Assignment 3
Seniors with Diabetes and Interaction with Technology
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Observations of Seniors with Diabetes and their Interaction with Technology

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Executive Summary

One thing that piqued our group to choose this topic (Seniors with Diabetes and Interaction with Technology) is the common fact that we all know a senior with diabetes, and our passion to help make their life easier. One thing I learned was that many of the senior's lives are centralized within their home as they feel comfortable inside there and not much reason to leave. Some of the artifacts that use are CGM (continuous glucose monitor) and insulin pumps. Some of them do own a smart phone that they do not use for health purposes.
Specifically, we wanted to know how these subjects live every day and what they do to monitor their condition. One method that we used to get to know these subjects better was through an interview. Through this interview, the interviewer (me) would briefly mention what this interview would be about, tell them we are doing it for our project, and create some small talk to relieve the tension. Other questions would include the tools they use to monitor their situation or what are some of the hardships they deal with on a daily basis. These interviews took place where they felt most comfortable, which was usually a room inside of their residence. Finding the right criteria for our user group can be difficult, and so I was only able to conduct a few tests on three subjects.
Another method was an observation plan, however I was only able to observe one person as it was convenient for the both of us. I would observe what they did throughout their time during the meal times, and take notes and ask how they feel about certain activities.
Overall, many of the participants found their daily basis mediocre, but living conditions could be improved through better application uses. Many of them are not exposed to the technology that is available to the younger generation, thus they are not familiar with the newer products.

Methodology

Who we tested

Three participants, all of whom are seniors with a type of diabetes.

Age	
0-55	0
56-70	0
71-85	2
86+	1
TOTAL (participants)	**3**

Technology Usage (phone/internet)	
0 to 10 hrs. wk.	3
11 to 25 hrs. wk.	0
26+ hrs. wk.	0
TOTAL (participants)	**0**

What participants did

The participants and researcher met up and talked to each other (via a face to face interview or an observation method) and discussed what hinders the participant's daily activities. The tasks that were done were as followed:

- Interview
- Observation method which includes:
    1. Routine done before eating
    2. Routine done before going out
    3. Routine done after eating
    4. Given them an app on a smartphone and see how much they learn in 15 minutes

What data we collected

All of the participants seemed to use the older technologies, ones that were available in the 80's. This information was gathered through the interview, specifically when asked if the instrument can be seen out of curiosity. The data that was collected was gathered smoothly as there were not that many issues in fact some of them enjoyed the company and commended us for our interest in their well-being. Many of them also use CGM (a continuous glucose monitor) and insulin pumps to regulate their condition.

Major findings and recommendations

Many of the issues that rose up to the elderly are stemmed from the availability of the current technology. Specifically, it is the difficulty and effectiveness that turns them away. They feel the equipment is too advanced for them and they are not sure how effective it is.

Many of these problems can be fixed with through a trusted instructor who can explain the usefulness of the technology. Alternatively, they can try and experience other technologies that are available such as Dexcom's Apple, which is a tiny monitor that is under the skin used to measure the blood glucose levels and the information is sent to their smartphone, which is much easier than a larger monitor on them.

User needs list

One thing that is needed is to have more available technology when we meet up with the participants. By asking them questions of what they use is not sufficient enough to know how comfortable with new technology, or current technology for that matter. Along with the observation plan, we can introduce newer technologies as the seniors find most technology difficult to use and are sceptical about the effectiveness. Some artifacts we can bring are:

- Smartphone/tablet/computer apps where they log blood sugar levels
- Devices that test out blood sugar every few minutes
- Smart pumps (not attached to them) that provide insulin when needed
- Texts/calls/email programs that notify them to test or take medicine

Stakeholder descriptions

The people that are affected in our system of gathering data are the seniors (participants) and researchers (our group). Indirectly, it may affect doctors, companies that produce the technology to help the diabetics, pharmacists, and even other families (by alleviating their concerns to worry less about their family member (who is the senior with diabetes)).

Persona

Jung-Ja is an 87 years old and use to work for an accounting firm that has a lot of influence in the business world, which brings a lot of stress into her life. She has worked in the job for 30 years and knows it well, practically inside out. Many of the younger accountants use to ask her for advice due to her professionalism in the career. Despite being very good at her job, she has a condition which limited her working capabilities. She suffers from type 2 diabetes and has to constantly monitor her condition or else she cannot perform well. Because she had to monitor it a lot, she had to take the technology what was available in the 80's to help her, however now that there is not as much stress in her life, she hasn't bothered to learn the new available devices.

Lately she has been feeling down as her family is moving away from her hometown which leaves her alone in the city. This leads her to taking care of herself and monitoring her condition without the aid of anyone else. She notices that the technology she is using has been malfunctioning lately and cannot get the parts to replace it as they have been discontinued.

She has used many instruments to look at her condition but over time she eventually stopped caring as less stress has been put upon her. However with the increasing number of times of her equipment being malfunctioned, she turns to newer technology but cannot comprehend how to use it or how affective it will be. She wonders how she will get use to the newer technology without being a burden to her family and make it easier for her to live by herself whilst monitor it all.

Scenario

Jung-Ja is an old retiree who lives on the outskirts of town alone. She use to have family members living with her to remind her about her diabetes condition, but as of late they have all moved to the urban part of town. Not being use to this, she forgets one day to measure her blood glucose levels with her CGM and forgets to inject insulin into herself through an insulin pump. While her daily exercise routine, she realizes she is more tired than usual and has a blurry vision, but she could not remember why until nothing or no one reminded her to monitor her condition.

Task Analysis

Critical task: Monitoring the condition and doing something to fix if needed

A way to analysis this task is to have someone or something regularly check up on your condition. Whether it is a person like a family member or friend, or an automated device like a device or application, it should regularly check on the condition of the participant in case something changes in their body. The condition would then be checked and recorded, and if there is a severe change that threatens the person, some medication doses will be added to help counter-act the symptoms.

Additional Personas

AJ is a 64 year old actor who lives in the heart of LA and is a few months away from retirement. AJ suffers from a disease that is called diabetes, which he must monitor carefully or he puts a risk on his life. With the active lifestyle that AJ lives, he is constantly moving around and straining his body, and because of the way his job demands him to be, AJ must be in character for his role most of the time. He plays a feeble man who is hyperactive. Because of his eccentric role, people cannot tell whether if he is playing his role correctly or something is off with him. When people think he is acting well, it sometimes mean his glucose sugar level in his blood is low which causes his speech to be slurred and twitchy. AJ wonders if there is an easier way for him to monitor his blood sugar level while he is working so he does not have to be out of character or become a burden at the work area.

Max is a 56 year old avid mountain hiker. He resides in the suburban area of Vancouver and loves to hike up mountains many times a week. Max wakes up at 5am and gets ready for his day to go hike in one of the various rocky mountains around and goes out all day until night. However Max has diabetes and he has to remember to take his insulin dosages a few times a day. Because Max leaves so early in the morning, he is sometimes groggy and forgets to pack his insulin dosage with him on his trip. As a result, he gets really thirsty on his trips and it becomes dangerous for him to go mountain hiking alone. Max wonders if there is an easier way for him to get his insulin dosage without him having to remember the correct dosage and correct time when his body needs it.

Appendix

Research Instruments:

1. Interview Scripts:

INTRO

- introduce yourself
- explain the goals of the interview
- reassure the participant about the ethical issues (especially privacy and anonymization of their data)
- ask for permission to record the interview present the informed consent form for their review and approval

WARMUP

- (It's called warm up in order to break the ice and for the situation to get comfortable.
- Start a casual conversation about what technologies the person uses and what they do with them.)
- are they users of any types of technology? (Don't just explore computers and smartphones… they may prefer other types.)
- if so what do they enjoy ?
- with what types would they prefer to extend their knowledge and learn something new?
- if they make a particular choice, why?

MAIN BODY

- (This section is likely to raise the sensitive issues, if there are any. We need to be careful and considerate about our probing, but not avoid the issues. We are breaking down this enquiry into a few key parts: first to find out generally what they are supposed to be monitoring and managing; then find out what tools are provided or available to perform the monitoring and managing; then by asking about particular events, we find out innocently about what is actually used. We must be careful about not being judgemental if there is a gap between what they should be doing and what they are actually doing. In fact, we expect there to be a gap, and we need to explore it considerately.)
- what is involved in managing their diabetes ? (attempt to obtain a full inventory of the management items: i.e. factors to manage)
- what are the tools, or systems, or aids, that are used to manage diabetes ?
- how is this management to be performed (PROCESS question) ?
- describe a few recent recording/decision/required management task events explore the difficulties or obstacles to taking greater advantage of the available tools and processes

COOLOFF PERIOD

- (The preceding questions may have made them a little uncomfortable, so we can give them an opportunity to blow off some steam and even rant a little.)
- what are the emotions that are experienced with the management of diabetes?
- are there supports available from family, physician, health care agencies; 5do they offer new systems, technology, and the training to use them?
- is there something that they would like to use instead, an alternate technology?
- what would they most like to change: about the management requirements, or about the tools, or the processes, or the environment?

WRAPUP/CLOSURE

- thank you
- signal the end of the interview

* follows the format presented in class
* uses some suggestions from ‘WoodSemiStructured Interviewing1997ACM’

2. Questionnaire:

Gender:

Male	Female

Age:

55 -	56-70	71-85	86 +

Do you feel comfortable using the following devices?

- Computer desktop or laptop Yes/No
- Tablet Yes/No
- Smartphone Yes/No
- Other:_____

How useful do you think technology is to help in the diabetes management?

Extremely useful	Useful enough	Not so useful	Extremely Useless

Do you use any technological device to help you in the diabetes management? Yes/No

-> If so, what types of apps do you use with these devices?

__ Reminders
__ Medication dosage control
__ Diet regulation
__ Control of physical exercise
__ Search for general information about diabetes
__ Other: _____
_____

-> If not, would you be learn to use some of those devices only to help you in your health management? Yes/No

What are the difficulties that you have within technology?

__ I cannot find information about what I want.
__ I am afraid of having my personal information stolen.
__ Usually, the color and size of texts and pictures make them hard to see.
__ I do not know if the informations are trustful.
__ Other: _____
_____

-> What is the frequency of use of the device?

__ Several times a daily
__ Daily

__ A few times a week
__ Once a week
__ Less frequently

-> Are there any other tools that would help you?

_____
_____
_____

3. Observation Plans:

OVERVIEW

Through the observation plan, our intentions of researching on these subjects come from our initial interest in the issues that users run into when dealing with diabetes via technology. The initial process should start off with interviews and questionnaires to get to know them. After knowing more about the subjects, questions could be asked specifying about their use of technology. To be more precise, the amount of usage and interaction they have with their devices that they use to monitor their conditions. A method to gather this information would be a more direct observation approach, such as a fly on the wall, although we are not going to be quiet, we would ask questions while they are going through a certain activity. The technology that the subjects would be using can include glucose monitors, insulin pumps, weight scales, heart-rate monitors, or any other device they find useful.

PLAN

The people that would be conducted in this observation are the people from the user group in phase 1; those who are in their senior years and suffer from a form a diabetes (types 1 or 2). The reason they are being targeted is because they require constant monitoring of their blood glucose levels to stay in good health.

Their surroundings when they are being studied should vary, however it should mainly be taking place inside their home. This is mainly we want information where they feel comfortable and living their life without thinking too much about it.

We would want to pay careful attention to their activity and see if they have any interactions with media and see how they react (frustrated/fine/confused…). Most activities that we would be observing them should not be something new to them so the way they may react may not be odd, but when an activity they do is not normal, more attention should be directed to them.

DETAILS

Things we would focus on:

- The amount of participants (a good number would be 2 each if possible, but aiming for having each member observe 1 person)
- Try to focus on a particular activity, but not too long (20-50 minutes)
- 15-20 minutes of that time would be the researchers (us) giving the elderly a mobile application or device, and us asking them how much they can figure out of the application in the allotted time

RESEARCH PROTOCOL

1. **Project Title**: Seniors Managing Diabetes

2. **Investigators**: Jeremy Johnston – jeremy.johnston@mail.utoronto.ca, Eric Xue – eric.xue@mail.utoronto.ca, Marc de Niverville – marc.deniverville@mail.utoronto.ca, Jhony Campanha – j.campanha@mail.utoronto.ca, Joseph Lee - josephy.lee@mail.utoronto.ca.

3. **Purpose**: The purpose of our research is to understand the elderly with diabetes mellitus to help us derive requirements for the design of novel interactive computational media that are intended to be useful to elders with diabetes. A brief description of our design concept is: a health app used to monitor and track daily health.

4. **Process to be followed**: We will brief the participants about the purpose of the study, explain the consent form to them, and ensure that they sign the consent form. We will then engage the participants in a roughly hour long, semi-structured interview. We will also with their permission make observations as follows: taking notes of activities, eating habits, and use of technology.

5. **Participant selection**: Participants will be chosen from elders with diabetes. They will be identified via voluntary assessment and selected according to easy of access. In general, they will be characterized by being above the age of 55 and having diabetes.

6. **Relationships:** Our relationship to the participants may be described as follows: no relationship.

7. **Risk and benefit**: There will be minimal risk to the participants, for example that they feel that they have wasted their time. The only benefit will be to contribute to the education of the investigators. Participants are free to withdraw before or at any time during the study without the need to give any explanation.

8. **Consent details**: We will brief the participants about the purpose of the study, and explain the attached consent form to them, and ensure that they consent to participate and sign the consent form.

9. **Compensation**: Participants will receive no compensation.

10. **Information sought**: The information to be sought is described in the attached interview protocol, observation plans and surveys.

11. **Confidentiality**: Information will be kept confidential by the investigators. Names or other identifying or identified information will not be kept with the data. The only other use will be to include excerpts or copies in the assignment submitted, but names and other identifying or identified information will not be submitted.

Consent Form: Seniors Managing Diabetes

I hereby consent to participate in a research study conducted by Jeremy Johnston, Marc de Niverville, Joseph Lee, Jhony Campanha, and Eric Xue for an assignment in University of Toronto Computer Science 318, Design of Interactive Computational Media.

I agree to participate in this study the purpose of which is to learn about the activities and use of technology by elders with diabetes.

I understand that

- The procedures to be used are interviews and observations.
- I will receive no compensation for my participation.
- I am free to withdraw before or any time during the study without the need to give any explanation.
- All materials and results will be kept confidential, and, in particular, that my name and any identifying or identified information will not be associated with the data.

PARTICIPANT

Name (please print)_____

Signature_____

Toronto, Date_____

INVESTIGATOR(s) Name_____ Signature_____

_____