) has identified the radical transformation of the space-time of everyday life during the crisis, where various social spaces converge and blur in the home. What remains unanswered is how everyday life is organized in such conditions and how individuals manage multiple social roles simultaneously in the same space. We address this through a user research approach, focusing on how working parents experienced and practically handled the situation when their remote work and children's school happened simultaneously in the home during the early moments of the COVID-19 pandemic. Here, it should be noted that remote schooling is not homeschooling, where a parent fully takes on the role of the teacher (Ray 2015). Still, parents had a role not only in supporting teaching tasks (Brom et al. 2020) but also in assisting with ICT infrastructure (Häkkinen et al. 2020). With our research, we seek to fill the research gap of how family practicalities affect work and extend prior work on adapting homes to become home offices (Inalhan & Fan Ng 2010). We also provide a Nordic perspective on working from home during the COVID era. For instance, Risi et al. (2021) have researched the redefined boundaries of life in Italy during the COVID-19 lockdown and point out a need to research how the restrictions were perceived in different socio-cultural contexts.

Methods and materials

Research context

In Finland, on 12 March 2020, employees were advised to work remotely if their tasks could be carried out from home (Finnish Government 2020a). A few days later, a state of emergency over the COVID-19 outbreak was declared. In the context of schools, that meant closing the premises of all education providers and reorganizing teaching as



distance learning (Finnish Government 2020b). The studies reported in this paper were conducted in the turn of April–May 2020, when remote schooling had been in operation for almost two months. Contact teaching in Finland’s primary and lower secondary education resumed on 14 May 2020 (Finnish Government 2020c). Thus, our research is positioned to sample a unique 2-month time window. To produce a rich dataset, two separate studies were conducted: (1) a qualitative user study and (2) an online survey. The participants in the two studies were different.

Qualitative user study

Participants

The user study collected data using several methods: (1) ESM via WhatsApp messages, (2) online diary entries, and (3) semi-structured interviews. The user study was conducted during the first wave of the COVID-19 pandemic at the beginning of May 2020. Due to the limited time window, the participants of the qualitative user study were recruited through informal networks of colleagues across Finland. In addition, a request for participants was shared in Finnish social media forums dedicated to discussing remote school-related topics. Altogether 16 participants, 11 female and 5 male, from different regions of Finland, were recruited. Details of the interviewees are provided in Table 1.

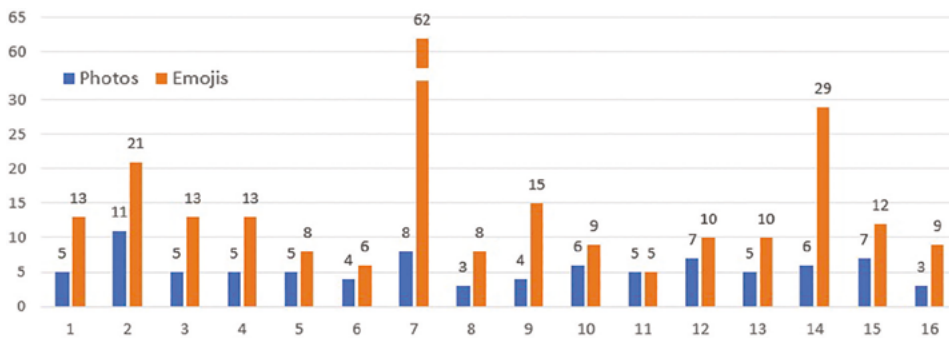
Table 1 User study participants, $n = 16$.

Participant number	Gender	Adults in household/ interviewed parent	Children’s ages	Parental work situation
1	Male	1	9, 12	RW
2	Female	2	11, 13, 14, 17	RW, RW
3	Male	2	5, 8	RW, OH
4	Male	2	10, 13	RW, OH
5	Female	2	10, 12	RW, RW
6	Female	2	9, 11	RW, TL
7	Female	2	15, 17	RW, RW
8	Male	1	11, 14	RW
9	Female	1	6, 8	RW
10	Female	2	11, 14	RW, RW
11	Female	2	14	RW, RW
12	Female	2	9, 12	RW, RW
13	Male	1	11, 13	RW
14	Female	2	9, 13	RW, OH
15	Female	Other	c1	RW, RW
16	Female	2	c1, c2	RW, OH
c1, c2, Did not want to reveal the school child’s age; OH, Working outside the home; RW, At home – Remote work; TL, At home – Temporarily laid off.				

Experience sampling

The ESM was deployed as a data collection method. With ESM, people are prompted to provide self-reports at random times during the day (Larson & Csikszentmihalyi 2014). Mobile phones are well suited as a platform for ESM, as they are widely adopted, and using them for data collection creates only a minor load for the participants (Van Berkel et al. 2017). In our study, participants received WhatsApp messages from a prepaid research phone number. Altogether, seven prompting messages were sent to each participant, at different times over a period of three days. Participants were asked to reply with photos, or emoji symbols and short explanations. The questions focused on space usage and home arrangements, home atmosphere, and overall experience in reconciling remote work and remote school. The resulting ESM dataset contained textual answers and, in total, 89 photos and 243 emojis, Figure 1. Exemplary emoji-based responses are presented in Figure 3.

Figure 1 Number of photos and emojis sent by participant.



Diary study

Participants were asked to write online diary entries over a two to three-day period. The diary entries were written in the same week as participants replied to the ESM WhatsApp messages. The online diary forms were created in Google Forms and consisted of a background form and an identical diary form for each day of the study. In the diaries, participants were asked to describe their mornings at home, what happened during the workday, things that parents needed to take into consideration in children's remote schooling, concrete examples in reconciling remote work and remote school, changes in the daily rhythm, as well as the positive feelings and challenges they experienced.

Interviews

At the end of the study period, after participants had completed the ESM and diary tasks, semi-structured interviews were conducted by phone or online meeting. The interviewees were divided between two interviewing researchers, and interviews lasted for



approximately 15 minutes, consisting of background questions and nine semi-structured interview questions. The focus of the interviews was on parents' experiences in reconciling remote work and remote school. This dealt with parents' positive and negative feelings related to remote school, and remote school's effects on the overall home and family setting, including space usage, working ergonomics, family dynamics, parent's ability to work, as well as the effects on overall daily life such as a division of household chores and time together.

The participants invested relatively much of their time in the qualitative user study conducted through the various data collection methods. At the same time, they struggled to keep the remote work and remote school running simultaneously at home. Therefore, we decided to keep the interviews efficient. For this reason, the material collected by ESM and the diary study was not used systematically as the basis for the interviews. However, the participants were asked to reflect organically on the material they produced through their ESM and diary replies in the interviews. Due to the participants' prior engagement in the ESM and diary study, participants were oriented toward the questions in advance. That enabled deepening participants' insights in the relatively short interview slots.

Qualitative user study analysis

The qualitative user study data was prepared for analysis by the authors, including transcribing audio-recorded interviews and organizing diary entries and ESM data to Excel sheets per participant. The methods used to analyze text are also regarded as effective for analyzing visual data (Saldaña 2015). Thus, we relied on a combined textual and visual analysis by using an affinity wall method. Through the affinity wall method, emerging themes were identified by reading the rich datasets line by line, then structured into conceptually similar groups, and finally organized into higher-level categories. The authors discussed the themes emerging from the data iteratively throughout the process. The first author then compiled a codebook where nine theme categories captured the 49 identified subthemes (Table 2). The codebook was reviewed and agreed upon among the co-authors. Two researchers then independently analyzed the interviews, diary entries, and ESM material, thematically coding the data according to the codebook. A third researcher then arbitrated any conflicts in the coding.

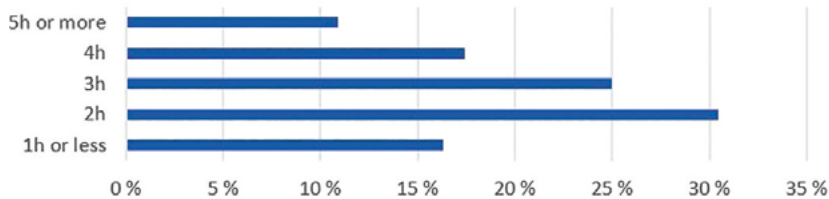
Online survey

An online survey was organized at the end of April 2020 to collect feedback from a broader sample of participants. The survey was distributed through email lists by contacting school personnel across Finland. In addition, the survey was shared in domestic remote school-related social media forums. The survey was completed by 140 parents. The data was then filtered to include only answers where at least one parent in the family was working remotely at home during the remote schooling. This resulted in a dataset of 92 participants from different parts (and consequently, different schools) in Finland. The survey included open questions, where participants were asked to describe the challenges of combining remote work at the home office and the remote school, as well as the positive and negative experiences of remote

schooling in families. The free text data was analyzed using an open coding approach. One researcher first created a codebook by identifying themes and grouping them to reduce the number of categories, resulting in a set of themes describing the parents' challenges. Two researchers then independently coded the participants' responses using the developed codebook. A third researcher then arbitrated any conflicts in the coding.

Of the total of 92, 72 (78%) participants were female, 19 (11%) male, and one other/preferred not to state gender. The mean number of elementary school (ages 7–13) children in remote schooling was 1.6 ($SD = 0.7$). In addition, 59% had older children in the household, and 41% had younger children. Both the parents remote work and the children's remote schooling was very ICT intense (Figure 2).

Figure 2 Parents' ($n = 92$) estimation of their child's or children's ICT technology use during an average remote school day.



Results

In the following, we present the findings from our combined qualitative user study and survey datasets. Themes emerging from the qualitative user study are presented in Table 2 and thematically analyzed survey findings in Table 3. We refer to the qualitative study participants with the letter P and survey participants with the letter S.

Table 2 Themes emerging from the qualitative user study.

Themes emerging from the qualitative user study		
WORKING SPACE	Kitchen	Children's room
	Living room	Expansion of workspaces outside the home (e.g., garage)
	Workroom	Outdoors
	Bedroom	Changes in workspace
WORKING ERGONOMICS	Table	Standing position
	Couch	Experience of poor ergonomics
	Bed	
	DIY workstation	
RHYTHM AND ROUTINES	Re-rhythm of adults' work	Changes in sleep rhythm
	Remote meetings and lessons as rhythmists of the day	Slowed down life
	Mealtimes	Clear daily rhythm and routines
	Outdoor times	No rhythm and routines



Themes emerging from the qualitative user study		
PEACE OF WORK AND PRIVACY	Interruptions Space utilization Scheduling remote meetings and lessons Closed door	Closed microphone/camera Headphones Intra-family agreements Intra-family communication channels Showing private outside the home Challenges in attention sharing
NEW WAYS OF WORKING	Adopting new ways of working (e.g., not being proactive at work)	
INTRA-FAMILY ROLES	Parent's minor role in remote schooling Parent's major in remote schooling Other parent's clear supervision responsibility on remote schooling	Children's responsibilities in housework Care for children under school age Parents' division of housework
INTRA-FAMILY RELATIONSHIPS	Increased time together Rapprochement of family members	Parent as an employee in the eyes of a child Child as a schoolchild in the eyes of a parent
OTHER EFFECTS ON THE DAILY LIFE AT HOME	Increased cooking Increased cleaning	
THE EFFECTS OF EMOTIONAL LIFE	Initial negative emotions Negative emotions from time to time	Positive emotions Positive trajectory

Table 3 Themes emerging from the survey. Number of respondents mentioning (n = 92).

What have been the challenges to manage remote work and remote school?				
WORK INTERRUPTIONS	Concentration difficulties	16	Multitasking	12
	Interruptions	8	Fragmentation	5
SCHEDULING CHANGES	Change of work rhythm	17	Scheduling home tasks	15
CHILD MONITORING	Child monitoring	17	Guilty feeling of not helping child	14
SPACE RELATED	No space and peace issues	9		
WORK-LIFE BALANCE	Home atmosphere suffers	7	Sleep disturbance	4
	Blurring work-life boundaries	2		

Figure 3 Exemplary emoji-based responses to the question 'Describe with emojis how remote work was during the remote schooling period this spring'. The responses illustrate the various emotions the parents experienced, from being concerned, unwell, and angry to feeling joy, affection, and strength. The participant reference number is indicated.



Working space and ergonomics

Working space

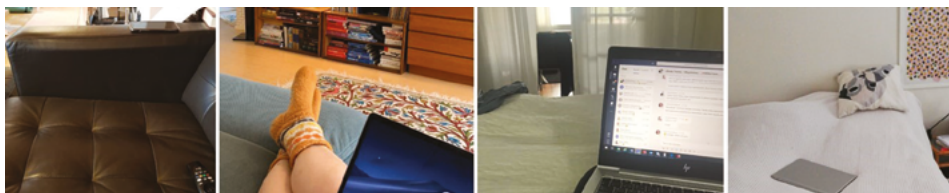
Turning the home not only into an office but also a classroom was primarily a question of space usage during the intense use of ICT tools. In many families, shared spaces such as the kitchen and living room were utilized as working spaces, for example, ‘I must run between the kitchen and living room workstations’ (P7). Setting up a workstation in the kitchen or living room was also a chance for parents and children to work side by side, which was a solution some families enjoyed, for example, ‘It’s nice to have the whole family together in the same space’ (P6, diary entry). Or, as one participant aptly describes, sharing the same space is a solution families ended up at, more or less intentionally, ‘... children wanted to do tasks in the same room [as everyone else] all the time’ (P5).

There were also families who wished for separate spaces to conduct work and school tasks. However, only a small minority of participants had a dedicated workroom for the adults, for example, ‘Fortunately, we have three floors in the house, so we basically have a study in the basement, then there is a workspace on the middle floor’ (P11). Instead, many participants said they found peace in a bedroom, for example, ‘I’ve been working in my bedroom, behind the door, in practice in the bed’ (P9). In addition, there were participants who made creative solutions aiming to guarantee separate working spaces. In these cases, the home was extended, for example, to the yard or a garage: ‘Sometimes my son went to an office in our garage’ (P16). But rather than being fixed, workspaces were in constant flux. Participants reported that both parents and children moved between different rooms. As one participant summarized, ‘I vary between the kitchen and the living room ... also the children move from place to place’ (P4).

Working ergonomics

Generally, participants sought working positions at tables, couches, and beds, and typically moved between these three. As one participant summarized, ‘Pretty fifty-fifty, I was at the desk, on the couch, in the bed’ (P2). The working position often depended on the nature of the work, for example, ‘If I need to write, then I’m at the table and try to focus on that position. If I read a lot, I like to lift my legs’ (P6). Illustrative photos provided by the participants are shown in Figures 4 and 5. Many participants recognized the poor ergonomics of their working situations, for example, ‘Of course, when you’re working on couches, it’s by no means an extremely good posture if you’re in it all day’ (P11).

Figure 4 Example photos of different participants working at home. Sofa (with Laptop, not shown in the photo), sofa, bed, and bed.





Several parents noted prioritizing their children's ergonomics above their own. Some participants searched DIY solutions to poor ergonomics, for example, 'I then built a standing table using kitchen stools' (P7). Some participants also reported working in standing positions or walking around, for example, 'I've done a lot of walking outdoors. If there I can participate while chatting or just listening' (P9.)

Figure 5 The parent's work ergonomics at home was typically not optimal, as illustrated in participants' photos.



New rhythms of parents' work

Changing the time of the work

To mitigate the effects of interruptions and the inability to concentrate (Table 3), families often sought new rhythms and time slots for the adults' work. Some parents could adjust their working schedules to help children in remote schooling, for example, '... I can pretty well influence my work, to control days and reschedule meetings. I start a little later, so that children get to start their school tasks' (P4). Participants also worked in a different rhythm compared to normal to better concentrate on their own work while the children were at home, for example, 'I intended to do as much work as possible without interruption before the children settle down at the same table to do school assignments' (P6, diary entry). Remotely working parents also organized taking turns: 'My partner and I monitor school in turn every second day so that the other one can work. The one who does the schooling then works after, until midnight' (S36). The rescheduling of one's own work also tired parents, who related, for example, 'My day starts when [remote school] things are done, and then lasts late' (S31).

Scheduling the day with meals as the key routine

Other central necessities, which set a rhythm for everyday life, were mealtimes, brought up in both user studies. This was often not without challenges, as illustrated by participants' provided photos, Figure 6. In the interviews, participants reported trying to reconcile mealtimes with everyone's remote meeting schedules, for example, 'All lunch breaks and such were adjusted according to them [remote meetings], we could not keep any fixed lunchtime but had to devise a little bit about where will be a half-hour slot that we can have a lunch done' (P1). The need to prepare all kinds of meals for the family

was emphasized in all the collected data and was an aspect that burdened parents, for example, ‘Well, of course, mom has had to be a chef here’ (P16).

Figure 6 Participants’ reflections on what does not work with remote schooling. From left ‘Friction in the food supply chain at times, when everyone is working’; ‘Organizing school meals while working remotely keeps you busy [...] It feels you have to be cooking all the time’; ‘Common mealtimes are hard to find, and after eating fast, the kitchen is a mess’; ‘Remote schooling takes the biggest part of the kitchen table’.



Remote meetings and remote lessons giving a rhythm for the day

Participants reported on how remote meetings and remote school lessons set a framework for the day: ‘A quick breakfast, the schoolchild’s classes began at 8:45 am as instructed in the Qridi App. Teams classes began after lunch. My Teams call started at 9 am and the husband’s teaching work through Teams at 8.15 am. The day went by calls’ (P11, diary entry). Whether it was the children’s or parents’ meetings that dominated as the rhythms of the day, and on whose terms days were scheduled, varied between families. In many families, the remote school meetings gave the structure for the day, for example, ‘In practice, it was precisely because of how those children’s remote school lessons, let alone these video calls, were’ (P1). For others, the remote work meetings played a key role in scheduling the days at home, for example, ‘We have in the morning usually planned the schedule according to when I need to be in work-related meetings...’ (P9).

Peace and privacy for work

Interruptions with parents’ work

Participants noted the impact of interruptions in work caused by children being at home in remote school, Table 3. One participant commented, ‘I had to read a couple of texts that typically would take an hour in total. But I spent four hours on it, because I had to stop reading all the time, and then I had to gather my thoughts again’ (P6). Many participants had also interrupted their work to help children with technical issues related to remote schooling, for example, ‘Zoom or Meet doesn’t open or something like that’ (P4). Overall, participants were not always able to pay attention to their children. ‘When



I had work-related calls, the child was looking for my attention simultaneously. Then, I could not talk about things to the extent I wanted to' (P3). The previous quote illustrates how the capacity of work decreased: an experience shared by other participants as well. 'I cannot be proactive in my work. I do my job and do what has to be done. But it is very much about answering emails and stuff like that' (P2). On the other hand, parents also commented on the positive aspects of the child asking for help, for example, 'The parent sees all the time where the child needs more help and where they are doing well' (S41). There were also some positive implications of interruptions, for example, 'The highlight of the morning was a high school 1st-grade music class, and he came to play and sing for his assignment. I got to enjoy a morning concert while working' (P7, diary entry).

Practical solutions for guaranteeing peace of work

Remote meetings and remote school lessons set their own needs for peace and privacy when family members worked and studied under the same roof, for example, 'Then, when we had scheduled who is on the phone at any given time, everyone was assigned their own room or corner' (P1). Many participants described how they utilize spaces especially to create possibilities to retreat to their own peace, for example, 'At some point, I retreated downstairs, which has been perhaps a little quieter' (P7). In addition, participants utilized several solutions to guarantee peace of work and privacy. One simple one was to close the door, clearly signaling the need for peace and privacy. Participants also noted becoming more skilled, for example, in muting the microphone when in a meeting, for example, 'We initially thought that when making video calls, everyone must be in a different room. But in practice, when we used headsets, it didn't matter so much' (P5). Often peace of work and privacy were also based on intra-family agreements, for example, 'In a way, it was tacitly agreed that if someone has Meet [Google Meet] going on, then don't jump with underpants into the background' (P15). Providing screen time for children, aiming to guarantee peace for the adults' work, for example, 'PlayStation time was arranged for the children during my longer meeting to keep the house quiet' (P9, diary entry).

Discussion

The findings shed light on a COVID-era paradox of remote-work-life balance (Sull et al. 2020). Although prior research has indicated that remote work gives more time with families (Sull et al. 2020), the pandemic led to another extreme: suddenly, people had nothing but time with family when all day-to-day activities were handled under one roof. The families drifted into a solution out of necessity. In Finland, parents were not forced but recommended to work from home if their tasks could be carried out from home. However, closing the premises of education providers led to a situation where parents worked remotely not only to curb the virus but to take care of their school children. The investigated experiences cannot be focused into a question about whether the overall situation was experienced as positive (Akash & Tripathi 2020; Daneshfar et al. 2022; Ipsen et al. 2021) or negative – or whether work-life balance improved (Ipsen et al. 2021) or degraded (Sandoval et al. 2021; Saragih et al. 2021) in the exceptional circumstances.

Instead, the experiences must be understood holistically, with both positive and negative aspects. We know from prior research that the *perceived control* of the work-life boundaries is significant in work-life balance experience (Mellner et al. 2014). What is interesting is how this control was sought when the world suddenly slipped out of control. The focus gets attached to renegotiating the boundaries of life (Bødker 2016) as our particular interest has been how parents experienced and practically handled the situation when their own remote work and children's school happened simultaneously at home. Next, we discuss the reframed boundaries regarding roles, space, and time.

Renegotiating the boundaries between roles

A need for further research concerning remote work combined with the presence of children has been recognized in prior work (Bellmann & Hübler 2021). Our study emphasizes how the pandemic set parents in a vulnerable position (Kuśnierz et al. 2022) when reconciling their work with children's remote school. Parents rarely must simultaneously be both employee and parent on such a concrete level during their working hours. In our study, multitasking while working was common, as the exceptional conditions required parents to balance and perform different social duties simultaneously. This type of role transition has been previously researched, for example, in the context of remote work and work-home conflicts, where remote workers have been found to have more interruptions caused by home demands during work hours (Delanoeije 2019). Still, the circumstances posed by COVID-19 put working parents in very different situations compared to the context of prior research.

The prior art has reported how computer-mediated work interruptions at home during over hours cause negative effects through interruption overload and the psychological transition (Chen & Karahanna 2018). In our study, the parents had the same difficulties but somewhat in the reverse conditions, in trying to concentrate on working at the home office. Interruptions, work fragmentation, and difficulties concentrating on work tasks were common challenges the parents faced. The parents needed to support the children during remote schooldays, as reported by Brom et al. (2020). However, they often felt guilty when not able to pay enough attention to it or immediately help the children. Also, as parents arranged work meetings from home and had work-related calls, paying attention to the children was challenging. Participants described how these situations caused conflicts, especially with younger children. In addition, many participants experienced that the mess and time spent cooking at home increased exponentially as the other family members stayed home during the day. On the other hand, the feeling of inadequacy was also reflected in work as parents, for instance, experienced that they could not be proactive in their work. The experiences are related to work-family conflict (e.g., Gallie & Russell 2009; Roman 2017; Tammelin et al. 2017) as a broader theme. COVID-19-related research has identified the intensity of housework and care as central themes (Shirmohammadi et al. 2022a). In contrast with previous encounters, our paper has explored in a solution-oriented way what practical means the parents used to adapt to the situation. The COVID-19-forced convergence of social spaces in the home can result in overburdening individuals who cannot manage multiple social roles simultaneously in one place (Fuchs 2020). Our study demonstrates how the parents became masters at this kind of role management, but also felt overwhelmed. This links to the spillovers between



work and family-related emotions and aligns with Palm *et al.* (2022) who argue how both work and non-work matters trigger emotions experienced at work.

Renegotiating spatial and temporal boundaries

The study highlights work and home as extremely intertwined social spaces without clear temporal and spatial boundaries. Reconciling parents' remote work and children's remote school led to workspace limitation: an issue identified in other pandemic-related studies as well (Risi *et al.* 2021; Shirmohammadi *et al.* 2022a). Our study highlights how parents actively sought solutions that eased the reconciliation of remote work and remote school at home. That is a question about family members negotiating the domains of work (Jokinen 2009) and school. Kawsar and Brush (2013) have earlier reported that, although computer usage at home has emerged, for example, in bedrooms and the bathroom, work-related computer usage is still mostly done in dedicated workspaces. However, in our study, remote-working parents were pushed to work in bedrooms and on sofas – and in garages and sheds – as the table spaces had been occupied by school children. Whilst raising ergonomic concerns, on the plus side, this provided parents peace and privacy for their work, for example, for teleconferencing.

It is also noteworthy that renegotiating spatial boundaries was not only a question about physical space but to a large extent, a combination of physical and online spaces. We know from prior research how the omnipresence of ICT technology has blurred the boundaries between work and life (Bødker 2016; Mazmanian *et al.* 2013). During the COVID-19 pandemic, work was transferred to remote work applications with a few days' notice, resulting in a sudden interweaving of physical and online spaces. If there were no physical workspaces at home, the technology was not always in order, either. The circumstances emphasized the spillover of physical and online spaces. Parents needed to figure out what and who they wanted to show outside when working at home, and with what means is work peace guaranteed for everyone, for example, when having work-related meetings. In many families, family members became the distant ancestors of work and school communities: flashing and audible people in the background, with whom parents tried to arrange schedules and space reservations. The situation was also increasingly a question about technological ergonomics when technology was intensively present in remote work and school. Prior research has illustrated the challenges when new applications and communications channels were introduced rapidly in the early stages of the COVID-19 restrictions. Consequently, adapting to remote schooling required many families to install new applications and share computing equipment between family members (Häkkinen *et al.* 2020).

Prior research has indicated how working from home during the COVID-era increased intensity in several areas of life, including not only work, but also housework, and care (Shirmohammadi *et al.* 2022a). It is evident that these intense experiences are related to temporal boundaries and attempts to renegotiate them. Regarding temporal boundaries, parents reported the dramatically changed working rhythms and the need to adapt to new ways of work, including making a new prioritization of work tasks and managing the overlap of work and home life. Rescheduling the work activities to early mornings, evenings, or late nights commonly took place. In dual-income families, parents also reported taking turns in who works and who takes care of the children.

Overall, parents sought a new structure in workdays, and our study highlights a longing for routines. There were attempts to bring familiar rhythmists – such as meals and meetings – from previous everyday life to the new situation. This highlights how social rhythm (e.g., Tjora 2016) was continuously renegotiated in families in the pervasively changed circumstances.

In sum, the COVID-19 pandemic not only changed how parents work and children study but also overturned everyday life as work and school functions moved inside the home walls. Although our study demonstrates how reconciling parents' remote work and children's remote school at home drastically collapsed the work-life boundaries, the ways in which families coped with new circumstances by reframing their everyday highlight their resilience and adaptation. Our datasets give insights into how parents developed new ways to work while taking care of children and daily duties.

Limitations and methodological notes

We acknowledge that our study has several limitations. User behavior and preferences differ across cultural contexts (Hofstede 2011) and the socio-economical context varies between different countries. Finland is a country of high technology adoption, which eased the transition to remote work and schooling. A cross-cultural study would offer interesting comparisons and insight into the topic from a wider perspective. Our study is also limited by the sample size. We sought to compensate for this by employing different data collection methods. Although we managed to recruit participants from various backgrounds, the study method does not reach, for example, marginalized families, who may not have the possibility or energy to volunteer for research. Overall, it has been shown that workers with higher incomes (Adams-Prassl et al. 2020) and higher education (Bick & Blandin 2020) have better opportunities to work from home.

In addition, we acknowledge that most of the qualitative user study participants and survey respondents were female. This might be related to the gender roles and inequalities in general. In Finland, women take more responsibility for home and family (Känsälä & Oinas 2015). These gendered inequalities have been a cross-cultural phenomenon during COVID-19 too (see, e.g., Del Boca et al. 2020; Hjálmsdóttir & Bjarnadóttir 2021; Parlak et al. 2021). Also, in the Finnish context, prior research has suggested that the work-home boundary work practices were gendered during the pandemic times (Karjalainen 2023; Otonkorpi-Lehtoranta et al. 2021). On the other hand, 5 of the 16 qualitative user study participants were men; thus, the study presents men's perspective relatively well.

We also acknowledge the methodological limitation of conducting user studies with interviews and self-reports. This can lead to positive bias, as people are not as willing to discuss the difficulties and failings of their everyday lives. The phenomenon where people have an urge to tell about positive things is referred as a happiness barrier (Roos 1988). We believe that some of this may be present, for example, in the interview data. Here, we also wish to highlight that the ESM data provided a rich and valuable dataset, also illustrating the challenges in home organization, and the conflicting feelings of remote-working parents. Comparing our data collection methods, the momentary nature of the ESM method, where participants documented their day with photos and



gave comments with emojis, was effective in exposing emotional challenges. On the other hand, the interview data gave deeper and wider insights.

Conclusion

In this paper, we have presented the findings of a study investigating how Finnish parents experienced and practically handled the situation when their own remote work and children's school happened simultaneously at home during the early moments of the COVID-19 pandemic. The research extends our knowledge of renegotiating the boundaries of life when parents' work-from-home is combined with the presence of children and contributes to the research regarding the impact of the COVID-era on work-life balance. From a dataset collected from 16 working parents, combining semi-structured interviews, online diaries, and sampled experiences, complemented with survey data from 92 parents, we identified the drastic effects on the entire family setting caused by the technology-enabled transformation. The challenges reported by parents included interruptions and fragmentation of remote work tasks, non-optimal work ergonomics with computer-mediated work (laptops), and rescheduling of work times, for example, to evenings. As positive aspects, increased family time together and the ability to pace the day more flexibly were emphasized. Parents' rich experiences provide insights into the early steps of COVID-19-catalyzed remote work. Thus, the paper offers a reference point for exploring potential development trajectories in the rapidly increased remote work as a broader phenomenon.

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Article VII

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The use of collaborative media in societal crises – towards a conceptual framework

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The COVID-19 pandemic and ecological crisis are examples of long-lasting crises that challenge everyday life as we know it. Based on a set of empirical user studies, this paper suggests an initial conceptual framework for the use of collaborative media in societal crises. News and social media construct crisis awareness and a sense of crisis that, in turn, may channel into media-enabled collaborative activities. These activities occur in a socio-technical shaker, setting the boundaries for crisis collaboration. After all, the activities grow into use purposes, including collaborative crisis intelligence, collaborative crisis action, and collaborative crisis adaptation. The suggested conceptual framework sheds light on the role of collaborative media in a broader hybrid media environment, increases understanding about organizing and maintaining collaborative activities by seizing the opportunities and tackling the constraints of collaborative media, and clarifies collaborative media use purposes in crisis settings.

Keywords: *collaborative media; collaborative and social computing; crises*

1 Introduction

The awareness of societal crises has today penetrated everyone's mental landscape. The long-considered societal crises related to the issues such as poverty and safety have become accompanied by new threads that crosscut the whole society and affect even on a larger scale. The discussion on societal crises no longer addresses topics that may be vague or distant to many, but their impacts have been recognized to touch every citizen's life, as demonstrated by the COVID-19 pandemic. In times of crisis, digital technologies can play an increasingly important role in creating collaborations among individuals and communities.

Today's digitalized societies have widely adopted the use of collaborative media, which refers to forms of "mediated communication whereby people collaborate on messages, content, and meaning" (Löwgren & Reimer, 2013, p.4). The use of different collaborative media platforms and applications has risen, and with the recent pandemic, even more so. A survey conducted in nine European countries showed that the COVID-19 lockdown caused a 65% increase in screen time (Pišot et al., 2020). The pandemic caused an increase in social media use (Nguyen et al., 2020), which was



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also used for collaborative purposes. The social media activities involving larger user groups included more frequent attendance to different online events, but also collective social media initiatives in the form of campaigns and challenges, that people could participate from home (Karhu et al., 2021). Remote education enforced due to COVID-19 has now been estimated to stay, with educators rethinking the pedagogical solutions (Alhat, 2020), and predictions for the remote workforce have grown from the pre-pandemic times (Ozimek, 2020). We can conclude that the use of collaborative media is on an extensive rise in different life contexts, and it is topical to attempt to frame its role holistically.

In this paper, I focus on collaborative media use during societal crises. Design is crucial in empowering communities' media-enabled collaboration in crisis circumstances. To strengthen such collaborative processes, we need to understand 1) the role of collaborative media in a broader hybrid media environment, 2) the socio-technical framework for collaboration, and 3) the use purposes of collaborative media in crisis settings. To answer these questions, I introduce an initial framework on how collaborative media is used in societal crises. The framework fuses together the findings of a set of empirical studies I have conducted in the area together with my colleagues, as well as of the literature.

In the choice of empirical studies, the underlying interest has been to explore widely shared societal crises that are global and long-term and carry chronic uncertainty (about chronic uncertainty, see Palen et al., 2020). Therefore, the selected studies deal with the ecological crisis and the COVID-19 pandemic. As a brief outlook, the conducted studies are related to the Youth4Climate project, which searched for solutions to the climate crisis through collaborative media, an open-for-all online hackathon that addressed COVID-19-related challenges, craftivists' online solidarity collaborations during the Australian Black Summer 2019-20 Bushfires, as well as the massive digital experiment that turned homes into offices and classrooms during the restrictions that aimed to curb down the coronavirus. These are only indicative examples of collaborative activities that seek forms in changing technological spheres in times of societal crises. Nevertheless, this short paper provides a novel contribution as an attempt to formalize and theorize the topic in the big picture. It contributes to the discussion on collaborative media use in societal crises, a topic that has become increasingly important during the past few years.

2 Background

When researching the use of collaborative media in societal crises, I have a bottom-to-up lens and concentrate on collaboration among citizens. With collaborative media, I refer to forms of "mediated communication whereby people collaborate on messages, content, and meaning" (Löwgren & Reimer, 2013, p.4). Jonas Löwgren and Bo Reimer emphasize collaborative media as a cultural form (Williams, 1974), meaning that it is always historically and contextually specific, shaped by technological properties and historical, social, and cultural circumstances. Collaborative media focuses - rather than on technology - on the practices the cultural form makes possible. (Löwgren & Reimer, 2013). This view about 'possible practices' comes close to the concept of affordance, which may refer to "the type of action or a characteristic of actions that a technology enables through its design" (Earl & Kimport, 2011, p.10). This is related to how collaborative media should not be defined as some specific

mediums: mediums become collaborative when used collaboratively (Löwgren & Reimer, 2013). There we come to a question about what collaborative use may mean in crisis contexts.

With a focus on citizens, it is central to look at the research positioning in the broad field of social media. Since the second half of the 21st century, a rapidly growing multidisciplinary research field has drawn attention to social media usage in crises (Reuter & Kaufhold, 2017) as the role of social media in broadening citizen participation and making it more visible has been recognized (Palen & Liu, 2007). Overall, social media sets as a part of a larger technological advancement that targets to prevent, reduce and mitigate the impact of crises (Bukar et al., 2022). A vast amount of researchers have concentrated on how social media enhances crisis awareness and how people make sense of crisis events within an online network. During crises, social media serves as a platform for looking for and sharing information (Hughes & Palen, 2009; Palen & Liu, 2007; Starbird & Palen, 2011; Takahashi et al., 2015; Yates & Paquette, 2011) as well as forming emotions collectively (Valaskivi et al., 2019). In addition, people organize a variety of individual and collective actions through social media (Enjolras et al., 2013; Lim, 2012; Tufekci & Wilson, 2012), and the organizational capacity of social media plays a crucial role in catalyzing new movement forms (Bennett & Segerberg, 2012; Segerberg & Bennett, 2011; Theocharis, 2013). Social media also enables communication between the affected areas and the rest of the world (Takahashi et al., 2015; Valaskivi et al., 2019) by bridging the local and the global (Enjolras et al., 2013) and scaling up the movement endeavors (Mundt et al., 2018). This background creates conditions for how people can coordinate and organize their crisis response efforts (Albris, 2017; Sarcevic et al., 2012; Starbird & Palen, 2011; Takahashi et al., 2015) and how the ones in need of help can be connected to those offering it (Albris, 2017) through social media.

The aforementioned research contributes to understanding how new media technologies reshape relationships between people and organizations, increase abilities for harnessing collective intelligence, allow innovative idea exchange, seek and share skills to solve problems collaboratively, and are oriented towards action. But despite the useful perspectives and elements, none of the streams as such grasps the richness of the phenomena. Instead, the research in collaborative technologies and cultures is fragmentary, and the use of collaborative media in societal crises is a relatively recent development whose parts we are still analyzing. Prior research focuses mainly on collective sense-making and lower-threshold microtasks like crisis mapping. Little is still known about crisis collaboration, which requires more extensive efforts from its participants. Also, when discussing collaboration, we often discuss participation/networking/coordination/cooperation. We need a better understanding of the nature and essence of collaboration (Randrup et al., 2016) and to find new ways to understand and conceptualize the use of collaborative technologies in crises (Pipek et al., 2014) in socio-technical terms.

Also, less research covers long-lasting – and more ‘abstract’ – crisis settings. These types of crises are characterized by chronic uncertainty (Palen et al., 2020, 14). Prior research focusing on social and collaborative media technologies as a part of societal crises has mainly focused on immediate natural disasters (Palen et al., 2020), such as earthquakes, heat waves, wildfires, hurricanes, and floods (Albris, 2017; Liu et al., 2008; Palen et al. 2020; Starbird & Palen, 2011; Yates & Paquette, 2011). In addition, political uprisings (Starbird & Palen, 2012; Wulf et al., 2013), terrorist attacks (Burnap et al., 2014; Palen & Liu, 2007; Perng et al., 2013; Vieweg et al., 2008; Wiegand & Middleton, 2016), and wars

(Mark & Semaan, 2008; Mark et al., 2009) have been studied. As a result, research on people and local communities directly affected by crisis events seems to play a major role in the research corpus. There is also a lack of information about different uses of collaborative media as a part of societal crises, so the spectrum of uses would emerge. In sum, more research is needed to holistically understand and conceptualize citizens' crisis-related use of collaborative media.

3 Towards a conceptual framework for the use of collaborative media in societal crises

Today's societal crises emphasize a hybrid nature of media. In hybrid media (Chadwick, 2013), meanings are formed through the endless circulation of texts, visuals, and meanings in closely interwoven practices of professional, journalistic, and social media (Sumiala et al., 2018). During crisis events, circulating crisis content – from live monitoring news to social media content such as photos, videos, and comment threads – creates crisis awareness and a sense of crisis that, in turn, may channel into media-enabled collaborative activities that need to be captured and conceptualized in their own terms. To do so, I rely on the concept of collaborative media.

These media-enabled collaborative activities require their setup. Collaborative media is 'a socio-technical shaker' in which people aim for a joint crisis response in a constant mix of human-human and human-computer interaction. In this socio-technical shaker, a coincidence of human encounters and a sum of technological compromises construct the boundaries for collaboration.

After all, the activities in the sociotechnical shaker do not run into the sand but grow into use purposes, including collaborative crisis intelligence, collaborative crisis action, and collaborative crisis adaptation. Together they describe new opportunities and hope in the spirit of a certain kind of techno-optimism.

3.1 Crisis circulation in hybrid media

In hybrid media, people circulate crisis-related content such as text-based and audiovisual materials. Often, these materials cause strong emotional reactions that play a critical role in gaining and accumulating attention (Sumiala et al., 2018). Together, these circulation activities create crisis awareness and a sense of crisis that further paves the way for the use of collaborative media in societal crises. The key question is why collaborative media needs to be explored as its own concept when we have (more) established ones such as hybrid media, social media, and new media. Here I refer to Löwgren and Reimer (2013), who argue that, e.g., the concept of social media does not capture the salient properties of people's everyday media practices that are, to a great extent, collaborative. For this purpose, Löwgren and Reimer suggest the concept of collaborative media. (Löwgren & Reimer, 2013). To conceptualize the use of collaborative media in societal crises, I will explore collaborative activities taking place in various online environments as 'socio-technical shakers'.

3.2 Collaborative media as a socio-technical shaker

I understand 'socio-technical' regarding the mutual shaping of technology, social structure, and human action (Starbird et al., 2019). Regardless of how the use of collaborative media in societal crises is organized and managed, it emphasizes a coincidence of human encounters as collaboration evolves on the fly without prior agreements. In collaborative-media-based projects: 1) people gather around loosely defined shared goals, 2) a group of participants emerges and points out an interwoven structure of real-life and virtual networks, 3) there is a need for leadership covered by project

initiators/moderators/a pre-structured process, 4) people make spontaneous contributions according to their interests, knowledge, and skills, 5) all this requires trust among the participants.

From a technological point of view, the use of collaborative media in societal crises is a sum of technological compromises and entails constant balancing between technology-related advantages and disadvantages. In societal crises, existing platforms and tools are rapidly appropriated as reach, familiarity, ease of use, and real-time communication are valued. Consequently, the appropriated platforms and tools are a mismatch with operations, leading to divided application use and further to lack of transparency, information overload, and disorder.

Together, these properties shed light on how collaboration does not follow “naturally” from the technologies but is an outcome of an interplay among social and technological factors (Löwgren & Reimer, 2013).

3.3 The use purposes of collaborative media

I suggest that the use purposes of collaborative media in societal crises are divided into 1) collaborative crisis intelligence, 2) collaborative crisis action, and 3) collaborative crisis adaptation.

To begin with collaborative crisis intelligence, recent years have introduced an array of initiatives launched to bring people together to address, e.g., the ecological crisis and the COVID-19 pandemic as shared crises. Crisis intelligence initiatives are oriented towards thinking, meaning that people are invited to come up with ideas and solutions in creative ways. In crisis intelligence, collaboration is related to activities such as crowdsourcing and hacking.

In collaborative crisis action, collaborative media is utilized in an action-oriented way, such as planning and coordinating solidarity activities during environmental emergencies and connecting those providing help with those who need it.

At last, collaborative crisis adaptation is about how collaborative media technologies provide ways to adapt everyday life to crisis circumstances. The COVID-19 pandemic is a drastic example of how everyday life was rapidly diverted onto a remote track with the help of collaborative media technologies. Remote work and remote school are examples of practices that describe how collaborative media is used as a means of crisis adaptation.

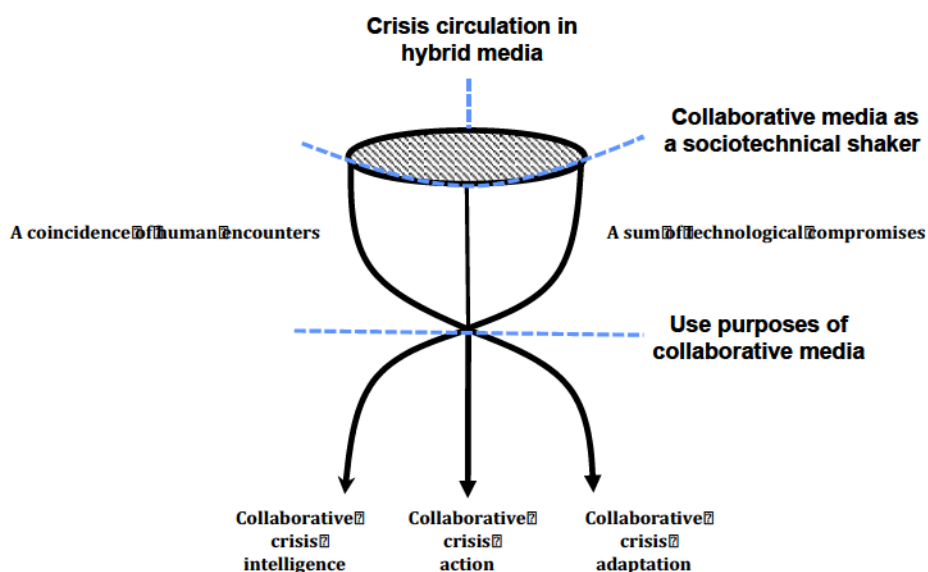


Figure 1. A visualization of the initial conceptual framework on how collaborative media is used in societal crises.

4 Discussion

As recent years have demonstrated, we live in a ‘permanent crisis’ era where several societal crises with ongoing disruption overlap. The COVID-19 pandemic, the manifestations of the ecological crisis, the Ukraine war, and the related economic crisis, among others, have filled the hybrid media environment. To cope with and adapt to crisis circumstances, it is significant to understand what drives individuals’ and communities’ media-enabled collaboration in these settings. In the presented framework, I suggest that mediated crisis awareness and a sense of crisis may further channel into collaboration – and circulating emotions and affects (Chouliaraki, 2010) have a key role in bringing out that action.

Collaborative media is part of a hybrid media environment in which news and social media do not focus so much on collaboration. Instead, for example, the toxicity (Almerekhi et al., 2019; Pascual-Ferrá et al., 2021) and polarizing effect (Harel et al., 2020) of social media have recently been highlighted. For example, some actors leave, e.g., Twitter – or X as it was rebranded when writing this paper – because of its negative conversational atmosphere (Maity et al., 2018). Is social media tearing us apart instead of bringing people together? These are trajectories we need to monitor carefully.

For constructing a crisis response based on positive citizen engagement, there needs to be a specific focus on collaboration in online environments. Aware of social media criticism, I rely on the concept of collaborative media to capture the salient properties of people’s collaborative practices during crises and argue that collaborative media research should be carried forward with its own conceptualization work. As a part of this conceptualization, the socio-technical dimensions of that collaboration should be better understood.

As also Löwgren and Reimer (2013) state, some environments have properties that support collaboration better than others. The framework I have suggested helps to map the boundary conditions of online collaboration in crisis contexts, the rich cultures connected to them, and to design environments where collaboration could be better realized. The use purposes, on the other hand, shed light on the many ways in which collaborative media can be utilized in a wide variety of crises.

The framework presented here adds to the theoretical discussion on collaborative media in crises. It captures a holistic understanding that supports designing collaborative processes. The framework is based on an extensive set of empirical case studies I have conducted with my colleagues in the area. The studies range from COVID-19 online hackathons where hundreds of people collaborated to come up with solutions to curb the virus to craftivists' online collaborations to help Australian wildlife during catastrophic bushfires and remote work and school practices in times of COVID-19 lockdowns. The underlying interest in the empirical studies and resulting framework is how to empower communities to cope with and adapt to societal crises. That should, to a large extent, shape the agendas for design. As a next step, the framework should be validated by applying it as framing for a new empirical study. This would reveal how well and comprehensively the different aspects of it would map into a case study with field research data. However, as the framework has emerged based on quite an extensive set of prior empirical research, I firmly believe this grounding has led to a well-applicable result. In addition, exploring potential future scenarios and constructing design guidelines, would be a compelling avenue for inquiry.

5 Conclusion

In this short paper, I have introduced the framework that attempts to provide a holistic understanding of the use of collaborative media in societal crises. Prior research has focused on more narrow themes and is thus scattered over different topics. The framework presented shows how mediated crisis awareness and a sense of crisis may further channel into collaboration and how collaborative media functions as a socio-technical shaker, which enables human encounters on the digital platform. This provokes and leads to different actions on collaborative crisis intelligence, action, and adaptation. The framework brings together discussions related to the use of collaborative media in crises and adds a theoretical contribution. The underlying holistic understanding helps design collaborative processes that empower communities to cope with and adapt to societal crises.

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We are living in an era shaped by overlapping societal crises, in which citizen collaboration has become increasingly crucial. This dissertation explores how citizens collaborate through media technologies in crises characterised by chronic and geographically distant uncertainty. Drawing on six empirical case studies, it develops a new theoretical framework for understanding collaborative media in the mediated crisis sphere, including the organisation of collaborative activities amid platform opportunities and constraints and the purposes these media serve across diverse crisis contexts.