Charitable Technologies: Opportunities for Collaborative Computing in Nonprofit Fundraising

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ABSTRACT

This paper presents research analyzing the role of computational technology in the domain of nonprofit fundraising. Nonprofits are a cornerstone of many societies and are especially prominent in the United States, where $295 billion, or slightly more than 2% of the U.S. Gross Domestic Product (i.e. total national revenue), was directed toward charitable causes in 2006. Nonprofits afford many worthwhile endeavors, including crisis relief, basic services to those in need, public education and the arts, and preservation of the natural environment. In this paper, we identify six roles that computational technology plays in support of nonprofit fundraising and present two models characterizing technology use in this domain: (1) a cycle of technology-assisted fundraising and (2) a model of relationships among stakeholders in technology-assisted fundraising. Finally, we identify challenges and research opportunities for collaborative computing in the unique and exciting nonprofit fundraising domain.

ACM Classification Keywords

H.5.3. [Information Interfaces and Presentation (e.g., HCI)]: Group and Organization Interfaces—Collaborative Computing, K.4.2 [Computers and Society]: Social Issues.

Author Keywords

Charitable technologies, nonprofit, charity, fundraising.

INTRODUCTION

There is ample research demonstrating that computational technologies can enhance existing forms of collaboration and can provide venues for new forms of collaboration, as well. Much of this research has occurred in private companies and government organizations, but collaborative computing technologies are also having a profound impact on the third sector of society, nonprofit organizations. One of the most striking differences between nonprofits and other organizations is that they often obtain much of their revenue from voluntary donations, and thus fundraising is a core facet of nonprofit activity.

The nonprofit fundraising domain features numerous diverse stakeholders—including donors, potential donors, nonprofit organizations, intermediary organizations, and beneficiaries—who have appropriated computational technologies in a variety of ways in order to interact and collaborate with other stakeholders. For instance, donors are using technology to engage with other donors and potential donors through individual advocacy campaigns and ad-hoc collective action, and nonprofit organizations are using technology to enable donors to select and contribute directly to individual beneficiaries.

These examples suggest that much can be learned about collaborative computing by studying technology use in the nonprofit fundraising domain. In addition, there are numerous challenges and research opportunities present in developing novel collaborative computing technologies for this domain. Taken together, these two parallel tracks—studying current technology use and developing novel technologies—define a compelling and socially-relevant research trajectory for collaborative computing in nonprofit fundraising.

Nonprofit Fundraising as Collective Practice

Nonprofit organizations are a cornerstone of many societies, serving four critical functions: (1) providing goods and services that are underprovided by private industry and the government; (2) promoting individuals' initiatives for the common good; (3) advocating for societal issues, particularly giving voice to under-represented points of view; and (4) bridging between capitalism and democracy by enabling citizens to engage in social welfare [31]. Nonprofits frequently address the needs of underrepresented communities (e.g. crisis victims or rescue animals) and promote public goods (e.g., education, the arts, or the environment) [30, 31, 32].

Nonprofits play a significant role in the United States economy[1], accounting for 5–10% of the country's Gross Domestic Product (GDP; i.e., total national revenue) and

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[1]We motivate this research with statistics detailing the impact of U.S. nonprofits because the U.S. nonprofit sector is larger, by percentage of GDP, than that of any other country [30]. However, many other countries also have thriving and important nonprofit sectors [32].

generating more than $1 trillion in total annual revenue, an amount that is larger than the GDP of all but six countries in the world. There are more than 1 million legally registered nonprofits in the U.S.; that number nearly doubles when including private foundations and religious congregations [30]. Individuals and institutions in the U.S. donated a combined $295 billion to nonprofits in 2006, or about 2% of the country's GDP; individual donations accounted for 75% of this total [19]. While it is difficult to quantify the societal (non-economic) impact of nonprofits' programs and services, this impact is most certainly significant and positive.

One of the most essential activities undertaken by nonprofit organizations is fundraising, and, increasingly, nonprofits are turning to technology to support their fundraising efforts. Online giving has grown exponentially between 2000 and 2005. Statistics from the ePhilanthropy Foundation put the increase in online giving at approximately 1700% over this period, with $4.5 billion given online in 2005 (qtd. in [29]). In addition, nonprofits are attracting new donors online much more quickly than they are attracting them offline [17].

Nonprofits are likely to continue using technology-enhanced fundraising for multiple reasons. Online fundraising can be significantly more cost-effective than offline fundraising. Every $1 raised offline can cost a nonprofit up to $1.25 to generate; online, it can cost as little as $0.05 to raise $1 [29]. In addition, there is a significant difference among the average age of donors who give online (39 years old) versus those who give offline (usually estimated to be 60 years or older), suggesting an affinity for online giving among the next generation of donors.

At its core, nonprofit fundraising is a collective practice—construed not just fiscally but also socially:

> The purpose of fundraising, then, is to build those relationships, or more simply put, the purpose of fundraising is not to raise money, but to raise donors. You don't want gifts, you want givers [24].

As Dourish has argued, "CSCW's 'site' is the relationship between information technology and collective practice" [16]. The relationship between technology use and the collective practice of nonprofit fundraising provides rich examples of online social behavior and the appropriation of collaborative computing technologies, as well as opportunities for developing novel collaborative computing applications. There is, however, a dearth of existing research exploring collaborative computing in the nonprofit domain. This paper addresses this fundamental gap by providing a holistic overview of the use of computational technology in nonprofit fundraising. In this paper, we discuss the relationship between computational technology and the collective practice of the domain of nonprofit fundraising.

We offer three primary contributions in this paper. First, we provide a survey of technology use and identify six roles of technology in nonprofit fundraising. Second, we present two models characterizing technology use: one illustrating the cycle of nonprofit fundraising supported by technology and a second highlighting the relationships among stakeholders in this domain. Finally, based on these models, we identify opportunities for further CSCW research in nonprofit fundraising.

RESEARCH ON TECHNOLOGY & NONPROFITS
Research exploring the intersection of technology and nonprofit organizations is relatively sparse, samples quite broadly, and is spread across multiple disciplines.

HCI & CSCW Research
Research has explored how nonprofit organizations can better use information technology (IT) to meet organizational needs. In early work, McPhail et al. reported a case study that employed participatory design to prototype an IT system for a volunteer organization [27]. More recently, Merkel et al. described efforts to identify approaches that enable community organizations to create IT management practices that are sustainable and meet organizational goals [28].

Saraswat and Williams performed a content analysis of the websites of Fortune 100 corporations to evaluate the charitable responses of companies to the terrorist attacks on September 11, 2001 [33]. They found that companies employed a mix of charitable actions and that four factors influenced company responses: industry category, location, physical impact, and profitability.

Torrey et al. studied online volunteer groups that formed to distribute needed goods to victims of Hurricane Katrina [39]. The study found that small groups mobilized more quickly than large groups, but that large groups sustained themselves longer than smaller groups.

Nonprofit Research
Nonprofit researchers Burt and Taylor performed observational studies of how U.K. nonprofits adopted information and communication technologies (ICTs) [7, 8]. Their findings indicate that nonprofits used ICTs to perform more intelligent campaigning and afford better donor interaction. However, they also found evidence that some nonprofits struggled to balance embedded organizational practices and the adoption of ICTs.

Brainerd and Brinkerhoff documented the differences between online and traditional (offline) grassroots organizations [5]. They found that online grassroots organizations possessed important advantages that offline grassroots organizations did not. Online grassroots organizations scaled more easily than their offline counterparts due to lower communication and coordination costs. Online grassroots organizations also had the potential to adapt more readily and likely had larger and more

Organization	Website
American Cancer Society	www.cancer.org
American Red Cross	www.redcross.org
Change.org	www.change.org
Charity Navigator	www.charitynavigator.org
Convio	www.convio.com
DonorsChoose	www.donorschoose.org
ePhilanthropy Foundation	www.ephilanthropy.org
Facebook Causes	apps.facebook.com/causes/about
Firstgiving	www.firstgiving.org
GuideStar	www.guidestar.org
Network For Good	www.networkforgood.org
Six Degrees	www.sixdegrees.org
TechSoup	techsoup.org
Text 2HELP	www.wirelessfoundation.org/Text2Help

Table 1. Organizations discussed in this paper.

diverse membership, characteristics that may increase capacity to act toward organizational goals.

Economics Research
Chen et al. studied the effectiveness of four different mechanisms for soliciting contributions to the Internet Library, a nonprofit website: voluntary contributions (the control condition), premiums (i.e., gifts), seed money, and matching funds [10]. The study found that the mechanisms did not significantly impact contribution size but that employing seed money and matching funds yielded significantly higher response rates from donors.

Conitzer and Sandholm developed a formal bidding language to help potential donors specify matching donation offers over multiple charities. [12].

EXAMPLES OF COMPUTATIONAL TECHNOLOGY USE IN THE NONPROFIT GIVING DOMAIN
Stakeholders in the nonprofit domain are employing technology in a variety of ways to affect nonprofit giving. We describe four examples to orient the reader to this emerging domain, as well as to provide concrete grounding for various aspects of our analysis.

DonorsChoose
DonorsChoose[2] is a website that enables donors to contribute to specific educational projects in need of funding. Teachers submit project proposals to DonorsChoose, volunteers examine and vet the proposals, and donors use the website to search for and donate to projects that they want to fund. Examples include a terrarium-building project for a middle school science classroom and a project to fill elementary school students'

backpacks with books, games and other items to encourage children and parents to read together. Project proposals are informal and written in the first-person by teachers; each proposal describes the project's motivation and agenda and specifies how donated funds will be utilized. Proposals also include school demographic data (e.g., the percentage of students from low-income families), the number of students the project will serve, and how purchased supplies will be repurposed at the conclusion of the project.

Potential donors can search for projects by academic subject, school location, or the outstanding amount required to fully fund the project. Donors can choose to either partially or fully fund a project. When a project is completely funded, DonorsChoose uses the project's donations to purchase and deliver the project supplies to the teacher. Donors receive pictures and thank you notes from the teacher and students at the completion of each project.

DonorsChoose went online in 2000 and has raised $20 million for nearly 50,000 projects benefiting more than 1 million students[3]. Total annual donations have increased steadily each year and more than $8 million was donated in 2007. Nearly two-thirds of projects funded through DonorsChoose took place in schools that predominantly serve students from low-income families.

Network for Good
Network for Good (NfG) is one of the Internet's largest nonprofit portals. NfG's website provides resources for donors and potential donors to find, research, and donate to more than 23,000 nonprofit organizations.

NfG enables donors to search for nonprofits based on keywords, name, or location. Donors can research nonprofits, as well, learning about each nonprofit's mission, goals and accomplishments, and fiscal standing. NfG obtains this information from GuideStar, a website that aggregates and makes available information about nonprofits to help donors make more informed decisions. Finally, donors can make donations directly to any nonprofit registered with NfG without leaving the NfG site.

NfG recently reported detailed statistics about donations made via the site [29]. Donations made on NfG follow a classic "long-tail" (power law) distribution [1]: excluding crisis giving, 50% of donations made via NfG went to 1% of nonprofits and the other 50% of donations were spread amongst the remaining 99% of nonprofits (the long tail).

Firstgiving
Firstgiving provides online services and tools allowing individuals to advocate and raise funds on behalf of a nonprofit of their choice. These individuals do not need to have previous fundraising experience or technical expertise in order to use Firstgiving's tools and services. Firstgiving leads individual advocates through a step-by-step process to

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[2] Table 1 lists all organizations and programs discussed throughout this paper.

[3] http://www.donorschoose.org/about/impact.html

create webpages that serve as their online fundraising homes. Individual advocates can select any nonprofit registered in the Guidestar database and customize their pages with pictures and personal messages describing why they are fundraising for the nonprofit. Once complete, each customized Firstgiving page enables donors to make contributions to the selected nonprofit and tracks individuals' progress in raising funds. Firstgiving also provides email-based services that advocates can use to publicize their fundraising pages and communicate with donors.

In addition, Firstgiving enables individuals to create a "widget" or "badge" to publicize fundraising efforts elsewhere on the World Wide Web. These widgets are small snippets of HTML code that can be placed on a web page to promote a cause and are intended to make it easy for individuals to serve as advocates for nonprofit causes. Firstgiving's widgets display the name of the cause, the name of the individual who is raising money for the cause, the target amount to be raised, and the amount raised so far. Most importantly, the widget provides a hyperlink to the Firstgiving page where visitors can make donations. By displaying a Firstgiving widget on a blog or a profile page on social networking sites, individuals can leverage their social networks to raise money for nonprofit causes.

Firstgiving does not provide summative fundraising statistics, but anecdotal results are impressive. The five most successful nonprofit organizations using Firstgiving have each raised an average of $32,800. The ten most active individual projects have raised approximately $8,200 each[4].

Change.org

Change.org is a website that enables users to organize, communicate, and take action based on shared goals called "Changes." Example Changes include 'Stop Global Warming' and 'Improve Public Schools.' Any user can create a Change and join a Change's group. Associated with each Change group are numerous types of user-generated content such as the names of preferred politicians, links to related resources, and group impact measures such as the number of group members, actions taken on behalf of the Change, and total donations contributed by the group.

Change.org also enables group members to cultivate a list of nonprofit organizations for the Change. Group members can add to the list, comment on organizations in the list, vote (positive or negative) on organizations, view the amount of money donated to organizations by group members, and donate to an organization.

Change.org does not provide summative statistics about donations raised. However, there is evidence that Change.org has had success in stimulating donations. There are more than 300 total Changes created to date on the website. For the 10 most popular Changes, average group membership is 900 people and the average total donations were $10,300, but we estimate that, on average, a Change has 50 members and has raised $200.

METHOD

In order to provide a broad foundation for future research in this unexplored domain, we surveyed the current state of technology use in nonprofit fundraising. We studied approximately 150 instances of technology, most of which were websites whose resources and services were publically visible. Other technologies required a form of membership (e.g., Facebook Causes), which a researcher obtained, in order to explore the resources and services there. Other technologies, while highly relevant, were no longer accessible (e.g., they were implemented temporarily during a crisis situation); in these cases, we relied on secondary sources such as press releases and news reports for our data.

We employed a variant of snowball sampling to compile our corpus of data. Beginning our sampling with Network for Good, one of the largest nonprofit portal sites, we followed links to other nonprofit sites and news articles[5]. We followed leads through the online networks of the nonprofit community until we stopped encountering new data or encountered data that was similar enough to our existing data as to be redundant for purposes of data collection[6]. In our sampling process, we also leveraged a vibrant community of bloggers who are professionals in the nonprofit industry (e.g., organization presidents and marketing directors)[7]. We utilized these blogs to find new data but have not considered them objects in our analysis.

We analyzed our data inductively. For each site in our data, we asked, "What roles do computational technologies play in this site's relationship to nonprofit fundraising?" The categories we generated from this analysis are presented in the following section. Further analysis produced two significant themes that cut across the data. First, the roles of technology in nonprofit fundraising suggest a broader cycle of technology-assisted giving, extending well before and after someone clicks the ubiquitous "Donate Now" button. Second—and most striking for the field of collaborative computing—the roles of technology in nonprofit

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[4] http://www.firstgiving.com/design/1/firstgiving_all_stars.asp

[5] Because the starting point for our sample was an organization based in the United States, our corpus of data and models may show a Western bias.

[6] This technique for deciding when to conclude data collection is commonly employed in qualitative research (e.g., [13]).

[7] Prominent examples include the blog of Katya Andresen, Vice President and head of Marketing for Network for Good (http://www.nonprofitmarketingblog.com/), the blog of Jocelyn Powers, Director of Marketing and Development in the D.C. area for NPower, a technology consulting firm for nonprofits (http://www.nonprofittechnologyblog.org/), and the blog of Trent Stake, President of Charity Navigator (http://www.trentstampstake.org/).

fundraising suggest a network of relationships among stakeholders that are being mediated by the use of computational technology.

ROLES OF COMPUTATIONAL TECHNOLOGY IN NONPROFIT FUNDRAISING

In this section, we describe the roles that computational technology currently plays within nonprofit fundraising. Collaborative computing technologies are present in varying degrees across the roles; there are, however, opportunities for collaborative computing in all roles; we discuss these opportunities later in the paper.

Role #1: Communicating Information about Nonprofits

One of the most basic roles of technology in nonprofit fundraising is to communicate the activities, goals and impact of nonprofit organizations to potential donors. A nonprofit's online presence includes its website, the blogs that it sponsors, its presence in virtual environments like Second Life, and its information on third-party sites.

Third parties are aggregating and analyzing public information to provide insight into particular facets of nonprofit organizations. Both Guidestar and Charity Navigator use data from IRS 990 forms; all registered U.S. nonprofits must file an IRS 990 tax form in order to receive nonprofit tax status, and these forms are publicly available.

Charity Navigator uses 990 data to rate nonprofits on their fiscal efficiency using a 5-star system. GuideStar indexes 990 data so that it can be searched and compared; Guidestar provides numerous types of information, including past and present goals, the number of employees and volunteers, financial data (e.g., endowment, revenue sources and expenses), locations served, and board members.

Communicating these types of information enables donors to build trust in a nonprofit and helps nonprofits build relationships with potential donors. Communicating information about a nonprofit is critical to fundraising as two of the most important factors in decision making about donations are having trust in the nonprofit and having a relationship with that nonprofit [11].

Role #2: Helping Potential Donors Discover Nonprofits

Technology also assists potential donors in discovering nonprofits with which they were not previously familiar. Several prominent third-party websites—including GuideStar, Network for Good, Change.org, and Charity Navigator—provide a variety of ways for users to discover nonprofits based on criteria of interest.

Different design decisions afford different degrees of discovery: a greater variety of searching and browsing mechanisms affords increased possibilities for discovery. Some third-party sites such as Network for Good have demonstrated success in enabling potential donors to discover smaller or less well-known nonprofits, tapping into the long tail of nonprofit giving and fostering diversification in online giving opportunities [29].

Role #3: Enabling Donations

Nonprofits are employing technologies that make it easier for donors to make donations. Many large nonprofits enable donors to make contributions directly through their websites. Smaller nonprofits often receive donations online through third-party portals like Network for Good or through third-party payment services such as Convio.

Some third-party sites provide additional services to donors that go beyond supporting a single donation. For instance, Network for Good offers donors the ability to contribute to several nonprofits at the same time and to schedule recurring contributions without the need for establishing accounts and keeping payment information up-to-date with multiple organizations.

Nonprofits are also employing fundraising methods that go beyond popular but simplistic "Donate Now" buttons, translating traditional fundraising activities into online events. For instance, the American Cancer Society has held virtual walkathons in Second Life, with the most recent event raising $115,000[8]. An annual "Blogathon" has also taken place to support various charities[9].

While web-based support for donations is the most common class of technologies in this category, there are nascent efforts to facilitate donations via mobile phone. One promising example of giving via mobile phone is The Wireless Foundation's Text 2HELP program, designed to enable donors to contribute to the American Red Cross via SMS during times of national crisis.

Providing fast and simple donation mechanisms is a significant role for technology to play as the ease with which individuals can donate is an important factor in their decision making about what nonprofit to support [11].

Role #4: Enabling Directed Giving

Individuals traditionally make donations to a nonprofit organization without knowing how their contributions will be used. Nonprofits and third parties, however, are utilizing technology to enable donors to direct their contributions to specific programs, services, and even individual beneficiaries. DonorsChoose, for example, affords directed giving by enabling donors to read about and contribute to specific educational projects. Further, DonorsChoose leverages records of directed giving to show donors the impact of their donations. DonorsChoose demonstrates impact by collecting thank you notes from teachers and students who have had their projects funded and sending those notes to the donors who contributed to their project. Other nonprofits afford direct giving to families and small businesses owners all over the world in similar ways.

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[8] http://www.cancer.org/docroot/MED/content/MED_2_
1x_American_Cancer_Society_Raises_Nearly_115000_
during.asp

[9] http://blogathon.org/

Research in nonprofit fundraising suggests that solicitations for nonprofit contributions are more effective when they are made on behalf of specific individuals rather than groups [37] and when a nonprofit has demonstrated impact through its programs [11]. The role of technology in supporting directed giving, then, is quite important.

Role #5: Enabling Individual and Community Advocacy
Technology enables individuals to become advocates for nonprofit organizations. Perhaps the most straightforward technologies enabling advocacy are tools that publicly reflect a donor's affiliation with a particular nonprofit. For example, Facebook's Causes application enables donors to display Causes they support on their profile page, including the amounts donated to each Cause. Similarly, individuals participating in organized events (e.g., walk-a-thons) can use Firstgiving to advertise their participation and advocate for a nonprofit. Websites such as SixDegrees and Firstgiving also provide tools for individuals to create and post semi-structured "badges" (widgets) on their blogs or social networking profiles to promote awareness of and fundraise for a charity.

In online communities, such as those at Change.org, individuals also join together and advocate collectively. Many of the communities on Change.org advocate for a small number (1–4) of nonprofit organizations, and hence these communities provide virtual meeting places for advocates of the same or very similar organizations.

Research indicates that more than 75% of individuals cite family and friends as being significant influences on whether or not they support a charity [11]. Supporting individuals' ability to advocate within their social networks, then, is an important role for technology.

Role #6: Helping Nonprofits Learn about Technology
The final class of technology helps nonprofits become aware of and learn about technologies that may be useful in their fundraising efforts. Examples of technologies serving this role include online communities like TechSoup and web-based knowledge repositories such as those at the ePhilanthropy Foundation. These technologies provide resources for nonprofits to explore and discuss technological solutions to common problems. In addition, these technologies often support organizational learning among nonprofits as nonprofits can learn how other organizations are employing technology.

MODELS OF TECHNOLOGY-ASSISTED FUNDRAISING
This section discusses two models that further characterize technology's functions in nonprofit fundraising. These models present a holistic view of technology-assisted nonprofit fundraising, contextualize the roles of technology discussed above, and provide a means to identify promising avenues for CSCW research.
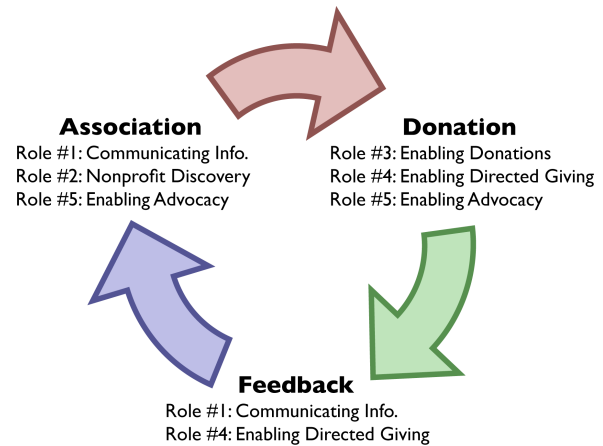
Figure 1. The technology-assisted donation lifecycle.

The Cycle of Technology-Assisted Fundraising
The analysis of the roles of technology in nonprofit fundraising suggests that there are three phases comprising a "fundraising cycle": association, donation, and feedback (Figure 1). Association can lead to donations, and successful feedback can lead to stronger association and additional donations, allowing the cycle to continue. The phases in this cycle resonate with traditional nonprofit fundraising models (e.g. [24]); augmenting the phases with the roles that technology plays in each phase yields insight into how technology is influencing traditional fundraising.

Association
The association phase is a discovery and matching phase between nonprofit organizations and potential donors. During this phase, nonprofits and other third-party organizations promote programs, services, and goals that are in need of funding, and donors make decisions about which nonprofits they will make donations towards.

Research indicates two motivations for giving: (1) donors give for altruistic reasons, believing that a cause deserves support because it benefits society [25], and (2) donors give because they get a "warm-glow" feeling from giving [2]. A recent neuroscience study found a physiological correlate for both of these motivations [21].

Technology has a significant presence in the association phase: technology enables nonprofits to share vast amounts of information about their organizations easily (Role #1), enables third-parties to aggregate and process that information (#2), and enables donors to search that information (#2). Taken together, technology provides mechanisms for donors to discover nonprofits in ways that they previously could not.

User advocacy via technology (#5) is also changing the association phase. Traditionally, nonprofits employed direct communication to build association with donors; however, user advocacy technologies allow advocates to mediate association between potential donors and nonprofits using

personal solicitations and social network ties. Fundraising totals from user advocacy technologies are promising [3].

Donation

During the donation phase, donors make decisions about how, when, and how much to give. Because of the donation phase's importance in nonprofit fundraising, there is substantial research about techniques employed within this phase. When soliciting donations, techniques that can increase donor response rate, donation amounts, or both include demonstrating an immediate, persistent need for donations [40], providing matching contributions [23] or seed money [26], publicizing contribution levels [20], legitimizing small contributions [18], framing appeals as helping individuals rather than groups [37], and showing information about other donors' contributions [14].

This body of research can be used to better understand why technology has shown promise in stimulating nonprofit donations. Basic technologies that enable online donations (Role #3) may be useful because of the ease with which nonprofits can ask for donations online and the convenience of donating online. Affording donors the chance to direct contributions to particular programs or beneficiaries (#4) may stimulate giving by making visible an immediate need and framing a contribution as helping individuals rather than groups. User advocacy technologies (#5) may be useful because they often provide information about what other people have donated and legitimize small contributions, both of which can increase donations.

Feedback

In the feedback phase, a nonprofit organization communicates the impact of donors' contributions on the nonprofit's programs and services and/or the beneficiaries of those programs and services. Nonprofits often convey impact through pictures, testimonials, or statistics. Research indicates that providing feedback strengthens the commitment and trust donors have in a nonprofit, which in turn stimulates additional giving [34].

Technology has significantly enhanced nonprofits' abilities to provide feedback to donors. Nonprofits have harnessed technology to communicate impact quickly and easily via computational media (Role #1). Nonprofits are also using technology to track donors and donations, enabling nonprofits to more easily target feedback to donors.

Affording directed giving (#4) has also enhanced feedback. By enabling donors to see how or to whom their donations are directed, nonprofits allow donors to anticipate the impact of their donation. Technology-assisted directed giving has the potential to tighten the fundraising cycle considerably by bridging donations with feedback and building more robust associations with donors.

Nonprofit Fundraising Stakeholders

The fundraising cycle provides a temporal lens for understanding the interdependencies among the roles of
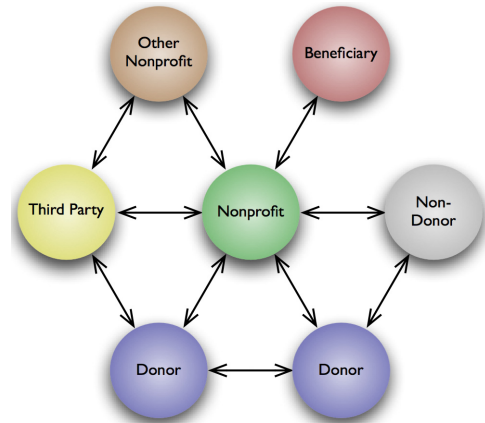
Figure 2. Stakeholders and relationships in the technology-assisted nonprofit giving domain. (The *donor* node is replicated to represent possible relationships among donors.)

technology in nonprofit fundraising. An alternative lens is one that highlights the relationships among stakeholders in this domain and how the use of technology can and does mediate many of these relationships (Figure 2).

Our data show that there are a diverse set of stakeholders in technology-assisted nonprofit fundraising, including nonprofit organizations, donors, non-donors, beneficiaries of nonprofit programs, and third-party organizations[10]. Stakeholders have appropriated technology to mediate relationships with other stakeholders and thus have substantially influenced the collaborative nature of the nonprofit fundraising domain. Here, we highlight three significant technology-mediated relationships.

Donor–Donor and Donor–Non-Donor Relationships

Technology enables donors to advocate for a nonprofit and to build community around a particular cause (Role #5). Technology also enables donors to solicit donations directly alongside advocacy messages (#3). Visible displays of advocacy such as charity badges are an opportunistic and personal solicitation mechanism that attempts to transform non-donors into donors. Online communities provide a discussion space where donors and non-donors can build relationships that may otherwise be difficult to build due to the constraints of time or distance. Through these roles, technology mediates donor–donor and donor–non-donor relationships, supporting the formation of relationships among donors and between donors and non-donors.

Donor–Beneficiary Relationships

Technology-assisted directed giving (Role #4) supports more direct relationships between donors and beneficiaries.

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[10] In this paper, we use the term "third party" to refer to organizations that support one or more nonprofits but do not interact directly with other beneficiaries. These third parties may be legally registered nonprofits, for-profit businesses, or other communities and organizations.

Via directed giving (e.g. DonorsChoose), beneficiaries create giving opportunities that often directly appeal to donors, and donors can see and read about individual beneficiaries, choose particular beneficiaries to support, and receive feedback from supported beneficiaries. In some instances, these connections between donors and beneficiaries evoke feelings of relationship among both donors and beneficiaries[11].

Relationships with Third Parties
Third parties are employing technology to mediate relationships among many different stakeholders, and hence third parties have numerous influential functions within the nonprofit fundraising domain. By communicating nonprofit information (Role #1), helping donors discover nonprofits (#2), and enabling donations (#3), third parties are mediating relationships between themselves and donors. Third parties often help to connect donors to nonprofits (#2); thus, third parties also mediate indirect relationships between donors and nonprofits. Finally, by facilitating technology education among nonprofits (#6), third parties are mediating relationships between themselves and nonprofits. When third parties provide forums and other community features for sharing expertise (#6), they are mediating relationships among nonprofit organizations.

CHALLENGES AND RESEARCH OPPORTUNITIES
Most computational technologies currently utilized in the nonprofit fundraising domain are relatively simple and we see ample room for extending them in novel ways to generate greater impact. In addition, many of the roles that technology currently serves in this domain suggest research opportunities for collaborative computing—further exploring technologies for fostering advocacy across social networks or within online communities, for providing better support for directed giving, and for producing large-scale, technologically-mediated fundraising events.

The nonprofit fundraising domain also serves as a leading indicator of the use of collaborative computing technologies toward practical and immediate goals. We anticipate that additional studies of technology appropriation in nonprofit fundraising will yield further insights about technologically mediated social behavior.

The following sections discuss additional challenges and research opportunities for the collaborative computing field.

The Work to Make Directed Giving Work
Existing technologies that foster directed giving focus on offering donors individual giving opportunities (e.g. an educational project on DonorsChoose) selected from a collective beneficiary pool. The work required to foster directed giving is substantial and distributed across beneficiaries and nonprofits. Beneficiaries define and characterize individual giving opportunities; nonprofits vet

and organize opportunities for donors. This distribution of work among stakeholders suggests two challenges for extending technology-enhanced directed giving.

Because individual beneficiaries are very often responsible for defining and characterizing individual giving opportunities, supporting directed giving for nonprofits that do not have individual beneficiaries or relationships with individual beneficiaries is an open challenge. Nonprofits that focus on enhancing shared, public goods such as parks, museums, and health research, for example, often do not have individual relationships with their beneficiaries, and some nonprofits do not have individual beneficiaries at all. Without these relationships, a nonprofit may lack the resources required to characterize individual donation opportunities. In addition, without individual beneficiaries, nonprofits may not be able to adequately identify discrete and compelling donation opportunities from within the larger goal of contributing to a public good.

The work done by nonprofits to vet and organize opportunities also presents challenges for extending technology-enhanced directed giving. Scaling these systems to support a larger number of beneficiaries and provide a greater number of giving opportunities is an open challenge, as well, and one that may be best addressed by collaborative, computational support.

More broadly, one challenge for collaborative computing is to help many different kinds of nonprofits engage beneficiaries, volunteers, or other stakeholders in the distributed work of directed giving. Research on successful volunteer, technologically-mediated collaborative efforts such as Wikipedia [6] and open-source software [35] may provide initial insights into this challenge.

The Dual Logics of Fragmentation and Streamlining
In general, technology simultaneously serves two dual logics in the nonprofit fundraising domain. On one hand, technology use in nonprofit fundraising has led to the multiplying and fragmenting of information resources and donation channels. There is a vast amount of information related to nonprofit fundraising online and different stakeholders often present different classes of information. A nonprofit's website, for example, may present compelling case studies attesting to its services and impact, a third-party website may provide resources about the fiscal efficacy of the nonprofit, and another third-party website may provide community forums for discussing opinions about or experiences with the nonprofit. Some of these websites—and others—may also allow donors to make online donations to the nonprofit.

On the other hand, technology use has led to the streamlining of the fundraising process, providing computational scaffolding that allows donors to move more simply and efficiently through the donation cycle. Network for Good has developed relationships with other third-party websites to bridge between phases of association and

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[11] http://www.donorschoose.org/about/testimonials.html

donation, providing resources for potential donors to discover, learn about, and donate to nonprofits.

One challenge of the dual logics of fragmentation and streamlining is in striking the right balance between the two—designing technologies that enable potential donors to draw from the fragmented resources of multiple, diverse stakeholders while simultaneously and fluidly supporting simple and efficient movement through the fundraising cycle. This is a challenge at both an organizational level—engaging the needs and perspectives of multiple stakeholders—and a technical one—aggregating a diversity of information resources and online services.

This challenge extends to domains beyond nonprofit fundraising, such as consumer health informatics and collaborative medical or financial decision-making. In all of these domains, disparate stakeholders are providing an increasing amount of information online and individuals and communities are tasked with evaluating and using that information to make the best decisions possible. The wealth of experience drawn from CSCW research in social navigation [22] and community discussion support [15] may provide initial insights for addressing this challenge.

Supporting Mid-sized and Long-lived Collective Action
Existing technology use for nonprofit fundraising highlights the fundamentally collaborative nature of the domain. Yet, there are also established collaborative practices in this domain that currently have little or no technological support. The growing popularity of giving circles—groups of individuals who pool their individual donations and make large donations to selected nonprofits—suggests that user advocacy can be highly collaborative and can extend across giving opportunities, particular nonprofits, and time. A recent study shows that giving circles have both impact and longevity: 160 surveyed giving circles have raised more than $88 million and granted nearly $65 million, and 27% of these circles have been through five rounds of donation allocation. In addition, donors in giving circles are highly involved, engage in collective learning and problem solving and build social capital amongst each other [4].

Giving circles present a worthwhile opportunity for collaborative computing research because of their unique niche in the space of collaboration. Giving circles engage in mid-scale, long-lived grassroots collective action and face unique challenges as a result of occupying this niche. For instance, circles must balance their size with their goals; a larger size affords larger donations, but a smaller size can be more amenable for discussion and building consensus. In addition, giving circles spend significant resources developing goals and planning a strategy to achieve those goals that extends over multiple rounds of donations.

There are opportunities for collaborative computing to better understand and support mid-scale, long-lived collective action by studying the practices of and developing technologies to support giving circles.

Collaborative computing research that may provide initial insights for this research opportunity includes social matching research [38] as well as research on sharing and reflecting on collective group histories [36].

FUTURE WORK AND CONCLUDING THOUGHTS
In addition to exploring the above challenges, future research in this domain should provide a better understanding of the perspectives of various stakeholders with respect to the roles of technology in nonprofit fundraising. We would also like to extend this work to two related domains with which we believe our research has resonance:

• Nonprofit donations of goods (e.g., canned foods) or expertise (e.g., roofers for a homebuilding nonprofit). We believe the donation process surrounding these alternate currencies pose additional challenges to which collaborative computing expertise might be applied.

• Political donations are distinct from nonprofit donations because the motivation, mechanisms, and expected impact for donating are often quite different. However, we believe that research on nonprofit fundraising complements existing CSCW research on political fundraising [9] and that there are related challenges and research opportunities in political fundraising, as well.

To conclude, this paper provides a comprehensive analysis of the roles that technology currently plays in the nonprofit fundraising domain and presents two models of technology-assisted nonprofit fundraising: (1) a fundraising cycle and (2) a model of relationships among stakeholders. Based on this analysis and these models, we discussed research opportunities for collaborative computing in nonprofit fundraising.

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