

# Getting the Right Design

*CSE 440, Spring 2017*



## Team & Roles

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## Problem and Solution Overview

Social isolation can lead to loneliness, lowered self-esteem, and mental health issues. Maintaining good social interaction can be particularly important for residents in nursing homes, who are often estranged from the rest of society. A study in French nursing homes shows that developing social ties with fellow residents improves integration into retirement homes- “Feeling connected, secure in the relationships with others, and integrated as an individual to the group contributes to enhance leisure practice, self-determined motivation, and finally adaptation to life environment” (Altintas et al.). Participation in leisure activities helps support social connection by promoting interactions with peers and developing a sense of community among individuals. Furthermore, while social connections with peers are not necessary for all residents, they require facilitation and are unlikely to develop spontaneously (Bergland and Kirkevald).

Currently, there are a few technological solutions out there try to connect the elderly. Stitch is a social network for seniors above fifty that helps members find friends and partners (O’Hear). Tapestry is another networking app that helps keep the elderly connected with their family members with a simple layout (Tepper). While these solutions tend to focus on remote

connections with those in their age group and family, they do not address relationships within the nursing home environment or socializing for residents with physical disabilities.

Our initial problem space was improving social connections between residents of retirement communities. Through interviews and a literature review, we narrowed our problem space to focus on residents for whom mobility is a barrier to socializing. Our proposed solution uses VR to enable these residents to engage with others in both structured and unstructured social events by removing the barrier of mobility. A VR solution enables residents to socially engage with others while simulating activities that immobile residents cannot do.

## Design Research Goals, Stakeholders, and Participants

The goal of our user research was to elicit specific “pain points” faced by individuals in retirement communities. Although scheduling conflicts prevented us from talking to retirement home residents, we interviewed a retirement home staff member and caretakers who support others with age-related mobility impairments to inform our design process. While retirement home residents are our target users, we must also consider the needs and perspectives of retirement home staff, friends, and family.

## Interview Participants

For our inquiries, we interviewed four people who all have some connection to the elderly community or to nursing homes in an attempt to better understand the situation that the elderly (both in homes and not) find themselves in. The method we chose was to conduct one-on-one interviews and ask open-ended questions from a prepared list. One-on-one interviews offer insight into personal questions and experiences which would otherwise be lost in a graffiti wall approach -- an option we considered early in the project.

Our first interviewee is Jessica, the Life Enrichment Director of a Seattle-based nursing home. She is in charge of planning events, mostly outings, for the residents of the nursing home. Jennifer interacts with the elderly residents on a daily basis and determines what events are available to entertain residents. She has first-hand experience seeing interactions between elderly within a retirement community.

Jennifer is the second person we interviewed and she is a part of the Bainbridge Island Volunteer Caregivers. Her volunteer work is transporting elderly people and assisting with activities/actions that residents are no longer capable of doing. Currently, she helps a nursing home resident who has problems retaining their memory. About a week after the first interview, we conducted a second interview with Jennifer with a particular focus on residents with disabilities.

Sarah, a grandmother, was our third participant. Sarah doesn't live in a nursing home and is able to take care of herself. Sarah struggles with memory problems as do many of her friends. She has many friends who are currently living in nursing homes and has told us of their experiences. Sarah is not adept at technology and requires someone else take care of her finances and online matters.

Our final interviewee is Jane, a 79 year old woman living alone in a condo in Canada. She has been widowed for 6 years. She does not go out very often because a car accident damaged her hip and she has trouble walking without a cane. She is a native Korean speaker. Most of her socializing comes from family visits or takes place in church. She is not technologically-savvy and finds smartphones complicated. She does have a laptop which she has a basic grasp of but she seemed open to learning new technologies if they help her connect to her family.

## Design Research Results and Themes

From our interviews, we discovered residents primarily socialize through meals, TV programs, and structured social events. Structured events can include museum and art gallery visits, music events, movies, and crafting events. Members from outside the community also occasionally engage with residents in the context of these events.

Staff are mindful of helping facilitate connections between residents: one retirement home staff member described the move-in process as a pain point for residents, as it generally coincides with social isolation and big life changes. Specifically, new residents may have recently dealt with the loss of a partner. Another staff member notes that they try to seat new community members with other residents during meals to enable development of social connections. However, seating community members with one another is random and it might help to base these pairings on some kind of common interest.

For the elderly in general, both physical immobility and decreased mental capacity pose challenges in sustaining meaningful friendships. Loss of physical mobility prevents individuals from participating in activities outside of their homes. This physical restriction also lends towards a smaller social circle that is hard to grow. Memory loss and other mental disabilities are isolating to individuals who would otherwise be independent.

Focusing specifically on residents with physical disabilities, the most important consideration is whether VR is well received by residents. A nursing home in Edmonds, WA is a local example of success in this regard. The residents use VR headsets to view travel footage and sign-up sheets to use the VR headsets are always full. A new therapy for Alzheimer's patients is a sensory class where residents listen to old, familiar music -- sparking many residents to recall fond memories.

The VR system falls into this same field of sensory experience. In addition to audio, the VR headsets provide visual therapy.

From these user research activities, we determine that the elderly—specifically individuals in retirement homes—face a unique set of challenges in building meaningful social connections. The lack of deep social connections, initially identified in our earlier literature review, can be primarily attributed to health-related barriers that prevent members of our target group from socializing.

## Answers to Task Analysis Questions

### Who is going to use the system?

Members of retirement communities will use the system, especially those who are physically disabled or have impaired mobility.

### What tasks do they now perform?

They use meals and structured social events to communicate. Paper calendars are used to keep track of events for the nursing home community. Social events are mainly sponsored by the nursing home staff. Disabled residents mainly get scenic car rides as many events are not accessible. Residents may sit at any table during meal time which allows groups to form around common interests. Communicating with family is left to the residents -- some are capable of managing Skype or phone calls.

### What tasks are desired?

Further opportunities for socializing and building stronger, more fulfilling social ties are desired, especially for physically impaired members. It would be ideal to immerse physically impaired residents in experiences they would otherwise be unable to live.

### How are the tasks learned?

The tasks are learned by exposure to the retirement community norms and practices. Local teenagers in some communities receive volunteer hours for helping elderly residents navigate new technology. Sometimes families provide steps and how-to guides for residents.

### Where are the tasks performed?

The tasks can be performed from within the nursing communities and the residents will not

have to venture out of the nursing home. Communal areas and individual bedrooms are locations to complete tasks.

## What is the relationship between people & data?

More structured events represent more opportunities for residents to socialize. Yet, this might not always be the case, especially for less mobile residents. There is no simple metric for determining the quality of social ties, other than conducting further user research that takes participant input into account.

## What other tools do people have?

Some other tools available are whatever tools the nursing homes currently make available to their residents who are attempting to find activities to take part in. Technologically adept residents can also turn to social media for help in making connections but this does not seem to be very common. There is currently no universally accepted tool that can aid in this type of socialization. Many residents have smartphones to communicate with others.

## How do people communicate with each other?

Events are communicated with calendars. Smartphones and phone calls are still the norm for those able to make them. Face to face interactions are the most common form of communication.

## How often are the tasks performed?

Meals occur multiple times each day. In the case of one retirement home community, scheduled outings occur 5-7 times per month. Less structured activities might occur more frequently. While some outings accommodate impaired residents, the nursing home staff is hard pressed ensure all events are accessible.

## What are the time constraints on the tasks?

There are no time constraints on the tasks as strong social connections can be made at any time, however, it is much better for all involved if they can be formed quickly after moving in. The sooner residents build communities, the deeper the relationships can grow.

## What happens when things go wrong?

When individuals are not successful in completing these tasks, they are socially isolated which leads to a lower quality of life. For those unable to attend the variety of outdoor social gatherings, relationships are hard to come by. A social stigma and a sense of not being apart of a community furthers the cycle of isolation.

# Proposed Design Sketches

## Design 1

Our first design is a large screen set up in a common area or tablets distributed to residents. The screen/tablets would be touch screen in order to make them easier to use for the residents regardless of their level of comfort with technology. The size of the screen is also intended to be large in order to make it easier to see and use. The screen would be able to display information regarding different aspects of life in the residential homes such as dining and other events and allow residents to interact with it to inform others of their plans.

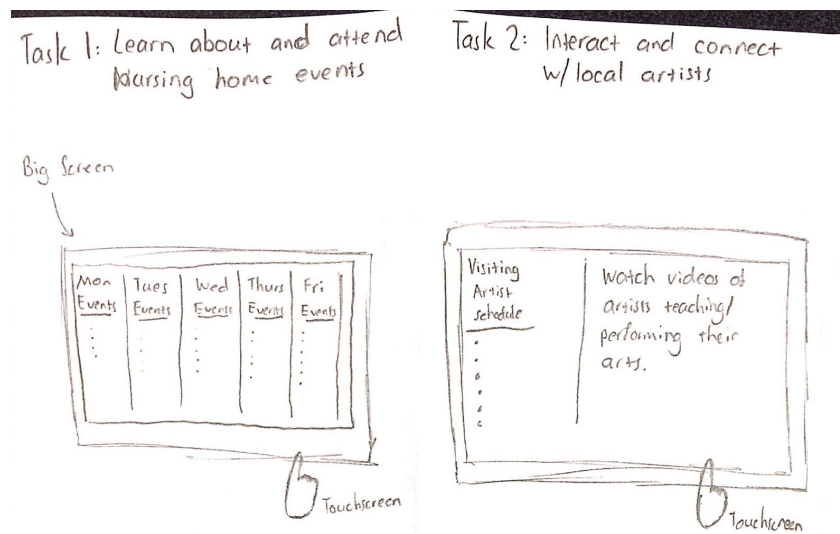


Fig. 1a: Enables residents to learn about upcoming events and interact with local artists.

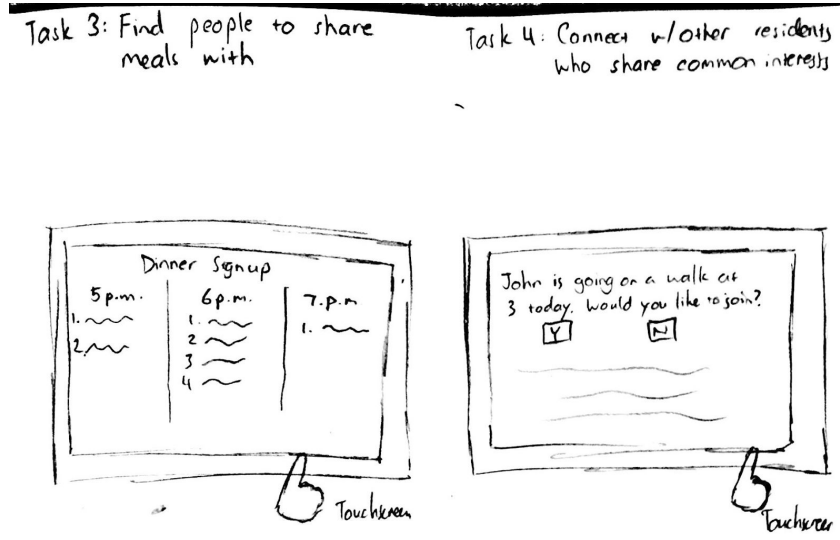


Fig. 1b: Enables residents to share meals and build communities around common interests.

*Task 1: Learn about and attend nursing home events (Fig. 1a)*

- Ability to display a calendar which contains information regarding any and all events taking place in the nursing home on each day
- Residents could look for a weekly or monthly schedule
- Easy to view and interact with the calendar

*Task 2: Interact and connect with local artists (Fig. 1a)*

- Separate page with information regarding local artists
- Displays information on scheduled events regarding visits to local artists
- Contains videos of artists teaching or demonstrating their craft, giving the residents easy access to entertainment from local artists and giving local artists greater engagement

*Task 3: Find people to share meals with (Fig. 1b)*

- A page containing a dinner sign up
- Displays the meal menus and times
- Interactive sign up sheet, allowing residents to let others know when they are eating in case they are hoping to meet up with others

*Task 4: Connect with other residents with common interests (Fig. 1b)*

- Allows each resident to enter and share a list of their interests
- Pair up residents with others who share their interests
- Find others more knowledgeable in activities of interest, pairing up novices and experts

## Design 2

Our second design is a virtual reality application that facilitates various social activities. The application would support various tasks such as “attending” events, video calling friends and family, and engaging with other residents in virtual reality. This solution is especially useful for residents with physical disabilities who have difficulty leaving or moving around the home to partake in various social activities.

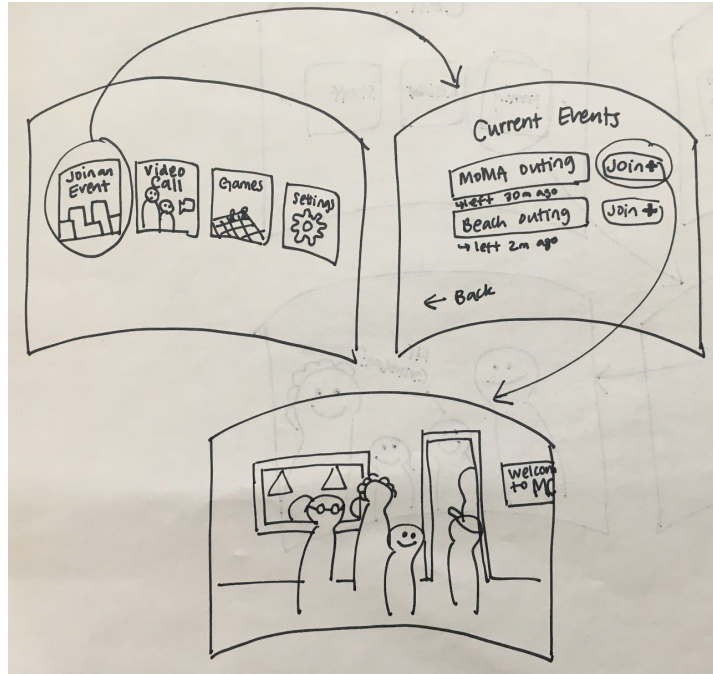


Fig. 2a: Enables residents to learn about home events and connect with local artists.

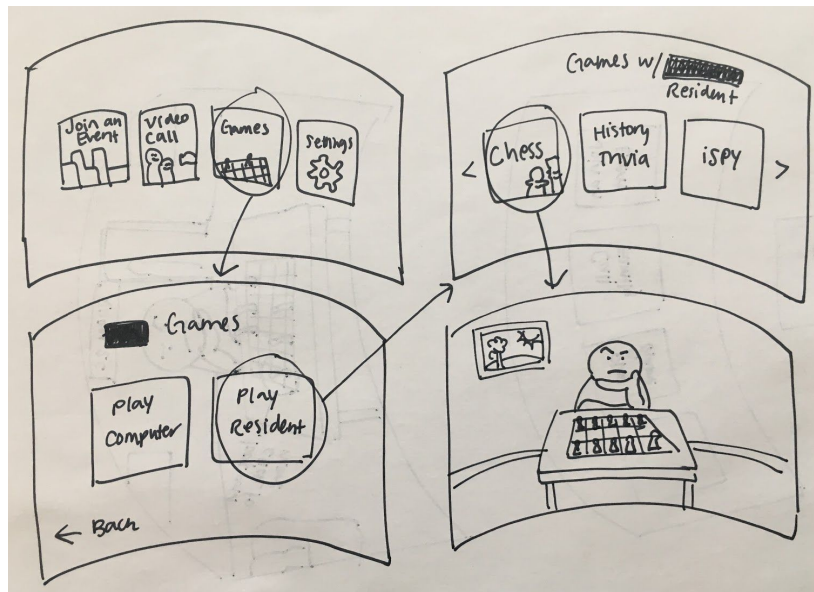


Fig. 2b: Enables residents to connect with other residents who share common interests.



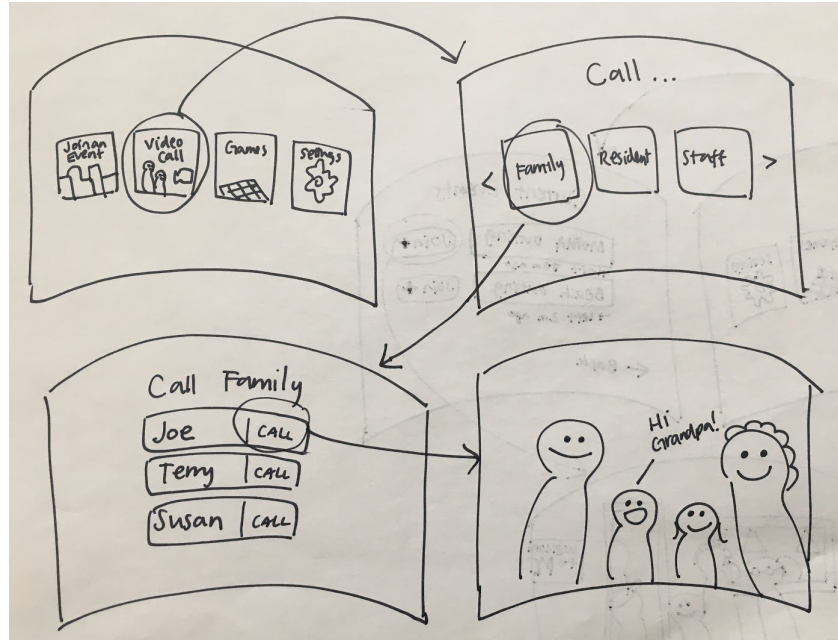


Fig. 2c: Enables residents to find opportunities to connect with family.

*Task 1: Learn about and attend nursing home events (Fig. 2a)*

- Join real-time or previously recorded nursing home outings/events in virtual reality
- Staff member can be recording their experience, which gets streamed real-time
- Recorder may receive messages from viewer to guide their positioning etc.

*Task 2: Interact and connect with local artists (Fig. 2a)*

- Join real-time or previously recorded nursing home outings/events in virtual reality
  - Outings/events seeing local artists
- Join real-time events streamed specially for residents in virtual reality such as a local concert or gallery setup
  - Possibly recorded by volunteers, other residents, or nursing home staff

*Task 3: Connect with other residents who share common interests (Fig. 2b)*

- Play games with other residents in virtual reality
- “Meet” residents in VR using avatars
- Communicate verbally via a mic connected to the VR viewer
- Add “friends” to play games and communicate in subsequent sessions

*Task 4: Find opportunities to connect with family (Fig. 2c)*

- Make video calls in virtual reality to people in and outside of the nursing home
- VR video calling with family: allows residents to have a fuller and more immersive experience of being with their family

- Provides autonomy to residents
- Possibly have a feature to schedule calls so that residents know when to call or answer a call

### Design 3

Our third design is a wearable device that facilitates various social activities. The device would be a small watch or bracelet-like wearable. This solution doesn't require much knowledge on how to use technology -- matching the needs of our elderly users. Numerous tasks would be supported with the wearable, such as connecting with other residents/family, finding new events to attend, and getting reminders of calendar entries.

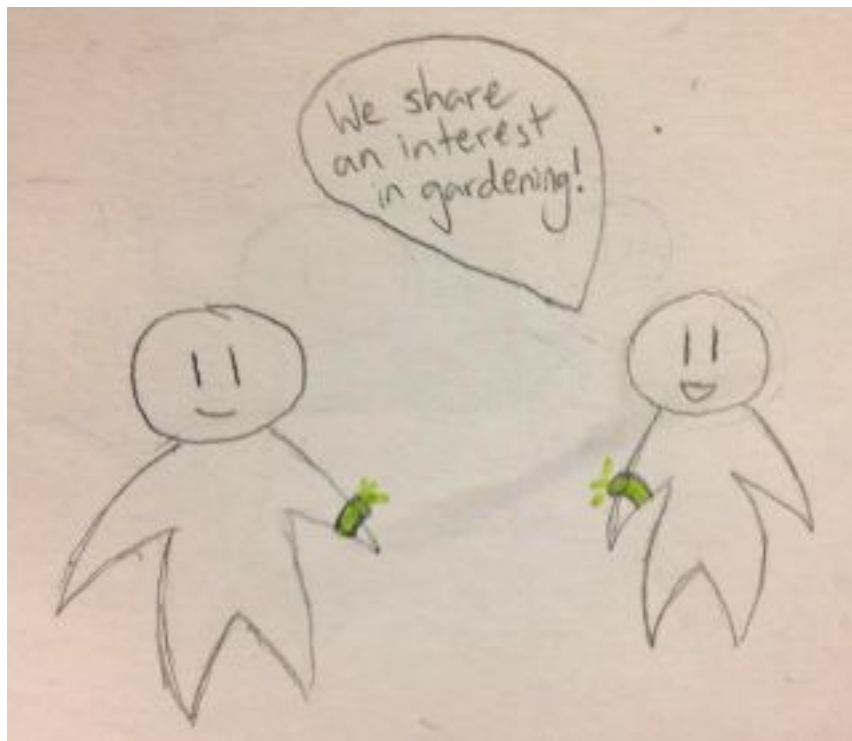


Fig. 3a: Enables residents to connect with other residents who share common interests.



Fig. 3b: Allows residents to find people to share meals with.



Fig. 3c: Allows residents to learn about and attend nursing home events.

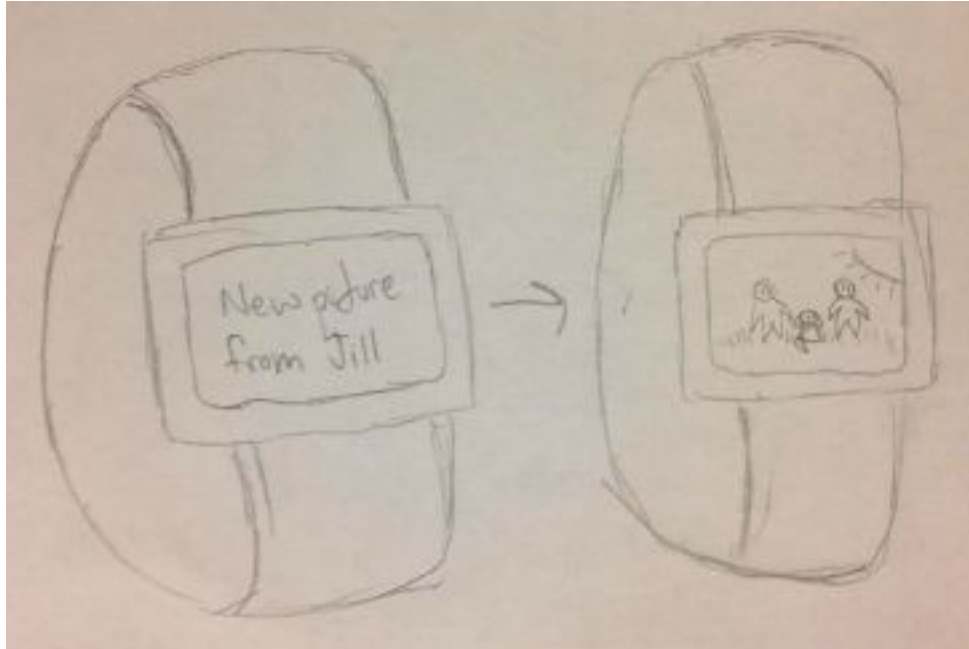


Fig. 3d: Enables residents to find opportunities to connect with family.

*Task 1: Connect with other residents who share common interests (Fig. 3a)*

- Watch flashes lights to indicate to users that another individual near them shares a common interest.
- Caretakers could program interests for users, this allows for community themes
- Residents could also add their own interests with a smartphone application, this enables individual style

*Task 2: Find people to share meals with (Fig. 3b)*

- At meal time, the watches light up a color indicating table the individual might want to sit at
- Beacons placed on each table can reflect themes such as “rock n’ roll” or “gardening”
- Meal time is a place for the nursing home community to gather, eat and talk -- the watch empowers individuals to join groups of like interests
- The nursing home staff could also program the beacons and rotate themes to mix up the social circles

*Task 3: Learn about and attend nursing home events (Fig. 3c)*

- Broadcasting information and making sure everyone knows of local artists or outings can be difficult -- the watch provides a way for the nursing home staff to send out messages to everyone
- Individuals calendars can sync with the watch, allowing residents a simple interface for keeping up with the daily events

- Individuals can select which events they want to attend and they can get reminders to attend

*Task 4: Find opportunities to connect with family (Fig. 3d)*

- Family and friends can send pictures to the residents which will then be displayed as a background on the watch-face
- Residents will be able to cycle through the images and select which they prefer for a given day
- The connection of new technology and family allows younger grandchildren to keep in touch with grandparents via picture stories

### Selected Design: Virtual Reality Application (*Design 2*)

We will design a virtual reality application to facilitate social activity. We decided to support nursing home residents who have physical disabilities or difficulty moving. A VR application allows these residents to have more immersive experiences when they otherwise would not be able to socialize with others. People with disabilities are often left behind as they are unable to attend or fully participate in nursing-home scheduled events. One interview with a caretaker informed us that VR headsets are well received in their local nursing home for individual activities, such as watching travel footage. We hope to expand the use of VR to allow for more communal/social activities. The design matches our user group because the VR headsets uninhibit physical limits. VR headsets allow for our team to create more intuitive and innovative interfaces specialized for low mobility. This solution accomplishes the tasks of: learning of and attending nursing home events and finding opportunities to connect with other residents and family. These tasks hone in on what our project set out to do - connect elderly residents with others and build stronger communities.

# Written Scenarios

## Task 1 (*Storyboard #1, Fig. 4*)

Mary is a resident of a nursing home who has difficulty moving as a result of her age. She is bored and does not have anything fun planned for the day. Since she is unable to leave the nursing home unassisted, Mary decides to put on her VR goggles. She sees that her friend Bill, another resident of the nursing home, is online. She suggests that they go hiking (using a VR application that mimics going on a hike) and Bill agrees. Mary and Bill go on their virtual hike and socialize the whole time, even though they are in separate rooms and would be unable to hike or socialize offline without major assistance.

## Task 2 (*Storyboard #2, Fig. 5*)

Christopher is a resident of a nursing home who is in the process of recovering from hip surgery (after falling one day) and therefore is unable to leave the nursing home. He decides to make the best of his day and get involved in any events taking place within the nursing home. However, he doesn't know what events are taking place that day. He decides to use his VR device to look this up, so he puts on his headset. Christopher goes to an application that allows him to view a calendar containing all the events planned for each day in the nursing home. He sees an event he likes, RSVPs through the application, and sets a reminder for himself in a few hours so he remembers to attend. Later, Christopher attends the event on time and has a great time.

# Storyboards

## Storyboard #1

Task: Finding opportunities to connect with other residents and family.

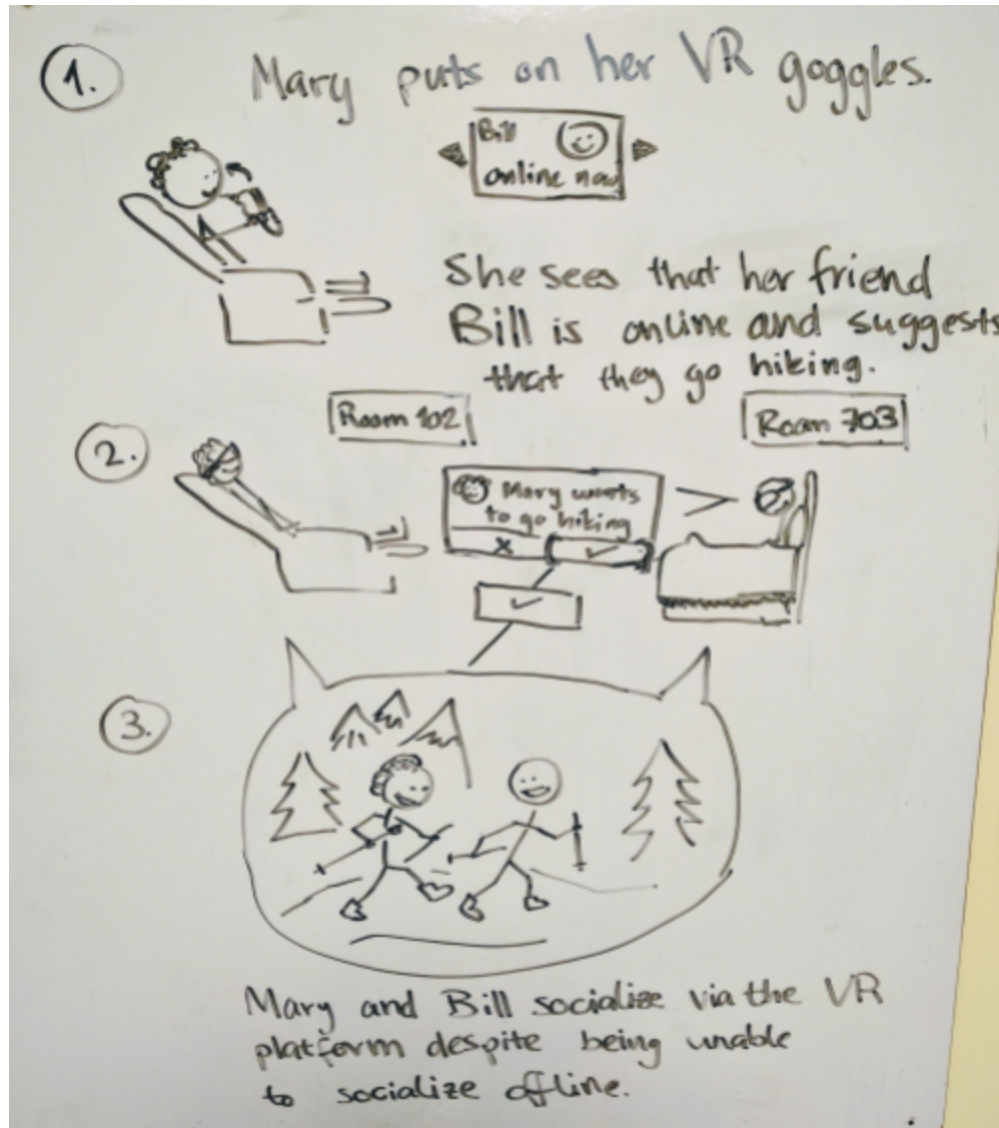


Fig. 4: Finding opportunities when physical movement is too difficult.

## Storyboard #2

Task 2: Learning of and attending nursing home events.

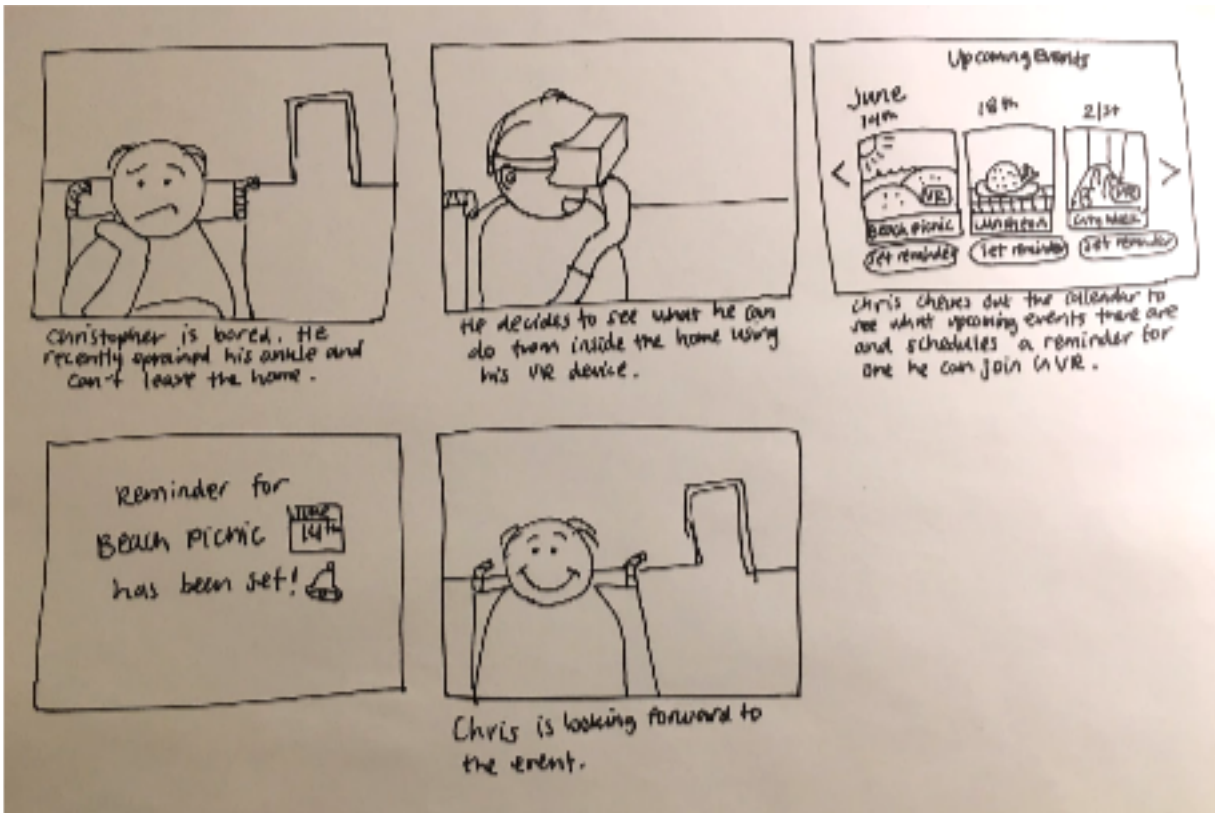


Fig. 5: Scheduling future events from the comfort of a wheelchair.



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