

(Infra)structures of Volunteering

Amy Voida¹, Zheng Yao² & Matthias Korn¹

¹School of Informatics and Computing
Indiana University, IUPUI
{amyvoida, korn}@iupui.edu

²Department of Information Science
Cornell University
zy87@cornell.edu

ABSTRACT

We report on the results of a diary study of the everyday volunteering and help giving of individuals in the millennial generation. We describe the breadth of work structures implicated in volunteering, the social structures implicated in volunteering, and the interdependencies between the two. We analyze the roles that technology plays in volunteering with a particular focus on the forms of infrastructure that are constituted through the work and social structures of this philanthropic activity. Finally, we reflect on design opportunities for infrastructures where work and social structures meet to support more everyday, ubiquitous forms of volunteering.

Author Keywords

Volunteering; Infrastructure

ACM Classification Keywords

H.5.3. [Information Interfaces and Presentation]: Group and Organization Interfaces—Collaborative Computing

INTRODUCTION

One of the earliest challenges observed in the nascent domain of collaborative computing was that of the discrepancy of benefit—between those who did the work and those who benefited from the system [11]. From the beginning, then, the theoretical attention of the field was focused on understanding the additional work carried out (or not) by some individuals in order to make the system work. Many early systems, of course, were designed for the private sector; perhaps because of this, help given or requested without a clear personal benefit was observed to be a critical challenge in the adoption of collaborative computing systems. Who, after all, would want to take the time to do work that mostly or only benefited others?

As collaborative system design has moved beyond the private sector, the importance of unpaid help and the role of volunteers has increasingly been recognized and become the object of research in a variety of domains. Researchers, for example, have asked questions about how to motivate

volunteers to contribute to online communities (e.g., [13, 17]), about how design might help to scaffold novice volunteer contributors toward more expert participation [5], and about how grassroots groups structure volunteering [24]. Researchers have also designed new infrastructures for supporting the participation of volunteers [25].

While research in collaborative computing has primarily explored infrastructures that support volunteering on a technology-by-technology basis (e.g., Wikipedia or Twitter)¹, we have yet to examine empirically the breadth of philanthropic activity that constitutes volunteering and the ways in which technology supports that breadth of work. Volunteering is a phenomenon that extends beyond any one system, transcends physical and virtual realms, and permeates the everyday lives of many civically engaged individuals and groups.

In this paper, we report on the results of a diary study of the everyday volunteering² of individuals in the millennial generation, aiming to better understand technology use as part of the *breadth of philanthropic activities* carried out by individuals. Following Lefebvre’s call to uncover the order of everyday life [16], we describe the work structures implicated in volunteering, the social structures implicated in volunteering, and the interdependencies between the two. We analyze the role that technology plays in volunteering with a particular focus on the forms of infrastructure that are constituted through the work and social structures of this philanthropic activity. Finally, we reflect on design opportunities for infrastructures where work and social structures meet to support more everyday, ubiquitous forms of volunteering.

RELATED WORK

Our research draws from two different threads of scholarship: research about volunteerism from the domain of philanthropic studies and research about infrastructures from the domains of collaborative computing and science and technology studies.

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

CSCW '15, March 14 - 18 2015, Vancouver, BC, Canada
Copyright is held by the owner/author(s). Publication rights licensed to ACM.
ACM 978-1-4503-2922-4/15/03...\$15.00
<http://dx.doi.org/10.1145/2675133.2675153>

¹ See Starbird and Palen for a notable exception [24].

² In this paper, we use the terms ‘volunteering,’ ‘volunteer work,’ ‘help giving,’ and ‘unpaid assistance’ interchangeably. This language reflects the breadth of terminology that we used in consent forms and data collection instruments in order to encourage a broader spectrum of reporting than would have been likely if we had only used the term ‘volunteering,’ as it is often interpreted very narrowly in contemporary culture.

Volunteering

Research in philanthropic studies suggests that the construct of volunteering is too narrowly understood. Schervish and Havens emphasize that:

...in order to study the full temporal, spatial, and relational range of voluntary assistance, we need to unlearn the bias toward equating the measure of a caring society with the amount of formal giving and volunteering taking place, and learn to recognize the day-to-day giving of time and money that sojourns in the daily occasions for care surrounding work, family, friends, and community. [22]

Schervish and Havens refer to this broader understanding of philanthropy as both “moral citizenship” and “caritas,” drawing philosophically from multiple intellectual traditions (e.g., Aquinas [9] and de Tocqueville [8]). A more holistic perspective on volunteering—one validating the importance of everyday caritas—may also help foster more “formal” volunteering in the long-term, as one’s self-identification as an empathic or philanthropic human being is a first step toward caring about the fate of more distant others:

...the informal and generally unrecognized assistance carried out in and around the community of one’s family, friends, and associates, is where we first identify with the fate of others and learn to care for them, and the beginning of and the opening to a wider horizon of assistance. [22]

An orientation to and appreciation for a breadth of volunteering practices, beyond hours volunteered for nonprofit organizations, is also increasingly important as scholars in philanthropic studies have come to recognize that a diversity of volunteering styles are increasingly “blended together into a personal volunteer cocktail” [12]. Hustinx and Lammertyn suggest that collective and reflexive styles of volunteerism co-exist in individuals—sometimes held in tension and sometimes enriching each other.

A collective style of volunteering is centered around the desire for the construction of group-based identity and motivated by a sense of obligation to the community [12]. Collective volunteerism “thrives” in the context of formal voluntary organizations, which are typically highly structured and membership based. For collective volunteers, involvement with the organization is a way of “reaffirming shared group identity” and they may be as much or more concerned about supporting the values and goals of the organization than they are with the specific work that they are doing. Collective volunteers typically offer a regular, long-term commitment to an organization.

A reflexive style of volunteering is centered around one’s individual experiences and identity and motivated by personal goals and self-realization [12]. Reflexive volunteerism is more apt to be associated with “an

expanding field of rather informal, self-organized, and decentralized initiatives” in which the volunteer participates, not for a sense of belonging, but for the sake of the work being done [12]. Reflexive volunteers typically offer irregular, ad hoc, or project-based commitments to organizations.

Fundamental in this distinction between collective and reflexive styles of volunteering are the interdependencies between the social structures of volunteering (group versus individual biographical frames of reference) and the structure of volunteer work (regular versus episodic, for example). These interdependencies play out in different ways depending on the particular style of volunteering and can be expected to play out in an even larger diversity of ways given each individual’s “personal volunteer cocktail.”

Infrastructure

An infrastructure occurs when local practices are afforded by a larger-scale technology which can then be used in a natural, ready-to-hand fashion. [23]

Infrastructures are often most notable because they are typically *not* noted—characterized by their invisibility [23]. Yet researchers in science and technology studies and, more recently, collaborative computing and human–computer interaction, have sought to orient more analytic attention to this construct. Bowker, in particular, has argued for research to methodologically undertake “infrastructural inversion”—subverting the traditional figure/ground relationship which perpetuates the analytic invisibility of infrastructures and, instead, foregrounding them in studies of science and technology [2].

Infrastructures are mutually constituted of interdependent technological and social structures [15, 23]. They are fundamentally relational—embedded in social structures, learned as part of membership in social structures, and shaped by the conventions of social structures [23].

Infrastructures are also temporal, changing over time [23]. Questions of “when is infrastructure” have gained increasing primacy in the research literature, both to understand when infrastructure becomes visible (e.g., when breakdowns occur in either technology or work practices, rendering the infrastructure visible) [20, 23] as well as to emphasize an empowering shift toward supporting the appropriation, tailoring, and ongoing repair of infrastructures over time as opposed to perfecting or fixing them in advance at the point of design [14, 20].

But the research community’s critical engagement with infrastructure has also found that the evolution of infrastructures, from which it has become increasingly difficult for people to opt out, can be experienced as “noisy,” inviting nuisance and distraction [18]. Additionally, the full-service, at-hand nature of many infrastructures may also invite complacency or disempowerment [18], which could be particularly problematic in civically engaged domains like volunteering.

METHOD

Participants

We recruited 19 participants from a large university in the northeastern United States; participants responded to an advertisement posted on a university-sponsored research recruitment website. Participants ranged in ages from 18 to 22. All participants were undergraduate students from a breadth of (15 different) majors. Our choice to include a college-age sample in this research was motivated by research suggesting that a diversity of volunteering styles—a valuable breadth of data for exploratory research such as this—might be more present in individuals of the millennial generation [12]. Individuals in this generation hold civic engagement as a core value; for them, helping others is simply part of what it means to live in a community [26].

Participants included 12 females and 7 males. The skew in distribution toward female participants mirrors trends in the demographics of volunteers in the United States; in 2013, 58% of volunteers in the United States were female [6].

Data Collection

Participants kept a diary via a Google Docs Spreadsheet, logging all of the “unpaid help or assistance you provide to anyone outside of your immediate family” over the course of one month. The guidance provided to participants was based on language recommended by researchers in philanthropic studies [22] and aimed at eliciting a breadth of everyday *caritas*—beyond the organizationally sponsored activities typically associated with the term ‘volunteering.’ In their diaries, participants logged the following information: date, start and stop times, a brief description of the unpaid assistance, their location, whether the participant was alone or providing assistance with a group of volunteers, for what organization (if any) they were volunteering, what activities they were doing before and after, and what technology(-ies) were used to provide the unpaid assistance.

All diaries were shared with researchers for the duration of the study so that we could customize reminder emails based on the incoming data (or lack thereof). We required participants to log a minimum of 30 days of data to constitute a complete diary. If there were no instances of unpaid assistance to log on any given day, we asked participants to indicate that explicitly with a “N/A” entry, so that we could differentiate between days with no help giving and days during which participants forgot to log data.

We conducted semi-structured follow-up interviews with all 19 participants. The interview protocol was designed to explore the following areas of interest:

- Similarities and differences among the various instances of volunteering reported in each diary;
- Decision making processes and rationales surrounding the various instances of volunteering; and

- Role(s) of technology(-ies) in each relevant instance of volunteering.

Interviews lasted 24 minutes, on average. Different subsets of researchers conducted the various interviews; all researchers used the same interview protocol. A subset of researchers met weekly while collecting data to discuss the interview data and to revisit the protocol, where necessary, in light of each new interview.

Participants were compensated with a \$10 gift card after the completion of their diary and another \$10 gift card following the interview.

Data Analysis

The data from the diary spreadsheets were aggregated and cleaned. Some missing information subsequently solicited in the interviews was also added. We computed descriptive statistics to provide general characterizations of the nature of the everyday volunteering of the millennials in this study.

We also inductively coded data that participants entered in two of the fields in the diaries. Descriptions of the help given were coded based on the type of help and the participant’s relationship with the beneficiary. Descriptions of the technologies used were coded based on the class of technology(-ies) that played a role in each instance of volunteering. In all cases, coding was done based on a synthesis of the diary content as well as the elaborations and reflections elicited in the interviews. These elaborations were particularly essential in understanding technology use, as participants frequently under-reported technology use in their diaries. Cellphones, in particular, were often rendered invisible to participants, for example:

This [diary entry] I guess I should probably put as cell phone. I don't even think like cell phone as a technology. So like, I don't know... 'cause she was there, so she called me. (P1)

In addition, participants frequently reported technology-as-hardware instead of technology-as-application, so unpacking what participants meant by “laptop,” “cellphone,” or “internet” was critical.

All interviews were transcribed and analyzed using inductive coding and affinity diagramming techniques (e.g., [7]). Our initial round of analysis yielded a set of categories describing volunteering practices, including motivation, investment, visibility of impact, scope of impact, relationships, context, rhythms, structure, etc. As we moved into subsequent rounds of analysis, it became increasingly clear that the boundaries among these categories were messier than we had originally understood. We ‘exploded’ each category via affinity diagrams, focusing on the relationships among categories. Instead of each interview excerpt being coded under a particular category, most excerpts were situated as bridges among two or more categories (Figure 1). These interrelationships were

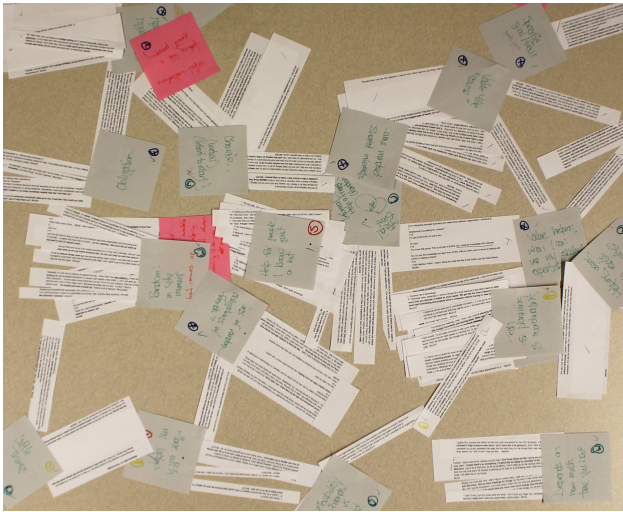


Figure 1. The interrelationships among dimensions led to new, bridging categories in our second round of data analysis.

highlighted by a new set of bridging categories including empathy and expertise, reciprocity and obligation, and impact. Reflecting on this shift in the analysis, we observed that many of these new coding categories bridged between data about the structure of volunteer work (i.e., the genres, temporality, and systematization of the work) and the social structures of volunteering (i.e., the role that social relationships play in arranging and carrying out the work). The interdependencies between work and social structures came to the foreground as we continued to work with and understand our data.

OVERVIEW OF RESULTS

Participants logged 380 instances of volunteering over the month-long study (an average of 20 instances of volunteering per participant). These instances lasted, on average, 63 minutes, and ranged in duration from a few seconds to 12.5 hours.

Participants collectively reported 183 instances of help giving (48%) during which they provided unpaid assistance alongside other volunteers; for the remainder of the unpaid assistance, then, they were the sole help giver. Participants also reported 105 instances of help giving (28%) that were affiliated with or coordinated through an organization (e.g., a nonprofit, sorority, or campus club); 71 of these organizational volunteering opportunities (68% of the organizational instances) were carried out alongside other volunteers, suggesting that organizationally-affiliated volunteering is more likely to be carried out alongside others than volunteering, more generally.

Participants collectively reported 169 instances of help giving (45%) in which technology was involved in some way. Participants appropriated a diversity of technologies for many different kinds of volunteer work (Table 1).³ This

³ Some participants noted multiple technologies used for particular instances of volunteering; because of this, numbers in the table do not add up to 169.

ecosystem of technology used for philanthropic purposes ranges from cellphones to centrifuges, from search engines to stoves. The most frequently reported classes of technology include productivity software (16% of technologies reported), messaging (11%), email (10%), cellphone calls (7%), and vehicles (7%).

When single technologies are reported for an instance of help giving, they typically align more strongly with either the work or social structures of volunteering. That is, for many instances of help, participants reported using technology to *carry out* the volunteer work. In other instances of help giving, participants used technology to *activate* the social structures implicated in the volunteering.

When multiple technologies are used to support volunteering, the different technologies often support a combination of work and social structures. In these instances, participants shift between technologies—from a technology used to activate social structures to a technology used to support the work structures. This transition between technologies is similar to the “outeraction” observed by Nardi et al.—the work of negotiating availability for work at a later time, frequently arranged for a different medium [19]. P13, for example, exchanged text messages with a friend to coordinate and then met up with her later at a dorm, where she helped with a class assignment using productivity software.

Many technologies reported in this study seem to be infrastructural already: larger-scale technologies creatively appropriated for local volunteering practices. No participant reported using any technologies specifically designed for volunteer work, even in an organizational setting; this finding resonates with trends toward creative appropriation in previous studies of volunteer work from an organizational perspective [29]. Similar to the majority of homebrew databases in Volda et al.’s study, all infrastructures used by volunteers here are more general-purpose infrastructures (or at least they are not tailored for volunteering) that have been appropriated locally.

In what follows, we characterize the work structures of volunteering and the supporting technological infrastructures that have been appropriated. We then characterize the social structures implicated in volunteering and describe the supporting technological infrastructures that have been appropriated for this purpose. Finally, we describe some key interdependencies between work and social structures in volunteering and reflect on what it would mean for technological infrastructures to better support these interdependencies.

WORK STRUCTURES OF VOLUNTEERING

The structure of volunteer work is most saliently characterized by variations in its genre, its temporality, and the degree of pre-structuring and systematization of work activities. The diary entries reflect a diversity of genres or types of volunteer work including academic help (27% of

	Product. Software	Msg.	Email	Cellphone (Call)	Vehicle	Course Mgmt. System	Home Appliance	Sci. Equip.	Search Engine	Design Software	Nonprofit Website	E-Commerce	Web-Based Reference	AV Equip.	Social Network Service	TV/Stream. Video	Video Conf.	Online Survey	Printer	Scanners/ Swipe Cards	Software Dev. Tools	Total	
Academic Help	20	7	2	2	5	11		8	8	2		1		1		1	2	3				2	75
Clerical Help	11	1	16	2						6				3					2	2		1	44
Householding & Errands		5		1	6		8					1											21
Small Courtesies		3		6	1		1					1			2					1			15
Information Help		2	1	1					1			1	4		2		1						13
Well-being		2		1				1			2	1				3	1						11
Lending		1	1		1		2	1					1						1				8
Financial Help											6	1											7
Total	31	21	20	13	13	11	11	10	9	8	8	6	5	4	4	4	4	3	3	3	3	3	194

Table 1. Instances of reported technology use and type of help given

	Product. Software	Msg.	Email	Cellphone (Call)	Vehicle	Course Mgmt. System	Home Appliance	Sci. Equip.	Search Engine	Design Software	Nonprofit Website	E-Commerce	Web-Based Reference	AV Equip.	Social Network Service	TV/Stream. Video	Video Conf.	Online Survey	Printer	Scanners/ Swipe Cards	Software Dev. Tools	Total	
Helping Alone	12	12	13	9	2	6	7	2	5	2	7	3	5	1	4	3	3	3	2	1			102
Helping with Others	19	9	7	4	11	5	4	8	4	6	1	3		3		1	1	1	1	2	3		92
Total	31	21	20	13	13	11	11	10	9	8	8	6	5	4	4	4	4	3	3	3	3	3	194

Table 2. Instances of reported technology use when helping alone versus when helping alongside others

	Product. Software	Msg.	Email	Cellphone (Call)	Vehicle	Course Mgmt. System	Home Appliance	Sci. Equip.	Search Engine	Design Software	Nonprofit Website	E-Commerce	Web-Based Reference	AV Equip.	Social Network Service	TV/Stream. Video	Video Conf.	Online Survey	Printer	Scanners/ Swipe Cards	Software Dev. Tools	Total	
No Org. Affiliate	21	20	6	11	8	10	9	5	9	2		5	5	2	3	4	4	2	2	1	2		131
Organizational Affiliate	10	1	14	2	5	1	2	5		6	8	1		2	1			1	1	2	1		63
Total	31	21	20	13	13	11	11	10	9	8	8	6	5	4	4	4	4	3	3	3	3	3	194

Table 3. Instances of reported technology use when help is and is not affiliated with an organization

all entries), clerical help (18%), household help and errands (18%), emotional and physical wellbeing (10%), financial help (8%), informational help (4%), and lending (4%). Many participants also reported small courtesies (11% of all entries) like holding open a door or giving up one's seat on the bus. This category is likely underreported in the data, however, as other participants were more hesitant to report small courtesies and explicitly told us this type of assistance should not 'count' as these behaviors are simply a reflection of how people ought to be treating each other rather than a type of help giving that should be reported.

In the interviews, participants portrayed a variety of structural characteristics that we describe on a spectrum from being planned and systematic on one end, to being spontaneous and unpredictable on the other end.

From Planned and Systematic...

At one extreme, activities may be scheduled in advance and have "a set time and a place" (P2); they may even take place repeatedly and at regular intervals with a "set time each week" (P2). As such, they are likely to be planned and "not just 'oh I randomly feel like going here'" (P2). Planned activities may also require aligning other activities to accommodate this schedule: "there's a specific time each week that I have to be there [so] I know I have to do it, [which] means that I have to plan other things around that" (P15). A scheduled activity also implies that one has made a commitment to the activity that would not be lightly retracted: "If, for instance, like one day, you are not really feeling up for it, you kind of already made that investment, like commitment, like you are certain you have to do it." (P2).

Besides being planned and scheduled in advance, volunteer work may not only be seen as "consistent" (P3) in terms of taking place regularly, but also consistent in terms of what has to be done. In that sense, the work may be "very systematic" (P3) and highly structured—i.e., the entity initiating the work activity may have laid out exactly what and how the work is to be conducted.

... to Spontaneous and Unpredictable

On the spontaneous side of the planned-to-spontaneous spectrum, volunteer work may be "more up in the air and spontaneous" (P3), e.g., "bump[ing] into" someone on the street or before class to help them find the way (P6), or when one considers picking up groceries for roommates at the store (P9). Spontaneous help can sometimes be "easier" (P11) because it doesn't have to be coordinated in advance. However, participants' willingness to help spontaneously does depend on what else they are doing and how much time they have, because one may be "more inclined to help someone else when I don't have like a lot going on" (P1). Hence, one may also have "to put [a request] on hold, tell someone, like, can you give me half an hour" (P2).

Although more spontaneous help may seem to signify a lack of structure, as in Lefebvre's analysis of everyday life,

we find that it follows a different structural order [16]. The work structure of more spontaneous help seems to stem from a set of expectations derived from social structures—social relationships, personal motivations, and societal influences. There are expectations that, for some beneficiaries, one should drop everything in order to help. In addition, there is an expectation that more spontaneous help will have highly variable and uncertain durations (e.g., "the time is variable, like who knows how long you will have to be like devoting" (P2)) and this variability influences how and if one takes on spontaneous help.

The Evolution of Work Structure

Notably, the structures of volunteer work are not static; they frequently evolve over time. While some volunteers may enter into volunteer work after it has been heavily systematized, numerous participants noted changes in the structure of their volunteer work—either over the course of the one-month study or when reflecting on the historical trajectory of work structures leading to an instance of help giving reported in the diary. Most commonly, participants reported that a single instance of assistance evolved into a repeating pattern of help. With enough repetition, patterns of help may also become more institutionalized and those who help each other become a known "group":

*Here is a group of girls that walk someone home....
We pick someone up. We come and get someone
wherever they are.... A lot of us study at engineering
quad [and] really don't want to walk home alone.
(P3)*

Here, P3 describes a somewhat more institutionalized form of assistance in which a group of friends and classmates routinely make arrangements to pick each other up from the library or meet up to walk home safely together at night. This assistance has become so frequent among the students that it can be activated and made use of by members of the group at almost any time. Hence, the structure of volunteer work is also highly influenced by the social structures in which participants are embedded.

Technologies Foregrounding Work Structures

Different types of work are associated with different classes of technology. Among this student population, technology is, perhaps unsurprisingly, used to provide academic help more than any other type of help. And the technologies used to provide academic help are also more diverse than technology appropriated to provide any other type of help, ranging from productivity software to scientific equipment to vehicles to search engines to email (Table 1). Participants also appropriated many diverse classes of technology for clerical help and informational help; however, few classes of technology are appropriated to provide financial help.

Conversely, different classes of technology are also used for providing different types of help (Table 1). Messaging, cellphone calls and, more surprisingly, e-commerce, are used to provide numerous different types of help. Others,

such as design software, are used for relatively few classes of help; in this case, for only academic and clerical help.

The planning and coordination of volunteer work are supported by email lists and productivity software, such as Google Docs' spreadsheets, documents, and forms (for polls and surveys).

A lot of planning and coordinating can go on in like Google Documents.... To put ideas of events, to sign up for shifts when we have a food fundraiser.... Sometimes we set up like duos for meeting polls. (P9)

These infrastructures also support discussion and brainstorming about how to carry out the volunteer work as well as reflection about the work structure after the fact via shared meeting minutes.

Micro-coordination of volunteer work is supported by cellphone calls and messaging—both text messaging and Facebook messaging. These infrastructures are used to request spontaneous help, arrange meeting times and locations, confirm modes of transportation, etc. But they are also used to coordinate with and remind other volunteers closer to planned events:

Cellphone will be used just to coordinate volunteers.... If we've got an event going on and someone is not there for the shift they signed up for, I will send them a very polite text: "Hey, where are you? We need help!" (P9)

In addition, a range of infrastructures (cellphones, laptops, internet) are seen to be convenient resources because they are available when needed, or in-the-moment, as was the case with many spontaneous instances of help giving:

I always use my laptop because it's really portable and [I] can take it wherever I am. I can just pull it out. So it's [a] more immediate vision of help, I guess.... My friend really needed help like right then... and I think technology was so useful for that. I was able to look stuff up and be talking to him online at the same time. (P2)

All forms of volunteer work, then, are structured in some way or another and both the structures and structuring of this work are supported by technology. Yet, the work structure of volunteering is not influential in isolation, but through its interdependencies with the social structures implicated in volunteering.

SOCIAL STRUCTURES OF VOLUNTEERING

More, perhaps, than in most other types of work, social structures play a central role in how volunteer work is carried out—what kind of volunteer work is done, how it is done, and, in fact, whether volunteer work is done at all. In this research, two classes of social structures are influential:

- The nature of relationships between the help giver and beneficiaries—whom people help in what way and to

what extent (see also [10] for a discussion of this relationship in the context of charitable giving).

- The nature of the relationships among volunteers, e.g., is one volunteering alone or with friends, with people who share similar interests and goals, under the purview of an organization, etc.

Note that we have scoped this paper to focus on the collaborative work that is predominant in volunteering. A few participants did acknowledge, however, that sometimes it is just “easier” to find ways to help others without the coordination overhead of working in groups (P3).

Relationships Between Volunteers and Beneficiaries

By far the largest group of beneficiaries of the help reported in the diaries is friends (57%), followed by volunteer organizations (17%), strangers (9%), and classmates (7%). All types of help, from academic help to help for physical and emotional wellbeing, are reported for beneficiaries who are friends. Help given to classmates, in contrast, was almost exclusively limited to academic help and lending; and the help given to strangers were predominantly instances of small courtesies. The interview data corroborates the importance of social structures and relationships as an indicator for the likelihood of help giving: “The biggest thing that might influence whether I choose to help someone out or not is how well I know them” (P4).

Even more, the closeness of the relationship also influences what types of help participants provided to others—particularly as it relates help that may require more of an emotional investment:

It will depend on how close I am with them, like what kind of assistance I give. [...] If it's like technical skill that I could help with, I would help like anyone with that, like doesn't matter how close I am. [...] But if it's something that requires more emotional investment, then it has to be someone that I'm close to. (P2)

Relationships Among Volunteers

Participants also have preferences about whom (if anyone) they prefer to work with in providing assistance. Volunteering in conjunction with an organization was seen as more “fun” when done alongside others who share the same passion, whereas some things are just more effective if done alone:

Sometimes it's nice to have like another friend with you if it's an organization, 'cause it's like more fun that way. Just like feels good for both. But if it is like helping a friend, it's like one-on-one help is the best.... And also if I'm providing technical skills, any kind of skills, that's usually better alone, 'cause then I can just get it done. (P2)

Social structures also served as critical bridges for introducing individuals to new organizations and to new volunteer opportunities within those organizations.

Holi [the Hindu festival of colors] is like one of my favorite holidays. One of my friends here... she's like, "Oh, let's volunteer." So I was just like, "Okay, let's do it...." I'm actually not [a member of the host organization]. I was just going to participate in Holi in either way.... I met a lot of people at Holi who were really great and I definitely see myself as joining that organization. (P19)

In addition, some participants reported volunteering for organizations that support causes they do not strongly believe in, if it meant that they were helping a friend—i.e., they are only helping the organization for and because of the relationship to the friend:

I helped a friend with an event that I normally wouldn't have. And that's just because my friend wanted me to be there, support him and things like that.... I don't really feel like passionate about that.... I don't like not [to] support [them], but I wouldn't really go on my own. (P2)

Hence, the social structure also influences the structure of the work—whether and how much someone is willing to help in a given way.

Technologies Foregrounding Social Structures

Participants reported a similar prevalence of help giving involving technology when helping alone (102 instances; 50% of all instances of solo volunteering) and when working alongside co-volunteers (92 instances; 52% of all volunteering with others) (Table 2). However, different social contexts of help giving are associated with different types of technology. Communication media, home appliances, and nonprofit websites are more commonly used when helping alone, whereas A/V equipment, design software, scientific equipment, software development tools, and vehicles are more commonly used when helping alongside others. Other technologies represented more diverse contexts of use, with course management systems, e-commerce, and search engines used for approximately the same number of instances of volunteering alone as when alongside others.

Participants also reported different patterns of technology use corresponding to the organizational affiliation of the volunteer work (Table 3). While there are fewer instances of organizationally affiliated help giving than non-affiliated help giving in the data, a larger percentage of the organizationally affiliated help giving involved technology—60% of organizationally affiliated help giving involved technology and 48% of non-organizationally affiliated help giving involved technology. Yet, the only classes of technology used more frequently for organizationally affiliated help are design software, email, and nonprofit websites. The only class of technology *not* used for non-organizationally affiliated volunteering in this study is nonprofit websites.

While communication media do contribute to supporting the coordination of work (as noted previously), they also, even more predominantly, foreground the social structures of volunteer work. Communication media take up the important function of helping people learn about volunteer opportunities and activating existing relationships for philanthropic purposes.

And also Facebook is really good about finding out causes.... And I feel like it's such an efficient way to get people involved. (P2)

Often, these technologies function as broadcast channels where people send and receive help requests (see also [30] for similar evidence from an organizational perspective). In this sense, they present a way to tap into existing social networks. Prominent infrastructures appropriated for this include Facebook, group texting, and email listservs:

So people [in my sorority] are always like asking [for help]. You know, we have like a Facebook group that always posts like take the survey, like can you do this for me, or like can you come to this... (P1)

'Cause we also had a big group text in our apartment, so people send things out like, "Oh, anyone going to the grocery store," like "Is anyone doing this?" Even if we talked in person about it, like that first, like initial, like the question, I need help with this... was through the cell phone. (P1)

Yet these social structures require some form of an existing tie; Facebook groups and email listservs, in particular, require membership. In our data, volunteer work broadcast through these media only served beneficiaries who were part of that membership.

Social structures play key roles in initiating and motivating help. These structures influence and are influenced by both work structure and technology use. Indeed, it is the interdependencies among these constructs that provide the richest characterization of everyday volunteering.

INTERDEPENDENCIES BETWEEN WORK AND SOCIAL STRUCTURES

In introducing both the work and social structures of volunteering, we foreshadowed some of the basic interdependencies found in volunteer work. Here, we highlight three key interdependencies in more detail: expertise and empathy, reciprocity and obligation, and impact.

Expertise and Empathy

The structure of volunteer work is strongly influenced by the previous experiences and expertise of the volunteer. Participants valued giving help in areas where they had expertise. P2, for example, prefers to volunteer when “my knowledge can kind of benefit someone.” P14 noted that expertise can extend beyond academic knowledge to practical hobbies such as baking, as well.

When this expertise was gained through hard work or personal struggle, participants suggested that they volunteered because they knew “I have been there and I know what you are going through” (P4). For the participants in this research—all students—empathic help often manifested in tutoring sessions for classmates who did not necessarily have strong pre-existing ties with the volunteer:

A lab was due for a CS class.... It was just like a large group of people there, working on it. I saw one person that basically just started to look at it and they really did not have a good feel. And I kind of have to empathize with them, because that's what I had a day or two before. And so I just kind of sat down with them, walk them through what kind of they have to do. (P4)

The interrelationships between work and social structures come to the fore where empathy and expertise meet. Empathy fosters expert help where shared experiences are foregrounded, such as within a community of classmates. Empathy takes root in the social structure of volunteering whereas expertise is brought to bear as a resource for the tasks at hand, taking root in the work structure of volunteering.

Infrastructures of Expertise and Empathy

Participants in this study employed such a diverse set of technologies for their volunteer work, in large part, we believe, because of the diverse breadth of skills and expertise being developed by these undergraduate students. Technologies like centrifuges, incubators, specialized scientific calculators, design software, and software development tools all demand some degree of expertise in their use. Tools-of-the-trade, although diverse, individualized, and often-still-invisible, were a significant form of philanthropic infrastructure:

I never like think about [technology], but actually like as I was doing it, the computer is really useful. And then the Internet, for a lot of the skills that I could apply, like friends, I will take a lot of others' jobs like emailing. I helped like build this photo uploader and that all was kind of necessary. (P2)

Collaborative computing has explored systems that provide expertise recommendation within given communities (e.g., [21]), crowdsourcing systems for complex tasks requiring skills and expertise (e.g., [27]), and social Q&A services for gathering expert knowledge (e.g., [28]). Systems that foster support among individuals with shared experiences, such as patientslikeme.com (e.g., [3]) are also relevant here. But part of what is striking in our data is the fluidity of social structures across which empathy and expertise extend. It is not simply existing friends or classmates whom one helps; expertise can function as an open call, leading volunteers to be introduced to new social structures and causes, enriching their “personal volunteer cocktail” based on this expertise

[12]. For infrastructures supporting expertise and empathy, then, it will be fruitful to consider how expertise might be conveyed across existing (and even closed) communities, and how empathy can be extended to new social contexts.

Reciprocity and Obligation

Work and social structures interleave tightly where helping becomes reciprocal. Whether among housemates, friends, or sorority sisters, participants valued volunteering for people who they knew would “be there for [them], too” (P2):

Helping a friend... it just feels good. You will become closer to them. They are like opening up to you, you feel like reliable, stuff like that. And you also just have an implicit knowledge that they'll be there for you too, like if you did that. (P2)

Giving reciprocal help not only builds closer relationships within a given social structure, it enables P2 to feel more reliable, a personality trait that has direct implications on the temporal structure of her volunteering. Being reliable implies that she will be available for others when needed.

Reciprocity also develops through the emergent structures of volunteer work. P3, for example, started walking home from campus with a few friends. After helping one another get home safely several times, they began to recognize the activity as a more structured, reciprocal form of volunteering:

We were like, “Okay, we are gonna pair assist.” I like that a lot. [...] It feels good to know like, it's kind of like the girls there you are making a little family here. We all kind of watch out for each other. And I like that a lot. (P3)

The reciprocity of help giving here also led to the development of closer, “family”-like relationships. Within some social structures, the assumption of reciprocity led to an even stronger interrelationship of obligation: “[There’s] an obligation to help family members because they will always be there for one” (P2).

The obligation to provide help extended beyond family to both friends and organizations, but the social structures related to feelings of obligation varied among participants. P13, for example, felt a strong sense of obligation to help her friends: “Things that I do for friends, like out of that obligation of friendship...” (P13). In contrast, P12 reported feeling more of a sense of obligation for an organization than a friend: “[For the] individual, if I don’t have time I would say no, but if I volunteer for an organization, I don’t think... [I would say no]” (P12).

The sense of obligation also holds significant implications for the temporal structure of the volunteer work. For friends, the obligation can require a significant amount of time (e.g., “we did stay till 5 in the morning” (P2)) but this commitment is much more “variable” and “random” (P2).

In contrast, the obligation to organizations is not really “flexible”:

So if, for instance like one day, you are not really feeling up for it. You kind of already made that investment, like commitment, like you are certain [you] have to do it. (P2)

Yet, it is the interrelationships between work and social structures relating to both reciprocity and obligation that challenge beliefs about what ‘counts’ as volunteering. Numerous participants reacted against the idea that helping friends should ‘count’ for a study—even one that explicitly asked participants to report all instances of “unpaid help or assistance.”

Well, the friend helping... I feel like that's just part of friendship, not really like assistance type of thing. Just like giving and taking relationship. They help me all the time and I help them.... With friendship that's kind of like an obligation.... This is weird. Want just to be a good person. (P13)

Infrastructures of Reciprocity and Obligation

Although not mentioned by participants in this study, new infrastructures are emerging to support help giving practices reliant on reciprocity, such as timebanking [1]. However, Bellotti et al. find many challenges that have emerged in the infrastructuring of these practices. In particular, the overfixing of work structures in timebank systems may be crowding out the philanthropic goals of many participants and diminishing the potential for community building. Considering how to support not merely the work structures but the social structures within these technological infrastructures is likely key to sustaining their use.

As we reflect on infrastructures of reciprocity and obligation, it would also be prudent to heed the cautionary advice of Mainwaring et al. [18]. We need to better understand how to reflect obligation appropriately in infrastructuring—to balance between supporting the philanthropic work being done with the potential downside of increased infrastructural noise and distraction.

Impact

For nearly all participants, the work and social structures of volunteering were deeply tied to individual preferences about the kind of impact the individual wanted to make with his or her volunteering. Some individuals valued the scope of their impact while others valued its visibility.

For some individuals, the *scope of impact* was most important. These individuals valued “having more effect on other people’s lives” (P8) and “making a huge difference” not simply doing a “small favor” (P11). They typically valued volunteer work more when it was coordinated through an organization:

I guess I feel better about the work I do with an organization. It's more actually community service.

When it's just a friend, it made me feel good, but...I mean it's not bad that I'm doing a favor for my friend, but it's not like helping the world, anyway, for the community.... (P11)

Part of the value of volunteering through an organization was the structure that it provided—not simply of the volunteer work being done—but the intentional, goal-driven nature of the work suggested a larger impact than when helping friends with everyday matters.

[Working with an organization] probably feels a little more significant.... Having more effect on other people's lives. I guess? 'Cause this seems like we required like specific dedications. None of these [instances of helping people I know] has any specific focus or particular goal I was trying to reach in helping people. (P8)

When participants valued the scope of impact, they typically made connections between this impact and work that had been organized through the social structures of an organization. Similarly, P2 highlighted the benefit of volunteering with others who share the same mindset. Whether or not the volunteering was carried out within an organizational structure, working with a group that shares the same mindset may also suggest future possibilities for longer-term impact with that social cohort:

I also really like working with other volunteers too with same mindset. That's definitely a pro because people who share your interest, maybe in the future we could like work together on bigger things. (P2)

For other individuals, the *visibility of impact* was of critical importance to their help giving; valuing the visibility of impact had different implications for the work and social structures of volunteering. When these participants knew the people they were helping, they had direct access to see the impact of their volunteer work. This direct access was meaningful for them:

Like sometimes when you are helping a friend it feels better than... helping for an organization. Because I know the person that I'm helping and I see the results. (P17)

Even when the participant did not know the individual that was being helped, the direct nature of small courtesies helped provide the visibility of impact that was important.

Um yeah, I think the [helping by providing an] umbrella one stands out the most 'cuz it's just like... you really made a difference, like you saw that immediate difference as opposed to donating blood. Like I'm not gonna actually see the person who ends up getting blood or whatever. (P18)

Those who valued visibility of impact rarely spoke about distributed help or virtual volunteering as being particularly

meaningful. For these participants, visibility was always equated with co-presence.

And while most participants who valued the visibility of impact recalled work structures that were more sporadic and episodic, one participant, P2, did offer an example of a more structured or “formal” volunteering through a nonprofit organization in which she mentored elementary school-aged children directly. Here, the opportunity to build social relationships (as opposed to helping an individual within an existing social relationship) was of particular value.

I guess for the formal organization [tutoring children in an elementary school], it's just really good to know that I'm contributing to a cause that I feel good about. And like all of these causes involve helping people directly, which makes it feel even better because I wanted to [be] as helpful as I can.... You could really form formal relationships with them. You could see how you could benefit them. (P2)

Infrastructures of Impact

We find little evidence in our data or from existing systems of technologies that serve as infrastructures of impact—either related to scope or visibility. The one instance we can point to of a technology providing consistent measures of impact was from a diary entry of P13, who knew, based on feedback from a ‘quiz’ website maintained by the United Nations World Food Programme, just how many grains of rice would be donated on her behalf as a result of quiz questions she had answered correctly: “Donated 1140 grains of rice through Freerice.com” (P13, diary entry).

However, the dearth of examples of infrastructures of impact is striking, particular given that impact is one of the most influential motivations for volunteering [4]. Previous research examining technologies used to support charitable donations also emphasized the need for technologies to provide better feedback about the impact of financial help [10]; our recommendation here is similar. Technological infrastructures are well positioned to track data about help given; tracing and visualizing trajectories of the impact of that help—across work and social structures—would be a compelling area for research.

INTEGRATING WORK AND SOCIAL STRUCTURES IN TECHNOLOGICAL INFRASTRUCTURES

Technology reflects and supports both the work and social structures of volunteering in a variety of ways. Yet, the strong interdependencies between work and social structures of volunteering that surface in the data from this study are not as clearly mirrored in technology use. Instead, we primarily see a diverse, ad hoc assemblage of different technologies supporting parts and pieces of volunteering—individual technologies that either primarily support work or social structures, but rarely both in a more integrated manner.

Certainly, some technologies can support both work and social structures. P5, for example, “talked with best friend back home about her depression and living situation”; to do this, she activated her social network via Skype and then provided emotional support in that medium, as well. Despite the few examples such as this, we believe it is useful to reflect on the more general disconnect between the integration of work and social structures observed in volunteering *practices*, on one hand, and the lack of integration of work and social structures in *technologies*, on the other. Not to suggest that all technologies should be all things in all contexts, but rather, as we reflect over the diverse set of technologies appropriated for philanthropic purposes, we see value in posing the questions, ‘How might we be more attuned to the interdependencies between work and social structures in infrastructures of volunteering?’ and ‘How might we imagine technologies that transect the space of volunteering—including dimensions of both work and social structures?’

CONCLUSION

Lefebvre, in his seminal critique of everyday life, argues that everyday things are not “infantile” or “prelogic” [16]. They have an underlying order that is relevant, interesting, and uncoverable. Through our analysis of diary study and interview data about the everyday volunteering of millennials, we have sought to uncover the structures underlying this philanthropic activity.

We have provided empirical evidence of the diversity of everyday volunteering practices relative to more traditionally studied forms of organizationally affiliated volunteering. We also offer the first empirical study of technology use across this diversity of volunteer work. Our insights reinforce the crucial role that technology plays in an updated, expanded, and richer understanding of volunteering. In particular, we have made the following contributions:

- Characterized the prevalence and diversity of technologies used for volunteer work;
- Characterized the work structures of volunteering, noting, in particular, the spectrum from planned and systematic to unplanned and spontaneous volunteering as well as the evolution of these structures;
- Characterized the social structures implicated in volunteering, including the nature of relationships with other volunteers, organizations, and beneficiaries;
- Identified the interdependencies between work and social structures of volunteering as a key site for infrastructuring;
- Identified and characterized three key areas of interdependencies between the work and social structures of volunteering—expertise and empathy, reciprocity and obligation, and impact—and described implications for infrastructuring in each area; and

- Identified critical disconnects between the integration of work and social structures observed in volunteering *practices*, on one hand, and the lack of integration of work and social structures in *technologies*, on the other; nearly all technologies were either used to carry out volunteering work or to activate the social structures of volunteering, with little interplay between the two.

These findings have both methodological and design implications. Methodologically, we need to widen our analytic focus beyond technology-by-technology studies—exploring the broader ecosystem of philanthropic technology use. More mundane, everyday forms of volunteering are relatively pervasive and rely on an incredibly diverse ecology of technologies. These technologies need to be understood more holistically, as many of them serve as infrastructures already, pervading the everyday lives of many civically engaged individuals. From a design perspective, this research suggests that we need to explore infrastructuring that better integrates work and social structures, reflecting the highly interdependent nature of these structures in everyday volunteering.

Mainwaring, Cheng, and Anderson, in their study of individuals who have chosen to live beyond the boundaries of traditional infrastructures, remind us that...

Infrastructure, for all its benefits—indeed, because of all its ready-at-hand benefits—was seen to bring also complacency, stasis, vulnerability.... The challenge, then, as we see it, is for ubicomp systems that seek not to automate or even augment/amplify human skills but to exercise and celebrate them, to encourage active engagement, and provide resources to individuals and communities for continuous change.... [18]

This study is an exploratory, formative step aimed at addressing this challenge. In it, we have sought to better understand those infrastructures that support active engagement and philanthropy. We have sought to bring the field of collaborative computing back to some of its earliest theoretical engagements, exploring the discrepancy of benefit in collaborative work. But instead of asking how to design systems to prevent some people from doing work from which they would not benefit, we ask what it would take to design the foundational infrastructures that provoke people to carry out work that *does* benefit others.

ACKNOWLEDGMENTS

Many thanks to Ellie Harmon for her feedback on early drafts of this paper. This material is based upon work supported by the National Science Foundation under Grant Number 1218051. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

REFERENCES

1. Bellotti, V.M.E., Cambridge, S., Hoy, K., Shih, P.C., Handalain, L.R., Han, K. & Carroll, J.M. (2014). Towards community-centered support for peer-to-peer service exchange: Rethinking the timebanking metaphor. In *Proc. CHI*. New York: ACM Press, 2975–2984.
2. Bowker, G. (1994). Information mythology: The world of/as information. In L. Bud-Frierman (Ed.), *Information acumen: The understanding and use of knowledge in modern business* (pp. 231–247). London: Routledge.
3. Brubaker, J.R., Lustig, C. & Hayes, G.R. (2010). Patients Like Me: Empowerment and representation in a patient centered social network. Presented at the CSCW Workshop on CSCW Research in Healthcare: Past, Present, and Future, Savannah, GA.
4. Brudney, J.L. (2010). Designing and managing volunteer programs. In D.O. Rentz (Ed.), *The Jossey-Bass Handbook of Nonprofit Leadership and Management* (pp. 753–793). San Francisco: Jossey-Bass.
5. Bryant, S.L., Forte, A. & Bruckman, A. (2005). Becoming Wikipedian: Transformation of participation in a collaborative online encyclopedia. In *Proc. GROUP*. New York: ACM Press, 1–10.
6. Bureau of Labor Statistics, US Department of Labor. (2013). *Volunteering in the United States—2013*. Retrieved 6 May 2014: <http://www.bls.gov/news.release/volun.nr0.htm>
7. Corbin, J. & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (3rd ed.). Los Angeles: Sage.
8. de Tocqueville, A. (2003). *Democracy in America*. I. Kramnick (Ed.). (G. Bevan, Trans.). London: Penguin. (Original work published 1835)
9. Gillemen, G.S.J. (1959). *The primacy of charity in moral theology*. Westminster, MD: Newman Press.
10. Goecks, J., Volda, A., Volda, S. & Mynatt, E.D. (2008). Charitable technologies: Opportunities for collaborative computing in nonprofit fundraising. In *Proc. CSCW*. New York: ACM Press, 689–698.
11. Grudin, J. (1994). Groupware and social dynamics: Eight challenges for developers. *Commun. ACM* 37(1), 92–105.
12. Hustinx, L. & Lammertyn, F. (2003). Collective and reflexive styles of volunteering: A sociological modernization perspective. *Voluntas: International Journal of Voluntary and Nonprofit Organizations* 14(2), 167–187.
13. Lampe, C., Wash, R., Velasquez, A. & Ozkaya, E. (2010). Motivations to participate in online communities. In *Proc. CHI*. New York: ACM Press, 1927–1936.

14. Le Dantec, C.A. & DiSalvo, C. (2013). Infrastructuring and the formation of publics in participatory design. *Social Studies of Science* 43(2), 241–264.
15. Lee, C.P., Dourish, P. & Mark, G. (2006). The human infrastructure of cyberinfrastructure. In *Proc. CSCW*. New York: ACM Press, 483–492.
16. Lefebvre, H. (2014). *Critique of everyday life*. London: Verso.
17. Ling, K., Beenen, G., Ludford, P., Wang, X., Chang, K., Li, X., Cosley, D., Frankowski, D., Terveen, L., Rashid, A., Resnick, P. & Kraut, R. (2005). Using social psychology to motivate contributions to online communities. *Journal of Computer-Mediated Communication* 10(4).
18. Mainwaring, S.D., Cheng, M.F., & Anderson, K. (2004). Infrastructures and their discontents: Implications for Ubicomp. In *Proc. Ubicomp*. Berlin: Springer, 418–432.
19. Nardi, B., Whittaker, S., & Bradner, E. (2000). Interaction and outeraction: Instant messaging in action. In *Proc CSCW*. New York: ACM Press, 79–88.
20. Pipek, V. & Wulf, V. 2009. Infrastructuring: Towards an integrated perspective on the design and use of information technology. *Journal of the Association of Information Systems* 10(5), 306–332.
21. Reichling, T., Veith, M. & Wulf, V. (2007). Expert recommender: Designing for a network organization. *Computer Supported Cooperative Work* 16(4-5), 431–465.
22. Schervish, P.G. & Havens, J.J. (2002). The Boston area diary study and the moral citizenship of care. *Voluntas: International Journal of Voluntary and Nonprofit Organizations* 13(1), 47–71.
23. Star, S.L. & Ruhleder, K. (1996). Steps toward an ecology of infrastructure: Design and access for large information. *Information Systems Research* 7(1), 111–134.
24. Starbird, K. & Palen, L. (2013). Working and sustaining the virtual disaster desk. *Proc. CSCW*. New York: ACM Press, 491–502.
25. Starbird, K. & Stamberger, J. (2010). Tweak the tweet: Leveraging microblogging proliferation with a prescriptive syntax to support citizen reporting. In *Proc. ISCRAM*.
26. Taylor, P. & Keeter, S. (Eds.). (2010). *Millennials: A portrait of Generation Next. Confident. Connected. Open to change*. Washington, D.C.: Pew Research Center. Online at: <http://pewsocialtrends.org/assets/pdf/millennials-confident-connected-open-to-change.pdf>
27. Teodoro, R., Ozturk, P., Naaman, M., Mason, W. & Lindqvist, J. (2014). The motivations and experiences of the on-demand mobile workforce. In *Proc. CSCW*. New York: ACM Press, 236–247.
28. Vasilescu, B., Serebrenik, A., Devanbu, P. & Filkov, V. (2014). How social Q&A sites are changing knowledge sharing in open source software communities. In *Proc. CSCW*. New York: ACM Press, 342–354.
29. Volda, A., Harmon, E. & Al-Ani, B. (2011). Homebrew databases: Complexities of everyday information management in nonprofit organizations. In *Proc. CHI*. New York: ACM Press, 915–924.
30. Volda, A., Harmon, E. & Al-Ani, B. (2012). Bridging between organizations and the public: Volunteer coordinators’ uneasy relationship with social computing. In *Proc. CHI*. New York: ACM Press, 1967–1976.