StepStream: A Social Fitness Intervention for Middle School Students

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Abstract

Adolescent obesity is an increasing challenge in the US, and social computing systems hold promise as part of holistic efforts to increase everyday healthy behaviors. To examine the potential of social computing in this space, we developed and deployed StepStream, a social fitness intervention for middle school students. StepStream performed comparably in attitude and behavior change to more competitive or direct-comparison systems, and suggests promising new approaches for future obesity prevention systems.

Overview

Adolescent obesity is an increasing challenge in 21st century America: in the last 30 years, adolescent obesity rates in the US have tripled. Social computing technologies may play a role in addressing the obesity epidemic. Health promotion research shows that even the simple act of walking more each day has lasting benefits, and these benefits are multiplied when groups and communities work together to create new habits.

Social computing technologies have the potential to act as platforms for personal health—to allow people to encourage each other to share previously solitary activities and interact with each other around health topics. Social computing systems can integrate naturally into users’ daily lives, encourage and reward identity presentation and exploration, and support daily rituals and collective experiences. Combined with recent advances in physical activity tracking, social network site adoption creates a unique opportunity for social computing research in everyday health.

The Everyday Computing Lab at Georgia Tech has been studying social systems that encourage middle school students to get more physical activity throughout the day. We designed our own system: StepStream, a social network site for middle school students to share and encourage everyday lifestyle activity. At WISH 2012, we described our pilot design and findings. Since then, we have redesigned the system and completed a four-week deployment with 42 students in a public middle school. Overall, we found that StepStream users improved their attitudes to and perceptions of fitness, particularly their sense of social support for fitness, and that the least active students improved their physical activity more than the most active.

System Design

We designed StepStream to help us study how social media can help adolescents form identities around healthy activities and connect online incentives to offline behaviors. StepStream encourages awareness and social support as a core foundation for reflecting physical activity in an online community.

Stepstream consists of wireless pedometers, a base station and a closed social network site. At the beginning of the deployment each student receives a pedometer (we used Fitbit Zip pedometers that store 30 days of activity and can be chest or waist-mounted) and creates an account on the system. Each time they pass the base station at the school entrance, their pedometer number of steps they earned. For the first week, students wear the pedometers without accessing the website. This allows us to establish a baseline daily step count for each student and to give the students a chance to get used to wearing the pedometers. Raw step counts are hidden from other students; instead, the system reports “activity points,” which are relative to a student’s typical day.

The system wirelessly uploads step data from the pedometers, and after the first week participating students can log in to the system web site to give each other tips on how to get more activity, share thoughts, and interact with each other by commenting and “liking” each others’ posts. Students can spend their activity points to play PuddleJump, a simple endless running game where the player can ‘gift’ their winnings to up to three friends. Once enough students have played PuddleJump, a new level is unlocked.

StepStream is intentionally missing several features known to encourage attitude and behavior change in fitness applications. While students can see their own step counts over time, the system does not set or track specific goals. Direct interpersonal comparison is discouraged: the system lacks a leaderboard or similar tool, and only reports students’ activity points to each other.
Methods

From 2010 to 2012, we conducted participatory design exercises with middle school students aimed at understanding their priorities and desires relating to everyday social fitness applications. A report of our findings from this preparatory work was recently presented at the Pervasive Health 2013 conference.6

In March 2013, 42 students from a local middle school wore pedometers for a total of four weeks (one baseline week without website access, three weeks with website access). We visited the school weekly for five hour-long sessions. In the first session, we introduced the system, distributed pre-study surveys, and handed out pedometers. In the second, third and fourth sessions students logged into the system in a computer lab setting, and we replaced or repaired any lost or damaged pedometers. In the last session, we conducted focus group interviews and distributed post-study surveys. We also collected log data from the website itself. In June 2013 we conducted a second round of focus groups with a subset of participants. We used validated surveys designed to evaluate adolescents’ fitness self-efficacy, perceptions and attitudes to fitness, and social support for fitness.7

Findings

Students who used StepStream reported greater levels of social support for fitness, as well as increased self-efficacy for some physical activity measures (p<.05, standard physical activity questionnaire’). There were no statistically significant decreases in any of our survey measures. StepStream also appeared to have a beneficial effect on physical activity for those most in need: students whose baseline daily step averages were below 6,000 steps/day (the lower 50% in our participant pool). Those students increased their daily step average by 25% (p=.04, repeated measures ANOVA), while step counts for students in the upper 50% remained unchanged, on average.

Website usage peaked during the three computer lab sessions; about 2/3 logins and messages occurred during the after-school sessions, and an average of 4 students per day accessed the system outside the sessions. While we had hoped for more inter-session interaction with the website, we believe that the blended online/offline socialization that occurred during the after-school sessions was a key factor in StepStream’s success.

Conclusion

Obesity prevention and social computing systems research have much to teach each other. Our system, StepStream, shows how social computing systems can help with obesity prevention in novel ways. As a non-competitive online/offline social fitness application, StepStream offers a promising complementary approach to traditional fitness interventions for youth, and one that appears to resonate with those who need it most: low-activity children who might be demotivated by direct competition. In future, we hope to study how our approach would fare in combination with other traditional persuasive health strategies, across larger populations, and in longer-term deployments (such as an entire semester or school year).

References


