

Prosocial Behavior on the Net

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Abstract: Volunteers and charitable organizations contribute significantly to community welfare through their prosocial behavior: that is, discretionary behavior such as assisting, comforting, sharing, and cooperating intended to help worthy beneficiaries. This essay focuses on prosocial behavior on the Internet. It describes how offline charitable organizations are using the Net to become more efficient and effective. It also considers entirely new models of Net-based volunteer behavior directed at creating socially beneficial information goods and services. After exploring the scope and diversity of online prosocial behavior, the essay focuses on ways to encourage this kind of behavior through appropriate task and social structures, motivational signals, and trust indicators. It concludes by asking how local offline communities ultimately could be diminished or strengthened as prosocial behavior increases online.

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In 2009, 63.4 million Americans contributed more than 8 billion hours of volunteer service in the offline world. With the exception of short-term service and relief programs like Habitat for Humanity, most volunteering benefits a volunteer's local community and consists of fundraising/selling items to raise money (26.6 percent of volunteers); collecting, preparing, distributing, or serving food (23.5 percent); engaging in general labor or providing transportation (20.5 percent); and tutoring or teaching (19 percent).¹ Beneficiaries are designated by the community as needy and worthy; they are typically children, the poor, the aged and infirm, and community resources such as libraries, schools, and parks. Volunteers and volunteer organizations enhance local community welfare by improving the situation of direct beneficiaries and by increasing community members' social capital: the bonds of trust and reciprocity created in social networks.

Volunteering is a form of what psychologists call *prosocial behavior*, that is, discretionary behavior such as assisting, comforting, sharing, and cooperating intended to help people other than oneself. Organized prosocial behavior is planned, relatively long-

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term, non-obligated by family or friendship, and situated within an organizational context. Organized prosocial behavior in the form of charitable donation of time and money represents an enormously important social resource in the offline world.

Prosocial behavior can also be found on the Internet, although most discretionary behavior on the Internet today is devoted to asocial behaviors – shopping or looking for information and entertainment – or social behaviors such as connecting with family and friends.² While prosocial behavior represents only a small fraction of discretionary Internet behavior, it is significant for at least four reasons. First, it can reduce transaction costs for offline volunteer organizations and activities, thereby allowing them to operate more efficiently. Second, it can extend the reach and impact of offline volunteer organizations by engaging volunteers and beneficiaries for whom offline opportunities are inconvenient or inaccessible. Third, it can offer new ways for people to strengthen important social institutions.³ Fourth, it can produce socially beneficial information goods and services that are undersupplied by the market. This essay sketches some of the scope and diversity of prosocial behavior on the Net today; describes the building blocks for producing online prosocial behavior; and suggests what can promote online prosocial behavior in the future. It concludes with questions about the relationship between prosocial behavior on the Net and in the offline world.

All major types of online prosocial projects share a small number of attributes derived from the underlying network technology and communications applications. One is that the people or projects that need help and the volunteers willing to help are able to find one another and interact independent of geographic or

social location. Another is that they are able to interact asynchronously. A third shared attribute is that volunteers are able to participate in brief segments of time at any hour of the day or night.

Opportunities for online prosocial behavior are evolving in a pattern seen in other sectors of human behavior on the Internet, such as electronic commerce. In this process of evolution, early efforts designed to make previously offline work more efficient give way to later efforts that create substantially new models of Net-based interaction. Like other types of activity on the Internet, some prosocial sites simply make offline prosocial behavior more efficient through reducing transaction costs. Others involve people in new models of helping. Tables 1 and 2 provide several examples of online prosocial behavior.

Websites that support and modify familiar offline models of volunteering can generally be divided among charitable giving, service projects, and online health-support groups.

Charitable Giving. Net-based charitable giving is increasing as more people use the Net regularly and are comfortable using it for financial transactions. In 2009, Americans made \$15.4 billion in online charitable donations (compared with \$300,000 in 1997).⁴ Early donation sites, connected to specific causes or organizations such as the Hurricane Katrina relief fund or the American Red Cross, provided the convenience of online donation but left all decision authority with the sponsoring organization. By 2007, individuals could create their own fundraising campaigns on the Net, using social networking sites and crowdsourcing to encourage friends (and friends of friends) to donate to causes or projects of one's own choosing or design. The newest of these sites – for instance, www.crowdrise

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Table 1 Online Prosocial Projects that Support or Modify Familiar Types of Volunteering

Website	Year Founded	Purpose	Scope/Impact
<i>Charitable Giving</i>			
www.firstgiving.com	2003	Support charitable giving campaigns	>8,000 nonprofits; >13 million online donors; >\$1 billion raised online
www.causes.com	2007	Support user-created advocacy groups	>\$27 million raised online
www.crowdrise.com	2010	Crowdsourcing for volunteers and charities	N/A
<i>Service Projects</i>			
www.volunteermatch.org	1998	Searchable directory of offline volunteer opportunities	4.9 million referrals since 1998
www.volunteerspot.com	2009	Tools for mobilizing and coordinating community volunteers	>450,000 volunteers, mostly parents in schools
www.mentornet.org	1998	Online mentoring for college-level women and underrepresented minorities in science and engineering	>27,000 matched pairs of mentors and protégés since 1998; >90% retention rate in science and engineering fields for protégés
www.icouldbe.org	2000	School-based curriculum supported by online mentors	>10,000 students served
www.onlinevolunteering.org	2000	Projects to support organizations addressing UN millennium development goals	>36,000 online volunteer assignments completed since 2000
<i>Health Support</i>			
www.dailystrength.org	2006	Health discussion boards and expert advice	>0.5 million members in >500 online groups
www.mdjunction.com	2006	Online health-support groups	>700 online groups
www.patientslikeme.com	2004	Support groups and tools for sharing medical/health information	>69,000 public patient profiles; >4,500 treatment reports; >3,500 symptom reports

Source: Table compiled by author.

.com – incorporate competitive elements taken from online gaming, such as leader boards and prizes, to encourage not just one-time donation but ongoing commitment to volunteer activity.

Service Projects. In the simplest case, an Internet site can provide a way for projects located in the offline world to de-

scribe their needs for volunteers and for people to see offline volunteer opportunities displayed by zip code. The actual volunteering and management of volunteers happens offline; the sites merely offer a way for people and projects to find one another efficiently. For example, VolunteerMatch lets users search for oppor-

Table 2

Online Prosocial Projects that Support New Types of Volunteering

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Website	Year Founded	Purpose	Scope/Impact
<i>Creating Information Goods</i>			
www.apache.org	1995	Collaborative volunteer software projects	Nearly 100 projects; >2,500 committers; Apache Web server powers >65% of world's websites
www.iFixit.com	2003	Collaboratively written consumer-product repair manuals	>2,500 repair manuals; >800 volunteer repair technicians
www.wikipedia.org	2001	Collaboratively written encyclopedia project	>16 million articles in >270 languages; >91,000 active volunteers
www.pgdp.net	2000	Support the digitization of public domain books	>19,000 books digitized; 2,500 active volunteers per month
<i>Citizen Science</i>			
http://boinc.berkeley.edu	2002	Donate idle cycles to generate computing power for scientific research	>50 projects; daily average computing power of about 4 PetaFLOPs
http://implicit.harvard.edu	2003	Participate in Web-based social psychology research projects	Volunteers have completed >3.5 million tasks
http://ebird.org/content/ebird/	2002	Contribute to global bird observation database	>35,000 volunteers have submitted >21 million bird records
www.gwap.com	2008	Tag words, music, clips, or photographs to improve search engine performance	>1 million images labeled
www.galaxyzoo.org	2007	Categorize telescopic images of galaxies	>250,000 volunteers
http://fold.it/portal	2008	Manipulate renderings of proteins to predict stable structures	>100,000 volunteers

Source: Table compiled by author.

tunities to volunteer by zip code, city, or state in order to “make it easier for good people and good causes to connect.”⁵ VolunteerSpot provides tools to mobilize and coordinate local volunteers for community projects like PTA fairs and youth sports leagues.

Some sites support projects that need online volunteers rather than offline ones. These sites typically offer more features than ones that simply list offline opportunities. They provide guidance to listing

organizations about the kinds of projects that are suitable for online volunteers; guidance to potential volunteers about what kinds of information to include in a volunteer application; and templates to support various parts of the process. Projects in developing countries, in particular, often need volunteers whose skill sets are in short supply on the ground. If those skills can be delivered via computer – by creating a website, writing a grant proposal, building a database, or translating

a document, among other acts – geographic distance is no barrier to volunteering. The United Nations Online Volunteering Service, for example, connects online volunteers with organizations working for sustainable human development. Its website proclaims: “Everyone can make a difference. Share your skills, knowledge and ideas – from a computer anywhere in the world.”⁶

In contrast with sites that serve as intermediaries between volunteers and projects, some sites run their own volunteer programs. Mentoring, a familiar offline model, matches young people or novices with more experienced or older mentors who offer them guidance and support. In its online form, mentoring differs in that protégés usually have little or no opportunity for offline interaction with potential mentors; mentors have little or no time or opportunity to engage in face-to-face mentoring meetings. Online mentoring programs operate independent of geographic and time constraints.

Online Health-Support Groups. About six million U.S. adults report having used an online health-support group in 2009.⁷ In addition to offering access to personal experience and advice about medications, procedures, symptoms, and so on, these groups also reduce the social and emotional isolation of people who find little or no support in their offline communities. The following comment is representative of the thousands of comments posted to these groups over the years: “i live in a remote rural community and had no support and little therapy options due to location. the support i have received [from this group] in not feeling alone has made a tremendous difference in my life and gives me strength.”⁸

Websites offering new types of volunteering often fall into the categories of information goods and citizen science.

Information Goods. The Net allows volunteers to collaborate to create and freely distribute high-quality socially beneficial information goods such as public domain e-books, repair manuals, software, and reference articles that function as public goods.⁹ Each person’s contribution to an information product is accessible to and modifiable by other volunteers with the consequence that product quality can improve over time. Observers note that these projects can produce high-quality information goods more rapidly with much lower overhead than similar projects organized and distributed by corporations and markets.¹⁰ Thousands of volunteers proofread scanned pages of books in the public domain to convert them into e-books for free distribution over the Net. Hundreds of thousands of programmers voluntarily contribute code, bug reports, and patches to freely downloadable open-source software projects. Although many of these are one-person vanity projects, some have attracted thousands of volunteer programmers and have become large enough and reliable enough to substitute for commercial software. The online reference site Wikipedia displays more than 16 million articles written by volunteers in more than 270 languages.¹¹ Anyone with Web access can write or edit an article on any topic; articles evolve because they are visible to everyone and can be freely edited by anyone. Over time, mistakes and lacunae are corrected; and through this process, at least some articles become equivalent in quality to those found in professionally produced publications.¹²

Citizen Science. A number of sites on the Net encourage interested amateurs to volunteer to help scientists and scientific projects. Opportunities for volunteer engagement range in level of effort from simply donating idle PC cycles to contributing data to categorizing and analyzing scien-

tific data. A relatively low-effort type of project lets people donate computing cycles from an otherwise idle PC to a project that is analyzing massive amounts of scientific or mathematical data. An early example, SETI@home, was launched in 1999 to detect narrow-bandwidth radio signals from space. More than three million people have donated idle cycles to this project.¹³ By 2010, volunteers had donated idle PC time to more than fifty projects in biology and medicine, earth sciences, mathematics, astronomy, physics, and chemistry.

Volunteers contribute data that they have personally collected about the physical world to sites for ongoing scientific projects that maintain databases for research and public distribution. In most cases, the volunteers are hobbyists who have been collecting data for their own pleasure. Submissions are verified, aggregated, and published to the broader scientific and citizen community. For example, bird, insect, or plant watchers upload field observations. People with backyard weather stations upload data to a server that makes them available to the National Oceanic and Atmospheric Administration (NOAA) and other weather services.

Volunteers also contribute data about themselves. The PatientsLikeMe site allows members to join support groups organized by condition or disease that serve the functions of the online support groups described above. But the site also supports collaborations with medical and pharmaceutical researchers. Support group members can report data about such factors as their health condition, symptoms, and medications; data are then anonymized and aggregated for sharing with medical researchers. Researchers can describe clinical trials to groups whose members may be eligible for enrollment. On the Implicit site, volunteers can participate in Web-based social psychology

experiments that allow researchers to access a large, relatively heterogeneous (compared to a pool of all college sophomores) research population at minimal cost. Volunteers have completed more than 3.5 million comparison tasks producing “the largest database on implicit attitudes and knowledge currently available.”¹⁴

Individuals can contribute their mental effort to help categorize existing knowledge or to create new knowledge. With a small amount of effort, volunteers tag music clips or photographs found on the Web in order to improve the performance of search engines. With substantially more effort, more than 250,000 volunteers categorize millions of telescopic images of galaxies to create a database of detailed galaxy shape information. More than 100,000 volunteers manipulate renderings of proteins to predict stable structures.¹⁵

There are no comprehensive surveys of online volunteering to provide an estimate of its overall magnitude and impact. Scattered evidence suggests that online prosocial projects do produce beneficial consequences. Studies of specific online health-support groups have shown that participation provides both informational and emotional benefits to group members.¹⁶ Broad studies of Internet health information, not just information in online support groups, suggest that its impact is more positive than negative.¹⁷ Online mentoring projects report significant retention rates. Millions of people use reference material sites like Wikipedia and depend on software produced in open-source projects. Scholars have drawn on citizen-science databases in the production of hundreds of scholarly papers.

Every context for online behavior is a symbolically differentiated place on the Net. Different people seek out different

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places, and the same people behave differently in different places. Each context for online prosocial behavior can be understood by characteristics of its task and social structures, by what motivates its participants, and by its trust dynamics. The shared features of the Net described above are influential across contexts, but most of the factors that influence online volunteer behavior are situational and specific to particular contexts.¹⁸ It is important to focus on the details of specific contexts because factors encouraging prosocial behavior in one context may impede it in another. (For example, leader boards highlighting top contributors might be useful for charitable donation sites but inappropriate for health support groups. Peer ratings might be useful for information product sites but inappropriate for citizen science sites.)

Task and Social Structures. A website's task structure embodies the purpose and goals of the group and focuses volunteers' attention on particular activities. Task structures can be more or less modular or decomposable with more or less fine-grained tasks and more or less complex aggregating mechanisms. Modularity and granularity determine the level of effort a volunteer must expend to participate. For example, on an online mentoring site, the task structure is relatively undifferentiated; each protégé represents one task unit. A volunteer's task—helping a protégé—entails multiple different kinds of interconnected actions and a relatively long time commitment. In an information product site, volunteers have their choice of different types of relatively circumscribed tasks (such as posting a bug report or a feature request, writing a review, editing an article, tagging an image, checking references, or providing a quality rating); each task type is relatively fine-grained and homogeneous. The greater the degree of modularity and granularity,

the easier it is for a volunteer to make a small contribution.¹⁹

A website's social structure, which includes explicit roles and governance rules, and implicit norms, represents how volunteers are organized to accomplish tasks. Sites with a relatively modular task structure often use volunteers' performance history to define roles and manage role differentiation. (For example, roles for Wikipedia include editor, featured article editor, administrator, bureaucrat, and steward.²⁰) Performance history may be assessed objectively by measuring the number of contributions or contributions with particular characteristics, subjectively through peer ratings of contributions, or some combination of both. Volunteers who make more contributions of greater value can be recognized with higher status roles. Higher status roles may serve as rewards for past performance; they may also confer additional task rights and responsibilities on those achieving such status. Higher status roles are also associated with more authority. Role differentiation helps volunteers understand why some members have more authority than others and how to attain more authority for themselves.

Motivating Participants. Analysts and commentators are fascinated by prosocial behavior on the Net that benefits unknown (and unknowable) others, such as contributing to an online health-support group or to an information product. Underlying the studies of volunteer behavior on support group sites is the question, why would people help others whom they do not know and with whom they could not have a close personal relationship? Early analysts argued that donating high-quality advice or help to unknown and unknowable others was a classic public goods problem and could not be sustained.²¹ These early analyses were flawed by framing the problem as “contributing to databases of

information” rather than as “helping people.” Researchers investigating why people offer help online found that volunteers clearly developed relationships with specific other online people and with the generalized “other” represented by the online group. Shared physical location (and all the information associated with proximity, such as physical indicators of participants’ worthiness) was unnecessary to create these relationships. Researchers typically found a mix of motivations for contributing to support groups, a mix dominated by altruism and generalized reciprocity: volunteers reported wanting to help others because “it is the right thing to do,” because they had been helped in the past or anticipated they might need help in the future, or because they wanted to spare other people the pain that they had experienced.²²

In terms of volunteer projects to create information products, the question is a matter of why people would do this work for free when they could be paid to do it. Studies of open-source programmers found that some programmers *were* being paid by their employers for their work on open-source projects, and some hoped to translate reputational benefit from their open-source work into economic benefit by securing better jobs. But more programmers reported contributing because it was fun, educational, improved their own programming environment, or benefited the open-source “cause.”²³

Social scientists distinguish between behavior and motivation and note that instances of the same behavior can be motivated by different reasons. Thus, prosocial behavior can be motivated by altruism (desire to benefit others with no concern for self), egoism (desire to benefit the self), or a combination of the two. Prosocial behavior can be motivated by extrinsic forces such as the expectation of positive regard or reward from others;

intrinsic forces such as compassion, curiosity, or the desire for mastery; or a combination of the two.²⁴ It is a mistake to expect all contributors to prosocial projects to be motivated exclusively, or even primarily, by altruism.

It is a truism in the offline world that volunteers receive more than they give.²⁵ Online volunteers follow the same pattern. The rewards are not only expressive and emotional; they can also be utilitarian. Volunteers in any domain, not just open-source programming, may develop skills leading to career advancement. For example, consider this statement from someone working with UNVolunteering on a technical documentation project to turn pig waste into energy in West Africa: “I hold an Advanced Technical Diploma in Electrical Engineering, and I wanted to learn more about this form of renewable energy.... I have learned a lot on all levels, strengthening my managerial, training and development project management skills, amongst others.”²⁶

Some citizen-science projects have been designed to appeal explicitly to hedonic motivations: that is, to the desire to be entertained and have fun and to do so through participating in competitive games.²⁷ In some games people compete or cooperate with one another to label images or guess commonplace words; their behavior contributes to the scientific goals of improving search or semantic understanding. In contrast to such simple online games, Foldit, a protein-folding game, offers much more complex challenges. Players use joystick-like motions to jiggle, twist, and pull protein elements in order to find the lowest energy arrangement most likely to exist in nature. More experienced players are assigned more complex proteins. Players can compete against one another, solo, or in teams. A recent competition offered down-to-the-wire excitement as the lead changed

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hands frequently in the waning minutes. The ultimate winner, a reminder that geographic and social distance are not barriers to volunteer participation on the Net, was a thirteen-year-old boy from Virginia with the screen name Cheese.²⁸

Instead of using video games as an organizing model, the creators of Galaxy Zoo, where volunteers label attributes of galaxies displayed from space telescope images, rely on the intrinsic beauty of the images themselves to motivate volunteers: “gorgeous imagery of hundreds of thousands of galaxies . . . more detailed and beautiful than ever.”²⁹ In response to a forum question about why volunteers take part in the project, many volunteers commented on the beauty of the images and the joy of volunteering. One said:

This stuff is beautiful, I could stare at it all day....I am overwhelmed – honored – overjoyed (language fails me) with the opportunity. Imagine, pissant little old *me* doing original research in Astrophysics! It doesn't matter that it's at kindergarten level – that's all I'm capable of. It doesn't matter that I may be (probably am) often wrong – I'm doing my best, and learning more each minute. I am making a contribution! And I don't care that I'm not gonna get a PhD for it – you guys (some of you, anyway) will. All I can say is “Wow!”³⁰

The symbolically differentiated place on the Web called Galaxy Zoo offers a particular combination of task structure, social structure, and motivational prompts that wowed this volunteer. Millions of volunteers are equally wowed by other sites that allow them to make their own online prosocial contribution a few minutes at a time, at any time, independent of geographic and social distance.

Trust. The production of prosocial behavior, whatever its goals and motivations, depends on bilateral trust. A volunteer must trust that a beneficiary's need is le-

gitimate and that the beneficiary will make use of the donation as represented. A beneficiary must trust that a donor's gift is free to be given and that it is honestly represented. Sociologists describe three sources of trust production in social settings: personal characteristics of the participants; the record of their past performance; and social institutions or intermediaries that vouchsafe participants and performance.³¹ Offline contexts for prosocial behavior afford many overlapping indicators of trustworthiness for both donors and recipients. Personal characteristics of participants, including physical appearance and demeanor, are visible. Records of attendance and contribution are kept and reported. Membership and performance insignia such as badges, uniforms, or logos from social institutions or intermediaries are conferred and visible. Untrustworthy situations can certainly be found offline, including scam charities, bogus beneficiaries, and malicious or predatory “donors.” But the diversity and abundance of trust indicators in offline prosocial contexts signify and reassure potential donors and recipients that participation is likely to be worthwhile.

Online contexts for prosocial behavior also must provide indicators of trustworthiness in order to attract and retain participants.³² Information about some personal characteristics may be captured and displayed through registration and profile creation processes. Some types of indicators are more difficult to convey online than offline, such as indicators of participants' demeanor and sensitivity. Some indicators of competence are relatively easy to convey. In the case of software projects, a first-order indicator of contributor competence and contribution quality is an affirmative answer to the question, does the code run? On many sites, information about a volunteer's performance history is available. In the case of text-based

information product sites like Wikipedia, some indicators can be produced because a complete contribution history is available. Page-related indicators of past history – number of edits over time and personal characteristics of editors, for example – have been shown to influence readers' perceptions of article trustworthiness.³³ When the task in citizen-science projects is tagging, labeling, or classifying, contribution quality can be assessed via comparing multiple completions of the same task. Multiple contributors are presented with the same stimulus; contributions are compared and the extent to which they agree is an indicator of quality.

Many online contexts for prosocial behavior use human intermediaries to provide additional indicators of trustworthiness. These intermediaries are typically identified and recognized through a context's role structure. Support-group moderators, where they are used, signal that replies have been vetted. People designated as module maintainers who accept code contributions in open-source projects confirm not only that the code runs but also that it does not break other contributors' code. The featured articles editor for Wikipedia oversees an elaborate process to identify the highest quality articles, which are indicated by a bronze star – a visible institutional insignia of quality.

In addition to gauging the trustworthiness of volunteers and their contributions, volunteers also need assurance that the beneficiaries of their contributions are trustworthy. Acting in accordance with the norms of the group is an indicator that people seeking help belong to the group and are legitimate and worthy of help. For example, questions that conform to a support group's norms are more likely to be answered than those that do not.³⁴ Open-source licenses assure potential contributors to information products

that their freely given contribution will not be appropriated for private gain. Institutional sponsorship indicates to citizen scientists that data they contribute will be treated according to the norms of science. It also indicates that, if they are asked to download code to their PCs, the code is benign.

Encouraging online prosocial behavior requires attracting, retaining, and motivating arms-length volunteers. Social scientists believe that if people agree to do a small prosocial act, they will be more likely to agree to do a related, larger one in the future.³⁵ The Net offers numerous ways for people to perform small prosocial acts that can be aggregated across many people for substantial social good. Donating idle PC cycles to scientific projects is one example. Tagging an image, answering a question, posting a bug report, or providing a small amount of data are others. Social scientists also observe that people like to do what their friends like to do. Recent projects using social networking sites and friendship dynamics to promote prosocial behavior build on this observation.

As the number of volunteers and the amount of online prosocial behavior increase, infrastructure sites that provide tools to create and manage prosocial projects are emerging. In the early days of the Internet, anyone who wanted to create or maintain a volunteer project such as an online health-support group had to spend significant time managing technical issues like mailing lists, archives, and software upgrades.³⁶ Today, sites like DailyStrength and MDJunction make it relatively easy for anyone to create and manage an online health-support group. BOINC gives scientific researchers the tools to create and manage projects using donated PC cycles. Sites like SourceForge provide tools for managing open-source software

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projects. Sites like FirstGiving and Causes make it relatively easy to create and manage a charitable donation project. As infrastructure sites make it simpler to create and manage opportunities for online prosocial behavior, these opportunities should increase.

All these sites recognize the importance of factors that help manage task and social structures and that increase trust and commitment on the part of participants. Among these factors are persistent identity, aggregation and coordination mechanisms, motivational prompts, and quality control. Tools and processes supporting these factors vary substantially across different types of sites, but their presence is evident in all of them. And evidence is accumulating about ways that are more and less effective to implement them. Scholars from several universities have organized a multidisciplinary, multi-year effort to understand, predict, and improve contribution behavior across all types of online communities. Their work has resulted in a number of scholarly papers and a forthcoming book.³⁷

Many of the examples described above are less than ten years old. Efforts to understand how to create, manage, nurture, and sustain them are in their infancy. The scope and diversity of online prosocial behavior should continue to grow and expand as new applications are developed, new volunteers are recruited, and new social connections are forged via the Net. As this growth continues, it will become more important to understand the contours of prosocial behavior on the Net. One mechanism for developing this understanding will be comparative research that simultaneously investigates different types of online contexts to understand how participant characteristics, motivations, and behaviors differ across them.³⁸ Another mechanism will be na-

tional sample surveys that specifically include questions about online prosocial behavior in comparison with other behavior. For example, national surveys of offline volunteering, such as those produced by the Corporation for National and Community Service, should be augmented to include questions about online volunteering. Surveys about the behavior of Internet users, such as those produced by the Pew Research Center, should include questions about online prosocial behavior.³⁹

What impact will online prosocial behavior have on offline volunteers – those sixty-three million Americans who contributed more than eight billion hours of offline service in 2009 – and local community well-being in the offline world? It is possible that local volunteer organizations and activities will be diminished as online prosocial behavior expands, just as some local bricks-and-mortar businesses have been weakened by online commerce. Local fundraising campaigns may be weakened as potential donors find it just as easy and perhaps more compelling to donate to more exotic causes that are featured on the global Net. Local volunteer organizations may be diminished as potential local volunteers turn to more convenient Net-based endeavors. New models of online prosocial behavior may redirect the attention of people who previously would have been local volunteers. When someone living in Fort Wayne, Indiana, can proofread a science lesson for a school in Africa over the Net, while sitting pajama-clad in front of her computer, how likely is it that she will do that instead of (or in addition to?) running a bake sale at her local elementary school? Alternatively, Net-based tools may allow local volunteer programs to enlist new volunteers and to operate more efficiently and effectively. Moreover, new models of online prosocial behavior may

attract people who never would have engaged in conventional offline volunteer activity, thereby increasing the total volunteer pool.

Encouraging prosocial behavior, whether online or offline, is a worthy societal endeavor. Understanding interactions be-

tween the two and how each contributes to broader social welfare will be important in our continuing effort to understand and build the Internet as a public commons.

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ENDNOTES

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² <http://www.pewinternet.org/Static-Pages/Trend-Data/Online-Activities-Daily.aspx>.

³ For analyses of how the Net can broaden access to social support, see, among others, Jonathan Cummings, Lee Sproull, and Sara Kiesler, "Beyond Hearing: Where Real World and Online Support Meet," *Group Dynamics: Theory, Research, and Practice* 6 (2002): 78–88; Kathryn McKenna and John Bargh, "Coming Out in the Age of the Internet: Identity Demarginalization through Virtual Group Participation," *Journal of Personality and Social Psychology* 75 (1998): 681–694; Andrea Meier et al., "How Cancer Survivors Provide Support on Cancer-Related Internet Mailing Lists," *Journal of Medical Internet Research* 9 (2) (2007), <http://www.jmir.org/2007/2/e12/>. For how volunteers on the Net can create nonmarket resources with economic value, see, among others, Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (New Haven, Conn.: Yale University Press, 2006). Yochai Benkler and Helen Nissenbaum suggest that an increase in participation in virtuous behavior on the Net could lead to an increase in public virtue more generally; see Yochai Benkler and Helen Nissenbaum, "Commons-Based Peer Production and Virtue," *The Journal of Political Philosophy* 14 (4) (2006): 394–419.

⁴ <http://mashable.com/2010/09/18/social-good-infographic/>.

⁵ <http://www.volunteermatch.org/about/>.

⁶ <http://www.onlinevolunteering.org/en/vol/index.html>.

⁷ Robin A. Cohen and Barbara Stussman, "Health Information Technology Use among Men and Women Aged 18–64: Early Release of Estimates from the National Health Interview Survey, January–June 2009," Health E-Stats, National Center for Health Statistics, February 2010.

⁸ <http://www.dailystrength.org/support-community-testimonials>; capitalization as in the original.

⁹ Not all freely produced online information goods have an overtly prosocial orientation. Hobby sites may be personally satisfying for members, but they do little to address broader social goals. Some information sites are explicitly antisocial or malevolent in their orientation.

¹⁰ Benkler, *The Wealth of Networks*.

¹¹ See "About Wikipedia," at <http://en.wikipedia.org/wiki/Wikipedia:About> (accessed August 24, 2010).

¹² Jim Giles, "Internet Encyclopedias Go Head to Head," *Nature* 438 (7070) (December 15, 2005): 900–901. Lara Devgan et al., "Wiki-Surgery? Internal Validity of Wikipedia as a Medical and Surgical Reference," *Journal of the American College of Surgeons* 205 (3) (September 2007): S76–S77.

¹³ <http://boincstats.com/>.

- ¹⁴ <http://www.projectimplicit.net/about.php>.
- ¹⁵ See <http://www.gwap.com/gwap/> for tagging; <http://www.galaxyzoo.org> for galaxy shape information; and <http://fold.it/portal/> for protein structures.
- ¹⁶ For example, McKenna and Bargh, "Coming Out in the Age of the Internet"; Cummings et al., "Beyond Hearing"; and Meier et al., "How Cancer Survivors Provide Support on Cancer-Related Internet Mailing Lists."
- ¹⁷ In 2008, the Pew Internet & American Life Project reported a benefit to cost ratio of ten to one. Thirty-one percent of e-patients say they or someone they know has been significantly helped by following medical advice or health information found on the Internet. Three percent say they or someone they know has been seriously harmed.
- ¹⁸ Although some theorists postulate the existence of an altruistic personality type, most scholars believe that helping others is usually motivated through the interaction between personality factors and situational factors. Daniel Batson and Adam A. Powell, "Altruism and Prosocial Behavior," in *Handbook of Psychology*, vol. 5: *Personality and Social Psychology*, ed. Theodore Millon and Melvin J. Lerner (Hoboken, N.J.: Wiley, 2003), 463–484. Jane Allyn Piliavin and Hong-Wen Charng, "Altruism: A Review of Recent Theory and Research," *Annual Review of Sociology* 16 (1990): 27–65. Louis A. Penner, "Volunteerism and Social Problems: Making Things Better or Worse," *Journal of Social Issues* 60 (2004): 645–666.
- ¹⁹ Task structures may be supported by more or less complex software to support coordination and aggregation. Mentoring sites may have complex matching algorithms to create mentor/protégé pairs, but then rely upon email and a simple website for information exchange. Scientific analysis sites rely upon more complex software to present images to volunteers, record their contributions, perform quality checks, upload data to the database, produce displays of results, and so on.
- ²⁰ http://en.wikipedia.org/wiki/Wikipedia:About#Editorial_administration.2C_oversight.2C_and_management.
- ²¹ For example, Brian K. Thorn and Terry Connolly, "Discretionary Data Bases: A Theory and Some Experimental Findings," *Communication Research* 14 (1987): 512–528.
- ²² For example, Cummings et al., "Beyond Hearing"; McKenna and Bargh, "Coming Out in the Age of the Internet"; and Meier et al., "How Cancer Survivors Provide Support on Cancer-Related Internet Mailing Lists."
- ²³ Karim Lakhani and Robert Wolf, "Why Hackers Do What They Do: Understanding Motivation and Effort in Free/Open Source Software Projects," in *Perspectives on Free and Open Source Software*, ed. Joseph Feller et al. (Cambridge, Mass.: MIT Press, 2005), 3–22. Jeffrey Roberts, Il-Horn Hann, and Sandra A. Slaughter, "Understanding the Motivations, Participation, and Performance of Open Source Software Developers: A Longitudinal Study of the Apache Projects," *Management Science* 52 (7) (July 2006): 984–999.
- ²⁴ E. Gil Clary et al., "Understanding and Assessing the Motivations of Volunteers: A Functional Approach," *Journal of Personality and Social Psychology* 74 (6) (1998): 1516–1530. John Wilson, "Volunteering," *Annual Review of Sociology* 26 (2000): 215–240. Batson and Powell, "Altruism and Prosocial Behavior." Piliavin and Charng, "Altruism."
- ²⁵ For example, see Wilson, "Volunteering," 231–233.
- ²⁶ http://www.onlinevolunteering.org/en/vol/stories/2009_africavenir.html.
- ²⁷ In 2008, 23 percent of U.S. adults played games online, and the majority of them played at least a few times a week. Americans watch 200 billion hours of television each year. Clay Shirky points out that if even a tiny fraction of those hours was converted to entertainment with a purpose, substantial social benefit could accrue; see Clay Shirky, *Cognitive Surplus: Creativity and Generosity in a Connected Age* (New York: Penguin, 2010), 10.
- ²⁸ John Bohannon, "Gamers Unravel the Secret Life of Protein," *Wired Magazine*, April 2009, http://www.wired.com/medtech/genetics/magazine/17-05/ff_protein?currentPage=all.

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- 30 <http://www.galaxyzooforum.org/index.php?PHPSESSID=81257edabee1bbf433ca69c4b4aca5a&topic=68.o>.
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- 34 Jolene Galegher, Lee Sproull, and Sara Kiesler, "Legitimacy, Authority, and Community in Electronic Support Groups," *Written Communication* 15 (1998): 493–530. Karl Sassenberg, "Common Bond and Common Identity Groups on the Internet: Attachment and Normative Behavior in On-Topic and Off-Topic Chats," *Group Dynamics* 6 (2002): 27–31.
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- 36 Brian Butler, Lee Sproull, Sara Kiesler, and Robert Kraut, "Community Effort in Online Groups: Who Does the Work and Why?" in *Leadership at a Distance*, ed. Suzanne Wiesband (New York: Lawrence Erlbaum Associates, 2008), 171–193.
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- 38 For a recent example of comparative research, see Shaul Oreg and Oded Nov, "Exploring Motivations for Contributing to Open Source Initiatives: The Roles of Contribution Context and Personal Values," *Computers in Human Behavior* 24 (2008): 2055–2073.
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