

Building Community and Commitment with a Virtual Coach in Mobile Wellness Programs

Stephanie M. Lukin¹, G. Michael Youngblood²,
Honglu Du², and Marilyn Walker¹

¹ Natural Language and Dialogue Systems Lab,
University of California Santa Cruz, Santa Cruz, CA, USA

{slukin,maw}@soe.ucsc.edu

² Interactive Intelligence Area,
PARC, a Xerox Company, Palo Alto, CA, USA
{michael.youngblood,honglu.du}@parc.com

Abstract. FittleBot is virtual coach provided as part of a mobile application named Fittle that aims to provide users with social support and motivation for achieving the user's health and wellness goals. Fittle's wellness challenges are based around teams, where each team has its own FittleBot to provide personalized recommendations, support team building and provide information or tips. Here we present a quantitative analysis from a 2-week field study where we test new FittleBot strategies to increase FittleBot's effectiveness in building team community. Participants using the enhanced FittleBot improved compliance over the two weeks by 8.8% and increased their sense of community by 4%.

Keywords: Virtual Agents, Health, Wellness, Conversation, Social.

1 Introduction

Personalization is a critical feature of natural interaction and there is growing evidence that virtual agents that deliver personalized interaction are more effective. For example, virtual agents that match the user's personality have been shown to help the user spend more time doing their exercises [1], or are judged as more competent at the task [2,3]. Our work aims to build social capital [4,5] in teams of users through the use of an *in-situ* virtual agent called FittleBot in the conversation feed of the Fittle mobile, social wellness-related application [6]. FittleBot participates in the team by developing and exerting its own social influence [7] within the team. Our belief is that an artificial agent can increase the overall level of engagement in the system through interventions in the activity space of an application.

The Fittle platform is highly team oriented. We want the participants to feel connected to their team mates whom they may not know, but share a desire to take care of their health, as in other related work [8,9]. There exists a temptation to defect in these social systems [10]. Group performance in Fittle is important, and if one individual doesn't perform well, the overall performance

goes down. Building social accountability and leveraging social influence have been shown to help counteract defections, but more work is needed in this area especially with regard to using team-based social agents to maintain and improve engagement. This paper aims to better understand how virtual agents can participate effectively in a social teams oriented to achieving particular health and wellness goals.

2 Design and Empirical Evaluation

We present a 2-week field study comparing the enhanced Fittlebot2 with Fittlebot-Basic [6]. FittleBot2 has new interaction strategies intended to foster a sense of community, increase social accountability and decrease defection. Fittlebot2 attempts to engage users unobtrusively and naturally by prompting team members with self reflective comments and conversation starters. We hypothesize that an increase in trust needs to happen early on in the challenge before the team can begin to support each others' goals. We believe that this also applies to groups who do know each other in person, but may not be as close or are not sure how to interact with each other through Fittle. FittleBot2 support strategies include asking questions in a generic way and allowing users to answer concisely (Fig. 1). FittleBot2 also encourages users to reflect about self progress and provides information and shares knowledge with the team to develop a sense of comradery and shared goals.

The study uses the Presidential Activity Lifestyle Award Challenge (PALA+). PALA+ is a loosely detailed routine with room for adaptability and preference selection. Every day, participants perform a physical activity for 30 minutes and work towards incorporating a new healthy eating habit each week. All the instructions are adapted directly from the PALA+ website or prepared by certified trainers from a third party.

We collected information about the participants' personality, and demographic information of age, gender, and ethnicity. Pre-test and post-test surveys assess participants general attitudes towards nutrition and physical activities. After the experiment, a post survey asked questions about participants general attitudes towards the FittleBot and their team. We measure "attitudes towards FittleBot" with a 3-item, 7-point scale, "perceived social support" with an adapted 9-item,

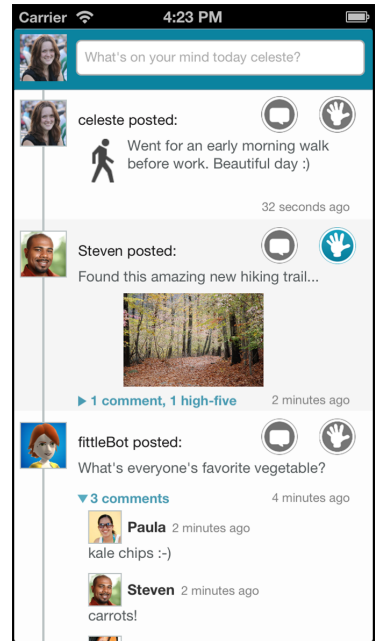


Fig. 1. Fittle mobile application team-based social activity feed

7-point scale from [11], and “sense of community” with an adapted 8-item, 7-point scale from [12] detailed in the next section.

3 Experimental Results

Participants in this study were volunteers from a research center on the west coast of the U.S. The participants were required to read English and be age 18 or older and were not compensated in any manner. Fourteen people signed up for the study. The average age of the participants is 44 years old (SD=8), ranging from 31 to 60 years of age. Seven of the participants are White; 6 Asian; and 1 Hispanic. We split the participants into 2 teams of 7 people each. Teams were distributed across gender and previous Fittle experience, so that 3 experienced Fittle users were present on both teams.

Both teams participated in the two-week PALA+ challenge. One team was given FittleBot-Basic, and the other team was assigned to FittleBot2. None of the team members knew each other prior to the study. This created an ideal environment for testing pre and post study sense of community. Two experienced Fittle individuals on each team were asked to be team leaders.

Table 1. Groups in the study and average compliance rate; Mean (Standard Deviation)

	FittleBot2 Team	FittleBot-Basic Team
Participants (M/F)	7 (2/5)	7 (3/4)
Week 1 Compliance (%)	69.4 (31.3)	79.6 (30.4)
Week 2 Compliance (%)	73.5 (19.2)	45.6 (33.5)
Average 2-week Compliance (%)	71.4 (24.7)	62.6 (26.7)

Table 1 shows the distribution of the participants’ compliance in the challenge, and shows that the FittleBot2 team has a higher overall compliance. Furthermore, the compliance rate actually improves for the FittleBot2 team while it drops drastically for the FittleBot-Basic team ($t(12) = 0.62$, $p = 0.54$ for week 1; $t(10) = 0.01$, $p = 0.08$ for week 2; $t(12) = 0.64$, $p = 0.53$ for average 2-weeks). The FittleBot-Basic team started off strong, but exhibits the typical Law of Attrition drop off rates from the first to second weeks. Interestingly, the FittleBot2 team starts off less strong, and increases compliance in the second week. Next, we explore the impact of specific elements of FittleBot2 and analyze the results of the post surveys

Conversation starters. Conversation starters were posted by FittleBot2 once a day if there seemed to be little activity within the team, to try to encourage members to log on and share. Five of the 7 team members of the FittleBot2 team responded to “What’s everyone’s favorite vegetable?” with a variety of responses: “yellow beets!!”, “Tough choice...Asparagus and broccoli are a close first...Spinach cooked or salad...”, “Raw: peppers; cooked, with oil and garlic and ginger: eggplant. But heritage tomatoes are pretty darn good too. And broccoli with cheese”, “Large pea leaf sprouts”, “Brussels sprouts—sauteed so

they caramelize”. FittleBot2 also provided self reflection questions like “What are you hoping to gain from this challenge?” Some team responses included “I’ll be going on a canoe trip next summer and I want to get into a routine that improves my upper body strength so I will enjoy the trip more,” and “Positive and healthier lifestyle changes.” Two other team members supported their teammates’ answers with a *High Five* (the Fittle app equivalent of a *Like*).

Attitudes towards FittleBot. We looked at how each team felt about their own team and the way that FittleBot paid attention to them as an individual and a team. Across teams, the FittleBot2 team felt stronger about FittleBot ($t(21) = 2.57, p < 0.01$, Cohen’s $d = 0.95$; means 4.6 and 3.5 respectively). Across teams, there was no different between the FittleBot2 team and FittleBot-Basic team’s attitudes towards their team ($t(22) = 0.98, p = 0.37$, Cohen’s $d = 0.37$; means 5.6 and 5.2 respectively). Within each team, the FittleBot-Basic team feels stronger about their own team ($t(22) = 3.8, p < 0.005$, Cohen’s $d = 1.39$; means 5.2 and 3.5 respectively) and the FittleBot2 team surprising show no difference in their attitudes towards the team and FittleBot ($t(20) = 2.6, p = 0.013$, Cohen’s $d = 0.9$; means 4.5 and 5.6 respectively). This suggests that the FittleBot2 team perceives their own team and FittleBot similarly in terms attention paid to them.

Sense of community. The Sense of Community scale represents the dimensions of needs fulfillment, group membership, influence, and shared emotional connection, which were found to be “correlated as expected with community participation, psychological empowerment, mental health, and depression.” Table 2 shows the measured means for each subscale for each team. For each of the four subscales, the FittleBot2 team reported higher scores (“fulfillment” $t(10) = 0.65, p = 0.53$; “membership” $t(9) = 2.2, p < 0.05$; “influence” $t(7) = 0.98, p = 0.35$; “emotional connection” $t(10) = 0.1.3, p = 0.2$). Note that there is a wider spread of “influence” and “emotional connectedness” on the FittleBot2 team than the Fittlebot-Basic team. This suggests that people on the FittleBot2 team had a diverse level of sense of community with FittleBot2.

Table 2. Sense of Community among teams; Mean (Standard Deviation)

	FittleBot2 Team	FittleBot-Basic Team
Fulfillment	8.2 (1.5)	7.8 (1.1)
Membership	10 (1.5)	8.4 (1.5)
Influence	8.9 (1.7)	8.2 (0.44)
Emotional Connectedness	9.4 (2.0)	8.2 (1.1)
Total	36.5	32.6

Perceived social support. Perceived social support refers to one’s personal appraisal of his or her available support [11], which is more important than actually receiving that support [13]. The *Perceived Social Support Scale* measures one’s perceived level of support towards friends, family (which we interpreted as team) and a significant other. We excluded measuring significant others in our study. Examples of questions include, “My team really tries to help me” for

Table 3. Perceived Social Support among teams; Mean (Standard Deviation)

	FittleBot2 Team	FittleBot-Basic Team
Team/Family	16.6 (2.1)	15.2 (1.3)
Friends	3.4 (1.1)	3.8 (0.45)
Total	20	19

the family subscale, “I can count on my friends when things go wrong” for the friends subscale. Higher scores indicate higher social support (“team” $t(10) = 1.37$, $p = 0.2$; “friends” $t(8) = 0.78$, $p = 0.45$).

Table 3 shows the measured means for each subscale for each team. While the FittleBot2 team found a greater perceived support from their team, they found a lower perceived support from the individuals on that team. Again, note the wider spread of scores on the FittleBot2 team. This suggests that people on the FittleBot2 team had a diverse level of perceived support possibly speaking to individual preferences for FittleBot2’s new strategies.

4 Conclusions and Future Work

This paper presents a field study of Fittlebot2, a virtual agent in the Fittle app, that aims to foster a sense of community with conversation starters. We see a trend towards an increase in compliance for the FittleBot2 team, and observe that conversation starters seem to engage teammates of the Fittlebot2 team. We measure a greater sense of community amongst the FittleBot2 team members than the FittleBot-Basic team members. The FittleBot2 team also saw its own team on the same level as FittleBot2, whereas there was a significant difference in how the FittleBot-Basic team saw its team and FittleBot-Basic.

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