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Crystallizations in the Blizzard: Contrasting Informal Emergency Collaboration In Facebook Groups

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ABSTRACT

This paper presents a comparative case study of improvised social media use in response to an emergency situation. The study focuses on a severe blizzard on the island of Bornholm, Denmark, which left hundreds snowbound for more than a week. Within a period of 10 days, two public Facebook groups showed a burst of intense activity. Combining content analysis of these online interactions and interviews with group members and authorities on Bornholm, the study demonstrates how divergent perspectives on the blizzard were collectively articulated in these two groups. While the members of one group self-organized to support each other in response to feeling overlooked by public authorities, the other group saw the snowstorm as an exciting spectacle. While the widely used notion of altruistic communities explain some of the activity in the groups, the concept does not capture how emergent groups construct emergencies in diverging ways. The analysis demonstrates how an entanglement of social and physical contexts influenced user adaptation of the Facebook platform. These dynamics must be recognized and understood better in order to design information technology that aids emergent groups in future emergencies.

Author Keywords

Altruistic communities, emergent groups, emergency, social media, computer-mediated communication, Facebook

ACM Classification Keywords

H.5.3 Groups & Organization Interfaces—collaborative computing, computer-supported cooperative work, organizational design, K.4.1 Public Policy Issues, K.4.2 Social Issues, K.4.3 Organizational Impacts—computer-supported collaborative work

INTRODUCTION

When a severe blizzard struck the Danish island of Bornholm on 23rd December 2010, a young girl got snowbound in a house she was visiting, unable to return to her mother for Christmas. Four days later, her mother used information shared by members of a just-launched Facebook group to identify a window of opportunity in which to get her daughter home through the snow, disproving official statements that all roads were closed.

This story stems from the present case study and it indicates that research is correct in focusing on the potential for distributed problem solving on social media in emergency situations. Recent research under the umbrella of crisis informatics has demonstrated how *altruistic communities* known to rise in the wake of disasters also operate online [2, 44]. In this perspective, citizen-driven crisis response on social media is not just another information arena that emergency management needs to handle. Rather, social media can empower citizens as first-responders to crisis [28]. It has also become clear, however, that makeshift online resources can be used in many different directions, including well-known patterns of social convergence around compassion as well as curiosity [13, 27]. These phenomena are relevant for the field of human-computer interaction (HCI), as cases of users employing a computer technology to meet extraordinary needs. The use of social media in emergencies also highlights a chance for HCI research to contribute to improving future emergency response.

My aim in this paper is to contribute to this examination of social media collaboration in crisis situations by presenting a comparative case study of the use of public Facebook groups during an emergency situation on Bornholm, Denmark, in December 2010. Here, two Facebook groups became highly active almost from one day to the other, attracting around 900 members in total. A significant number of members contributed with content, producing around 700 so-called wall posts and 500 replies in the streams of many-to-many communication that Facebook groups are [22]. Drawing on these online data and interviews with group members, I suggest that while the

notion of altruistic communities is certainly useful for understanding much of what goes on in these groups, they also differed crucially in terms of how the Bornholm blizzard became understood and articulated. This raises new issues for future research and has important consequences for the application of citizen-driven technology adaptation in emergencies, including a need to be sensitive to rapid changes in use patterns and the social and political conditions that influence such changes.

BACKGROUND

Social media like Facebook are worth studying because they often mirror offline social networks that are likely to become relevant in crisis situations [14]. At the same time, the malleable information streams generated by many-to-many communication on Facebook can generate a sense of participating in a public [6]. This resonates with Barton's early findings that in crisis situations, informal citizen response is shaped both by primary social networks, such as friends and family, and by altruistically motivated outreach to other victims nearby [2]. The Facebook Groups feature is especially relevant here, because it makes it extremely easy for any Facebook user to start such information streams online. Facebook also gives the group founder the option of making the group publicly accessible, which makes it a tool for reaching out to the wider community.

Despite the ubiquity of Facebook and Facebook's own efforts to highlight its usefulness in crisis [8], so far little research has probed the potential Facebook holds for social organizing in emergencies [21, 35]. In one of the few studies that do exist, researchers examined how one Facebook group became used to collaboratively compile a list of named victims after the 2007 Virginia Tech shooting [29, 30, 44]. The authors analyzed this as a case of online *collective intelligence*, stressing that the list proved to be accurate when official information was released later. These findings connect with a broader focus in the literature on how people turn to social media like Facebook to compensate for perceived deficiencies in the information they receive through other channels, such as mass media [24, 39, 42].

The notions of altruistic communities and collective intelligence are important because they allow emergency managers to view the citizenry as not mere victims, but also key resources in crisis response efforts [28]. However, actual behavior on existing social media platforms cannot be assumed to be straightforwardly beneficial to organized crisis relief efforts [42]. Due to the ease of publication on Facebook, and because users self-select into public Facebook groups, events are likely to be represented from a multitude of viewpoints [7], including some that challenge the authority of official information. This is probably unavoidable, since online collaborative crisis response is also about establishing "whatever criteria can be brought to bear" to discern good from bad information [34]. For example, pre-disaster inequalities have been found to influence not only how vulnerable people are in the face of disaster, but also to what extend they define an event as more or less disastrous [32, 47, 52].

Adding to these arguments that emergencies are also socially constructed, the widespread use and relative open-endedness of Facebook groups make relevant a constructivist approach that is sensitive to how techno-logical affordances are interpreted in diverging ways by different users in different situations [9]. In this perspective, a multitude of collective articulations of the situation must be expected in emergencies, determined not only by forces of nature, but also patterns of human settlement, power relations, and technology design. Put differently, this study suggests a constructivist approach in which social interactions as well as material constraints on such interactions both contribute to constructing the narratives that guide human behavior in emergencies.

In emergency situations, such collective articulations are likely to be highly ephemeral, but nonetheless vitally important for people to come together and act on their troubles [19], as was also demonstrated by the vignette story in the beginning of the introduction. When such ephemeral crisis communities organize on social media platforms, there is an opportunity for research to study hard-to-access social processes in detail. As such, the case presented here has dual significance in being 1) relevant to HCI research as a case of user-adaptation of malleable computer technology in times of crisis, and 2) of interest for emergency research more generally as a chance to study digital traces of citizen self-organization in emergencies. Ideally, these two elements should overlap in future research, enabling the field of HCI to contribute to improving the relationship between emergency managers and the cacophony of voices that are increasingly found online in times of crisis.

RESEARCH DESIGN

The case study combined analysis of online content with offline interviews in order to triangulate "life as lived" with "life as told" [23]. This also helped bridge an artificial online/offline dichotomy that rarely corresponds with actual social media use [26]. Another aim was to be able to draw on more than one Facebook group as data source.

The Bornholm case

To achieve this ambition of triangulating between data types and data sources, it was necessary to identify a recent, well-defined emergency that was severe enough to spark improvised collaboration, in a context where social media are widely used. I chose to focus on the Bornholm blizzard after comparisons with the 2011 Queensland floods in Australia confirmed that the Danish case had sufficient Facebook group activity and was superior in being clearly bounded in time, space and size.

Delivering on average 1.4 meters of snow across Bornholm [53], the 2010 blizzard made the Baltic Sea island with

40,000 residents the most snow-rich place in Scandinavia at the time, a surprising feat in a place famous for sunny holidays. As reported on the BBC, hundreds of stranded travellers blocked by drifts up to 6 meters deep spent Christmas Eve in Army barracks, unable to reach rural homes where people had to reach out to neighbors running out of food and medicine [33]. While people were warned by the Danish Meteorological Institute that many would have to spend up to three days snowbound [15], it was not foreseen that hundreds would still be trapped a full week later [36], forcing local authorities to set up an emergency hotline and ask for help from abroad [25].

As one official explained in the course of this study, the blizzard might be most adequately described as an emergency that could have turned into a disaster, because while no fatalities have been connected to the blizzard, fire trucks and ambulances could not reach private homes. In the constructivist perspective adopted here, this lack of fatal consequences does not make the case any less relevant, as "potential disasters (or hazards if you prefer) are just as important (practically as well as theoretically) as those which actually occur" [17]. Moreover, the relatively modest scale of the case makes it exemplary of many small-scale emergencies, which makes the findings more transferable than cases of even more extraordinary events [50].

Facebook group name	Members	Wall items
Bornholm Extremely White Christmas 2010	594	451
Bornholm needs help now	279	241
Help yourself – help Bornholm	265	30
Greetings for snow island Bornholm	25	6
Help Bornholm	23	5
The Roads on Bornholm	19	3
The Weather Gods are Terrorists on Bornholm	14	2

Table 1: Sampling frame with sample highlighted. Group names are translated to English by the author. The wall item count is the one provided by Facebook, which excludes replies.

Sampling
The fact that the case is well defined serves as a natural control on variables that differ across regions and over time when comparing Facebook groups [20]. It also makes the sampling frame more solid, something that is no less important when inquiring a diverse and rapidly changing social media environment [48]. The frame was identified through Facebook searches as done previously [48], benefiting from the fixed locality by capturing groups that contained the name 'Bornholm'. Manual analysis showed that Facebook lists the most populous and relevant groups first, and after 500 results, the groups listed grew increasingly irrelevant. Among these 500, seven groups were founded in reaction to the blizzard, a result that was vetted through further queries and confirmed throughout the case study.

Two groups were chosen for further analysis (table 1). There was an overlap of 4% between the members of the two groups. The remaining five groups informed the study, but were not directly relevant in that they contained too little interaction between members to be studied in depth.

The sampling strategy for interviewees was to get an equal number from both groups and maximize variation on the variables gender, age, location, and individual wall activity. People were invited to participate through Facebook messages, as explained elsewhere [4]. During the study it became clear that 'theoretical sampling' of users that joined both groups would particularly deepen the understanding of the groups' differences [41], which influenced the sampling strategy. Finally, it became clear that interviewing representatives of key organizations would help contextualize findings, which resulted in interviews with the local police, the municipality, and a major local news media organization. In total, 10 interviewees participated in phone interviews, while two requested email interviews (table 2).

Facebook users	Group 1	Group 2	Length (min.)
1	X		35
2	X		40
3	X		51
4	X	X	49
5		X	26
6	X	X	27
7		X	43
8	X		email
9		X	email
Formal organizations			
The media (Editor-in-chief, TV2/Bornholm)			40
The police (Chief Superintendent of Bornholm)			27
The municipality (The Deputy Mayor)			41
Average interview length			**38**

Table 2: Interviewee overview

The sample is not representative of the population of members in the two groups, or Facebook groups in general, nor was that the ambition. Rather, the goal was to tap into a diversity of experiences [10], and "work out the logic of the relationship between the individual and the situation" as is the strength of qualitative interviews [18].

Ethics
Individual users have given explicit consent to Facebook for the public availability of content that is available to researchers. However, complex online venues like public Facebook groups require heightened sensitivity to ethical concerns [51]. Fortunately, there were signs on the group walls that users were aware of the public nature of the forum in which they participated, suggesting that its

exposure to research met reasonable expectations [12]. Moreover, it only sparked positive attention when members in both groups announced their participation in the research project on the group walls, making it explicitly available that the groups were being studied.

All interviewees gave informed consent to participate in the study, including the three representatives of formal organizations, who also gave permission for their names and titles to be used in publications. The study was carried out with the approval of the research ethics committee of the University of Oxford.

Analytical strategy
The main venue for interaction between members of a Facebook group is the group 'wall'. There are five kinds of user-generated wall items: chunks of text, photos, videos, hyperlinks, and replies below these items. Usage of the 'like button' was also coded for, but this analysis is beyond the scope of this paper. Each wall item was coded according to manifest categories (type, time) and according to latent themes [3]. The thematic coding began with a set of codes derived by operationalizing the ambiguous idea of 'community' with Wellman's archetypes of community support that includes emotional aid, instrumental help, and information sharing [45]. In the first phase of coding, more themes were added insofar as they managed to "earn their way" in [41], paying special attention to ways in which the situation was framed and negotiated. One level of subcodes was allowed under each theme. Finally, I consolidated the coding scheme by merging overlapping codes and going through the data again. The coding process benefited from the multi-method design, following the "social anthropological approach" in that interpretation was informed by interviews and other documents [3]. The interview transcripts were also coded, following a similar

process, and both codebooks are available elsewhere [4].

In order to validate the coding process, a senior colleague with experience in qualitative text analysis was shown how to use the codebooks and then applied them critically to data excerpts. Rather than calculating inter-coder reliability measures as appropriate in a quantitative study [46], qualitative reliability was enhanced through discussions of ambiguous codes and texts, thus triangulating the interpretation between researchers.

FINDINGS
In what follows, I first characterize the two Facebook groups in turn, based on both the online data and the interview data. The focus is on how each group perceived and articulated the emergency situation and how members perceived the role of the group in this situation. I then turn to findings that might help explain the differences between the two groups. Throughout the analysis, quotes from interviews are in the same font as the body text, while quotes from the Facebook groups are in an alternative, sans serif font.

Group 1: "Bornholm needs help now"
The graph on the left shows how activity on the wall of the first Facebook group rose and fell quickly together with the emergency. The x-axis starts the day before the group was founded on 27th December 2010, and end when activity died out on 2nd January 2011. On January 3rd, the police said roads were clear again [40]. The y-axis counts different types of wall items posted each day.

The fact that the *"help now"* group was founded four days after the blizzard hit is evidence that in the perspective of this group, the emergency consisted of the prospect of running out of supplies while snowbound. It took days to realize that the snow would not melt away, and that snow removal efforts could not handle the sheer amount of snow. As the group founder said in an email interview, it was only when authorities failed to meet expectations of emergency management that she felt it necessary to found the group. This perceived lack of action on behalf of the local authorities also included a critique of the failure to attract and accept help from abroad, as shown in the description the ground founder gave the Facebook group:

> "This group is created to try to get an overview of how many people are sitting out there in real need and maybe we through joint assistance can get through the situation and not least try to make an appeal for help to the island."

There are at least three components in this mission statement, and analysis shows that the group members took all three tasks seriously. The first task, "getting an overview", can be seen as an appeal to the collective intelligence that might form on the Facebook platform and pool local knowledge about who might need help. The vignette story about a mother getting her daughter home through the snow described in the introduction belongs to
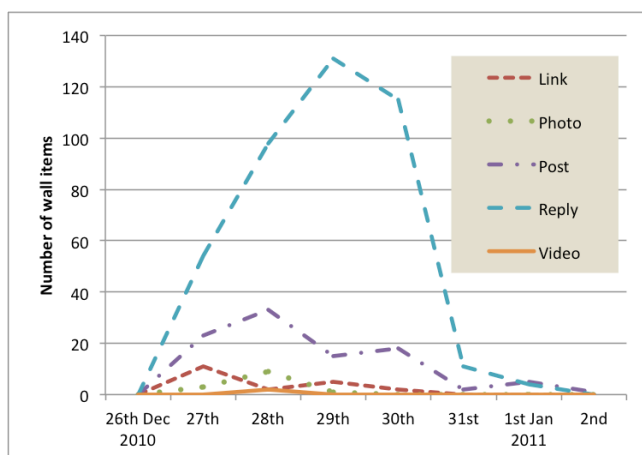

Figure 1: Content type over time in Facebook group 1, founded 27th December 2010

this component. Sharing local information also served as emotional aid, soothing uncertainty. In the words of two group members:

> "It was extremely nice to hear from people who lived in different places, so you could get direct eyewitness accounts: a snow plough has been through here, so this or that road is open"

> "I got hope (…) Much, much hope. (…) There are people who think about others, there are still some people left [in the snow] except for myself."

Second, there is an element of altruistic community in the hope that "joint assistance" will be given to those in need. Indeed, several offers of practical help appeared on the group walls, such as this one:

> "Now I got my car home (…) so if anyone needs to get some shopping done tomorrow, and my car can drive on the roads, then I can go shopping (…) I plan to leave Rønne tomorrow morning."

In at least one case, interviews evinced how an offer of help was matched with a person in need through the public group wall, followed by a retreat to private Facebook messages to coordinate more sensitive information about time and place. This demonstrates the benefits of an architecture that includes both public and private spaces [5], something that should be taken into account when designing collaborative systems for crisis relief. There is not much such evidence, however, of instrumental help actually taking place through the group. Interviews suggested that most help, such as digging an elderly couple out of their house, was coordinated face-to-face and through telephone.

So far, the group resembles the efforts of information sharing and mutual support that existing literature has thematized. The third component, however, consist of the ambition to attract attention outside Bornholm, in order to receive assistance. Both interviews and wall content show that this was not a simple case of making the outside world aware of an emergency situation, but rather a struggle over articulating the gravity of the situation. As one group member wrote on the group wall, comparing the main city on the island (Rønne) and the more rural parts:

> "It is about time [the authorities] realized how bad it is out on the island. It does not seem bad in Rønne, but those of us who live outside Rønne know how grim it is"

Another group member said in an interview:

> "One thing is what you hear on the radio, another thing is what you can see out of your window"

This third form of activity in the group is not easily labeled altruistic behavior. Nor is it straightforward collective intelligence, since it challenges rather than supplements the information provided by official emergency managers.

Rather, it is part of a politicized effort to compensate for a perceived lack of activity on behalf of local authorities. As one group member put it:

> "I do not understand why [the group founder] was not awarded (…) Bornholmian of the Year (…) because she almost did the politicians' job in attracting attention and making sure that we later got more for the snow-removal budget"

In sum, the group founder's threefold mission statement appealed strongly to some citizens on Bornholm. The 4-day long burst of interaction on the group wall is evidence for this. While some members shared links to news stories and photos, often adding detailed metadata about time and place, the group wall was dominated by exchanges of written text that discussed the gravity of the situation from the individual perspectives of group members, allowing people to show their support. The following interview quote suggests that this success is likely to be repeated:

> "If the weather turns wild again, then I could easily imagine that the same group would resurface (…) given all the talk there has been about it, some of the people who were not members, they know it was there once, so it might be there again."

If this is true, research is correct in focusing on informal crisis response on social media, since this kind of citizen response is likely to be only more abundant in the future. With abundance, however, multiple perspectives are likely to follow, as illustrated by the diverging perspective in the other Facebook group, to which we turn now.

Group 2: "Bornholm Extremely White Christmas 2010"
The graph of group 2 shows relatively high activity for around 10 days, with members producing a more mixed exchange that included many photos, links and videos. One thing to notice here is the difference in timing. The *help now* group did not become relevant until some people had been snowbound long enough for the situation to turn critical (27th December), and wall activity died out as soon
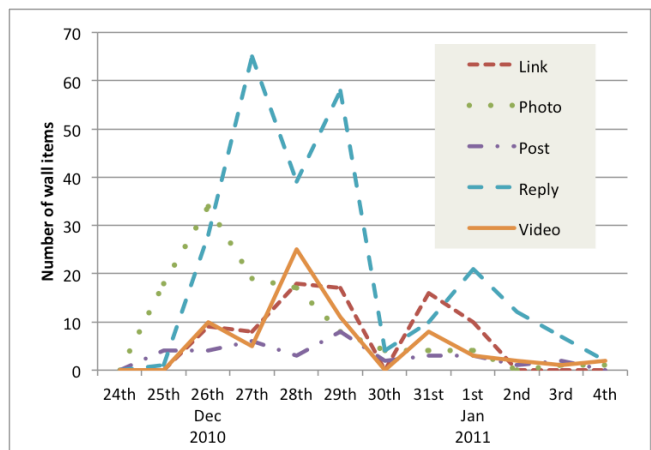

Figure 2: Content type over time in Facebook group 2, founded 25th December 2010

as the roads were clear again. The *extremely white Christmas* group, on the other hand, was founded two days earlier than the *help now* group (25th December), and wall activity died out less abruptly here. This suggests that participants were motivated by something else than a feeling of danger and public authority neglect. Again, the group founder's description is useful for understanding what took place:

> "Show the outside world how the unforgettable, extremely white Christmas on Bornholm 2010 looks!"

The relatively large proportion of photos and videos on the wall of this group confirms that the group was very much about sharing spectacular vistas of an island buried in snow. For both groups, thus, it seems the direction laid out by the group founder is a powerful determinant of subsequent group activity. This is not surprising and consistent with the fact that Facebook users self-select into groups they find useful [1].

Once again, the notion of altruistic community explains parts of the sentiment in the group. In an interview, one participant described group 2 with the distinctively Danish wording "*hyggeligt fællesskab*", inadequately translatable to 'cozy community', indicating that the group achieved something reserved for "small-scale settings, informality, relaxed intimacy and inter-personal warmth" [16]. This label, however, also captures that the sense of urgency in the *help now* group was largely absent in the *extremely white Christmas* group.

Rather, group 2 exhibits a clear element of curiosity towards the situation. In a recent contribution, curiosity was conceptualized as one out of several attitudes that create social convergence in disaster situations [13]. The authors noted that when such curiosity is satisfied online, it might be hard to track because the amount of silent onlookers ('lurkers') might be much larger than the few who actually upload pictures and videos. This is very much the case for the group discussed here, in which most of the 594 members were passive viewers of the content uploaded by relatively few active members. On the other hand, the group was founded with an explicit reference to satisfying the curiosity of those not physically near the enormous amounts of snow, so it does provide very concrete evidence that "being curious" is a source of online social convergence in crisis situations. As one member of this Facebook group enthusiastically noted in an interview:

> "We sent pictures and videos about how it all fit together and provided live updates almost every hour"

This notion of 'live updates' resembles how television news channels are now increasingly including user-generated content from social media when trying to satisfy the curiosity of their viewers as to what is going on in the emergency locality. In this sense, so-called 'disaster tourists' have the opportunity of paying virtual visits to emergency sites through venues such as public Facebook groups [49].

Explaining the difference between groups

So far, the analysis has shown that both groups did exhibit some degree of altruistic, community-oriented behavior and efforts to pool local information into what resembles collective intelligence. The analysis has also shown, however, that both groups were motivated by an ambition to show the 'outside world' what was happening on Bornholm. They did so in quite different directions. The *help now* group worked together to challenge the centralized viewpoint of public authorities and emergency managers, feeling that the grave situation in the more rural parts of the island was overlooked. The group founder even worked strategically with the group members to influence national media, as this post from the group wall shows:

> "DEAR ALL (…) if you want to appear in national radio news and raise awareness of our situation, please send me name and phone number before 21.00 tonight"

The founder of the *extremely white Christmas* group also urged members to "show Bornholm for the outside world", but with an entirely different focus. Here, members shared scenic photos and linked to news stories about the Bornholm situation from many different countries, celebrating that "we are getting internationally famous!", as one member wrote in a comment on the group wall. The members of this group seem to have been attracting attention in order to turn the situation into a media event that matched the spectacular significance they felt it had. This was tied to a Bornholm regional identity, with several members expressing pride in being "part of it", as one participant put it, stating that the situation was something to remember forever.

In a constructivist perspective, the different practices in the two groups resulted in the two groups being two quite different lenses through which to witness the snowstorm. The relationship to the news media illustrates this. While group 2 cherished the existing media coverage of the situation, the *help now* group actively tried to influence the news media agenda. These diverging uses of the Facebook technology were influenced by a difference in the offline situations of the users, as an interview with a member of both groups suggests:

> *It is interesting that there seem to be two different stories…?*

> "Well, I think it had to do with where one lives on the island. When Christmas was over and I started working again, my colleagues – who might live in Nexø and have their families around them in Nexø, the second biggest city on the island – they were 'yes yes, there was a lot of snow, and yes it had been white in the streets', but they never had

**Figure 3: Top 10 locations mentioned in group 1
(© 2011 Google)**

**Figure 4: Top 10 locations mentioned in group 2, shown as
7 locations due to overlap between 3 place names.
(© 2011 Google)**

any problem with it. So they just thought it was wild weather. 'Yes, goddammit, I could not get out!'. When I told them that where I lived, I could not get out before this or that day, they were 'Hm. Aha. Had it been so wild there?' Yes it was! So it was a bit, come on. So that is why I think these two different groups appeared, because for some people it was just wild, but they had no problems, and for others, it was a real problem that the weather was so wild."

In order to validate this explanation further, I triangulated it with the group wall data. The maps above show the top 10 most frequently occurring place names on the two group walls.

There is a clear difference between the *help now* group (left) and the *extremely white Christmas* group (right). The latter mentions the bigger cities most frequently, while the former focuses on a few inland areas. This difference in geographical focus resonates with the finding that online many-to-many communication is especially valuable for more rural communities where geographical dispersion and lack of media attention deepen the information dearth in crisis [11, 39]. It helps explain why information sharing achieved such importance and became tied to emotional aid in the more rurally focused *help now* group. Here, sharing information about what was perceived as overlooked areas in the emergency relief efforts created a strong sense of community, whereas the more populous *extremely white Christmas* group relished in photos of the main cities and roads dressed in snow.

The geographical difference does not only help explain why the two Facebook groups perceived the 'same' blizzard differently, it also suggests why the *help now* group felt a need to challenge the accounts of public authorities. The deputy mayor on Bornholm, who was responsible for the snow removal services, said in my interview with him "the problems with the snow were general across the island". This goes directly against the emphasis on differences between more and less populated parts of the island expressed by several Facebook users, but the deputy mayor maintained that "it actually did not matter if one lived in the cities or in the countryside, there was a lot of snow everywhere". This divergence of viewpoints might seem puzzling, but in the light of the responsibilities of the deputy mayor, his statements make some sense. As the man in charge of an increasingly worrisome snow-removal budget, the deputy mayor had to argue that everyone was equally overwhelmed in order to justify that his public services where unable to cope. This perspective lifted the situation out of the everyday politics of urban-rural budget tensions, drawing on a view of disaster situations as isolated from business as usual [47].

Against the official narrative, then, members felt the Facebook groups were attracting attention to alternative perspectives. As one participant put it:

> "Now that you have the Internet, you can attract attention to problems in a different way. And I think many demonstrated that during this extreme weather situation"

In the Bornholm case, however, these alternative articulations of the snow-problems were mostly directed

from the public to the public, to use Reuter et al.'s classification matrix [35]. Neither the local police, nor the municipal authorities were aware of the activities on Facebook according to my interviews with them, so the *help now* group's challenge to the deputy mayor's understanding of the situation never reached its target.

DISCUSSION

Compared to the single-case study of the use of a Facebook group in the Virginia Tech emergency [44], the comparative design of the study presented here makes it possible to highlight different, but equally important aspects of emergent citizen groups on social media in emergencies. For one thing, it is clear that the objectives for distributed problem solving are not always as obvious as in the Virginia Tech case of compiling a list of named victims. The above analysis demonstrated that in the Bornholm case, Facebook groups provided a venue for citizens to self-select into *different* collaborative articulations of the emergency. While the public authorities took a classic top-down emergency management approach and stayed off social media, one 'rural' Facebook group felt overlooked and in danger, another group felt safe enough to enjoy the unusual snowy spectacle, and both groups reinforced and acted on their perspectives through the publicity of the Facebook groups. Such diverging perspectives are crucial to take into account for designers of IT systems for emergency collaboration, because they determine the criteria according to which information is deemed relevant [34]: A scenic photo in the *extremely white Christmas* group could be an important clue about road conditions in the *help now* group, which again could be seen as a dangerous challenge to emergency vehicle's monopoly on road in the eyes the authorities. This is an example of how technological affordances interweave with social and political conditions in forming the outcome of emergent groups on social media in times of crisis.

While the findings confirm the relevance of the notions of altruistic communities and collective intelligence for understanding social media use in crisis, they also demonstrate that such community-oriented behavior is not apolitical. For example, it was shown that distrust of public institutions during emergency relief operations does not only emerge in war-ridden countries with low social trust, as highlighted by Seeman and Mark [37]. Even in non-fatal emergencies in stable Western democracies, such as the one presented here, emergent citizen groups can choose to voice well-grounded, public criticism of the authorities in the midst of crisis. This has important implications for policymaking and research around the use of social media in emergencies: Societal trust and altruistic behavior cannot be assumed; it is an empirical question how emergent citizen groups construct the emergency and position themselves. This raises a new set of issues, including to what extent it is possible to design social media tools reliable enough to tap into useful localized knowledge in future emergencies. In providing a socio-geographical explanation for the groups' differences, this study suggested that one way to predict what kind of collective intelligence groups might exhibit in an emergency is to focus on how pre-emergency social patterns influence how the emergency comes to be understood and acted on by citizens [52]. The ambiguous and normative notion of altruistic communities does not necessarily capture such preexisting inequalities [31]. Research needs to supplement the idea of altruism with a sensibility as to how emergencies might become politicized [43], as when tight budgeting in the Bornholm municipality created rural-urban tensions that became visible in crisis.

The lack of interaction between formal organizations and informal groups on social media in this case suggests that an emergency management perspective risks dismissing emergent citizen groups as irrelevant or even dangerous. However, citizen's need to collaborate on establishing the situation is well known in disasters, and it is crucial for building a sense of agency, transforming passive victims into engaged citizens who negotiate and act on their problems [39, 42]. For this reason, research should strive to develop a nuanced understanding of self-help groups, not least in the HCI field that can inform technology design. This paper has contributed to this effort by demonstrating that social media platforms can be of special value for rural communities that perceive themselves as overlooked by officials, and that such dynamics influence user adaptation of technology. Moving forward, Facebook is much more relevant than Twitter in Danish context, and Facebook offers the opportunity for designing apps that might aid informal emergency response by connecting emergent groups and afford online coordination of offline assistance between citizens rather than restricting interaction to discussions of the situation and expressions of support.

CONCLUSION

To my best knowledge, this study is among the first comparative case studies of public Facebook groups used in emergency situations. In addition, the study makes a contribution in extending our empirical knowledge beyond the much more studied US and English-speaking context [35]. The comparative research design yielded the lesson that it is an empirical question whether the theoretical concepts of altruistic communities and collective intelligence exhaust cases of social media use in emergencies. Even in the highly local and non-fatal Bornholm emergency, Facebook groups formed around strikingly different objectives. To be sure, the groups exhibited features of altruistic communities. But crucially, one group also politicized the situation and challenged official information, while another reduced the emergency to a spectacle sparking curiosity. Such multiple perspectives are justified and reinforced through social media collaboration in which likeminded people come together. The diverging articulations of the situation that are produced cannot be dismissed in any simple way as false, because they are crucial for turning victims into first

responders. While the potential for social media-driven collective intelligence is huge, it cannot be assumed that social media activity will result in altruistic communities. One way to move forward is for researchers, practitioners, and designers of technology to strengthen their sensitivity towards how pre-emergency social and political conditions influence the outcome of emergent groups on social media. More comparative empirical studies are needed, and our theoretical understanding of emergency 'self-help' on social media needs to be developed further.

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