Digital Mobilization in Disaster Response: The Work & Self-Organization of On-Line Pet Advocates in Response to Hurricane Sandy

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ABSTRACT
This ethnographic study of a Facebook Page founded on 28 October 2012 in anticipation of Hurricane Sandy's US landfall reveals how on-line pet advocates—a large but loosely organized social movement—mobilized their ad hoc discretionary activities to more cooperative, organized work to assist numerous displaced pets. The investigation shows how innovations around "crossposting" to create a more persistent form of visual data management were important. It describes how these innovations produced an improvised case management system around which members of the pet-advocacy crowd could collectively work to help displaced pets. The paper connects to the CSCW and organizational science literature to consider how this emergent community articulated work and structured the mission of the Page.

Author Keywords
Activism; Animals; Computer-Mediated Communication; Crisis Informatics; Disasters; Organizing; Pets; Self-Organizing; Social Computing; Social Media; Structuration

ACM Classification Keywords
H.5.3 Groups & Organization Interfaces—collaborative computing, computer-supported cooperative work; K.4.2 Social Issues

INTRODUCTION

Much attention has been paid to the possibilities of "crowd computing" [e.g. 20, 30], including how it might be used effectively in disaster response [3, 32, 34, 37]. This paper examines how crowd work emerged naturalistically in the 2012 Hurricane Sandy event. In the domain of pet advocacy, the latent potential for crowd interaction comes from intrinsic and extrinsic motivations—we focus on how that potential was transformed into a viable form of distributed, decentralized cooperative work. We combine practice- and structurational-based understandings of human action [29] to show how work practice and mechanisms of self-organizing interact with one another, where the features of the environment, the varying skills of the convergent crowd, and the problems that face the subjects of their interest come together to articulate a socio-technical cooperative work environment.

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Pets & Disaster. Pets and their "owners" are unheralded sufferers in disasters: for example, in 2005's Hurricane Katrina, about 70,000 pets were separated from their owners because of the damage to property, rapid human evacuation, and lack of formal support for pets in evacuation procedures. Of these, only 15,000 pets were rescued and just 2,300 were reunited—3% of the total. Many were euthanized or left to die at great emotional cost to families and financial cost to the state [17, 23, 25].

Pet Advocacy. Like other "convergers" onto a disaster [6, 12, 18, 32], pet advocates are present in both the physical and digital disaster scene. They bring their existing knowledge and very strong identities as advocates to assist in the disaster cause [3]. In non-disaster situations, pet advocates have taken to on-line activities in what Golbeck calls "passion-based networks" [10]. Message boards and forums were early internet destinations that remain highly frequented locations for pet advocates. However, like other topical groups that organize on-line, how they might mobilize into action is of great interest, particularly with respect to today's social media use where the differences between activism and "slacktivism" are at issue. "Slacktivism" [9] refers to the observation that on-line advocacy in its simplest forms (such as collective profile changes and the simple passing on of information to show support for a cause—which happens frequently in pet advocacy) have unclear benefits to the causes themselves [22, 28, 30]. However, the conditions of disaster response call upon advocacy in temporally accelerated and constrained ways that allow examination of how loose coalitions reorganize to engage in coordinated work—an important element of mobilization.

We examine a central on-line site for pet activism during and after Hurricane Sandy, which made US landfall on 29 October 2012 in New Jersey, exacting its worst damage

there and in New York. How people's on-line advocacy is reshaped and restructured within a digital environment [2] to support both centralized and decentralized forms of distributed, cooperative work is the topic of this paper.

The Pet Problem in Disasters

The impact of a disaster greatly increases the number of pets that enter shelters. The hazard event itself can disrupt the physical environment—fences are compromised and windows are broken. Pets might be scared by the hazard and run away. Their owners may not be able to return home, or perhaps assume temporary accommodations where pets are not allowed. Rebuilding efforts can further compromise the built environment because the usual security measures are looser. For areas in great distress, people might simply be unable to care for their pets.

The loss of a pet from a disaster may carry a higher risk for mental health issues [17, 19, 24, 27]. A study of pet-owning survivors of Hurricane Katrina found significantly higher levels of acute stress, depression, and post-traumatic stress disorder in those who lost their pets than those who did not, even when controlling for the other effects of the disaster [14]. In addition to devastating emotional loss, the logistical consequences of lost pets to the region can be high: Animals must be gathered, transported, sheltered, fed, fostered, and re-homed if possible. Following the 2005 Hurricane Katrina event, the US government passed the PETS Act [26] to help address the multi-faceted problems of pets in disasters. The Act has seen improvements in the treatment and logistical management of animals though it has not been a silver bullet for large disasters where the problems are so vast. The most reliable method of pet-family matching during non-disaster situations—microchipping—depends on proprietary software, and on owners to update phone and address details—major obstacles to seamless reunions in the aftermath of disasters.

The effects on pet welfare during Hurricane Sandy were far less than in Katrina, but still significant. One of the difficulties faced by both pet advocates and emergency managers is that so little comprehensive information is available about the pet population after disasters (see, e.g., [7]). At the time of writing, nine months after Sandy made US landfall, partial data helps explain the magnitude: The Humane Society deployed over 140 paid and volunteer staff, assisted with the rescue of more than 350 animals, and cared for over 700 total in their shelters; 400 of these animals were reclaimed by owners. In the initial days of Sandy, its 24-hour hotline received more than 900 calls [13]. The American Society for Prevention of Cruelty to Animals (ASPCA) reports that its combined response helped more than 30,000 pets in NY and NJ alone [1].

Finally, a message of distrust of established organizations pervades grassroots pet activism during times of normalcy. This distrust interacts with the disaster response in ways that influence advocates' behavior. In particular, some advocates distrust how sheltering organizations manage pets. According to ASPCA, 5-7 million pets enter animal shelters nationwide annually, and 60% of dogs and 70% of cats are euthanized. The Animal Care and Control group and the Humane Society make counter claims to pet management practices, and scholarship adds further to this conflicted space, describing the "neat and tidy" picture offered to the public as obscuring the issues that arise with the enormous number of unwanted and stray pets [15, 16]. A 72-hour stay is the minimum required time that an animal be sheltered before euthanasia, though some are euthanized earlier if they are judged to have health or behavioral problems. During disaster, however, a large number of pets—who are otherwise wanted—are newly subject to emergency shelters. Pet advocates therefore feel that it is urgent to alert rescue organizations to "pull" the pet from the shelter and help it find a "forever home" during what is perceived as a critical 72-hour window.

Objective & Theoretical Approach

With respect to the on-line response to Hurricane Sandy, the pet advocacy community participated in ways that echoed earlier events: social media accounts appeared, including Facebook Pages and Groups. However, the nature of the volunteer response to disaster is changing in often observable ways with each event, and *The Hurricane Sandy Lost and Found Pets Page* on Facebook, a central place of convergence, captured an important state change in pet advocacy response that is worth investigating from cooperative work and self-organizing points of view.

The decisions made—even when seemingly small—on this Page to organize the information about lost pets interacted powerfully with the existing but ad hoc work of on-line pet advocates ("crossposting"). The yield of this combination articulated a new form of work for pet advocates, which helped to realize the potential of organized collective behavior through volunteerism in disaster response.

Following Orlikowski [29], this analysis unites both practice-based [35] and structurational-based interpretations of coordination and social organization [8] to understand the nature of collective work in large, distributed, and emergent groups—groups that have some existing common motivation to help but have little prior precedent for how that work might be conducted [21]. By examining work practices, and tracing how those practices are reified in the social-technical organization of a group that is forming and stabilizing *as they do the work*, we learn not just what this particular group did, but also how the mechanisms by which collective action in digital environments are organized bottom-up. We also learn how those lessons are graduated into prescriptive top-down direction to sustain and direct future action.

METHODS

Data collection primarily took place in the form of ethnographic, non-participant observation of the Hurricane Sandy Lost and Found Pets Page over seven months from October 2012 to May 2013. In keeping with the

ethnographic method of both collection and analysis, we digitally captured interactions and took extensive field notes about user and administrator behavior, including features of their communication, collaboration, and organization. To supplement, we collected basic statistics about the Page using Facebook's Graph API to pull available data into a relational database. The data collected are specific to Timeline Posts, Album Photos, Likes, and Comments for the same seven-month period.

To ascertain reasons for behaviors that we could not directly observe, we followed up with an "email interview" to informants who, based on their observed activity on the Page, could speak to decisions that were made by members and admins individually and collectively. These open-ended questions queried issues common across all participants, including elements about their pet advocacy as well as their disaster response backgrounds. In addition, a second section was tailored to each participant to deeply inquire about their observed role on the Page. We initially contacted Page admins and active non-admins for a total of 38 people. Twelve people (three admins and nine non-admins) followed up with first-round responses to the email interview. Most elaborated their answers extensively, which supported the ethnographic quality of the investigation. Additional questions were sent after initial responses came in to clarify and elaborate points, just as in an offline interview. In one case, follow-up came in the form of a telephone interview per the participant's choice. Finally, one of the admins made critical measures from the Page analytics available. As an ethnographic investigation, the analysis uses a grounded, immersive, data-driven, triangulated approach in the interpretivist tradition [4].

THE HURRICANE SANDY LOST & FOUND PETS PAGE

Origins

The Hurricane Sandy Lost and Found Pets Page was launched on 28 October 2012. Sandy was expected to cause a great deal of damage on the US eastern seaboard; landfall a day out was known to be imminent by the storm that had earlier made landfall in Jamaica and Cuba. By 28 October, Sandy was already the largest Atlantic storm on record. After making landfall in New Jersey on 29 October, the storm exacted the worst of its damage there and in coastal areas of New York, with total damage estimated at over $50 billon by the time it dissipated on 31 October [36].

As Hurricane Sandy approached on 28 October, the founder of the Hurricane Isaac Lost and Found Pets page appealed there for "someone to create a page similar to this one but for Sandy" with a request to "…please comment here so we don't have a million different pages…so that it can be organized and people can add each other." Within a few minutes of the first share of this post, the newly created Hurricane Sandy Lost and Found Pets Page added a comment saying, "Done."

The Sandy Page founder lives well outside the affected region, but had experienced Hurricane Katrina and the pet loss in the aftermath of that event. She is also connected to numerous animal rescue and advocacy groups on-line. The Page About section states:

> Posting photos of lost or found pets in the areas affected by Sandy, as well as posting animal shelters in need and temporary shelters that allow animals. We are animal lovers and advocates trying to help with networking to get animals reunited with their families. We do not accept donations here nor can we direct you to a specific organization to donate to . If you post to our wall, your information may be shared so please keep this in mind before posting information you do not want shared

The elements here are important. First, the Page describes itself as a place for the posting of photos. As we explain, photo posting is one of the primary tasks taken up by a segment of pet advocates outside of disasters such that the very act of posting photos is tied quite strongly to the identity of pet advocacy. Second, the Page makes clear its role as a place for connection between people helping and searching for pets. Members reinforced early and often that the Page serve as a kind of hub that authoritatively organized information on behalf of the dispersed Sandy-related pet work happening across the social web. This, we believe, was to compel not just the Page's value, but the value and meaning of pet advocacy disaster work in general. Third, implied here and then clarified in posts, the pets represented on the Page were distinct from the numerous pets already in need of help. Members had to educate some advocates that animals lost in Sandy did not happen out of negligence: some pet advocates admonished owners of lost pets without appreciating how damaging a storm like Sandy could be to both pet and human welfare.

Membership & Content Volume

Three days into the Page's launch and two days after Sandy made landfall, the Page reached 6,000 Likes on 31 October 2012. By mid-November, it had achieved and then maintained more than 25,000 Likes with continued growth through 5 May 2013 to 28,436 Likes.

The Page had 12 administrators over its life, with six core admins persisting as primary admins. More active members would be invited to be admins, and many of the decisions that shaped the direction of the Page—and therefore the work of the Page—were made by these members. Other Admins rotated out when they could not be active. All admins (former and current) are female.

In terms of magnitude of activity, 6,683 unique users commented on the Timeline posts, and 3,932 unique users commented on the Photo Albums of the Page (a separate section where a lot of the "pet matching" work was done). Most of the active members were female. Page members produced the content shown in Table 1.

Number of Timeline posts	1,572
Number of Comments on Timeline posts	24,509
Number of Albums	25
Number of Photos in Albums	1,061
Number of Comments on Photos in Albums	10,639
Number of Comments Made by Admins	4,280

Table 1. Number and Types of Page Content

Early Organizing & Activity

The site was initiated as a Facebook (FB) *Page* rather than a *Group,* which carry different affordances. FB Pages were first designed to support official presentation of organizations or public figures. A FB Page is visible to everyone on the Internet. People simply need to "Like" the Page for posts to appear in their own timeline. FB Pages feature five different admin roles, each with different permissions. FB Groups are intended for small group communication and can be set up to be public, private, or secret. Unlike Pages, posts in Groups can be made by any member. FB states that Groups are most successful when the number of members is kept small. It is not possible to transfer a Group to the larger scope of a Page after the fact.

Elicitation of Goals & Connection to Implementation

Within the first 24 hours, people began posting suggestions about how to structure the Page, sometimes tagging others to attract them to the Page and solicit their advice. The founder demonstrated an understanding of the impact this kind of disaster had on pets, which informed decisions about how to organize the Page's operations. After a person who belonged to more than 70 pet-focused FB Groups/Pages suggested that different Pages be dedicated to each State affected by the disaster (much as other pet advocacy is organized outside of times of disaster), the founder explained that administration would be too difficult under that kind of architecture:

> Also if animals are left behind and rescued or get lost during the evacuation it is quite possible for them to be located in a different state from the owner. That was the situation with Hurricane Katrina and to a limited extent with Hurricane Isaac.

This early decision to maintain one Page also foreshadowed evidence indicating that the founder envisioned it as a destination for the information-sharing work of pet advocates rather than the usual bulletin board-like waypoints of other sites that field sometimes repetitious information posting. We discuss this point at further length in the *From Advocacy to Action* section.

Adapting Practice to Design Constraints

The admins established policies early on to direct practice: people were asked to provide as much detail as possible about lost pets. Early users tagged themselves (and sometimes each other) in photos of lost pets so that they would receive automatic notifications when someone asked a question or perhaps suggested a match. Members also asked owners of lost pets to tag themselves in photos to self-track the work being done on their pet. These were the initial steps of an improvised case management system.

Division of Labor

People started becoming admins to distribute labor and responsibilities, a critical step in the self-organization of loose coalitions [21]. Four days into the Page's life, as more people became admins, one initiated the practice of adding initials to the end of each post they made to differentiate from each other and to internally organize their work. This practice was immediately adopted by other admins. In addition, the admins set up a Facebook Secret Group that was "filled with spreadsheets" (P10) that contained personal contact and address information about foster-offer homes, as well as lists of URLs that tracked from whom and where pet information originally came. They discussed ideas and created files noting work that needed to be done. When those tasks were completed, the files were deleted. In addition, the admins communicated using email and phone.

The admins described the following tasks as part of their work over the life of the Page: Answering private messages, answering comments under photos of lost pets, creating flyers, contacting pet owners for follow-up, deleting duplicate pet entries, organizing pet photo albums, organizing pet transports, and going out "old school" to areas that did not have electricity or access to the Page with paper flyers to post on trees and telephone poles.

Establishing Relevance to Achieve a Broader Net of Support

In the first two days of the Page's life, multiple other pet-advocacy pages on FB shared the Page with their own communities. Mainstream news outlets around the world covering Hurricane Sandy also included reports about the Page, tying it to stories of reunion and rescue. Such campaigning helped to meet the objective of establishing a larger net of people who could be on the lookout for missing pets or for matching lost to found pet photos.

Organizing around Roles

In addition to the administration of the Page and the division of labor articulation [21, 31], we characterize the visible work of the Page as a set of behaviors originally based in acts of simple photo broadcasting (that many engaged in), which were then extended to more cooperative work that expressed more durable objectives. We describe the transition between these interactions and how they structured the environment (and vice versa) below.

Still, many people sat in the "long tail" of Page interaction: Of the thousands of people who "Liked" the Page, many did nothing more. However, others minimally engaged in Liking or Sharing photos of Timeline posts: By "Liking" a photo, it would show up on that person's Timeline for their FB friends to see (and was the only mode of sharing on mobile devices at the time). "Sharing" (that is, choosing the Share link) was more deliberate, but had the same effect

across all devices of making the photo visible to FB friends. Some commented to say that they shared a pet's photo, and several used the convention of typing just "s" (for "shared") that had previously been adopted by on-line pet advocates in non-disaster efforts. This mild engagement served the function of distributing information about lost and found pets, a necessary condition for the more elaborate "matching" and case management work that followed.

Administrators encouraged members to work with the content of the Page beyond their normal pet advocacy activities. Some members who had breed- or species-specific interests would work on advertising and trying to match up those particular animals. However, active members made appeals that everyone work on both dogs and cats regardless of personal preference. Recall too that a few members admonished owners who lost their pets in the disaster. These characteristics signal how strong some incoming identities were—they were advocates aligned to the animals rather than the owners. Others who were more familiar with disasters made appeals to suspend individual predispositions found in everyday advocacy (e.g. [10]) and instead apply broad concern to all pets and owners.

"Crossposting" as Page Launching Point

Of critical import to the understanding of both the origins and the progression of the mission and organization of the Page are the members who identify as "crossposters." Crossposters are pet advocates who deliberately crosspost information about pet issues from one site to the next. This straightforward task—and the strong identity that happens to be associated with it—is the taken-for-granted work upon which the Page rests. Curiously, though crossposting has been discouraged since essentially the birth of the Internet—early Usenet groups dealt with the issue of repetitious posts in FAQs, and some sites today ban crossposting in their Terms of Use—pet advocates view their form of crossposting *as favorable and central to their identity*. Some crossposters have set up special personal accounts dedicated to crossposting pet information, naming themselves "Francie Downey-Crossposter" or "Mary Crossposter Smyth." Crossposters connect with each other, and a few crossposters publicly collate the names and social media accounts of other crossposters—believing that "crossposting saves lives." Interviewees write:

> "The more people share a post, the more likely the person who lost/found the pet may see the post OR the more publicity a pet that needs a home gets the more likely he is to find that home." [P12]

> "What we do is have our friends who are with rescue groups all over the United States, animal lovers, [and] shelter volunteers send us pictures of dogs and cats who are more than likely to be killed at any time….when I share the photos a rescue group in that area [it] may save that animal, or a person wanting to adopt will see the animal and adopt, or [one] of [my] 5,000 friends will share my post to their friends and it continues to be posted by others."[P8]

The strong identity of on-line pet activists as crossposters—a term that seems reserved for use within the pet activist community—is critical here. Crossposting was the basis for the genesis of the emergent group [21]. Crossposting was nothing new for pet advocates, but what *was* new for them was managing the sudden flood of lost pets in a region, and understanding how disasters affect people and pets. Also new was the realization that the likelihood of finding matches between lost and found pets was far higher than normal, because the animals were accidently and suddenly displaced—not surrendered. This difference between routine crossposting and the information-sharing that could happen on a site built for the special conditions of disaster, transforms, we propose, activists' understanding of what they can do and achieve in their on-line advocacy work.

From Advocacy to Action

The desire to assist in disaster events in some way is broad [12, 18], but the mechanisms for enabling action in the form of on-line work or commitment, as with other causes, can be unclear [22, 28, 30]. In addition to the socio-psychological methods for motivating action, we must consider what kind of socio-technical features and mechanisms create an environment that supports transition from latent potential to cooperative work.

We see the information architecture for this Page as a turning point in how simple on-line individual pet advocacy was transformed into cooperative work. Pet information is strongly visual—reports of missing pets without visual information are far less useful and far less likely to be propagated to audiences. Crossposting as a pet advocacy practice seems to have arisen after the advent of "Web 2.0" when photos could be very easily uploaded to message forums and social networking sites by most anyone. The ease with which photos of animals could then be distributed to find a willing adopter gave rise to the role of the "crossposter" in the domain of pet welfare. Curiously, "crossposters" of this positive kind seem to exist only in a persistent way in the pet welfare world.

We explain below how the admins re-organized photo information posted by others to catalog the pets they were helping and to organize the work done around each pet. These acts of organization of visual data for crowd work transformed the simple activity of crossposting—which is all about posting early, often, quickly, and widely—to include cooperative tasks that more persistently focused on each pet in an improvised case management system.

Albums

At the start, the Page founder took information posted to the Timeline and organized it into Photo Albums, a feature that FB supports for its Pages (see Fig. 1). Facebook automatically creates three albums when the founder uploads any image: Timeline Photos, Cover Photos, and Profile Pictures. Page admins can add more albums. During

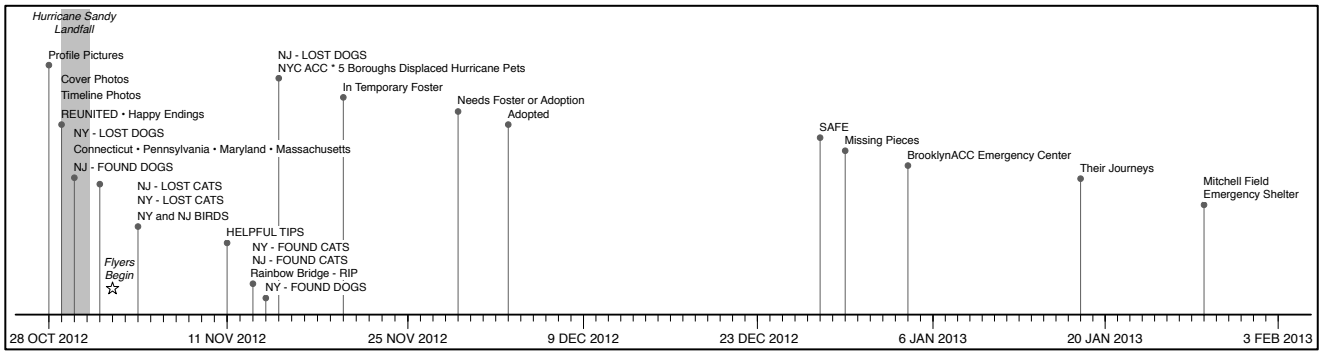

Figure 1. Timeline of Photo Album Creation & Flyer Invention

the first few days of the Page, admins focused on listing the pets reported as lost, found, or reunited in the different location-based albums, based on the information posted to the Page timeline by crossposters. We note that one member who was active in thinking about the information architecture of the Page was invited to be an admin because of her ideas about information management. Adapting the design constraints of FB, she customized the album faces to make the collection a clear destination for on-line work: Rather than use the FB default of the most recent photo, she created graphics for button-like navigation (Fig. 2). We note, too, that the graduation of active workers to the admin role demonstrates that the membership itself was based on a strong work-driven model.

The first album created was the "Reunited/Happy Endings" album, which shows an orientation to making sure that old information about previously lost pets was not propagated. It also shows an orientation to the goal of matching lost pet photos with found pet photos and achieving resolution. At the end of the 7-month observation, the Reunited/Happy Endings and the Adopted albums were the largest on the site with 208 and 246 photos respectively. In interviews, the more active members said that they would work until all the "hurricane kids" found homes.

Other albums created in the Page's first days reflect early suggestions by members to organize multiple Pages by State and animal type; instead that architecture was incorporated internally into albums in the single destination

Figure 2. Photo Albums

page: NY - Lost Cats, NJ - Found Dogs, etc. There were 10 albums of these types created by 15 November. The admins added others on topics for which people sought information for a total of 25 albums.

The admins constantly updated the albums as a way of organizing incoming information about lost and found pets. When a case was resolved (that is, a pet was matched, reunited, adopted, or found deceased), the admins moved it to the appropriate album. This information management demonstrates a strong commitment to the arc and completion of the work. The albums as an information architecture for visual information brought the reasons for crossposting work into focus.

However, this organization also implicitly challenged the goals of some crossposters, which are to post often and widely. When people were found to be posting pet information about animals that had already been organized into an album, the admin deleted the replication posts "so as not to miss any [new] pictures or posts." The Page made this policy public with a post saying they did not want to offend anyone, which received 65 likes, but also received two comments from people who stated that they were trying to make the information "as visible as possible" to counteract that pets had been filed away "on the forgotten list." The crossposting principles that the Page was set up to foster were then challenged because the Page effectively solved a problem that crossposters usually face—that of the ephemerality of posts. The information architecture of the Page was organized in a way that enabled information to persist and for pet advocacy work to shift from individual ad hoc crossposting to the more collaborative efforts of "matching" lost/found pets.

Flyer Templates

Another critical element to support the information architecture of visual information was the introduction of "flyers" that used a template to describe each pet that was lost by an owner or found by someone looking for the pet's owner. When possible, it included a description, location, contact, information about prior crossposts, and the original source of the information. A member who graduated to admin took the lead on creating flyers that were "easy to

Figure 3. A Standardized Flyer Used to Represent Each Pet Case in the Photo Albums

read" and fit standard American paper sizes for printability and postability on trees, sign posts, and so on (see Fig. 3).

This work began on 2 November. Then, critically, each flyer was put in the relevant album, effectively creating a more navigable case management system. This action kept all the relevant information about each pet within the image of the post, ensuring all the details were kept every time the images were shared on Facebook, so people seeing the image did not need to click on it to open additional information attached to the image. A participant explained in an interview the effect this had on the organizing functions of the site:

> "When you have crossposters, you might get the same image from 8 different people. By creating our own flyer, it identifies for me right away that we already have this animal. I know we already have it, it's in an album, it's being shared. I think it's a draw for the page, but it also shows us that we've already got it." [P10]

The idea that they "had" the animal indicates that they had cataloged it and formally incorporated it into their production functions. It also suggests a kind of caretaking concern in two ways: 1) that the flyers were a kind of proxy for the pets and that they were being accounted for, and 2) that the responsibility of the site was to be a useful terminus for crossposted information that otherwise pings around uncertainly in the ether. The admin posted on 3 November:

> EXHAUSTED! I will continue to make flyers and post in the am…I have not blinked, moved or eaten today because I wanted to get these stories shared. Thank you all for crossposting/sharing so we can have happy reunions. That's what it's all about right?

Matching Work & Connections to the Ground Response

The organization of the flyers in albums and a consistent effort to ensure that details from crossposters were correct set the stage for an element of work that connected the on-line advocacy with on-the-ground usefulness. The posts containing the flyers were the micro-places of work coordination; even when photos were moved between albums, the commenters could "stay" with the pet.

The Rise of "Matching" Work

On 1 November, one day after the storm dissipated and three days after the Page launched, an admin posted:

> Please help try to match pets. Look at photos of lost and found pets and try to help match them. You can do that from anywhere. I am in <a far-away State> and may have matched two within the last hour.

This is telling because the idea of "matching" pets between the lost photos and the found photos (that is, pets found by someone other than their owners) was not common practice. Some crossposters seem to do this, but it was not an explicit or well-articulated task. Crossposting seems largely focused on rescue activities and amplifying messages of help (because during non-disaster times, most pets are voluntarily surrendered and then need to be rescued by someone else). The idea that their work could lead to reunions was new enough that it got a response: 169 likes and 41 shares. Ten members wrote in support, indicating that it was not something they had thought of, saying: "OMG...that's awesome" and "Great idea!"

Some needed additional information about how to go about matching. Someone replied:

> you need to look real close at markings but just making someone aware that there is a similar match around is good. Never know it could be the same one.

Another member suggested that the scope of the matching work could be broad, and that people could look on findtoto.com and Craigslist for matches. Such comments reinforced the idea that the Page could serve as a matching hub for the much larger world of the 'net. The admins would move pets to one of the end-story albums no matter how or where the match happened on-line.

After this initial period, it became standard for people to work within the albums on individual pets to identify matches. People made suggestions for matches, and conversations ensued over their likelihood. The suggested matches were given to the contact for each pet listing for follow up. Often the owner of a lost pet would give feedback by commenting on their pet's post. Before a pet's flyer was moved to the Reunited Album, members sought proof of the resolution (similar to other verification tasks in disaster-related problem solving [37]).

An example was the case of "Butterscotch," a male orange and white tabby cat missing since 29 October from one of the hardest hit areas of the hurricane: Breezy Point, New York. Butterscotch was posted in the "NY - Lost Cats" album on 9 November. The post received 254 shares, 92 likes, and 32 comments. Many comments pertain to matching work, with suggested matches to pets elsewhere on the Page as well as on other on-line sites. The comment stream ran until 11 April, with members and admins giving feedback about the match suggestions. The updates showed

the Page was invested in sustaining the community that had mobilized around pet matching.

Connections to On-the-Ground Response

Some of the work went to physical search for lost animals. Analysis of posted data and interviews reveal that non-admin members who were geographically local to the disaster went to the neighborhoods of lost pets to distribute flyers. One Page member explained in an interview how she corrected information and translated the work of remote volunteers into meaningful work on the ground:

> "As I was sharing posts from the page, I would often notice incorrect information. Things like flyers with "Neptune, NY" on them, when I knew Neptune was here in NJ. So I would comment on those posts to have them make corrections... At the time, I didn't realize the people volunteering behind the scenes on the page weren't locals! So they had no sense of which town was where, or what areas were close to others. They started asking me questions about specific missing animals - "Could this found cat in ANYTOWN be the same one that is missing from OTHERTOWN?"" [P3]

"Napolean," a Rottweiler, was found in the Cliffwood Beach Area of New Jersey. Before he was captured, he was added to the Page's Albums with a picture of just the dog's paw print and "search and rescue needed" (Fig. 4). Eventually, Napolean was captured and housed by someone who knew to report about his case on the Page. People then shared a new photo of Napolean so that he could be matched. He was suggested as a match for other missing Rottweilers, but these were never correct. However, because of the public work on this case, a family came forward to adopt him when his owner could not be found.

The matching work still rested strongly on the idea that crossposting spread news of the plight of animals far and wide, as the person who helped find a missing dog posted:

> I just want to thank everyone again for all the cross posting. Without it, this dog might never have found his parents. The final sharing total was over 11,000 posts. Thank you everyone!

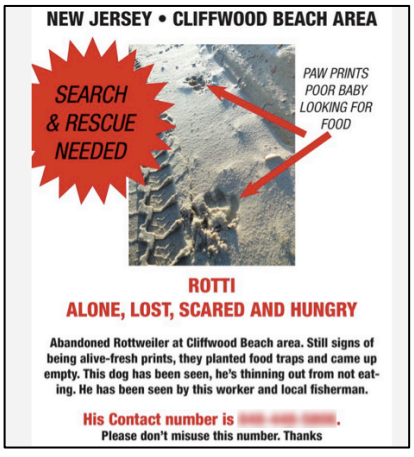

Figure 4. Napolean's Flyer

Disaster management designates the post-rescue stage as "recovery," which extends over a long period. Long-term recovery efforts can be hard to sustain for digital volunteers [34], even though their subjects of interest are still affected. The Page was involved in long-term on-the-ground recovery work: Three months after the hurricane, temporary shelters to house pets whose owners were most in need began announcing closure. Only about half the owners returned. One of the Page admins who was volunteering on the ground offered to create a Page album to help the pets find homes. With the assistance of Page members, many were adopted. The interviewee said that this experience helped "to grow our network even bigger" (P10).

Offering Resolution

The Page community's commitment to the successful homing of the pets is seen in the steady growth of the Reunited and Adopted albums. The Reunited album, created on 29 October, had over 200 posts and is matched in size only by the Adopted album. News of reunions was encouraging to workers, as a poster wrote: "that's just wonderful!...several of us have been scanning the pics looking to match the lost/found pictures!!"

Curiously, many people appeared to believe the Page was critical in the reunion of pets with owners, even though matching work included links from other on-line sources, and even though very few of the culminating narratives written about the pet directly identified a match made on

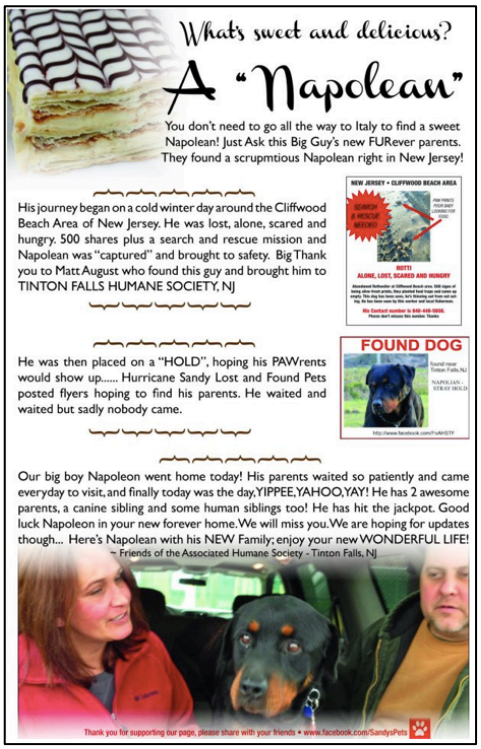

Figure 5. An End-Story Narrative Flyer

the Page itself. In interviews, admins and members alike were unsure of the number of successful matches made on the Page. Though all felt matches happened, none had a readily available record. Nevertheless, people believed that the reunions of pets with their owners happened as a result of the Page, which likely encouraged people to persist in the face of a difficult, uncertain task:

> Out of all the FB posts, this site is my favorite. You can see results. This is amazing how people have taken the time out to help. Truly amazing and I cry every time I see it work.

The admins created more albums and updated flyers to provide a conclusion to the pets' "journeys," which we believe had the strong effect of showing an arc of collective work toward some completion. The SAFE album collected information about animals successfully "pulled" by rescue organizations from shelters. The Rainbow Bridge RIP album memorialized pets that died either directly because of the hurricane or because they were euthanized. The pets' completed stories often were told in a narrative compiled from the comments made by members, another instance of reinforcing the importance of collective action (Fig. 5).

PROPAGATION OF THE ORGANIZATION

During the final writing of this paper, an EF5 tornado devastated the town of Moore, Oklahoma on 20 May 2013, killing 24 people. People from the Sandy Page are part of a similar effort for the pets of Moore, and their stated mission represents an evolution with a new claim to be "trained 'online' first responders":

> …a group of volunteers who utilize social media and other offline resources to help reunite lost pets with their owners in the aftermath of disasters.
>
> We combine our talents and knowledge, gained from reuniting families and animals after other disasters, such as Katrina, Joplin, Sandy, the Bastrop Wildfires, and the North TX tornadoes and most recently the West TX Fertilizer Plant Explosion. You might say we are trained "online" first responders.

The Moore Oklahoma Tornado Lost & Found Animals Page was launched employing similar practices that developed over the course of the Sandy Page. An admin said she ensured that it began with separate albums and a consistent look to the flyers, just as the Sandy one evolved to. A few members of the Sandy Page began to suggest possible matches on the Moore Page. We see early evidence in this of an attempt at sustained self-organization with repeating patterns of coordination [5, 21, 34].

POST-EVENT ACCOUNTING: HOW MANY HANDS?

With thousands of commenters and Likes on the Page, and a great deal of organization happening to make the Page viable, it would be easy to believe this volume of work was widely distributed. It is hard to know how much attention the Sharing and Liking of pets drew to the Page. From the Page analytics, we see that 60% of those who commented

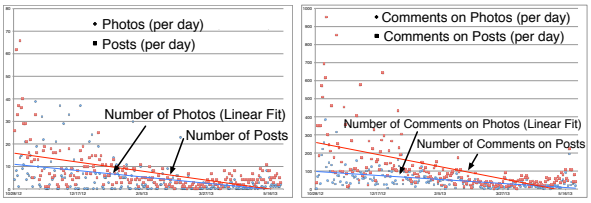

Figure 6. Daily activity for creation of posts and photos (left) and comments on photos/posts (right).

on the Timeline and 68% of those who commented within the albums left just a single comment, suggesting transient engagement. However, it could be that even one comment was valuable: the person who found Napolean commented just once upon Napolean's capture to notify others (with others verifying the claim). Across the seven months, data show that the number of posts, photos, and comments remained high in the first couple of months, which is a indication of ongoing engagement into the recovery period after Sandy was no longer in the news (Fig. 6). There is drop-off as the pet issue becomes less salient, but the photo activity shows less of a drop-off than the commenting and other non-photo posting, suggesting that a core group were committed to the work of pet matching.

Not everything was rosy: The tedious matching work was described by a participant as the necessary "dirty work" of the Page that not everyone wanted to do (P10). Other respondents said that they lost FB friendships because of crossposting, which some found to be overbearing. The lesson here might not be to aim for everyone mobilizing for a cause, but rather to create environments that make tedious work more attractive while still making functional use of a larger but only mildly engaged crowd.

DISCUSSION

Mobilizing advocacy is a central question in today's networked world [9, 28, 33]. This paper considers how work practice and a digital environment as a site of interaction for a highly distributed group of volunteers were co-adapted so that it might achieve the goals of accomplishing tasks as a group. Advocacy organizations may see social media as effective, but it is often difficult to integrate it with existing practices of connecting with audiences [28], and to engage long-term committed volunteers [38]. One could tackle the issue of mobilization as a matter of attaining critical mass, or understanding the social psychology of advocacy, or other theoretical frames. Here, we see that design decisions—even those for which there are many imposed constraints by the service provider—are important in igniting mobilization.

In recent years, disaster events have given rise to the influx of on-line digital convergers who want to help [6, 12, 18, 32]. Among these digital convergers are those who were already performing advocacy work on-line, though often in an ad hoc fashion. In the site we examine here, which we believe to be "the state of the art" in on-line pet welfare

disaster response volunteer work at the point in time that it was instituted, came to be built upon implicit knowledge of the crossposting that pervades on-line pet advocacy. A few of the lead people had prior disaster experience, but most other members and admins had little experience with respect to the particular matters of pet welfare in disasters.

In on-line crowd work, the matter of structure of the work is central. This is because much of the work that can be done includes manipulation of data, or the consumption or generation of information resources. In their study of the digital volunteers who instituted the "disaster desk" in response to the 2011 Peru earthquake, Starbird and Palen [34] reveal how work was restructured in response to the restructuring of the information environment volunteers were working in—which itself was an exasperated response to a confused division of labor and in the end enabled the group to sustain itself relative to its production functions.

In this case of matching lost pets, the information architecture was highly organizing to the group and graduated the information dissemination activity into a more structured case management system. Both the work and the mission came into focus, connected to efforts on the ground, and brought this special interest group to a workable state of mobilization. The information structuring here had to make use of the highly visual information that pet advocates needed to work—photos of pets. The visual nature of the information was already the reason crossposting in pet advocacy was as it was: so that people could be repeatedly appealed to about the plight of particular animals that crossposters believe needed rapid help. The admins made use of existing crossposting behaviors but organized the information generated so that it could be housed, standardized, and made persistent. This in turn had the effect of making clear what the production functions of the Page should be to a newly banded group of inexperienced disaster volunteers: that of rapid matching to quickly reunite suddenly displaced pets with people.

Such attention to the information architecture transformed the work of advocacy from an impulsive and transient "clicktivism" [28] into action that had a chance to be sustained for longer engagement—if not for very long volunteering commitments [38] then at least for longer task commitments. This observation maps to that of earlier work by Kreps and Bosworth [21] on the nature of self-organizing among (often volunteer) groups responding to disaster. In their terms, the Page would be described as arising out of loosely defined "activities" (crossposting) for most of the active members, which were then shaped by the "resources" in the form of the affordances of Facebook's Page features. This then gave rise to the articulation of the "task" of matching, which surprisingly had not previously been an explicit notion in crossposting work—the focus had been on pet rescue in non-disaster situations. In this case, people reoriented to the understanding that matching between lost and found pets—rather than the rescue of abandoned pets—is the solution for the setting of disaster and is a natural off-shoot of the visual information-sharing they were already engaging in. It also set the stage so that "site seers" [12] who had not previously been a part of the crossposting movement could become a part of the mobilization. Imposing structure on previously unarchitected, highly visual work brought the idea of advocacy work—mobilization—within this community clearly to the fore.

The admins also communicated resolution of the pet cases, which was a critical part of mobilization—and they did so in keeping with the information architecture they developed for the problem-solving work. These practices created the sense of completion of work—which communicated that there was work being done in the first place. Even when the actual matching work happened on another site or privately, the Page assumed the responsibility of calling the work completed for the entire large and amorphous pet advocacy world. This, we believe, appeals to the value of mobilized pet activism writ large.

Summary

The Hurricane Sandy Lost and Found Pets Page on Facebook sprung from a special interest group that represented an existing large segment of on-line society—pet lovers and advocates—that needed a structured information environment to spur further self-organization to assist in the aftermath of Hurricane Sandy. Innovations around the organization of visual information as well as other social practices articulated the cooperative work they could conduct—an improvised case management system—and in turn that work clarified the mission and larger social ordering of pet advocacy.

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