#Health@You: An Overview of Text-based Glanceable Displays as a Tool for Socio-technical Interventions

Allison T. Brown, MS[1], Katie A. Siek, PhD[1]
[1]University of Colorado Boulder, Boulder, CO

Abstract

Parents play an important role in helping adolescents with diabetes manage their health, but this relationship is strained as the teens approach adulthood and want more autonomy in their disease management. #Health@You uses text-based glanceable displays, text messaging, and online personal health records to help improve communication and disease management between these teen-parent dyads.

Introduction

Patients with diabetes control their disease with Insulin injections (type 1 and its variants), diet and exercise (type 1 and type 2), and blood glucose monitoring (all types)[1]. Monitoring these personal health metrics helps patients become self-efficacious in their disease management. Parents play an important role in helping adolescent patients learn to control their disease and its symptoms[1]; however, the parent-child relationship is strained as the teenager begins to assert their independence but the parent must continue to ensure their teenager's well-being[2,3]. This conflict could be mitigated by facilitating appropriate communication between the teen-parent dyads.

Paper-based, communication-focused tools have been shown to reduce such conflict, but they do not help the teen develop the skills they will need to manage their disease once they are on their own if their caregiver is not available[3]. Interventions using mobile phones allow teens and parents to use a remote, asynchronous communication method that teens have already willingly adopted. Previous research has shown that teens prefer mobile phone-based diabetes management to traditional methods[4]. Previous interventions for patients with diabetes have been limited to Short Message Service (SMS/text message) reminders, logging, and/or personalized informative and educational messages[5,6,7]. These interventions have not incorporated ways to share relevant information with caregivers.

There have been some smart-phone based technological interventions to improve health and sustainability practices by using graphical glanceable displays[8,9]. Glanceable displays condense information so that a user can understand the message with just a quick "glance." Although these studies have been effective in changing users' behaviors, their dependence on smart phones puts the interventions out of reach for low socio-economic (SES) populations.

#Health@You expands on prior work in both areas of technological interventions to create a system aimed at low SES, adolescent patients with diabetes and their caregivers. #Health@You will use text-based, glanceable displays (a combination of emoticons, abbreviations, and elements of microblogging) and SMS messaging to empower teens and caregivers with the ability to send and receive easily parseable messages on their mobile phones. An additional benefit of using text-based glanceable displays is that they will simplify the natural language processing (NLP) tasks that will be necessary to extract and store information from the messages users send. #Health@You will connect with an online Personal Health Record (PHR) to provide patients with the ability to use the PHR for long term reflection, both for disease management skills and communication patterns. The PHR can also be integrated with a clinic's Electronic Medical Record (EMR) to give healthcare providers the ability to monitor and give feedback.

The poster will provide an overview of a study to evaluate the use of text-based glanceable displays as a tool for socio-technical interventions. The work as a whole will also contribute the #Health@You system, a low-cost solution that can be deployed for a variety of underserved and vulnerable populations, and information about how PHRs can be used to facilitate communication between adolescent patients and their caregivers, and between those dyads and the adolescents' primary care practitioners, to the field of health informatics.

Example Scenario

Current Reality: Aura is a 15-year-old girl who was recently diagnosed with type 2 diabetes. She has problems maintaining her blood glucose levels and now her mom, Lucita, and primary care provider (PCP) are hounding her about watching what she eats and taking her medications. Aura texts Lucita about things she eats, but her mom doesn't have time to read long texts while working in the kitchen at a fast food restaurant. Aura starts a paper diary, but quickly loses interest.
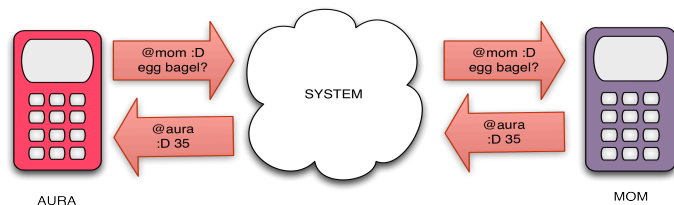
Vision: Aura learns about #Health@You at a PCP appointment and takes the pamphlet with cute diabetes management emoticons. After texting the #Health@You server to sign-up, Aura and Lucita practice sending the emoticons to each other during their favorite show's commercial breaks. The next day, Lucita receives an SMS "@mom :D egg bagel?" Lucita easily reads the query on how many carbs are in an egg bagel. She quickly texts back ":D 35" while a burger cooks to tell Aura that the bagel has 35 carbs (see Figure 1). Later,

Figure 1. A diagram of a possible "conversation" using #Health@You.

Aura uses a computer at the library and sees that she is eating well and exercising a little. She will show this to her PCP at her next appointment to see if her exercise is appropriate.

Text-based Glanceable Displays Study

Our first step in creating this system has been to examine whether people with diabetes and their caregivers will want to use the system as we envision it. We designed a preliminary set of emoticons and abbreviations to use in text-based glanceable displays for #Health@You, and conducted a study to examine how quickly participants became comfortable with the new system, how quickly and accurately they could send text messages using the glanceable display techniques, and whether they thought would like to use such a system to manage their diabetes or the diabetes of a dependent. We also asked them to provide information about and reflect on their current management and communication practices, and to think about what disease-related information---if any---they would like to share with others (or that they would like their dependent to share with them).

Contributions and Future Work

As of the submission deadline this study is still in progress, but we will be able to report findings at WISH in November. The major contributions of this study to the field of health informatics will be the evaluation of text-based graphical displays as a tool for socio-technical interventions.

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