

University of Lapland



This is a self-archived version of an original article. This version usually differs somewhat from the publisher's final version, if the self-archived version is the accepted author manuscript.

Collaborating in a Crisis

Karhu, Mari; Karampela, Maria; Häkkilä, Jonna

Published in: Mensch und Computer 2022

DOI: 10.1145/3543758.3547538

Published: 04.09.2022

Document Version Publisher's PDF, also known as Version of record

Citation for pulished version (APA):

Karhu, M., Karampela, M., & Häkkilä, 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. Matviienko, 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). ACM . https://doi.org/10.1145/3543758.3547538

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

Mari Karhu mari.karhu@ulapland.fi University of Lapland Rovaniemi, Finland Maria Karampela marwkarab@gmail.com University of Oulu Oulu, Finland Jonna Häkkilä jonna.hakkila@ulapland.fi University of Lapland Rovaniemi, Finland

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 overcame 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 \rightarrow Empirical studies in collaborative and social computing.

KEYWORDS

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

ACM Reference Format:

Mari Karhu, Maria Karampela, and Jonna Häkkilä. 2022. Collaborating in a Crisis: Perspectives on Trust and Technological Framework in Organising a COVID-19 Online Hackathon. In *Mensch und Computer 2022 (MuC '22), September 4–7, 2022, Darmstadt, Germany.* ACM, New York, NY, USA, 5 pages. https://doi.org/10.1145/3543758.3547538

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

MuC '22, September 4–7, 2022, Darmstadt, Germany

© 2022 Copyright held by the owner/author(s). Publication rights licensed to ACM. ACM ISBN 978-1-4503-9690-5/22/09...\$15.00 https://doi.org/10.1145/3543758.3547538 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

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than the author(s) must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from permissions@acm.org.

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 What-sApp (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 largescale 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 deployablity 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 overcame transparency challenges.

ACKNOWLEDGMENTS

The work has received support from Finnish Cultural Foundation, Lapland Regional Fund, A.E. Nordenskiöld grant.

REFERENCES

- Garage 48. 2020. garage 48. https://www.garage 48.org/hack-the-crisis. Accessed: 10th February 2022.
- [2] Ban Al-Ani, David Redmiles, Cleidson R.B. de Souza, Rafael Prikladnicki, Sabrina Marczak, Filippo Lanubile, and Fabio Calefato. 2013. Trust in Virtual Teams: Theory and Tools. In Proceedings of the 2013 Conference on Computer Supported Cooperative Work Companion (San Antonio, Texas, USA). Association for Computing Machinery, New York, NY, USA, 301–306. https://doi.org/10.1145/2441955.2442029
- [3] Timothy Dy Aungst. 2015. Using a hackathon for interprofessional health education opportunities. *Journal of medical systems* 39, 5 (2015), 1–2. https: //doi.org/10.1007/s10916-015-0247-x
- [4] Alberto Bertello, Marcel Bogers, and Paola De Bernardi. 2021. Open innovation in the face of the COVID-19 grand challenge: insights from the Pan-European hackathon 'EUvsVirus'. *R&D Management* 52 (02 2021). https://doi.org/10.1111/ radm.12456
- [5] Nathan Bos, Judy Olson, Darren Gergle, Gary Olson, and Zach Wright. 2002. Effects of Four Computer-Mediated Communications Channels on Trust Development. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (Minneapolis, Minnesota, USA) (CHI'02). Association for Computing Machinery, New York, NY, USA, 135–140. https://doi.org/10.1145/503376.503401
- [6] Katarina Braune, Pablo Rojas, Joscha Hofferbert, Alvaro Valera Sosa, Anastasiya Lebedev, Felix Balzer, Sylvia Thun, Sascha Lieber, Valerie Kirchberger, and Akira-Sebastian Poncette. 2020. Interdisciplinary Online Hackathons as an Approach to Combat the COVID-19 Pandemic: Case Study. (Preprint). *Journal of Medical Internet Research* 23 (11 2020). https://doi.org/10.2196/25283
- [7] Thomas Breideband, Poorna Talkad Sukumar, Gloria Mark, Megan Caruso, Sidney D'Mello, and Aaron Striegel. 2022. Home-Life and Work Rhythm Diversity in Distributed Teamwork: A Study with Information Workers during the COVID-19 Pandemic. Proceedings of the ACM on Human-Computer Interaction 6, CSCW1 (2022), 1–23. https://doi.org/10.1145/3512942
- [8] Gerard Briscoe and Catherine Mulligan. 2014. Digital Innovation: The Hackathon Phenomenon. http://www.creativeworkslondon.org.uk/wp-content/ uploads/2013/11/Digital-Innovation-The-Hackathon-Phenomenon1.pdf. Creativeworks London Working Paper No. 6, 1–13. Accessed: August 3, 2021.
- [9] Philip Burnard. 1991. A method of analysing interview transcripts in qualitative research. Nurse education today 11, 6 (1991), 461–466. https://doi.org/10.1016/ 0260-6917(91)90009-Y
- [10] Tina Chan, Josephine Mcmurray, AnneMarie Levy, Heidi Sveistrup, and James Wallace. 2020. Post-Hackathon Learning Circles: Supporting Lean Startup Development. In Extended Abstracts of the 2020 CHI Conference on Human Factors in

Computing Systems. Association for Computing Machinery, New York, NY, USA, 1–8. https://doi.org/10.1145/3334480.3375216

- [11] Xusen Cheng, Terry Nolan, and Linda Macaulay. 2013. Don't give up the community: a viewpoint of trust development in online collaboration. *Information Tech*nology & People 26, 3 (2013), 298–318. https://doi.org/10.1108/ITP-10-2012-0116
- [12] Ok-Kyu Choi and Erin Cho. 2018. The Mechanism of Trust Affecting Collaboration in Virtual Teams and the Moderating Roles of the Culture of Autonomy and Task Complexity. *Computers in Human Behavior* 91 (09 2018). https://doi.org/10.1016/j.chb.2018.09.032
- Startup Commons. 2015. Startup development phases, Grow VC Operations. https://www.startupcommons.org/startup-development-phases.html. Accessed: 10th October 2019.
- [14] J. Ignacio Criado, Ariana Guevara-Gómez, and Julián Villodre. 2020. Using Collaborative Technologies and Social Media to Engage Citizens and Governments during the COVID-19 Crisis. The Case of Spain. *Digital Government: Research and Practice* 1 (09 2020). https://doi.org/10.1145/3416089
- [15] Jasper R. De Vries, Van B. Severine, and Karin Peters. 2018. Trust at a Distance—Trust in Online Communication in Environmental and Global Health Research Projects. *Sustainability* 10, 11 (2018), 4005. https://doi.org/10.3390/ su10114005
- [16] Hans-Martin Von Gaudecker, Radost Holler, Lena Janys, Bettina Siflinger, and Christian Zimpelmann. 2020. Labour supply in the early stages of the CoViD-19 Pandemic: Empirical Evidence on hours, home office, and expectations. (2020).
- [17] Luca Giustiniano and Francesco Bolici. 2012. Organizational trust in a networked world: Analysis of the interplay between social factors and Information and Communication Technology. *Journal of Information, Communication and Ethics* in Society 10 (08 2012), 187–202. https://doi.org/10.1108/14779961211261076
- [18] Steffen Haesler, Stefka Schmid, and Christian Reuter. 2020. Crisis Volunteering Nerds: Three Months After COVID-19 Hackathon # WirVsVirus. In 22nd International Conference on Human-Computer Interaction with Mobile Devices and Services. Association for Computing Machinery, New York, NY, USA, 1–5. https://doi.org/10.1145/3406324.3424584
- [19] Jonna Häkkilä, Mari Karhu, Matilda Kalving, and Ashley Colley. 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. Association for Computing Machinery, New York, NY, USA, 1–9. https://doi.org/10.1145/3419249.3420155
- [20] Ari Happonen, Matvei Tikka, and Usman Usmani. 2021. A systematic review for organizing hackathons and code camps in Covid-19 like times: Literature in demand to understand online hackathons and event result continuation. In 2021 International Conference on Data and Software Engineering (ICoDSE). IEEE, 1–6. https://doi.org/10.1109/ICoDSE33690.2021.9648459
- [21] Sirkka Jarvenpaa and Dorothy Leidner. 1998. Communication and Trust in Global Virtual Teams. J. Computer-Mediated Communication 3 (06 1998). https: //doi.org/10.1111/j.1083-6101.1998.tb00080.x
- [22] Mari Karhu, Mari Suoheimo, and Jonna Häkkilä. 2021. People's Perspectives on Social Media Use during COVID-19 Pandemic. In 20th International Conference on Mobile and Ubiquitous Multimedia. Association for Computing Machinery, New York, NY, USA, 123–130. https://doi.org/10.1145/3490632.3490666
- [23] Nicolai Kruger and Frank Teuteberg. 2020. Are Hackathons the New e-Learning Environments? On the Outcome of the #WirVsVirus Hackathon From a Learning

Outcome Perspective. In 2020 Sixth International Conference on e-Learning (econf). IEEE, 225–228. https://doi.org/10.1109/econf51404.2020.9385424

- [24] Minh Hao Nguyen, Jonathan Gruber, Jaelle Fuchs, Will Marler, Amanda Hunsaker, and Eszter Hargittai. 2020. Changes in Digital Communication During the COVID-19 Global Pandemic: Implications for Digital Inequality and Future Research. *Social Media+ Society* 6, 3 (2020), 205030512094825–2056305120948255. https: //doi.org/10.1177/2056305120948255
- [25] Saša Pišot, Ivana Milovanović, Boštjan Šimunič, Ambra Gentile, Ksenija Bosnar, Franjo Prot, Antonino Bianco, Gianluca Lo Coco, Sunčica Bartoluci, Darko Katović, et al. 2020. Maintaining everyday life praxis in the time of COVID-19 pandemic measures (ELP-COVID-19 survey). European journal of public health 30, 6 (2020), 1181–1186. https://doi.org/10.1093/eurpub/ckaa157
- [26] Kaja Pogačar and Andrej Žižek. 2016. Urban Hackathon Alternative Information Based and Participatory Approach to Urban Development. *Proceedia Engineering* 161 (12 2016), 1971–1976. https://doi.org/10.1016/j.proeng.2016.08.788
- [27] Khalil Ramadi and Freddy Nguyen. 2021. Rapid crowdsourced innovation for COVID-19 response and economic growth. *npj Digital Medicine* 4 (02 2021). https://doi.org/10.1038/s41746-021-00397-5
- [28] Jens Riegelsberger, Angela Sasse, and John McCarthy. 2005. The Mechanics of Trust: A Framework for Research and Design. International Journal of Human-Computer Studies 62 (03 2005), 381–422. https://doi.org/10.1016/j.ijhcs.2005.01.001
- [29] Jeremy Rose and Bjarne Schlichter. 2013. Decoupling, Re-Engaging: Managing Trust Relationships in Implementation Projects. *Information Systems Journal* 23 (01 2013), 5-33. https://doi.org/10.1111/j.1365-2575.2011.00392.x
 [30] Nick Taylor and Loraine Clarke. 2018. Everybody's Hacking: Participation
- [30] Nick Ta'ylor and Loraine Clarke. 2018. Everybody's Hacking: Participation and the Mainstreaming of Hackathons. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (Montreal QC, Canada) (CHI '18). Association for Computing Machinery, New York, NY, USA, 1–12. https: //doi.org/10.1145/3173574.3173746
- [31] Serdar Temiz. 2021. Open Innovation via Crowdsourcing: A Digital Only Hackathon Case Study from Sweden. Journal of Open Innovation: Technology, Market, and Complexity 7 (01 2021), 39. https://doi.org/10.3390/joitmc7010039
- [32] Hack the Crisis Finland. 2020. Hack the Crisis Finland. https://www. hackthecrisisfinland.com/. Accessed: 10th February 2022.
- [33] O. Tymoshenko and K. Kotsiubivska. 2020. Use of Information Technology in Countering COVID-19. Business Inform 11 (11 2020), 263–268. https://doi.org/10. 32983/2222-4459-2020-11-263-268
- [34] Silvia Vermicelli, Livio Cricelli, and Michele Grimaldi. 2020. How can crowdsourcing help tackle the COVID-19 pandemic? An explorative overview of innovative collaborative practices. *R&D Management* 51 (11 2020). https: //doi.org/10.1111/radm.12443
- [35] Shan Wang, William Yeoh, Jie Ren, and Alvin Lee. 2022. Learnings and Implications of Virtual Hackathon. Journal of Computer Information Systems 62 (03 2022), 547–559. https://doi.org/10.1080/08874417.2020.1864679
- [36] Jeanne Wilson, Susan Straus, and Bill McEvily. 2006. All in due time: The development of trust in computer-mediated and face-to-face teams. Organizational Behavior and Human Decision Processes 99 (01 2006), 16–33. https: //doi.org/10.1016/j.obhdp.2005.08.001
- [37] Tomoko Yokoi, Nikolaus Obwegeser, and Michela Beretta. 2021. Crisis Innovation: Leveraging Virtual Hackathons for Rapid Ideation. *IEEE Transactions on Engineer*ing Management PP (08 2021), 1–13. https://doi.org/10.1109/TEM.2021.3097238