

The Opportunity of Social Computing to Make Us Healthier Together

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ABSTRACT

Social computing is perhaps the most promising opportunity for CSCW research to contribute to health and wellness. Social software can help connect patients with their friends and family, with other patients, and with caregivers, giving them access to information and social support. Social software – through comparisons and other techniques – can also help persuade people to make behavior changes that improve their wellness or that can help them better manage a chronic illness. One of the under-explored opportunities in this space is the integration of wellness applications with existing social network sites, which allow developers of applications to leverage a patient's existing relationships. Through the development of two applications, and deployment of one, we have identified some opportunities and challenges for building applications as part of sites such as Facebook, though many questions will require further study.

Categories and Subject Descriptors

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Design

Keywords

Health, wellness, social network sites, social software, social computing

1. INTRODUCTION

The health and HCI communities are engaged in considerable research on how technology can support self-management of illnesses and participation in health and wellness activities. One particularly promising capability of technologically supported wellness interventions is the ability to connect patients to caregivers, other patients, and a broader support network through which they can access information and support. Social software offers opportunities to create new wellness interventions with social interactions, sharing, and comparisons at their center. Social computing research may eventually be CSCW's greatest contribution to the health and wellness community.

Previous work has shown that connecting patients in wellness interventions can create a sense of both social pressure and social support [4]. Connections to others – including caregivers and other patients – can also help people share advice or information relevant to managing a condition [17]. A wellness application integrated with an existing social network site, such as Facebook,

can draw on participants' existing social networks rather than pushing them to form new relationships with other participants. For certain types of supportive exchanges, participants may get more benefit from interacting with people with whom they already share a bond, especially in the near term [16].

Internet-based interventions, like other wellness activities, also struggle with participation and adherence issues [1]. Reported adherence to Internet-mediated anxiety and depression interventions deployed through open-access stand-alone websites were as low as 1% [3]; participation rates in controlled studies, presumably involving subject screening and participation incentives, were reported as 19% for a smoking cessation study and 34% for a diabetes self-management study [15]. Social interactions may help make an intervention stickier by creating a more engaging experience or a desire to stay connected to the other participants in the intervention. Many members of social network sites visit very frequently, with nearly 50% of Facebook active users visiting every day [6]. Integrating a health intervention into a website that people are already frequenting could help overcome the challenges to adherence that many self-directed health interventions face.

There may also be drawbacks to integrating a wellness intervention with an existing social website. Though leveraging some existing relationships may be beneficial, the breadth of contacts on a general social network site – 120 for the average Facebook user [6], from a variety of contexts [2, 5] – may also limit how much patients are willing to share, particularly if they do not have privacy controls that are both sufficiently granular and easy to use.

In this paper, we will discuss applications and design implications specifically for deploying a wellness intervention on the existing social network site Facebook. We focus on Facebook both because of its widespread adoption and its existing application development platform. There are several existing health and wellness applications on Facebook, though the mixed success of these applications suggests that the best practices for integrating a health or wellness intervention into a large, existing social network site are not well known.

Designing wellness applications for existing social network sites shows great potential, but researchers and practitioners will need to better understand a variety of issues before this potential can be realized. What types of information should be shared and with whom? What comparisons offer the most benefits? For different interventions, conditions, and people, the answers to these questions may vary.

2. SOCIAL WELLNESS APPLICATIONS

Previous work indicates that simply delivering the content of offline interventions over the Internet may be no more effective, or even less effective, at increasing participants' physical activity than their offline counterparts [18], suggesting that technologically mediated interventions not only *can* but *must* be built around the unique capabilities that technology offers for health and wellness activities. Many researchers have explored ways to do this using individual health and wellness activities [e.g. 11] or activities that share information between patients and caregivers [e.g. 10, 12, 14].

Khaled et al argue that social software is one of the most promising directions for persuasive technologies, because it leverages the Internet's ability to connect people who a powerful ability to influence one another [8]. In the health and wellness domain, many of the challenges and opportunities associated with using social software have been explored in studies of online support groups or interventions deployed as stand-alone wellness applications with a social component [e.g. 4, 7, 9].

These studies have found that when a patient knows their performance in a wellness intervention – such as step counts in a walking intervention – will be visible to other participants, they may feel a sense of both social support and social pressure [4]. In an evaluation of the Fish'n'Steps application, other researchers placed participants in teams. The team membership and comparisons increased participants' sense of cooperation (with team members) and competition (between teams), but did not lead to improved clinical outcomes [9]. Moreover, while some found the competition stimulating, at least one participant felt frustrated by it.

The EatWell system, developed and evaluated by Grimes et al, allowed participants within one geographic area to record and share memories describing their efforts to eat healthily [7]. Hearing others' success stories can be a source of inspiration and evidence that progress is possible, and telling a success story may help motivate the storyteller to remain committed to their goal.

In addition to these standalone applications, several health and wellness applications have been built and released on Facebook. This opportunity should be part of the conversation among researchers and practitioners. Unlike the applications in previous studies, wellness interventions built into existing social network sites allow for information sharing and interaction with people who are not directly participating in the intervention or seeking out information about the health issue.

3. MOTIVATING RESEARCH QUESTIONS

Several questions are shaping our inquiry into the benefits and challenges of integrating wellness applications with existing social network sites.

- How do the health outcomes for a Facebook-based health intervention compare to similar interventions conducted using other means?
- Who benefits most from an intervention built into Facebook or another social networking site, and who gets left behind?

- Do users benefit from the integration, either from accessing the application as part of their other Facebook activity, or from sharing and interacting with their existing friends?
- Are people comfortable sharing all of their activity from the wellness application with all their existing social network friends? If not, then what features should be offered for controlling the visibility of activity in a wellness application?
- When do structured communication features, specific to the wellness application, offer benefits over just using built-in communication features of a social networking site?

Though these questions are specific to Facebook or other existing social network sites, the results will improve our understanding of to motivate people to participate in and stick with technologically-mediated health interventions, what health and wellness information people are willing to share and with whom, and the benefits associated with this sharing.

4. CURRENT WORK

To begin exploring the benefits and challenges for wellness interventions on existing social network sites, we have built applications for the Facebook application platform. The first, Three Good Things, is designed for anyone who wanted to participate in a structured activity that may help them become happier. This application has been deployed since July 2009. The second application, which allows people to record, track, and share their walking progress using step count data from pedometers, has not yet been deployed.

4.1 Three Good Things

Our first application was designed for people who wished to be a bit happier, rather than patients trying to manage a particular condition, and was based on a Positive Psychology exercise. Positive psychology is the “study of the strengths and virtues that enable individuals and communities to thrive” [13]. Positive psychologists have developed a number of activities that help people live happier and more fulfilling lives [13]. Participants in one of the most effective exercises, Three Good Things, are supposed to record three good things each day and the reasons why these things happened. By focusing on the good, rather than dwelling on the negative, it is theorized that people can train themselves to be happier.

The application design includes features to support previously identified benefits of using social software to support wellness applications, as well as features that take advantage of the opportunities derived from building the application for the Facebook platform. Below, we summarize some of these design choices and how participants used the application. Data include use data from 20 July through 17 September 2009 (117 participants with varied start dates) and 5 interviews (including 3 participants who were Facebook friends with one or more of the researchers).

Support for private and public recording of good things. Each good thing could be posted with one of three privacy options: Shared on the participant's newsfeed (visible to all of their friends) and visible to their Facebook friends who visit their 3GT profile, visible to their Facebook friends who visit their 3GT profile, and private (visible only to the participant).

In interviews, participants said they were concerned about sharing for a variety of reasons. Many were concerned that sending all of

their 3GT posts to their newsfeed would create “clutter” or that they would be “spamming” their friends. Another felt that his Facebook social network was too inclusive to share many of his posts.

We also placed participants in two treatment groups. In the first, good things were private by default. In the second, the good things were automatically posted to the user’s wall. Posting behavior was consistent the concerns reported in the interviews. Less than 4% of the good things from participants in the private default were posted 4% of their items to their newsfeed (all from one participant who posted infrequently) and only an additional 33% were visible to friends viewing their 3GT profile. They left the remaining 62% as private. The public group made 26% of their items private and set 40% as visible to friends viewing their 3GT profile, but left only 33% in the default of being posted to their wall.

Despite these concerns, however, participants in the public, newsfeed default were more likely to remain active for at least a week (39% vs. 22%). A two-sample test for equal proportions finds that this difference is statistically significant ($\chi^2 = 3.852$; $p < 0.05$).

Social support. By allowing participants to post Good Things to their Facebook newsfeed, and by making their 3GT profiles visible to their friends even if the friends were not 3GT users, we hoped to enable social support from friends, in the form of structured support in Facebook (e.g. “liking” someone’s good thing or commenting on it) as well as unstructured interactions between individuals who knew each other and had other communication channels.

Though participants were concerned about sharing too much, this does not mean that they did not want to share at all. They enjoyed receiving feedback on their public posts and looking at friends’ good things. Many also wanted other mechanisms for sharing and receiving support within the application. Ideas included ways to see and comment on good things from other participants in the intervention, even if they were not a participant’s friends on Facebook. The participant who was concerned that his Facebook network was too broad would have preferred to be able to limit his 3GT friends to a subset of this network. Not receiving any feedback was particularly frustrating for some participants, “sometimes it feels like you’re out there, putting stuff out in the world and you’re not getting any feedback, you know?”

Social pressure. By making participants’ activity in the application visible to their friends, we believed users might remind friends to participate if they noticed they had not posted in a while, or that seeing friends’ posts might be a reminder itself. Because so few posts were public, however, the most common see friends’ posts was in the 3GT application – in which case, the participant had already remembered to post. Instead, one participant reported that seeing that her friends were not posting every day caused her to post less.

We also created a formal mechanism for social pressure, user-to-user reminders. When viewing the profile of a friend who had not posted in more than two days, a participant would see an invitation to remind the friend to participate. Clicking would send a Facebook notification to the friend. Participants did not use this feature, and the interview data suggest several reasons: doing so was inappropriate (“No!... No, it’s not my job.”) or that it might

make their friends feel like it was work and cause discomfort. One participant said that she would have to know that the participant *wanted* to receive this sort of pressure or reminder before she would feel comfortable sending one.

Integration with participants’ routines and habits. In addition to being able to post from the 3GT application, participants were able to create public posts from outside of the 3GT, on their Facebook profile or newsfeed pages, or import tweets containing the hashtag #3gt from their Twitter account – both places where many people already post events that could be considered good things.

We hoped that these additional integration points would increase adherence by reducing the steps required to post a good thing and by fitting into activities that participants already do, but they were rarely used. 93% were posted through the application, 1% were posted from participants’ newsfeeds or Facebook profiles, and 6% were imported from Twitter. Despite this, the participation rate was better than or on par with many other Internet-based interventions, with 35% completing at least a week of the exercise, the minimum amount recommended by Seligman et al.

4.2 Steps

Our second application is designed to promote walking. Participants will be able to track their step counts using pedometers and then upload this data to Facebook.

The step count data and walking goals set in the Steps application offer us more opportunities than 3GT to experiment with what data to show and when to show it. For example, newsfeed items might be posted every time someone uploads their step counts, when they meet their goal (or when they fail to meet it), and achieving milestones (such as walking a distance equivalent to across their home state). We will also be able to compare a participant’s performance with different groups, allowing us to investigate issues such as the relative benefits of comparison with their friends’ progress and with the progress of peers (based on either age or starting average daily steps).

5. GUIDANCE FOR RESEARCHERS AND DESIGNERS

In our initial work, we have found that people will use at least one wellness application integrated with Facebook, 3GT. Even with an application where the primary activity resembles the status updates posted on Facebook, participants were concerned about sharing too broadly and polluting their friends’ feeds. They did, however, enjoy looking at friends’ good things and receiving comments on their own posts, and wanted more ways to interact with their friends using the application and with other application participants.

As concerns about collapsed contexts within 3GT application indicate, there are some sharing and privacy scenarios that Facebook applications do not support well. The 3GT application connected participants with their existing Facebook friends who also used the application as well as those who did not, but would likely have benefited from having a space where all application users could interact whether or not they were friends. Application developers are not, however, able to build applications that easily let people share with just a subset of their friends – to support this capability, people must create their own in-application network or

specific individuals with whom to share. Moreover, anyone's use of Facebook application is visible to all of their friends who visit that application's page, making it impossible to privately use an application.

Giving application developers an easy way to access groupings of friends – such as friend lists on Facebook – or to allow people to privately use applications will likely allow for more diversity in applications. Making possible scenarios that are not currently supported – such as a participant who wants support from some Facebook friends but does not want to disclose their condition or participation in an intervention to others – may eliminate some barriers to using wellness interventions as part of an existing social network site.

The ability to control which friends, if any, can see if one is participating in an application may be particularly important for wellness applications that help people manage conditions to which society or individuals attach more stigma. We also expect that people will have different privacy and sharing preferences when using applications for other conditions, and understanding these differences should be a priority for future research.

6. CONCLUSION

Research and the existence of in-the-wild health and wellness applications indicates that social software is a viable platform for deploying at least some types of health and wellness applications. More work is needed to understand what types of interventions, and what design characteristics, are most suitable for social health and wellness applications. As a community, we will need to identify approaches to wellness intervention design that will both support high adoption rates as well as beneficial clinical outcomes. What types of social influence will be most appealing to people, and which will have the greatest health impacts? Additionally, we do not expect one approach to work for everyone – or even that everyone will benefit from wellness applications integrated with social network sites -- and so research will need to identify which groups benefit most and which groups do not benefit.

Existing social network sites offer a particularly appealing research opportunity because they offer access to a broader range of connections and potential connections, including caregivers, patients with the same or similar conditions or goals, and participants' existing connections on the social network site. Our experience with 3GT and the existence of some health applications on Facebook also indicates at least some people will use some wellness applications that are deployed on these sites.

We are eager to receive feedback on these research opportunities, questions, and priorities at this workshop.

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