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# aSister - Scheduling for Homeless Women with Special Needs

**Kshitij Gupta**

Indiana University  
Department of Informatics  
901 E. 10<sup>th</sup> Street  
Bloomington, IN 47408 USA  
kshgupta@indiana.edu

**Adwait Joshi**

Indiana University  
Department of Computer Science  
150 S. Woodlawn Ave.  
Bloomington, IN 47405 USA  
joshia@indiana.edu

**Jamie Allison McAtee**

Indiana University  
Department of Informatics  
901 E. 10<sup>th</sup> Street  
Bloomington, IN 47408 USA  
jamcatee@indiana.edu

**Nigel Savio Vaz**

Indiana University  
Department of Computer Science  
150 S. Woodlawn Ave.  
Bloomington, IN 47405 USA  
nvaz@indiana.edu

**Abstract**

Homeless women need special care and attention especially during pregnancy or while trying to overcome substance abuse. We present a solution to help counselors working with these women. The solution allows the counselor to send text messages, which can be used to remind women of their daily schedule, as well as provide them with health and nutritional information. The system will also serve as a persuasive tool to help them develop positive behavior through the delivery of encouraging messages. Cell phone technology usage is increasing rapidly among the homeless population. The system uses text messaging which is an inexpensive and non-obtrusive method of communication. Our study contains details on the design of such a system and also attempts to evaluate the efficacy of such a text messaging system.

**Keywords**

Homelessness, pregnancy, substance abuse, text messaging, scheduling.

**ACM Classification Keywords**

H. Information Systems H.5 INFORMATION INTERFACES AND PRESENTATION (I.7) H.5.2 User Interfaces (D.2.2, H.1.2, I.3.6) Subjects: Prototyping; User-centered design

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*CHI 2008*, April 5–10, 2008, Florence, Italy.

ACM 978-1-60558-012-8/08/04.

## **Introduction**

Homelessness is a condition in which an individual lacks a fixed regular and adequate nighttime residence. It also includes individuals whose primary nighttime residence is a supervised, publicly or privately operated shelter designed to provide temporary living accommodations [7].

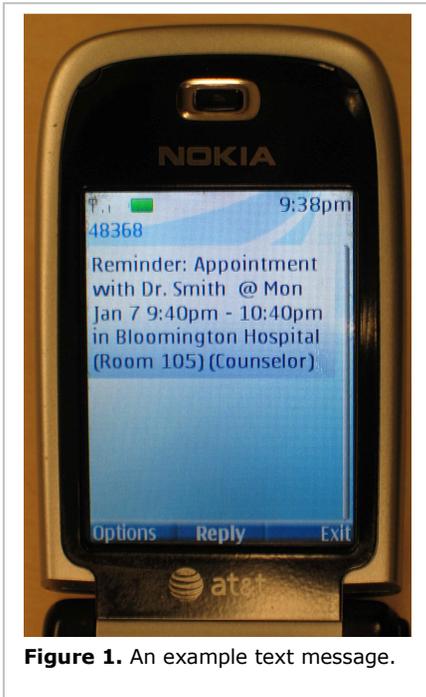
Our initial user research consisted of a literature review and interviews with counselors from three shelters in town. Our goal was to better understand the reasons for homelessness and the different groups within this population. One of the key things the literature review revealed was that low-income single women who are pregnant have an 18% probability of becoming homeless compared to 2% of women who are not pregnant [8]. When pregnancy accompanies the precarious state of homelessness, the need for emotional support and social communication is not being met during one of the most critical periods of a woman's life. Their pregnancies are difficult because normal physiological changes of pregnancy often become pathological, signs of potential complications can go unnoticed or unattended and minor discomforts of pregnancy can be exacerbated by the women's environment [5]. These women don't have easy access to information about general prenatal health, which includes doctor's visits, nutrition, exercise and other important information.

Besides pregnancy, homeless women often have a high occurrence of substance abuse problems. According to a study conducted in Los Angeles, 37.1% of homeless women had unwanted pregnancies while 75.7% women had substance abuse problems [6]. Women with substance abuse and pregnant women have many

needs in common. We decided to focus our research on homeless women with special needs. We define this group as pregnant women and women with substance abuse problems.

Gaining access to the homeless population in general was very difficult. We approached the human subjects committee at our university regarding access to the homeless population. The committee indicated that they defined this population as protected and in order to work directly with them we would need someone trained specifically in the special needs of this population. Due to this limitation we had to get creative with our user research and later on with our testing. Since we could not talk to the women directly we obtained approval to talk to counselors from three different agencies in town that worked specifically with this population. The insights we gained were important for us to understand the issues of this population.

In these interviews a few interesting points came up which influenced our design. The women in the shelters are often asked to work or volunteer in order to help them get used to a steady job of some sort. The women also have meetings they need to attend and doctor's appointments to keep track of. These tasks plus chores within the shelter keep these women very busy. The counselors mentioned that these women had difficulty keeping track of their schedules. They often miss appointments or forget things they are supposed to do. The general state of crisis that they are in contributes to the lack of organization on the part of these women. The women also have trouble remembering what sorts of things they should be doing for their health. For pregnant women this could be something as simple as remembering to take a break or



**Figure 1.** An example text message.

a nutrition tip. Women recovering from substance abuse also often need positive reinforcement to stay on the right track. Another interesting insight from the counselors was that to even their surprise, most of the women in the shelter had cell phones. The counselors said this was one of the first things the women would acquire when they had any money.

### Proposed Solution and Design

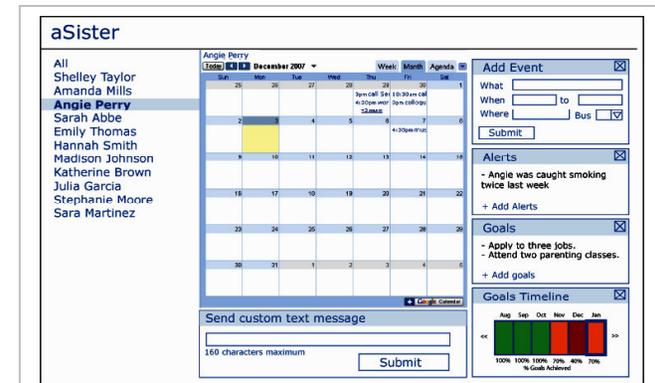
We saw a need that we could address in the scheduling and reminder problem. We also saw an opportunity in the ubiquitous nature of cell phones among this population. Further we discuss our design process, the final solution and feasibility of the overall concept.

Our initial idea was to build a system that would allow the counselor to sync their computer with a calendar application on the woman's cell phone. The syncing process would give the women their schedule for the week along with setting up event reminders. While this would have made for a more controlled application it would have created difficulty in the fact that the women would all be required to have the same model of cell phone. We liked the idea of a reminder system but wanted to design something that could possibly be implemented in one of the shelters we visited. After researching cell phone technologies we chose SMS (Short Message Service) as the delivery system for the calendar and reminders. SMS was chosen since a majority of the cell phones and cell phone providers currently in use support SMS. The ease with which large numbers of messages can be customized and sent by SMS (Short Messaging Service) text messaging, along with its availability and comparatively low cost, suggest SMS as the appropriate technology for our solution.

From insights we came up with aSister, a SMS cell phone reminder system. [Figure 2] aSister assists homeless women with special needs in their struggle to become productive members of society. The purpose of our system is to help these women better manage their schedules. aSister also assists the women by providing important health tips, advisory information and motivational messages that could be beneficial to the women in their attempt to overcome their difficult situation.

### aSister

We designed the aSister system to be flexible enough to be easily adapted to a variety of shelter models. We have modeled our example after the way Amethyst House, one of the shelters we talked to, works with their women. When a woman first arrives at Amethyst House she goes through a probationary period where she needs to meet a certain number of goals. The goals include getting a job or volunteer position, attending substance abuse recovery meetings and getting medical care.



**Figure 2.** The aSister calendar and goals interface.

When the woman moves into the shelter she sets goals and a schedule with her counselor. This information would be entered into aSister using the counselor interface. [Figure 2] The counselor sets up reminders for all of the events the woman has for the week. The counselor works with the woman to determine the lead-time for the reminders of her appointments. The counselor also enters the goals in the goals interface and sets up reminders related to these. The counselor adds appropriate health and motivational messages to be sent by aSister based on her interaction with the woman. At the start of each week the counselor meets with the woman to review her schedule and goals.

Once the woman has met her primary goals she is removed from the probationary period. At this point in time the counselor and the woman would revise the list of events for which she should be reminded. The number of meetings with the counselor also starts to decrease. As the woman starts to better manage her own schedule, the number of reminders would also decrease. As the woman makes progress aSister would be transitioned to a mentor in the house who would help the woman stay organized. The mentor would serve a similar role to that of counselor but would be more of an encouraging peer than an authority. The mentor would be a woman who has been through a similar situation and has been successful with the system. Before the woman moves out of the shelter she would have sole control over her aSister account.

The web interface gives counselors the ability to manage the schedules of all of the women that they are working with. The counselor sets up an aSister account for each woman that contains her schedule, goals and contact information. When the counselor logs in to their

aSister account they will see all of the women they are currently working with. The counselor can switch between women by selecting their name from the menu on the left. Within this interface the counselor can enter a new event for the woman, send an unscheduled message and update the goals interface. The goals interface allows the counselor to note where this woman is on her goals. At the end of each week, the counselor checks if the goals have been completed. As they enter the information about the completed goals into the system, the goals timeline is updated on the interface. This 'goals timeline' is a visualization, which helps the counselor to keep track of the behavior of the woman over a period of time. The alerts box is used to note possible issues with the goals.

When the woman is transitioned to a mentor the counselor would give the mentor access to the woman's aSister account. The counselor would still maintain access to the woman's account. The mentor interface would look similar to the counselor interface.

### Prototype

In order to test the system we built a working prototype of the application. The aSister prototype is a JSP application hosted on an Apache Tomcat 5.5 server. It makes use of Google's GData (Java) API to access the Google Calendar and the SMTP GMail services. [Figure 3]

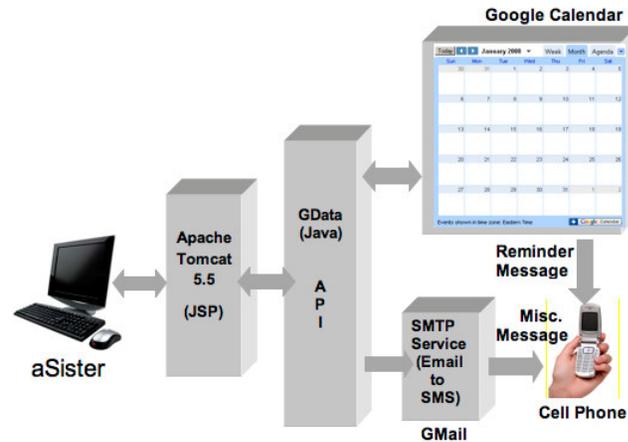
When the counselors log in they see the main screen that shows a list of names of women they are working with. Clicking on a name retrieves and displays the Google Calendar of that woman after authenticating connection credentials from Google servers. The

"We try to keep them as busy as possible, so they do not get time to think about past relationships and bad habits."

"I see how your system can work in our shelter. Only yesterday, we had an incident with a woman who is on probation. She was supposed to go for a urine test to see if she was taking drugs, and she forgot. She is really stressed about it right now."

**Counselor, homeless women shelter dealing with substance abuse problems**

prototype currently allows the counselor to add an event to the selected calendar. To add a new event, the counselor provides the event date, start, end times,



**Figure 3.** The aSister prototype system.

event location, and description along with the time in minutes before the event start time when the reminder should be sent. A SMS reminder is sent to the woman at the times entered during event creation. The reminder message contains the event time, location, description and bus transit line. To send an instantaneous text message, aSister provides a subject field and the main message field. On Submitting, it generates an email address of the format <cell number>@<carrier>.com. The cell number depends on the woman currently selected in the calendar. The subject and content of this email are the same as submitted by the user. This email is queued immediately as a text message to be sent to the cell phone number in the email address.

### Justification for solution

Recent years have seen increasing cell phone usage among homeless people [2]. The Fort Worth Star-Telegram spoke with workers at Fort Worth's homeless shelters who said the number of guests with cell phones is growing rapidly, and some shelters have even reported problems with too many guests seeking outlets to charge their phones [3].

Use of text message alerts in health care has been tried before and was found efficient in reducing the number of missed appointments [4]. Our solution integrates the ability to send automated reminders based on the schedule of homeless women along with other customized messages.

Since aSister uses free of cost services like Google calendar it does not add to the cost of the solution. Instead of letting homeless women pay for the text messages received, we would seek funding for these messages from grants and approach cell phone providers about free or reduced rates for messages.

### User Research and Evaluation

Once we had a working prototype to send the messages we tested the idea on a group of 5 graduate students with busy schedules. All of the students had a full course load plus outside work commitments, and other meetings. While we acknowledge that this population is not an ideal substitute for our target population, the goal of this test was to gauge the effectiveness of the system to keep up with busy schedules. We ran the test for a workweek sending them reminders of the schedule that they had provided us at the beginning of the test. During the test we

asked the users to take notes of their reactions to the messages they received. At the end of the week we had a group debriefing session with the participants. Three of our five students from our graduate student test indicated that the system helped them remember something they might have forgotten.

"I hope I would have given you guys more elaborate calendar with my submission deadlines and when I planned to study for them. :( I wasted my break."

"very nice. I am becoming more conscious of the passing of time. I am beginning to understand when I get a text - "oh that is probably about my next, next appointment etc"

"Got reminder while preparing notes for class. It's nice - even when I need not be reminded of the next activity scheduled, it does give me a sort of time stamp for - appointment is one half hour from now."

"I would have missed a class, had I not got this message."

**Excerpts from notes taken by graduate students after receiving text message**

After our tests we met with a counselor from a local shelter to discuss our solution and show our prototype. She was very positive about the concept and said she could see how something like this would help. She told us about a woman in the shelter who had missed two important appointments in the previous week due to simply forgetting about them. The counselor indicated that if the woman had a system like this to remind her she might have not forgotten these appointments.

### Future Work

The counselor in one of the shelters we talked to was enthusiastic about the concept. Our plan is to deploy the system in the women's shelter and study the response towards the system in the long duration. We plan to work with the counselors who will help us communicate with the shelter residents to get their feedback.

### Conclusion

The proposed system helps in managing the schedule and activities of homeless women with special needs. The goal of this system is to help homeless women in the transition from being a consumer of external services to an independent productive citizen. Feedback taken from the professionals working with this population group suggests that this system has the potential to bring a positive change in the lives of homeless women in this critical stage of their life.

### Acknowledgements

We would like to thank Dr. Kay Connelly for her guidance. We would also like to thank the counselors from Amethyst and Hannah House for their feedback and the graduate students who participated in our user study.

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