Xian Wu
Product Designer Portfolio

Tele-Robot Design for Special Needs

Objectives:

- Understand older adults' perceptions of Tele-Robots (opinions, concerns).
- Evaluate and redesign telepresence UIs for users.

Methodology:

- *Qual*: Semi-structured interviews, Field studies, Heuristic evaluation etc.
- *Qual*: Questionnaires: (50+ participants).

Results:

- Current robots are hard to use and lacked privacy.
- Redesigned UI improved usability scores and user performance.

My Role:

- Literature reviews, market research, and developed study materials
- Designed UIs and recruited participants.
- Analyzed data (qualitative via MAXQDA, quantitative via SPSS).
- Compiled findings into conference papers (Wu et al., 2016; Wu & Beer, 2021; Wu et al., 2021).

Example of tele-robot

Recruitment calling script

DRAFT

Participant Calling Script for Telewellness

1. **Answering Machine (leave the following message and be sure to speak your name clearly)** Hi, this is _____ calling from the Human Factors and Aging Lab at Georgia Tech. We are contacting you about your interest in participating in the Telewellness Technology Interview research study. Please give us a call at 404-894-8344 and ask for Jordan, if you would like to hear more about the study. Thanks!

2. **If a live person….**
   Hi, this is _____ calling from the Human Factors and Aging Lab at Georgia Tech. We are contacting you about your interest in participating in the Telewellness Technology Interview research study.

   <pause and wait for their response>

   - **IF not interested:** Thank you for speaking with me. Would you be interested in being called for studies in the future? *(NOTE ANSWER)* Have a great day. Goodbye!

   - **IF interested:** Great! For this study you will be interviewed about your attitudes about technology usefulness. Let me take the next few minutes to tell you about the research study and if you wish to participate I will be asking some questions to determine your eligibility criteria, this should take about 5 minutes.

3. **"Are you between the ages of 50-79?"** <if "yes" then continue, if "no" then thank them for their time and politely excuse them from the study>

   - **IF NO:** Sorry, but we are only able to include people who are between this age range for this study. I appreciate your time. Would you like to leave your name and contact info so that we can contact you in the future when we are doing studies that require participants to be within your age range? (*if yes get info)*Thank you, Bye!

4. **IF YES:** Are you a Native English speaker? *NOTE ANSWER* _____
   <If participants ask about why they need to be native English speakers, tell them that the study uses knowledge of the English language, and that we need all participants to be at the same experience.>

   - **IF NO:** Thank you for speaking with me. Are you interested in being called for experiments in the future? (*NOTE ANSWER* _____)
     Have a great day. Goodbye.

5. **Do you have any mobility limitation? (By this we mean having serious difficulty walking or climbing stairs)** <if "yes" then continue, if "no" then thank them for their time and politely excuse them from the study>
6. **IF YES, What is the nature of your mobility impairment?** (Write down any notes on underlying cause, upper/lower body limitations etc. on participant calling list).

DRAFT

   - **IF NO:** Sorry but we are only able to include people who have mobility limitations for this study. I appreciate your time. Would you like to leave your name and contact info so that we can contact you in the future when we are doing studies that require participants to be within your age range? (*if yes get info)*Thank you, Bye!

7. **IF YES:** Did your mobility impairment begin before 50? <if "yes" then continue, if "no" then thank them for their time and politely excuse them from the study>

   - **IF NO:** Sorry but we are only able to include people who have had a mobility impairment before the age 50. I appreciate your time. Would you like to leave your name and contact info so that we can contact you in the future when we are doing studies that require participants to be within your age range? (*if yes get info)*Thank you, Bye!

8. You meet the criteria for our study. **For this study, we are conducting interviews discussing the attitudes and acceptance of telewellness technology. Participants in this study will complete a questionnaire at home (approximately 30-40 minutes) and will be interviewed in person (approximately 1 hour). The interview session can take place at your home at a time that accommodates your schedule. We will compensate you $30 for completing the study. If you are unable to complete the research study, you will be compensated $15 per hour of your time.**

   The following dates are available for a morning or afternoon appointment:

   What is most convenient for you?

9. **Once scheduled say:** You can complete the pre-study questionnaire online or we can send you a packet in the mail to complete. What method do you prefer?
   - **IF PAPER:** We will mail you the packet. In the packet, there will be a letter and a questionnaire. What is your home address? (get info). *Please complete the packet before your appointment and have it with you at that time.*
   - IF ONLINE: Okay. We will email you a link to complete the questionnaire online. **Email participant with the following text.**

DRAFT

Hello,

Thank you for your interest in completing the TechSAge Minimum Battery as part of the **[INSERT NAME of STUDY].** Please follow the steps below to complete the survey:

1. Click the survey link: http://www.surveygizmo.com/s3/1792823/Minimum-Battery
2. Enter your code **[Insert study ID assigned to Participant]**
3. Click 'Next' and begin the survey
4. Answer all questions and submit;

Note: If you wish to save and continue the survey later, click the "save and continue later" button at the top of the survey screen. You will be prompted to enter your email, where your saved survey will be sent.

Thank you,

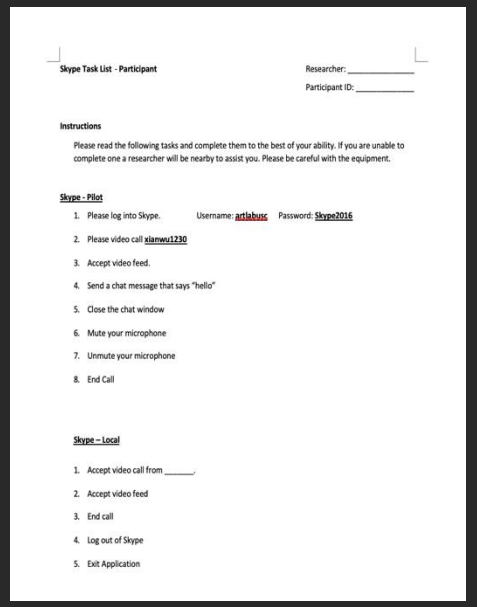
[INSERT CONTACT INFO]

For your appointment, please bring:
- If you wear glasses/contacts, be sure to wear/bring them.
- May I confirm your address and contact information?

10. **In closing say**: If you have any questions after receiving the packet or do not receive it within a week of our call, please call **404-894-8344 and ask for Jordan**. We look forward to seeing you. Goodbye.

Usability Assessment Process

- • Assess how the design of tele robots holds up usability standards using Nielson Norman's 10 heuristic principles (5 extra principles were added to cover all aspect of such robots
- • Three evaluators individually assessed 3 types of tele robots (i.e., BeamPro, Kubi, Skype) by performing a list of tasks in a real-home environment
- • Thirsty users were recruited to test the usability of the 3 robots



Skype Task List - Participant

Researcher: _____

Participant ID: _____

Instructions

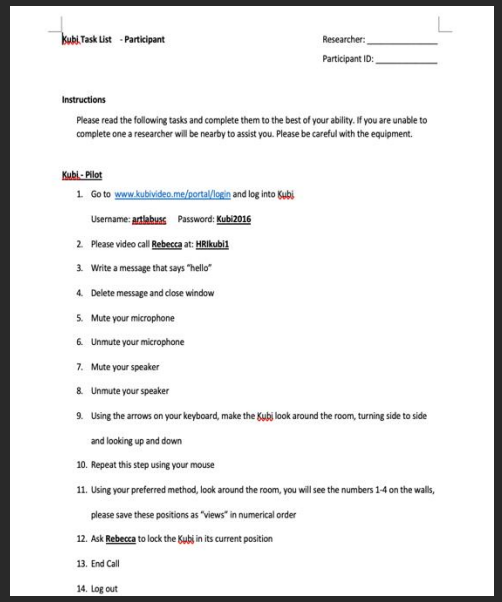
Please read the following tasks and complete them to the best of your ability. If you are unable to complete one a researcher will be nearby to assist you. Please be careful with the equipment.

Skype - Pilot

1. Please log into Skype. Username: artlabusc Password: Skype2016
2. Please video call xianwu1230
3. Accept video feed.
4. Send a chat message that says "hello"
5. Close the chat window
6. Mute your microphone
7. Unmute your microphone
8. End Call

Skype – Local

1. Accept video call from _____.
2. Accept video feed
3. End call
4. Log out of Skype
5. Exit Application



Kubi Task List - Participant

Researcher: _____

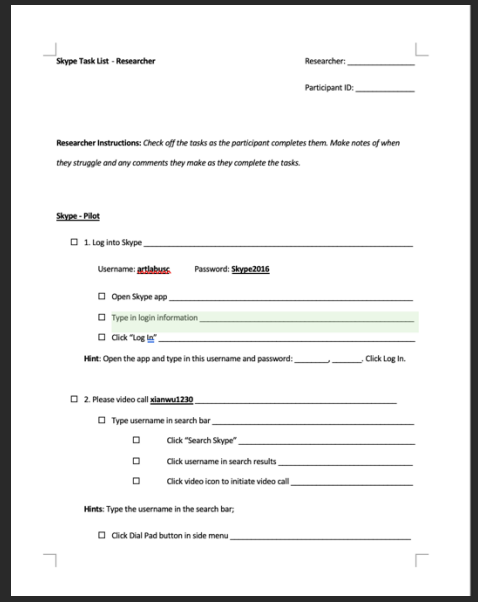
Participant ID: _____

Instructions

Please read the following tasks and complete them to the best of your ability. If you are unable to complete one a researcher will be nearby to assist you. Please be careful with the equipment.

Kubi - Pilot

1. Go to www.kubivideo.me/portal/login and log into Kubi.
   Username: artlabusc Password: Kubi2016
2. Please video call Rebecca at: HRIkubi1
3. Write a message that says "hello"
4. Delete message and close window
5. Mute your microphone
6. Unmute your microphone
7. Mute your speaker
8. Unmute your speaker
9. Using the arrows on your keyboard, make the Kubi look around the room, turning side to side and looking up and down
10. Repeat this step using your mouse
11. Using your preferred method, look around the room, you will see the numbers 1-4 on the walls, please save these positions as "views" in numerical order
12. Ask Rebecca to lock the Kubi in its current position
13. End Call
14. Log out



Skype Task List - Researcher

Researcher: _____

Participant ID: _____

Researcher Instructions: *Check off the tasks as the participant completes them. Make notes of when they struggle and any comments they make as they complete the tasks.*

Skype - Pilot

☐ 1. Log into Skype _____

Username: artlabusc Password: Skype2016

☐ Open Skype app _____

☐ Type in login information _____

☐ Click "Log In" _____

Hint: Open the app and type in this username and password: _____, _____. Click Log In.

☐ 2. Please video call xianwu1230 _____

☐ Type username in search bar _____

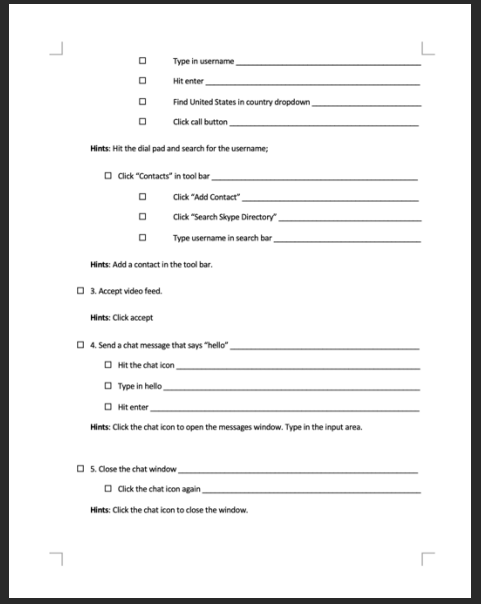
☐ Click "Search Skype" _____

☐ Click username in search results _____

☐ Click video icon to initiate video call _____

Hints: Type the username in the search bar;

☐ Click Dial Pad button in side menu _____



☐ Type in username _____

☐ Hit enter _____

☐ Find United States in country dropdown _____

☐ Click call button _____

Hints: Hit the dial pad and search for the username;

☐ Click "Contacts" in tool bar _____

☐ Click "Add Contact" _____

☐ Click "Search Skype Directory" _____

☐ Type username in search bar _____

Hints: Add a contact in the tool bar.

☐ 3. Accept video feed.

Hints: Click accept

☐ 4. Send a chat message that says "hello" _____

☐ Hit the chat icon _____

☐ Type in hello _____

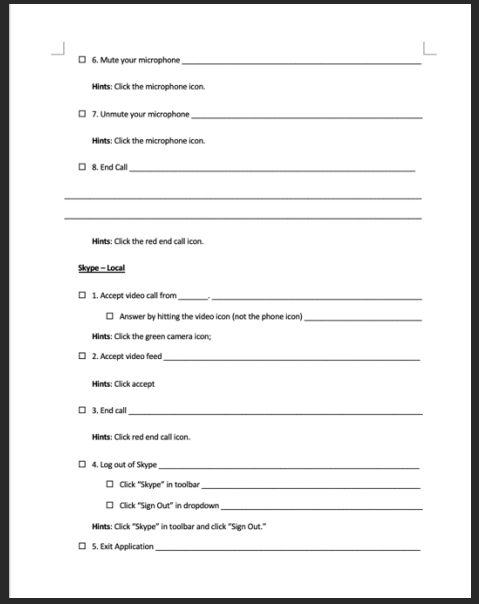
☐ Hit enter _____

Hints: Click the chat icon to open the messages window. Type in the input area.

☐ 5. Close the chat window _____

☐ Click the chat icon again _____

Hints: Click the chat icon to close the window.



☐ 6. Mute your microphone _____

Hints: Click the microphone icon.

☐ 7. Unmute your microphone _____

Hints: Click the microphone icon.

☐ 8. End Call _____

_____

_____

Hints: Click the red end call icon.

Skype – Local

☐ 1. Accept video call from _____. _____

☐ Answer by hitting the video icon (not the phone icon) _____

Hints: Click the green camera icon;

☐ 2. Accept video feed _____

Hints: Click accept

☐ 3. End call _____

Hints: Click red end call icon.

☐ 4. Log out of Skype _____

☐ Click "Skype" in toolbar _____

☐ Click "Sign Out" in dropdown _____

Hints: Click "Skype" in toolbar and click "Sign Out."

☐ 5. Exit Application _____

Usability Testing Tasks for Different Users

Example list of issues that violated the heuristics

Task	User	GUI / Hardware	Issue	Heuristics Violated	Severity
Drive Around/ Field Test	Both	Hardware	The base of the unit is too close to the floor. Different surfaces- some hard to drive on and issues when switching surfaces- especially when driving over lips between doors (get stuck sometimes and owner would have to help by moving beam base) Base of the Beam is very close to the ground and can catch on things easily. If it gets stuck there's no way for the pilot to unstick it since they're remote. Beam is awkward for local user to move about and can be dangerous if something is stuck beneath and local has to do some lifting to pull whatever is stuck out of wheels. If the pilot is driving around your home and they get caught on a rug, door lip, or something on the floor, it is often difficult to get the BEAM un-stuck. If the Beam rolls over a mat on the floor, it is possible the mat will get stuck up in the wheels and under the base. The pilot is not able to do anything from here, requiring the local user/owner to find a way to push the beam off (which pushing the beam in general is awkward) or (what we had to do) get down on the ground next to the base, lift it and pull the mat out from under the wheels. The beam is quite tall and awkward to lift from the ground and not very light.	3, 5, 7, 11, 12	5
Beam session	Both	GUI	General connection problems- lots of connection issues causing audio and video delays and interruptions. The local users are not aware when pilot side is frozen (unable to hear or see movements by local user) and may keep talking. Lots of pixelating on video when local people move (if bad connection).	1, 9, 14, 15	5
Beam in/ start session	Local	GUI	Beam does not allow for local user to answer or decline calls. Only control over people calling is inviting users. (Privacy Issues)	3, 12	5
Connect beam to network	Local	GUI	Without 5ghz wifi, there could be serious connection issues in the home.	7, 15	4

Driving around	Pilot	Both	Camera is not very clear; camera issues. Often hard to see some things when driving and sometimes hard to tell if they are 'drive-over-able' or not. [screenshot of tape on floor at expo] Hard to see small objects/changes in surfaces in dim light, especially when rugs are close to the same color as the floor- could cause beam to get stuck. Hard to see cords (could easily run over one and pull down lamp or something).	1, 2, 3, 5, 11, 12, 14	4
Drive around	Pilot	Hardware	There is no sensor in the back to prevent accidentally rolling over/backing over something. (Accidentally hit back arrow when I was not looking at keyboard and almost ran over someone's foot)	5, 4, 11, 12, 13, 14	4
Driving around	Pilot	Hardware	The Beam's ability to sense objects is not consistent. Objects have to be a certain size and certain height off the floor to be perceived. This can cause issues when things such as cords or feet are in the path and are not sensed by the beam or seen by the pilot. (only senses wider objects several inches off the floor) Hard to see cords (could easily run over one and pull down lamp or something).	4, 5, 11, 12, 13	4
Invite user	Local	GUI	Figuring out how to add a user can be confusing. There are multiple menu options it could be located under.	1, 2, 5, 8	3
Beam in/ start session	Local	GUI	The notification that someone is calling in is very short and not very loud.	1	3
Beam session	Both	GUI	Due to the lack of notifications, it is hard to tell whether a session is frozen or not. It can be difficult to tell at first if caller has lost their connection. When there are connection issues (on either side) there are not always notifications letting you know there's been a problem.	1, 9, 15	3
Conversation	Pilot	Hardware	Moving head in general. No way to turn 'head' without turning entire body (which is often irritating because the keyboard disables during times it's not being used) No way to move screen up and down when having seated conversations.	3, 7, 14	3

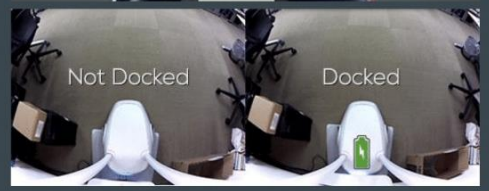
Adjust volume settings during beam session	Local	Both	Local user is not able to control the volume. They must ask the pilot to turn down their microphone if the volume is too loud.	3, 14	3
Setup beam	Local	GUI	Initial setup (network connection) is confusing and lacks instructions/steps that walk you through it onscreen.	1, 9, 10, 15	2
Beam setup	Local	Hardware	To set up the wifi, the local user must have a wired keyboard with usb connection. The usb port in the beam is difficult to find as the panel is somewhat hidden. Once we found the panel it was hard to open and put back.	1, 10,	2
Beam session	Local	Hardware	Only way of knowing beam is properly docked is if green light is on. Screen does not tell you when session ends that it is not properly docked and charging. There is no easy way to get it to charge if it is not properly docked. Must pull it out/maneuver it into position yourself.	1, 5, 9	2
Drive Around	Pilot	Hardware	Hard to tell how close you are to something when camera far above objects.	1, 2, 3, 11, 12, 14	2
Drive Around	Pilot	Hardware	Wheels stick out little further on either side of base and catch on things if you are too close to something.	1, 2, 3, 5, 11, 12, 14	2
In-session settings	Pilot	GUI	Controls while in call: microphone specifically – hard to control volume dragging. This created a problem when I tried to turn up the mic only a little bit and it accidentally went up all the way, scaring people in the local environment. The lack of ability to gradually increase the volume in small increments (without knowing special keyboard controls) can make controlling the volume sometimes difficult.	3	2

Change off screen settings in session	Pilot	GUI	Not easy to get back to beam session from settings. Not all settings are easily accessible to change while in a beam session. The pilot must go into the 'options' section (taking them out of the drive mode screen) to change other settings. It's also confusing on how to get back to the beam session. There is a small window in the top that's the video feed (which, when clicked, takes you back to drive mode) but it is not always easily noticed. If you go back to the 'beams' window on the menu, the beam button is grayed out and not clickable to go back to current session.	1, 7, 14	2
Share screen	Pilot	GUI	It is not completely clear what the screen sharing button does. Sometimes cannot bring certain things up. Not clear why it brings up a black screen sometimes. Messes up the navigation window.	1, 5	2
Drive around	Pilot	GUI (iOS App)	No arrows to drive around, must do it by touching and dragging on screen, meaning your thumb (or whatever finger you use) covers a good portion of the screen, obstructing view of path.	1, 3 ,11, 12	2
Drive around	Pilot	GUI (iOS App)	The iOS App is slow to respond to user controls.	1, 3, 4, 11, 12	2
Beam session	Pilot	GUI	Pilot controls and in session settings sometimes notify you when you change them but not always.	1, 4	1
Invite user	Local	GUI	The only way give a user the ability to call in through the beam is to add them on the website. There is no way to do this through the app.	4, 7	1
Parking/ Docking	Both	GUI	Nice that they changed it so if you let up on P it will allow you to continue. However, makes for awkward prolonged goodbye and pilot may not want to sit there and deal with parking it since they have to hold it down until it says docked to make it charge.	2, 3, 14	1

Example of issues identified

BeamPro GUI Issue: 4. Control Issues: b. Pilot User

- Difficult to adjust in-session settings
- Parking
  - Prolonged/awkward goodbye when parking
  - Pilot must dock properly for Beam to charge



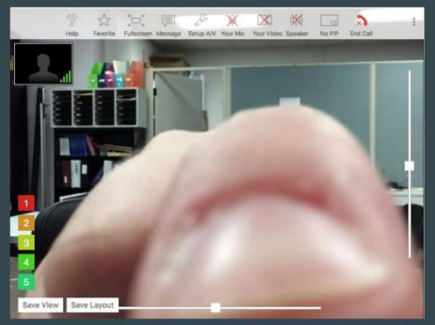
https://www.suitabletech.com/documentation/pilot-guide/

Heuristics Violated: 1. Visibility, 2. Match, 3. Control, 5. Error Prevention, 7. Flexibility, 14. Immersive

Severity Rating: 2 & 1

Kubi Hardware Issues: 2. Menu

- Location of control features near camera
- Hidden from view too quickly
- Only way to adjust microphone input and speaker output is muting or unmuting (must go through iPad settings to adjust)

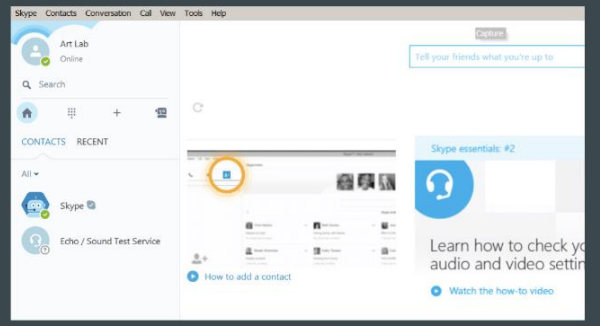


Heuristics Violated: 1. Visibility, 2. Match, 3. User Control, 4. Consistency, 5. Error Prevention, 7. Flexibility

Severity Rating: 2 - 3

Skype Issues: 2. Search Bars

- Visibility of search bars not apparent
  - Sometimes lack a blinking cursor



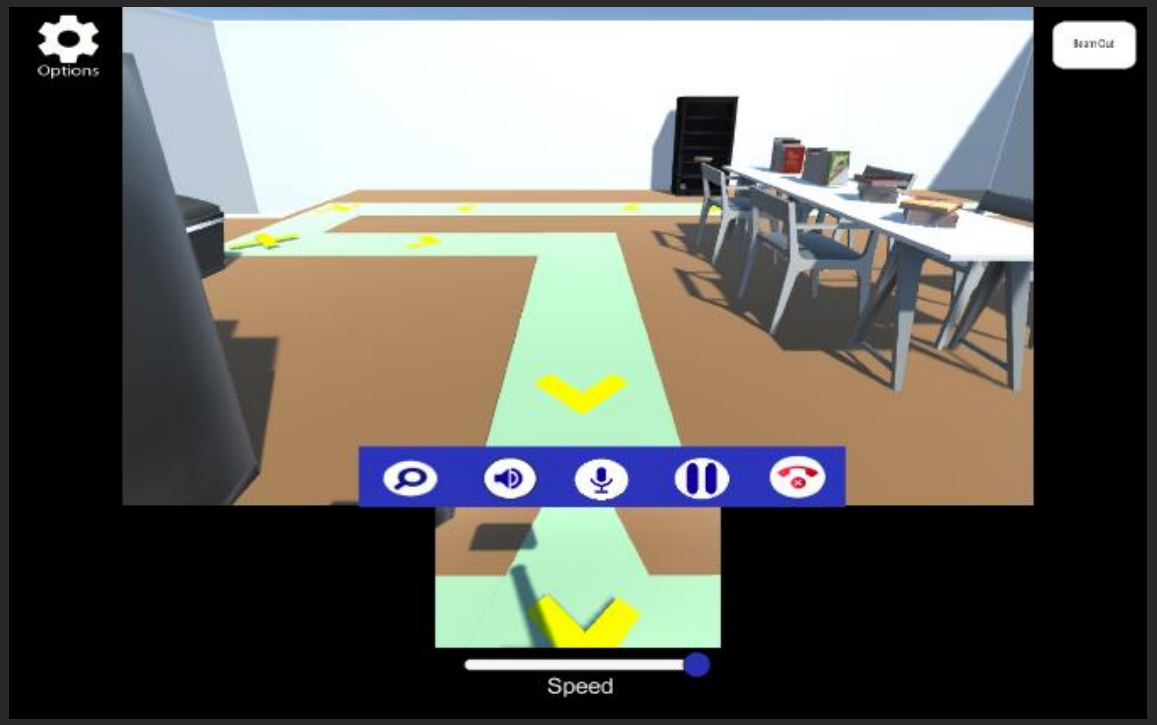
Heuristics Violated: 1. Visibility, 2. Match, 3. Control, 4. Consistency, 5. Error Prevention, 7. Flexibility

Severity Rating: 1 - 4

Design Suggestions for tele robots

Category	Variable	Design choices
Vision presentation guidelines	Color	Warm color is preferred
	Color contrast	High color contrast
	Color discrimination	Avoid using colors in blue-green or colors of the same hue
	Font size	Minimum acceptable font size is 14 adjustable font and graphic size
	Font case	Avoid using uppercase for long text; only use uppercase on short text that draws user's attention
	Illumination	Increase the level of illumination
	Simple visual presentation	Avoid visual clutter
Design guidelines for cognitive decline	Icons	Use icons that are easy to recognize; provide description to each icon
	Instructions	Use simple and short instructions
	System feedback	Simple, short and clear feedback
Design guidelines for physical/motoric decline	Height	Adjustable height of the system

Design Comparison



Control UI

Experimental UI

Usability Testing Script

Telepresence Interface Usability Testing Interview Script

Materials

- Laptop
- Video cameras
- Digital audio recorders (2)
- Extra batteries (AAA's)
- Testing script (3 copies)
- Timer
- Note pads and pens for note taker
- Pens/pencils for participants
- Consent form (2 per person)
- Media release form (2 per person)
- Questionnaires (bring extras)
- New participant database forms (bring extras)
- USB Mouse
- Copy of Usability Testing documents

Key

- Researcher 1
- Researcher 2

Researcher 1

Conducting the interview, help when participant tests the systems.

Researcher 2

Support Researcher 1, give feedback, and help with paperwork;
Review and obtain informed consent and media release form.

Questionnaire Review

Researcher collects questionnaires and reviews for completeness. Any missing questionnaire items can be filled out prior to the introduction. If time does not allow, then complete missing items after study completion.

- *Minimum Battery*
- *Video Conference Technology Usage Questionnaire*

Introduction

Hello, I am _____. I am a _____ at the University of South Carolina. _____ will be assisting me today. I will take notes and video record the session. We are here because we want to understand your opinions and attitudes about a usable, privacy-enhanced telepresence system for older adults. Telepresence technology can be defined as technology that allows a person to feel or appear to be present in a location through video. One use would be virtual communication between people located in two different places. This allows a person to feel or appear to be present, even though they are located remotely. For example, I could be located in another state and using tele-video technology, video into this location and communicate with you. That would be an example of using tele-video technology.

Topic and goal

Our goal is to better understand what older adults think about a usability and privacy enhanced telepresence system. Your information will help us to conduct research on this topic and, ultimately, to develop telepresence technologies that are more useful and easier to use.

There will be two sessions. You will have the opportunity to test telepresence system with a generic UI and telepresence system with PUTA (**P**rivacy-enhanced **U**sable Telepsence for **A**ging) UI. After each testing session we will ask you to answer some questions and fill out some questionnaires.

Procedure

Our session will take approximately 2 hours.
There is no rush during the session. There will also be an opportunity to take a 5-minute break after we test each tele-video system.
Please sign the consent form.

- *Consent form*

Are there any questions? Do you need to use the restroom or get water before we get started?

Generic UI User Testing

	Complete generic UI usability testing for each individual
Now I would like to give you an opportunity to use the telepresence with generic UI. I will give you your tasks one after another and observe your actions on each task. In this part there will be **16 tasks**, please read each task carefully and complete it to the best of your ability. If you have major question on one task and are unable to complete it, I will be here to assist you. Please tell me what's going on through your minds as you do the tasks, in another word, think out loud.	*Start video camera* *Start timer* *Hand each task one after another to participant* *Take notes*

Now you've completed all 16 tasks on the generic UI, I will ask you couple questions about this UI:

- *What do you find it's easy to use of this interface?*
- *What do you find it's difficult to use of this interface?*
- *What would you want to change about this interface?*

Now I would like you to complete couple questionnaires.
Distribute questionnaires
Please complete the questionnaires to describe your experience using the generic UI.

- *Perceived Usefulness Questionnaire*
- *Perceived Ease of Use Questionnaire*
- *System Usability Scale*

Do you have any other comments on this interface?

Do you need to use the restroom or get water before we continue?

PUTA UI User Testing

	Complete PUTA usability testing for each individual
Now I would like to give you an opportunity to use the telepresence with a usability and privacy enhanced UI-PUTA. I will give you tasks one after another and observe your actions on each task. In this part there will be **16 tasks**, please read each task carefully and complete it to the best of your ability. If you have major question on one task and are unable to complete it, I will be here to assist you. Please tell me what's going on through your minds as you do the tasks, in another word, think out loud.	*Start timer* *Hand each task one after another to participant* *Take notes*

Now you've completed all 16 tasks on PUTA UI, I will ask you couple questions about this UI:

- *What do you find it's easy to use of this interface?*
- *What do you find it's difficult to use of this interface?*
- *What changes do you like about this interface? Why?*
- *What would you want to change about this interface?*

Now I would like you to complete couple questionnaires.
Distribute questionnaires
Please complete the questionnaires to describe your experience using the generic UI.

- *Perceived Usefulness Questionnaire*
- *Perceived Ease of Use Questionnaire*
- *System Usability Scale*

Do you have any other comments on this interface?

Interview

Screenshots of each interface
To start, we will discuss first ONLY generic UI. For the next few questions please try not to compare it to PUTA, we will discuss comparisons later.
Okay so first, please tell me what you liked about the generic UI.
Please tell me what you disliked about generic UI.

Next, we will discuss ONLY PUTA. For the next few questions please try not to compare it to the generic UI.
Okay so first, please tell me what you liked about PUTA.
Please tell me what you disliked about PUTA.

Okay now I will ask you some additional questions, and I would like you to compare both interfaces. Which interface was the most easy to use? And why? *(Encourage them to talk about all three).*
Which interface did you like the best? And why? *(Encourage them to talk about all three)*
Which interface did you perceive has more privacy enhanced features? List some features.
Which system would you like in your home, imagine cost is not an issue. Why?
(Encourage them to talk about all three)

Post-Interview Questionnaire

Distribute questionnaires

- *Privacy Attitudes Questionnaire*
- *Interface Comparison Questionnaire*

Debriefing

Thank you for your time today. Your input will help us to develop a smart presence system that is more useful and easier to use for specific group. It is very important that you do not discuss this study with anyone else until the study is complete. Our efforts will be greatly compromised if participants come into this study knowing what is about and how the ideas are being tested. Thank you again for your participation!

Robot Whisper - the Middle-Man between Robotics Technology & Warehouse

Objectives:

- Accelerate and simplify deployment of robots in warehousing or manufacturing settings.
- Facilitate interoperability among robotic systems and enterprise software.
- Enable businesses adapt quickly to shifting market demands and consumer needs.

Methodology:

- *Qual*: Semi-structured interviews, Field studies, usability testing etc.
- *Qual*: Questionnaires: (50+ participants), click counts, heatmap etc.

Results:

- Produced UI for the platform.
- Increase deployment speed by 60%
- Created the first design system for the company.

My Role:

- Competitive analysis and developed marketing visual materials.
- Understand user pain points and needs.
- Designed UIs and recruited participants.
- Analyzed data (qualitative via MAXQDA, quantitative via SPSS).
- Compiled findings into easy-to-understand presentation.

Zebra

Marketing Material Examples

Traditional Integration

Robot Whisperer

Sample Competitive Analysis Results (with companies' names omitted)

MISSION
A is a global technology company unifying AI-driven software and mobile robotics to modernize order fulfillment and optimize warehouse operations in real time.

DESCRIPTION
They position as both a SW and Robotics house.
AI-driven, intelligently evaluates and drives real time decisions to orchestrate people, processes, and robots --so your fulfillment operation functions in frictionless end-to-end performance.

The **A FOS** (Fulfillment Operating System) is the only fully integrated software and robotic solution that uses advanced fulfillment science to instantaneously evaluate order data and compose the best decisions in real time to efficiently orchestrate people, processes, and robots. The result is a fast, agile, and precisely tuned operation equipped to perpetually meet the what-when-where expectations of today's retail consumer.
Their focus is on AMR, AGV and GtP, automated put-away, inventory storage, replenishment and order picking in distribution and fulfillment centers.

The Robots are purpose-built to work together to handle a range of tasks across a DC including:
Removing heavy-lifting and mile-walking from your workers by quickly and conveniently transporting racks of inventory to pick-pack stations;
Assisting work teams with picking and order consolidation
Conveying inventory and packages to appropriate destinations for additional handling
Sorting packages by destinations you can reconfigure at will, without being locked-in to fixed sortation patterns and destinations
Transporting packages and trolleys to various dispatch areas

PRODUCTS:
A FOS (Fulfillment Operating System)
Robot_Name communicate with each other and with **A** to continuously recalculate and orchestrate fulfillment priorities and inventory movement patterns based on real-time factors.
As order promise dates, inventory positions, store replenishment requests, available workers and robots, actual fulfillment pace and time remaining in dispatch windows fluctuate, the system adapts to ensure you meet your top priorities and Service Level Agreements.
Product_B: **Product_B** AI-powered system offers a deep and multi-SKU storage system. Its stringent SLA-based order fulfilment requirements were met, as many of its order-to-dispatch times were halved. optimizes supply chain processes from inventory management to order picking.

The **System** uses advanced fulfillment science to instantaneously evaluate order data and compose best decisions in real time to efficiently orchestrate people, processes, and robots. The result is a fast, agile and precisely tuned operation equipped to perpetually meet the what-when-where expectations of the market you serve.
The **A™ FOS** rapidly responds to real time exceptions and events, prescribes actions, and orchestrates integrated and frictionless performance across every node
of your operation.
A's advanced algorithms intelligently keep pace with demand—responsively, rapidly and with the elastic resilience to navigate fast fluctuations and unpredictable volume spikes.

STRENGHTS:

Advanced fulfillment technology solutions orchestrated by always-solving intelligence and maximum-life of robotics;
The A Fulfillment Operating System is the only fully integrated software and robot solution that uses advanced fulfillment science to instantaneously evaluate order data and compose the best decisions in real time to efficiently orchestrate people, processes, and robots. The result is a fast, agile, and precisely tuned operation equipped to perpetually meet the what-when-where expectations of today's retail consumer.
As an advanced autonomous mobile robot (AMR), Ranger GTP uses robotic GTP technology for automated put-away, inventory storage, replenishment and order picking in distribution and fulfillment centers.

Ranger robots get smarter as they operate to match the pace of the flow of orders and inventory on the floor, continuously keeping the right inventory in motion to the right place at the right time.

The Robots are purpose-built to work together to handle a range of tasks across a DC including:
Removing heavy-lifting and mile-walking from your workers by quickly and conveniently transporting racks of inventory to pick-pack stations;
Assisting work teams with picking and order consolidation
Conveying inventory and packages to appropriate destinations for additional handling
Sorting packages by destinations you can reconfigure at will, without being locked-in to fixed sortation patterns and destinations
Transporting packages and trolleys to various dispatch areas

WEAKNESSES:
Not a strong SW player (yet)
Focused on selling robots but is shifting their focus to be more SW oriented partnering with Tier 2 / 3 implementation partners.
They do not have (known) connectors to any of the Tier 1 WMS players

HOW TO WIN AGAINST THEM:

Company S has a strategic engagement with enVista – one of the leading WMS (Tier 1) Deployment partners

S has a proven connector to BY which is strongly supported by enVista – which would be a good fit for GO as enVista have their proprietary POS to which they would easily integrate / build a connector.

According to market intel the relationship between enVista and S is not as strong as promoted.

Their solutions are (until now) bespoke to the Ranger Robots which they manufacture and sell.

Company B

DESCRIPTION

Company B is the largest free and independent comparison platform for mobile robots (also known as AGVs - Autonomous Guided Vehicles) in logistics and production.

Aggregation of all AGV Robotics OEM in market provides selection of equipment with guidelines on selection of most suitable equipment for each use case;
Does not serve as an integrator;
Independent Consulting on automation with Robots;
Provides / Serves as a marketing platform – that is used as a lead generator by the robotics manufacturers.

PRODUCT

Robotics Advisory Marketplace
Comparison tool
Independent consulting / advisory

STRENGTHS

Affiliation of almost all Robotics manufacturers
Lead Generator
Market awareness
Education platform - lots of material to use for consulting and education of customers

WEAKNESSES

No integration capability - no connection to host systems
Focused on AGV market

DIFFERENTIATORS

Aligned with BLANK Robotics
Community Site - knowledge sharing
Lead generation
Education platform

HOW TO WIN AGAINST THEM?

Positioning against them is not necessary – they do not compete against S.

Company C

MISSION:

1) Create Amazing Drag-and-Drop UI applications for any form factors (what we wish we could have made DDAs into – full, first-class, apps for any form factor),
2) Create configurable in-line transformations inside your components (in other words, no Integrator and no 3rd party integration tool like **C*** needed for integrations or talking to things like Kafka or JMS),
3) Create simple, distributed event-based processing (think of this like distributed triggers and event subscribers able to talk to any system),
4) Support any combination of vendor features exposed as a Headless Execution System (this is an entirely new concept over the past couple of years but basically means massively scalable).

DESCRIPTION:

The Composable Platform for Warehouse Execution
C provides everything WMS companies, WES companies, WCS companies (WxS), Implementers, and IT partners need to create holistic, robust warehouse solutions. Its "Best-of-Breed Feature" fabric allows the user to select the best features from any provider and expose the value with LUCA. Features may run on any combination of their on-prem, cloud, hybrid - all having different tech stacks.
https://www.linkedin.com/pulse/

PRODUCTS:
Integration Platform
ATTUNED LABS
Get us ROI
LUCA

STRENGTHS:

- Z and F were considering A
- D has mentioned A (11/1/2021)

Composable Services. As I pointed out above, C supports codeless integration but also uses a unique technology called Leap Data Context and Attuned Entities for much better re-use. If your background is in JDA/BY, see our C For D Developers video for more info.
Hot-swappable Implementations for high-speed vendor or implementation selection (see video here). If your background is JDA/BY, think of it as a wrapper or pre-trigger but without having to designate a separate component to do it – the implementation selection is done on the fly. We use this all the time for Parcel Systems where we add a rule that says something like if the carrier is FedEx used, the FSMS implementation, otherwise use c or b, or p or name-your-vendor.
Create "Headless" Systems from WxS and/or legacy systems. Use Execution Activity Streams (EAS) to make any combination of features into a headless system. A headless system is a way to describe a system that does not have a single server endpoint or use HTTP endpoints at all. Instead, these tend to use event-based communication. See our video HERE for creating Headless systems and turning the BY Release Manager into a Headless System.
Composable Integration or O Integration Tool. C does codeless Integrations, but what if you already

Sample Competitive Analysis Results (with companies' names omitted)

AXES	(TRUE 1 - 10/FALSE = 0)			(TRUE 1 - 10/FALSE = 0)				(Avg. weeks) (TRUE 1 - 10/FALSE = 0)				(TRUE 1 - 10 /FALSE = 0)					(TRUE 1 - 10/FALSE = 0)						(TRUE 1 - 10 /FALSE = 0)							
	Simplicity: Code	Simplicity: Code	Simplicity: Code	Simplicity: Agnotic	Simplicity: Agnotic	Simplicity: Agnotic	Simplicity	Speed to deployment	Speed to deployment	Speed to deployment	Velocity	Transparency	Transparency	Transparency	Transparency	Transparency	Transparency	Transparency	Transparency	Transparency	Transparency	Ancillary benefit	Ancillary benefit	Ancillary benefit	Ancillary benefit	Ancillary benefit	Ancillary	OUTCOME	
Competitor	No Code	Low Code / Rapid Deployment Toolset	Code	One Sided	Multi-Sided	None		Pre-built integrations	Number of applications / SB Connectors	Ease of Use (Need for Technical Expertise) (1 no need - 10 HIGH need)		Data Monitoring	Embedded AI	Visibility - Data Modeling	Telemetry (Logging)	Data access	Data transparency (ability to make informed decisions with data as presented)	Data mining	AI for predictive behaviour	Time to Value (ROI)		R/A Selection Knowledge	Subject Matter Expertise (SME)	Education Capability / Material	Single Purchase Point	Price - Affordability		Total SCORE	
Weighting	1	0.5	0.1	0.5	1	0.1		0.5	0.5	1		0.2	0.1	0.5	0.75	1	0.75	0.5	0.5	1		1	1	0.75	-1	0.8		Total SCORE	
Accelogix	0	0	10	0	0	10	2	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	8	5	0	2	13.35	18.35	
A	10	10	0	0	10	0	25	10	10	0	10	10	10	10	10	10	10	10	10	10	8	51	3	5	5	5	2	8.35	94.35	
A	0	5	10	0	5	0	8.5	5	5	0	5	10	10	10	10	10	10	10	10	7	50	0	7	5	0	5	14.75	78.25	
A	8	8	2	0	10	0	22.2	5	5	2	7	8	8	5	4	4	4	6	5	5	25.4	0	0	5	0	5	7.75	62.35	
A	0	6	8	8	5	0	12.8	5	5	4	9	8	8	8	0	5	5	5	5	8	28.15	0	0	0	0	5	4	53.95		
A	10	10	0	0	10	0	25	10	0	0	5	10	8	10	0	10	10	10	2	8	39.3	0	0	0	0	5	4	73.3		
A	0	0	10	10	0	0	6	0	0	0	0	0	0	0	5	5	5	5	0	8	23	5	5	2	2	5	13.5	42.5		
A	10	10	0	0	10	0	25	7	7	0	7	7	7	7	7	5	5	5	7	7	32.6	0	0	0	0	5	4	68.6		
A	10	10	0	0	10	0	25	10	5	2	9.5	8	8	8	2	5	5	5	0	6	25.15	5	7	7	7	5	14.25	73.9		
A	5	5	5	0	10	0	18	10	5	2	9.5	6	2	2	0	5	5	5	0	5	18.65	0	4	2	0	2	7.1	53.25		
A	0	0	10	0	0	10	2	2	2	0	2	0	2	0	5	5	5	5	0	5	20.2	0	0	0	0	2	1.6	25.8		
A	0	5	5	0	10	0	13	5	5	5	10	5	5	5	3	5	5	5	2	5	23.5	5	7	6	5	5	15.5	62		
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A	10	10	5	0	10	10	26.5	5	7	7	13	8	10	10	5	8	8	9	9	8	42.35	0	2	2	0	8	9.9	91.75		
A	0	10	10	0	10	0	16	8	5	0	6.5	8	10	10	10	8	8	9	10	8	46.6	5	5	3	0	5	16.25	85.35		
A	0	5	10	0	10	0	13.5	3	3	0	3	7	5	5	3	5	5	5	5	7	27.4	4	7	7	0	5	20.25	64.15		
A	0	3	10	0	10	0	12.5	8	8	5	13	8	5	8	2	2	10	5	2	4	24.6	10	10	10	5	2	24.1	74.2		
A	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	10	10	10	10	10	25.5	35.5		
A	10	10	10	0	10	0	26	10	10	2	12	8	5	0	0	7	7	7	0	8	25.85	0	2	2	0	2	5.1	68.95		
A	0	0	10	10	0	0	6	0	0	10	10	8	2	5	0	5	6	9	5	7	27.8	2	2	2	0	2	7.1	50.9		
A	10	10	0	10	5	0	25	10	4	4	11	10	10	5	2	8	8	6	5	9	35.5	2	2	2	0	2	7.1	78.6		
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A	5	5	5	10	0	5	13.5	1	2	5	6.5	8	5	5	0	8	8	8	1	2	25.1	1	0	0	0	1	1.8	46.9		
A	10	10	0	0	10	5	25.5	3	5	5	9	8	8	7	0	8	8	8	1	2	26.4	0	0	0	0	1	0.8	61.7		
A	10	10	0	0	10	0	25	10	10	4	14	9	9	9	0	9	9	9	5	6	35.95	8	8	5	5	5	18.75	93.7		
A	5	5	8	10	4	0	17.3	5	5	8	13	8	8	8	2	7	7	8	8	8	36.15	6	5	0	4	5	11	77.45		
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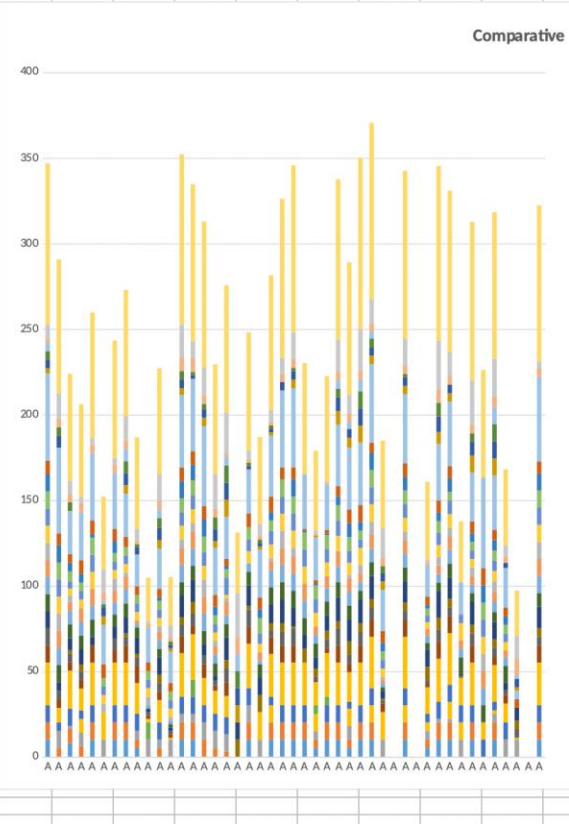
A	10	10	0	10	10	0	30	10	7	5	13.5	8	8	8	8	10	10	10	10	6	45.9	5	5	5	4	5	13.75	103.15		
A	0	0	10	10	0	0	6	5	2	1	4.5	2	2	2	2	5	5	5	5	7	23.85	5	5	4	0	5	17	51.35		
A							0				0										0						0	0		
A	10	10	0	10	10	0	30	10	5	5	12.5	8	8	8	5	8	8	8	8	8	40.15	5	5	2	0	5	15.5	98.15		
A							0				0										0						0	0		
A	5	5	5	5	5	0	15.5	2	2	8	10	4	4	4	0	4	4	4	2	5	18.2	0	0	0	0	2	1.6	45.3		
A	10	10	2	0	10	0	25.2	10	7	7	15.5	5	5	5	5	7	7	7	5	7	33	7	9	8	0	8	28.4	102.1		
A	10	10	2	10	10	0	30.2	10	5	5	12.5	8	8	8	5	8	8	5	8	7	37.65	5	5	0	0	5	14	94.35		
A	0	0	10	10	10	0	16	0	0	1	1	10	5	5	0	10	5	0	0	0	18.75	0	0	0	0	0	0	35.75		
A	10	10	0	0	10	0	25	10	7	5	13.5	5	5	5	5	5	5	5	5	7	28.5	10	8	5	0	5	25.75	92.75		
A	0	0	0	0	10	0	10	0	0	0	0	10	10	10	10	10	10	10	10	10	53	0	0	0	0	0	0	63		
A	10	10	5	2	5	0	21.5	5	5	5	10	6	6	6	6	6	6	6	6	6	31.8	10	10	10	10	6	22.3	85.6		
A	0	0	10	0	10	0	11	5	3	0	4	10	5	4	0	5	5	5	5	5	23.25	0	3	0	0	4	6.2	44.45		
A	0	0	10	0	0	0	1	0	5	5	7.5	0	0	0	0	0	0	0	0	5	5	2	5	0	2	10	13	26.5		
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
A	10	10	0	0	10	0	25	10	5	5	12.5	8	10	10	10	10	10	10	10	7	49.6	0	0	0	0	5	4	91.1		



Market Intel Survey Results

MODEX 2022_Market Intel Gathering

Market Intel Gathering at TRADE SHOW 2022

Originator:

Objective – to gather intel from vendor and partner companies about their positioning and experience of market dynamics in relation to the adoption of Robotics and Automation. This intel will serve as a validation point for A in respect of market Messaging, Product development focus and Strategic orientation.

Methodology:

Sets of questions were developed with input and consideration of internal stakeholders. Scripts were presented to the students who were given a short overview of the aim and expectations. The students were asked to conduct the interviews as independent students who were doing research for their school. The students captured the responses with a cloud hosted application, iAuditor, which they downloaded to their iOS or Android devices. This allowed them to capture the data while interviewing and we could check and process their feedback as it was uploaded to the cloud. Names, booth numbers (location) and company focus were provided to the students with a list of the companies each of them was expected to interview.

The target for each student was about 25 interviews with a sum of 134 companies named for interviews. By the end of day one (Monday 28 march, they had completed 42 interviews. Logistics e.g., booth numbers, finding the correct individual to speak with and getting responses were hurdles. The walking time between booths took longer than expected.

Companies were not forthcoming with intel e.g., number of projects per year, revenue of target companies.

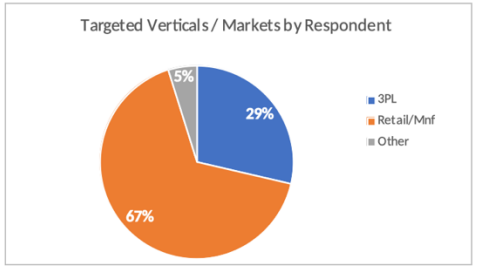
Stats on number of interviews completed per student:

Row Labels	Count of Response
A	9
B	8
C	14
D	11
Grand Total	**42**

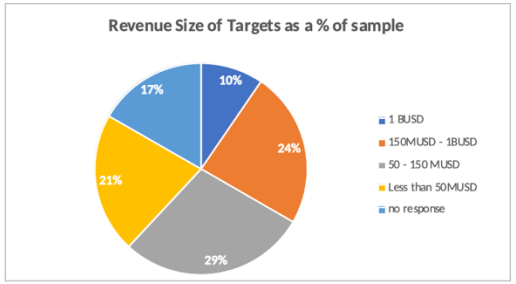
Data aggregation of processed forms as captured in iAuditor:

MODEX 2022_Market Intel Gathering

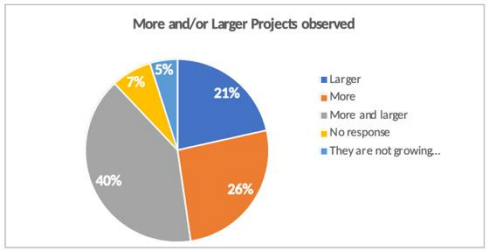
1. Target markets shown by interviewed targets:



2. Average Size of target market / client for interviewed company:

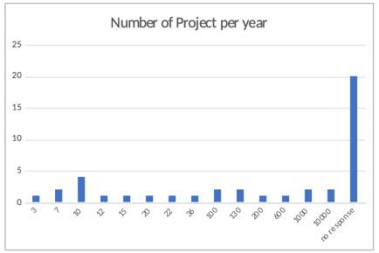


3. Experience of targeted companies in terms of more or larger projects per year:

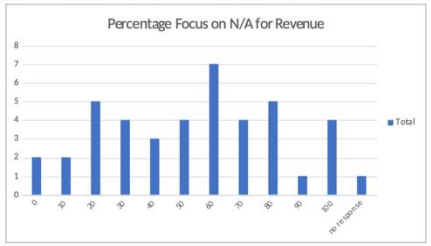


4. Number of projects managed per year:

50% of interviewed companies did not want to give a response to this question.

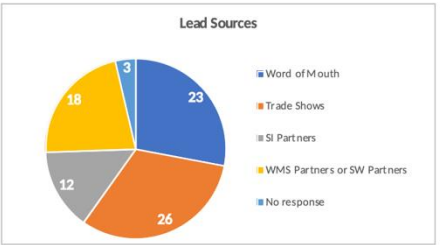


5. Percentage focus on NA to meet annual Revenue Targets:



61% of respondents had more than 50% focus on NA to achieve their annual Revenue Targets.

6. Where do you get most of your leads?



32% of the responses confirmed that they depended on Tradeshows for their leads with Word of Mouth following closely at 28% of the total number of responses. SI partners contributed 15% of leads against 22% from WMS or Software Partners.

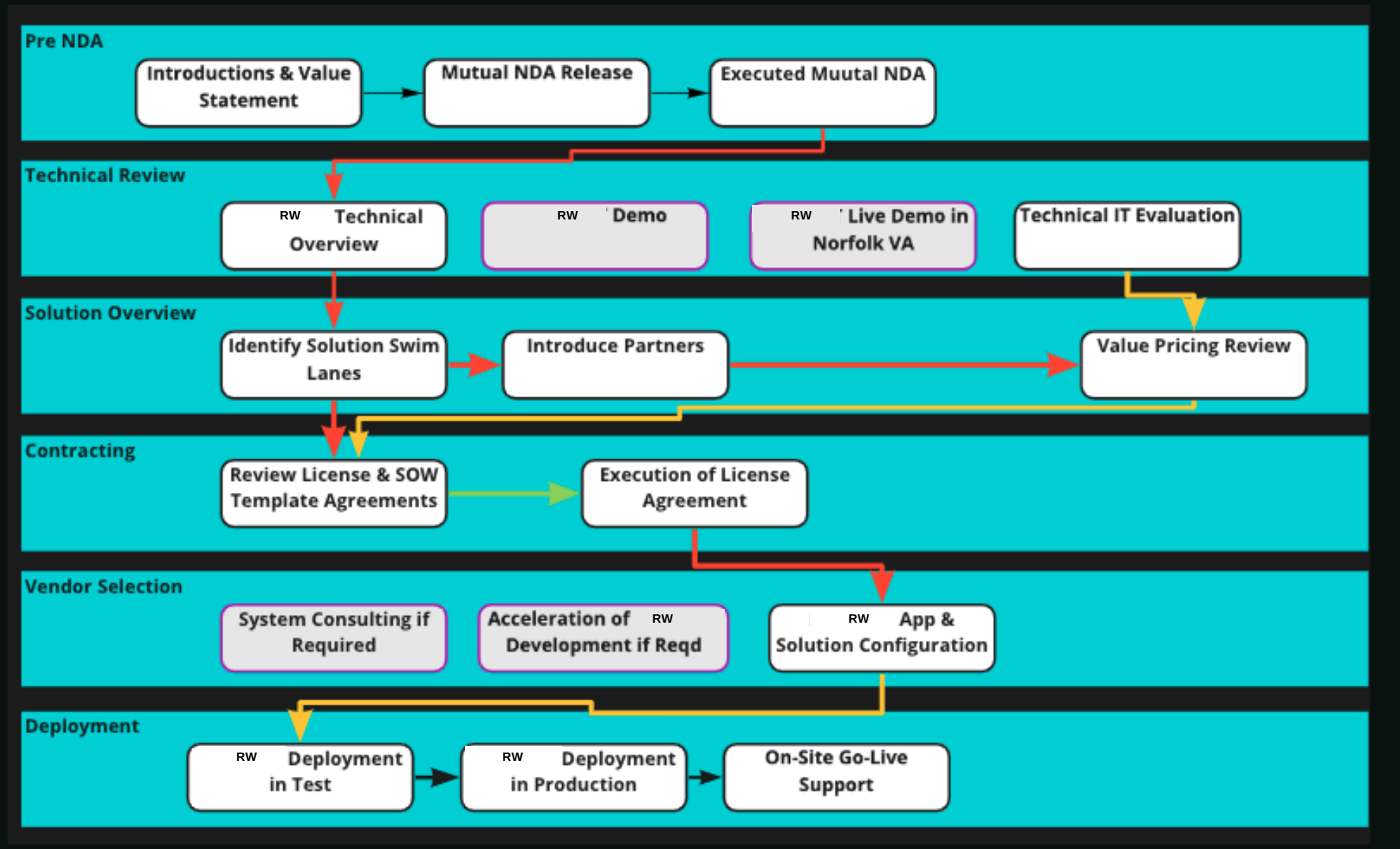
Sample Market Intel Questionnaire

Internal Target	PARTNER	
	QUESTIONS	
	Partner / Deployment, Development, Project stand up	What are we trying to determine? Intent of the question…
0	This industry is obviously growing: do you find you are doing more projects or larger projects?	Can we unlock smaller projects for them without lift
1	Are you global and if so what percentage of your business is in North America? How many deploymens is this.	Revenue opportunity, resource availability / bottleneck, traction in the market - partner with them?
2	What is limiting you from growing faster in North America?	Understand the nature of bottlenecks / constraints for them.
3	What are these blockers?	Understand where the unlock is for them if partnering with SVTR
3	On average what is your current lead time to deploy a typical solution	Understanding if time to value is a challenge for them.
4	What is driving the deployment schedule?	This would tell us if the bottleneck is software dev or project management
5	How many software development resources you have? FTE vs. Outsourced?	Indication of expected pipeline / projects
6	how many Project Managers do you have as FTE?	Indication of expected pipeline / projects
7	Who do you prefer to sell to, what is your ICP (Ideal Client Profile)?	Identify and align target markets that they identifiy as first adopters
8	Where do you find you get most of your opportunities from? Shows like this or partners etc?	Identify who are the gatekeepers for engagement
9	From a resourcing point of view…how do you handle integrations?	Understand their business model and growth expectations -outsource indicates focus or weariness ab
10	What types of technology do you regularly get asked to integrate to?	Indicates the vendor category to engage with and for which to build connectors.
11	Who are the providers/vendors you are partnering with?	Indicates to SVTR the vendors with whom to partner/align - gives direction for SVT on what connecto
12	Do you have any plans on how to reduce integration and deployment time? What plans to you have to reduce integration time?	Are they exploring tech solutions vs. throwing people at problems?
13	Should I consider becoming a Project Manager (PM) or software developer (SWD)?	This would tell us if the bottleneck is software dev or project management.
External Target	BUYER	
	QUESTIONS	
	Buyer of our solution - SI / Consultancy, 3PL, Pharma, Retail, Medical, eCommerce, other verticals, Integrators	What are we trying to determine? Intent of the question…
1	Typically, what is the timeline for deployment of each tech integration?	How long does it take for a standard deployment - how tied up are resources?
2	Do you have unconditinal support from your IT team?	Do they have internal IT support and sponsorship - NB to reduce IT time tied to projects
3	If NO, what is requied from IT to support as needed?	Understand project qualifiers from IT to dedicate resoruces and identify bottlenecks in IT
4	To gain approval, what is the expected time to value on tech projects?	What is the ROI expected to justify a project of this nature?
5	If you are launching an automoation intiative, how do match the type of MHE/tech with your operation /facility (tech type / size an	What tools / SME are they using to advise them on their acquisition?
6	What challenges are you facing in solving these questions?	What bottlenecks are they facing - nature thereof?
7	Do you have a confirmed budget and intent to deploy A/R Technology?	Is there a pipeline with intent to execute
8	IF yes to the above, what is your planned time frame to deploy A/R Technology?	Is there a pipeline with intent to execute
9	Which if the following technologies do you currently use?	Indication of Tech maturity and readiness to adopt a cloud hosted platform solution
10	If they use a PUBLIC Cloud - which of the following do you use?	Tech indicator - what to build for - preference in the market
11	What functions in your operation are you looking to automate?	Indicates what functions they are seeking to automate and vendor category to engage with
12	What types of tech are you considering?	Indicates what functions they are seeking to automate and vendor category to engage with
13	What is the the volume of transactions per day for which you are introducing Tech solution?	Indiction of size of their operation
14	How many plants / operation / locations do you intend to deploy tech at?	Indiction of size of their operation and number of connectors for technology required
15	How many types of Tech are you considering to solve for your efficiency gains?	Indiction of the number of connectors (for technology) required per facility
16	What are you solving for?	Functional indicator of the type of automation that they awill be considering - connectors to build
17	How are you selecting the tech - who is supporting you as an SME?	Intenal maturity in respect of Tech knowledge, availability of external SME to support in selection.
18	Who is the gatekeeper in your organization to approve a technology project e.g. R/A other tech	know who the gatekeepers are - messaging from Product marketing and Partners/Alliances

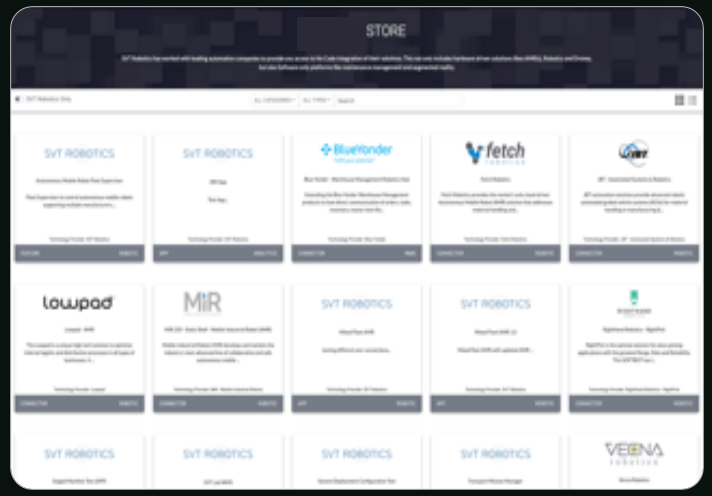
Functions Examples User Required

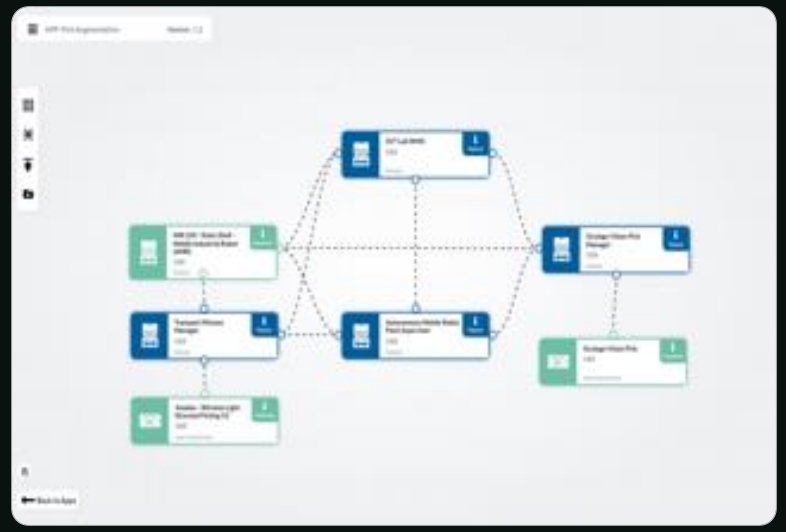
Connector Behavior Type	Description	Entities:	Example Providers	Example Provider API	Example Provider API	Example Provider API
WMS Orders	The ability to be informed of orders and update these including order lines, qnty, locations,	Order #, Order Line, Item #, Location, Check Digit, Qnty, Container Size	Fishbowl, BlueYonder, Deposco, Manhattan, SAP	Fishbowl API		
IOT Measurements / Actuate	An IOT platform message that carries measurements such as button presses, distance, weight, cube, count, Off / On or is able to actuate a device.	Weight, Cube, Distance, Button Press, Count, Open / close, Vibration	MyDevices, Banner IOT, Azure IOT	API Link Example - My Devices	API Example - Banner	Azure IOT
Pick Assist	The ability for the solution to direct an operator to a location to perform picking tasks to one or multiple order containers.	Order #, Container #, Location, Qnty, Serial #, Check Digit, Lot Code, Image of Item, Image of stack location	6 River, Locus Robotics, Lucas Voice, MCL Voice, Ox Vision	Lucas Systems (Does not have an API)	MCL Voice	Ox Vision
User Assistance - Light Directed	The ability to display messages to an operator that are typcially used for a pick wall, put wall or pick and pass solution.	Confirm, Qnty, Location, Message	Voodoo Robotics, Banner, Lightning Pick, KBS	Voodoo Robotics	Banner API	
Pick & Place Robotics	The ability to inform an automation provider to pick something from a location and place at a location. Also to determine if location is empty, full.	From, To, Qnty, Serial Number, Item Number, Empty, Full,	Right Hand, Osaro, Plus 1, Ambi	Right Hand	Osaro	
Transport Automation	The ability to identify a transport mission that needs to be accomplsihed with one to many stops.	Pickup Location, Destination Location, Drop/Off, Stop Location, Container ID, Priority Code, Full, Empty, Load Qnty	MIR, Otto, Fetch, Grenzebach, Vecna,	MIR	Fetch	Otto
Conveyor Routing	The ability to tell a conveyor to route product and or start or stop a location.	Start, Location, bar code, full, 1/2 full, empty, Destination, Height, Weight	Berken Solutions, DW&H	Berken Solutions		
Pick Assist	The ability for the solution to direct an operator to a location to perform picking tasks to one or multiple order containers.	Order #, Container #, Location, Qnty, Serial #, Check Digit, Lot Code, Image of Item, Image of stack location	6 River, Locus Robotics, Lucas Voice, MCL Voice, Ox Vision	6 River	Locus Robotics	
GTP Execution	The ability to operate a goods to person solution inclduing putaway, cycle count and picking. (Automation controlling inventory locations)	ASN, Qnty, Lot Code, Order, Orderlines,	Geek+, Knapp, Swisslog SynQ, Kardex PPG,	Attabotics	Kardex PPG	Grenzebach WES
Load Identification	A computer based vision system that identifies counts of types of devices seen, direction, carrier etc. Example is trailer inbound camera systems	Load Type, Color, Carrier, Size, Load ID, Weight, DOT Number,	Cogniac or Navtrac	Cogniac	NavTrac Data Push	
Inventory Adjustment	The ability to perform cycle counts or adjustments to inventory with reason codes.	Location, Item Number, UPC, Qnty, Serial Number, Reason	Vocollect, Lucas, WES			
Dimensioning	The ability to capture dimensions and use these to create a load container or update master item file.	Bar Code, Load ID, Height, Weight, Legnth, Cube, Type, Crushable, Qnty	Cubiscan	Link to Cubemaster API Info		
User Recovery Assistance	The ability to share data to support error recovery and or manual operation from 3rd parties.	Location, Destination, Load Status, Bar Code ID, Error Code, Power Level, Suction, Qnty, Task ID,	Phantom Auto, Ario,			
User Assistance - Light Directed	The ability to display messages to an operator that are typcially used for a pick wall, put wall or pick and pass solution.	Confirm, Qnty, Location, Message		Atop		

Robot Whisperer Process



Robot Whisperer Design Examples





Quicker and Safer – Automated Shim Measurement for Commercial Aircrafts

Objectives:

- Improve shim measurement precision
- Accelerate measuring speed
- Improve shim producing quality

Methodology:

- *Qual*: Semi-structured interviews, Field studies, usability testing etc

Results:

- Produced UI for the platform.
- Increase ahi measurement speed by 70%
- Deploy and maintained the product in multiple factories

My Role:

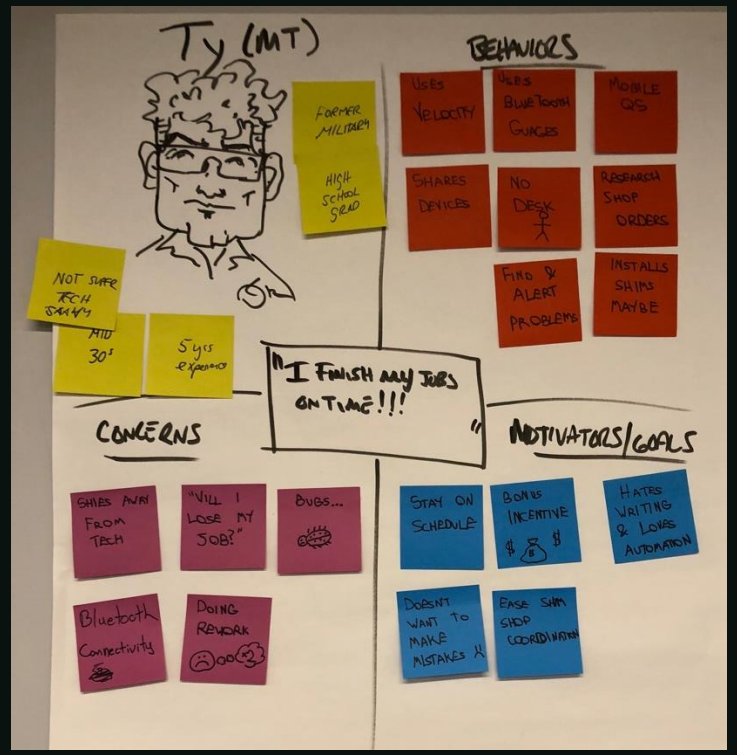
- User research to verify objectives
- Persona creation
- Field study, interview, usability testing
- Analyzed data and converted findings to simplistic designs
- Compiled findings into easy-to-understand presentation.

Goals and Anti-goals

	Business	Product	Engagement
Goals	○ Reduce manual build ○ Save labor cost ○ Try our best not changing business logic ○ Pivotal development process ○ Working product	○ Automate the measurement process ○ Identify product “fat” ○ The product is responsive to multiple platforms ○ Fast and easy to use ○ Robust ○ Offline and online capability ○ Stable integration ○ Quick recovery ○ Provide reliable support	○ TDD ○ Capturing end-users behavior ○ Continuous integration ○ Xamarin ○ Cloud Foundry ○ Better developer ○ Design for multiple platforms ○ Change in team culture ○ Critical active learning ○ Get
Anti-Goals	○ Executive goals vs. product goals ○ Mix and match features of legacy and new app ○ JAVA ○ iOS ○ Working pass 4 pm ○ Working to deliver product by June ○ Maintain in-house Bluetooth firmware ○ Firewall gateway etc. ○ Support phone allocation ○ PCF install/debug ○ Distraction with run support ○ Ignore deadline		

Goals and Anti-goals

Personas



Measurement Planner

Demographic

- Quality Planning/ Engineer
- Manufacturing Engineer
- Proficient in creating measurement plan on Excel
- Author measurement plans
- Measurement plans are required by Design Engineering
- Work with Velociy, CMES, REDARS, DELMIA, Mantis

Needs/ Pain Points

- Author measurement plans so that MTs can perform their work (ME writes what hey own, QE writes what they own)
- MobileQS has not been deployed to Premier programs. No process that supports the tool and does not integrate with CMES.
- Manage measurement plans correctly
  (1 SOI can consist of many measurement plans, 1 measurement plan can consist of many effectivties)
- Copy at measurement plan level
- Import and export files to excel and ability to sync with the tool (Check-in and Check-Out for import and export feature)
- Bond and Ground, nominal and lower is always "0"
- Group code should be organized in alphanumerical order
- Created plan can be stored in the system for future reference
-

Ideas

- Connect user profiles with DELMIA
- Need to get people to understand MobileQS value
- Managing measurement plan
  (Click on IP --> See all the plans on a new page)
- Select MES before IP
- The system should know what program user is supporting by user profile
- Get Effectivity from REDARS, enable copy & paste

Gauge Administrator

Demographic

- Quality Tech/Metrology
- Work in metroology/ cal cert lab
- Proficient in using CMIS
- Downstream customer = MT

Needs/ Pain Points

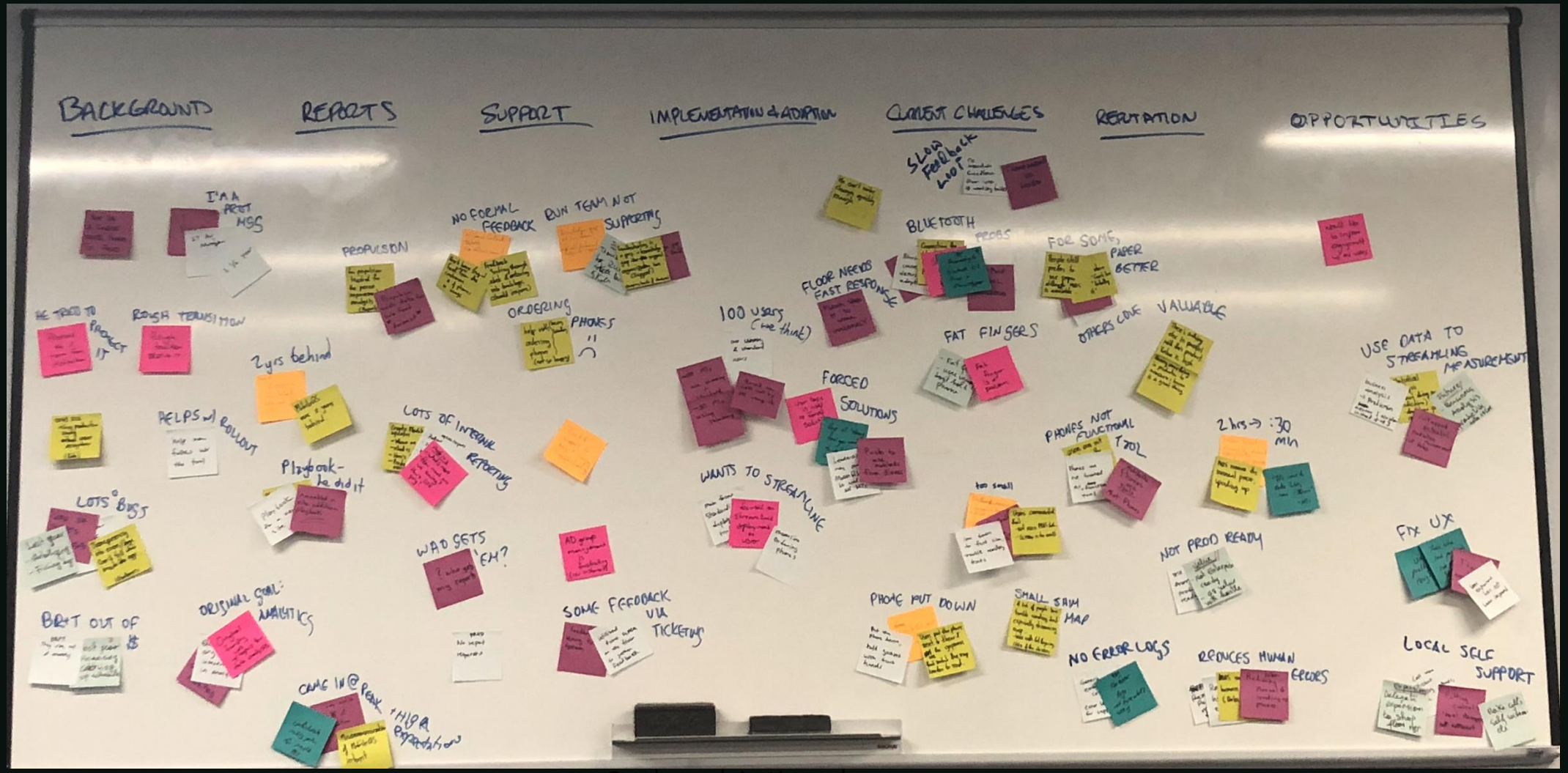
- Main goal is to make sure that the gauges are up to date, nothing is out of calibration (Responsible for making sure gauge calibration date is up to date)
- Something that notifies the "out of calibration date" gauge 10-15 days before
- Entering gauge information on CMIS is tedious, need this to be simpler
- Interacting with 2 different systems (CMIS & Legacy Website)

Ideas

- A new system should connect with CMIS database

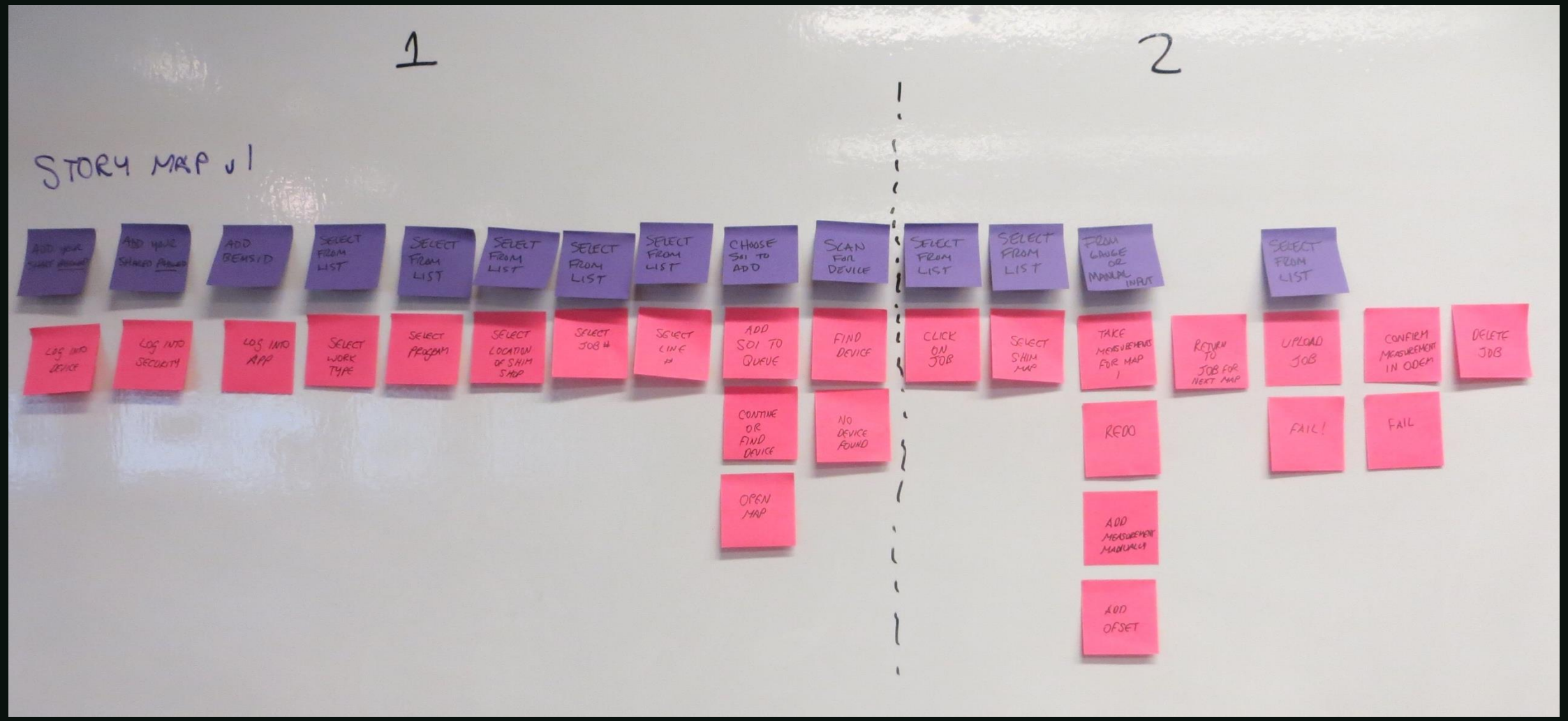
Goals and Anti-goals

Stakeholder Interview Synthesis



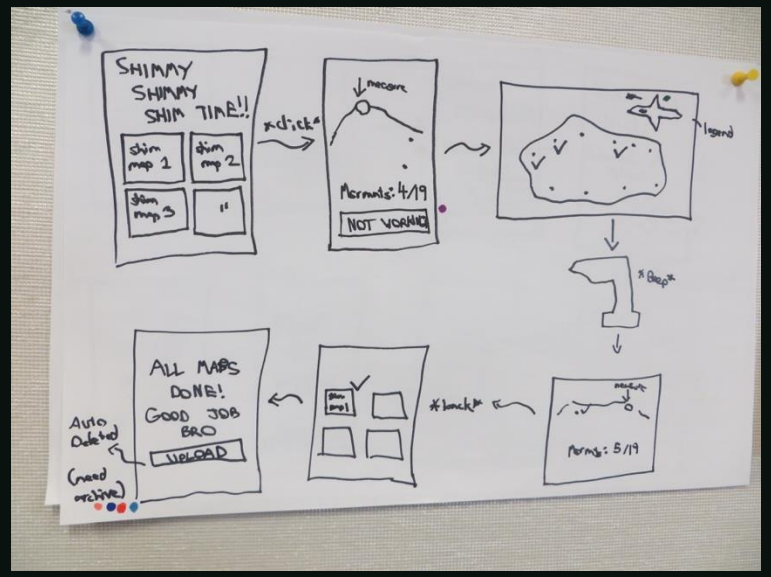
Goals and Anti-goals

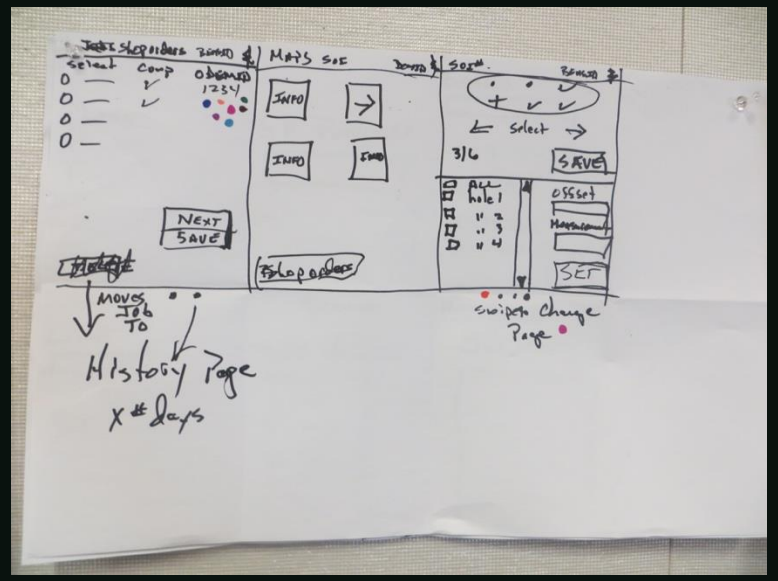
Story Map

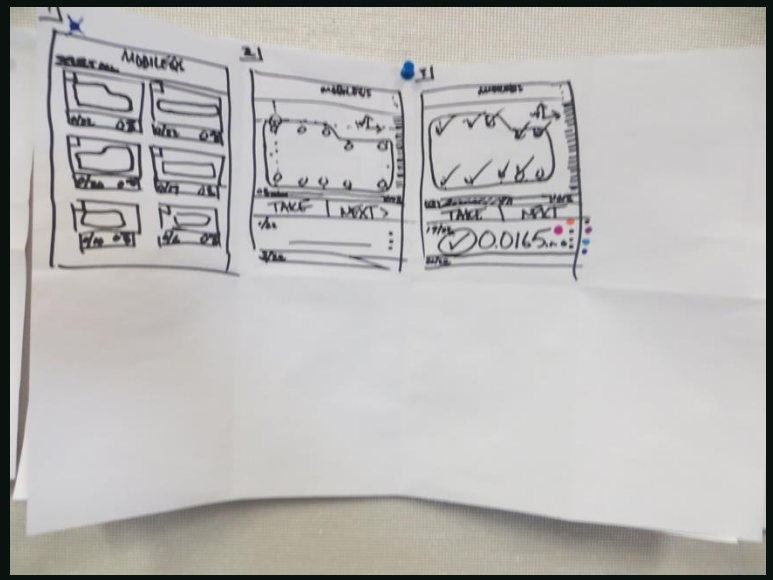


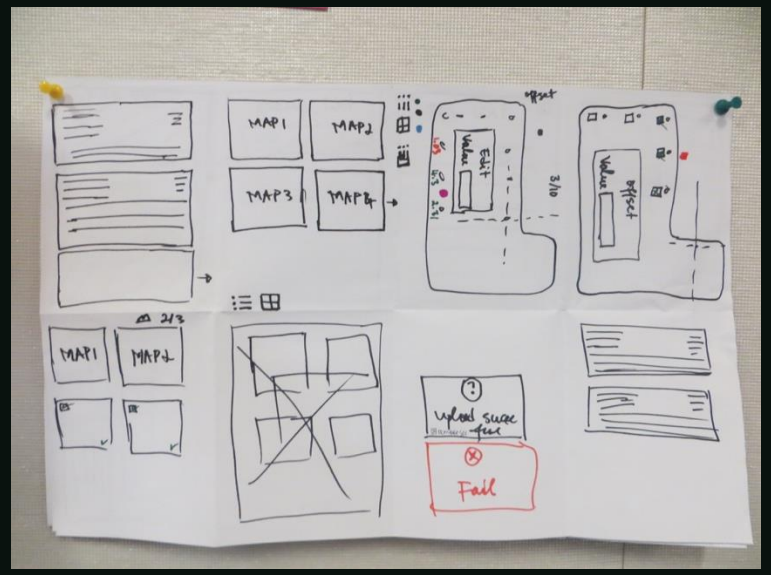
Goals and Anti-goals

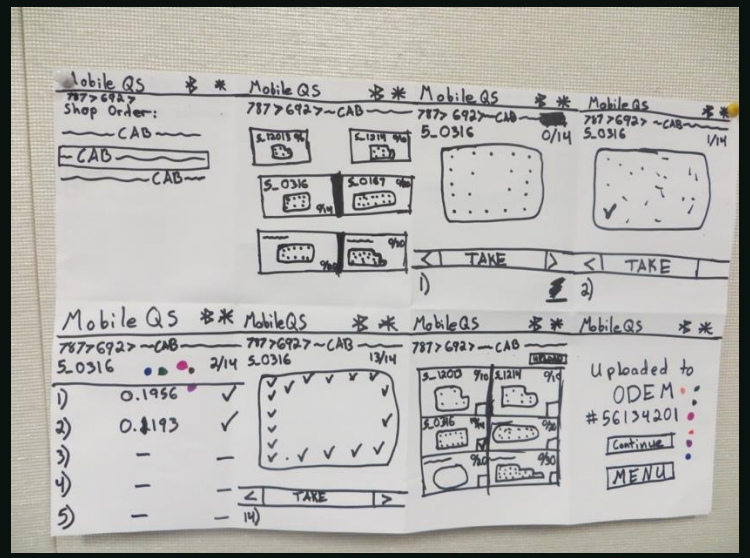
Design Mockup

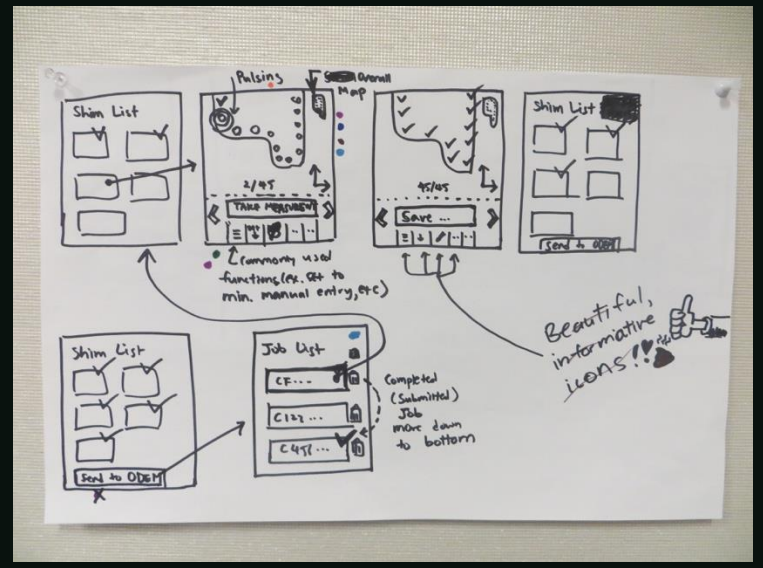






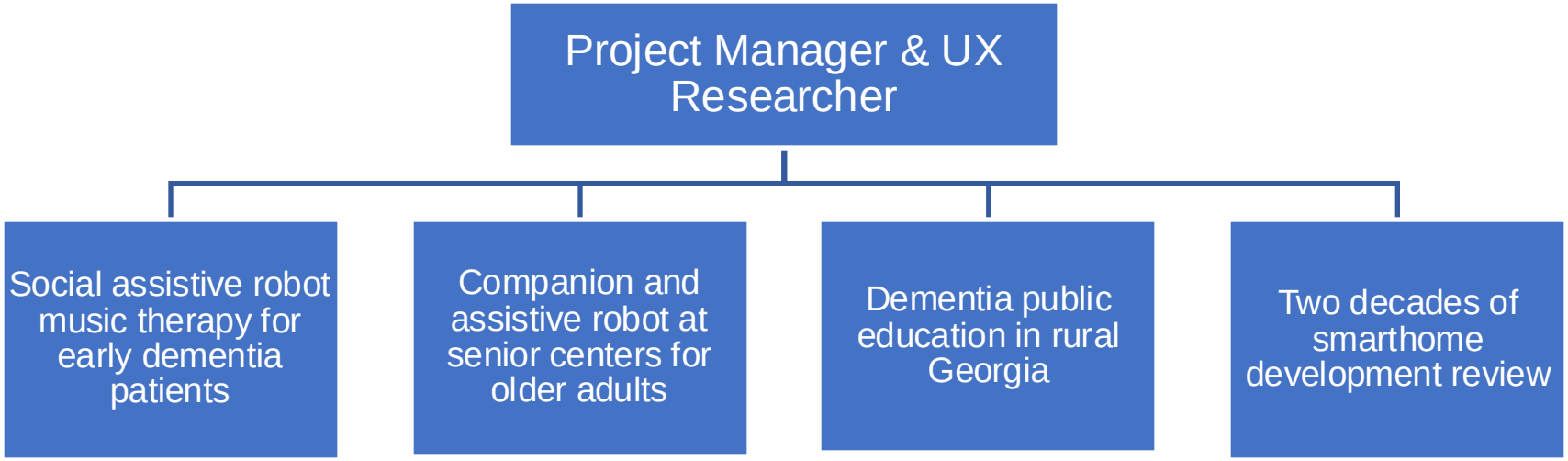






Goals and Anti-goals

Project Management Experience

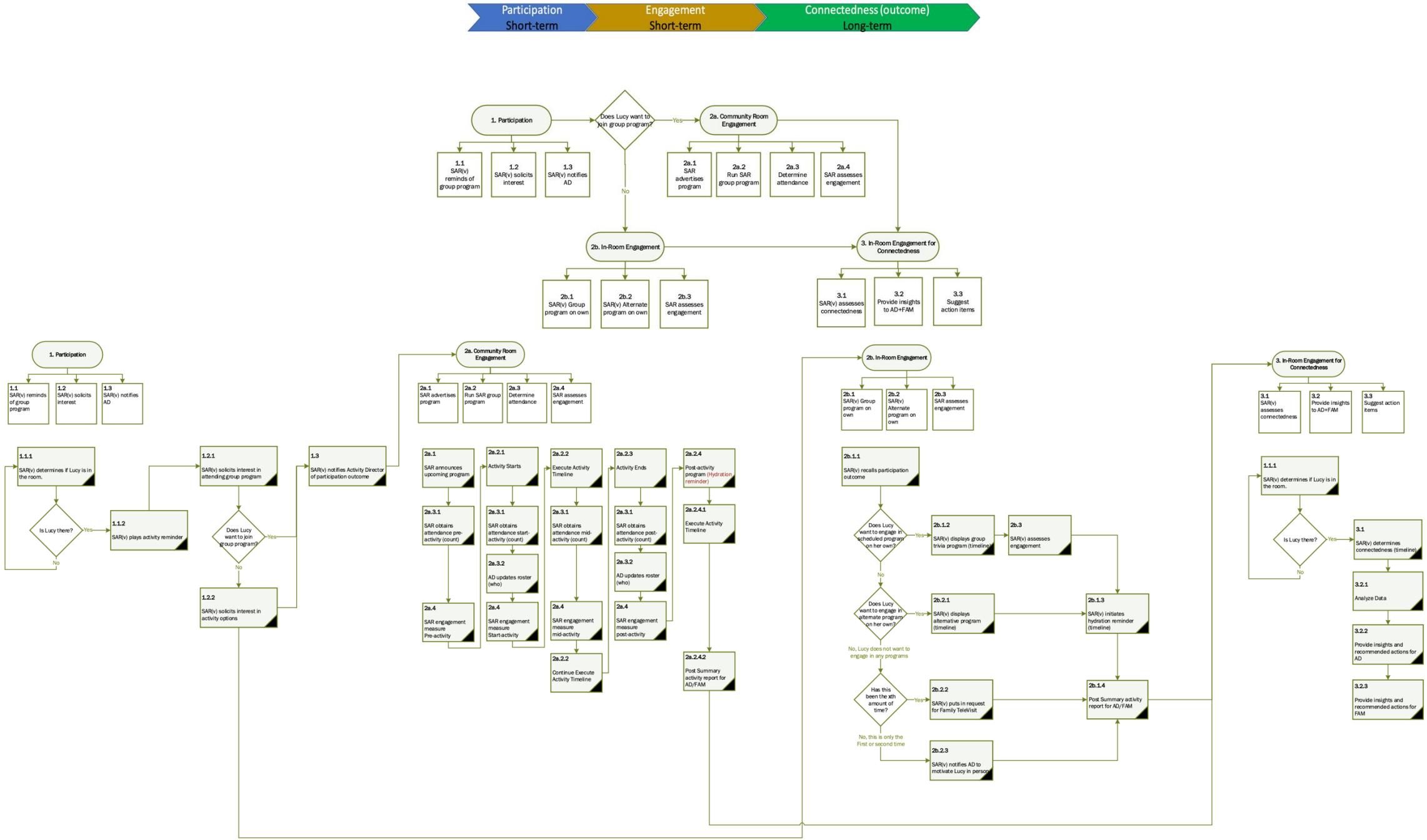


Socially Assistive Robot for Persons with Dementia in Care Centers, A Clinical Trial

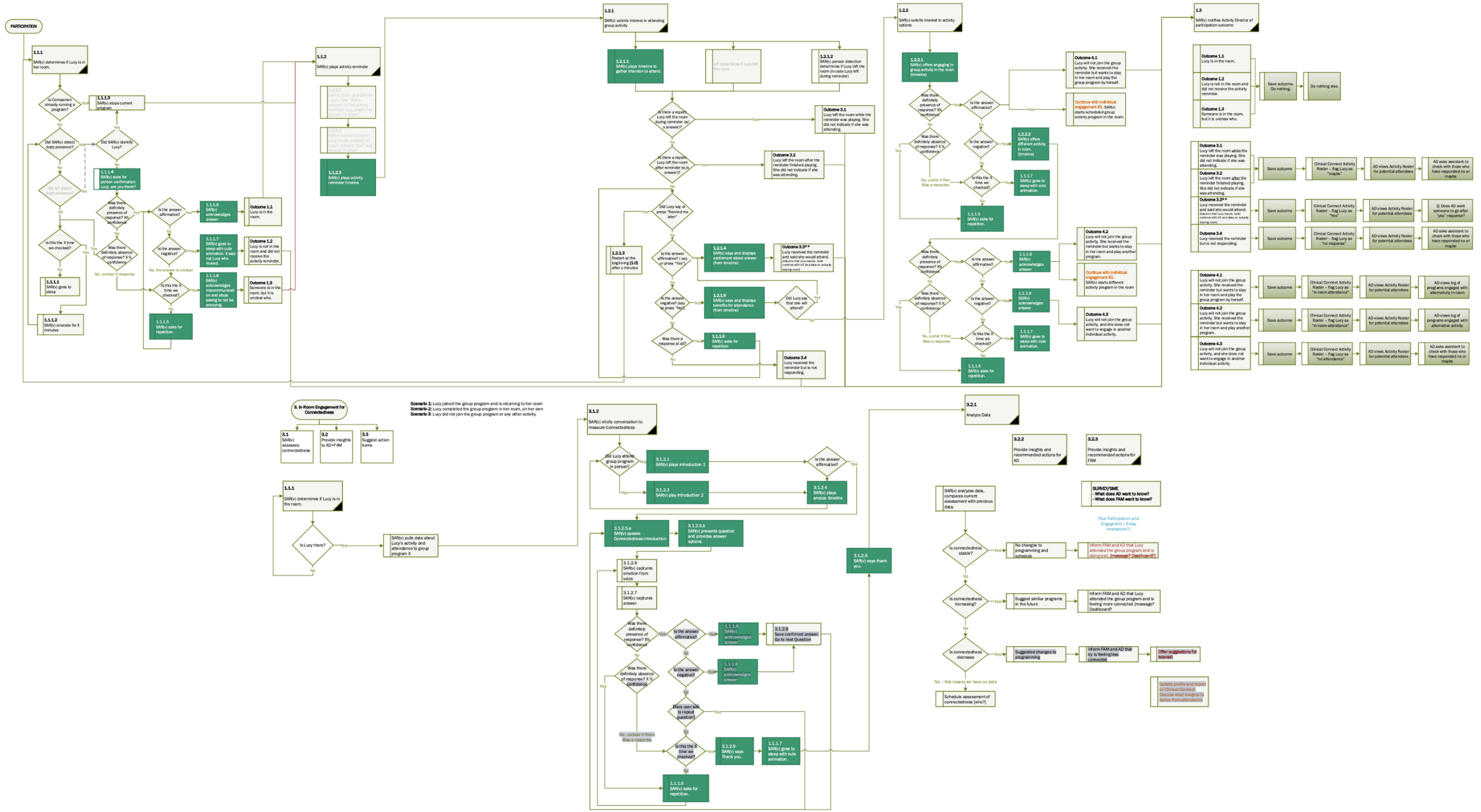
Objectives: Design and develop a Socially-Assistive Robot (SAR) system for persons with dementia (PWD), who are living in assisted living facilities. The system uses Augmented Intelligence (AI) to communicate with the PWD in natural language. The system engages PWD via activities such as storytelling and simple games.

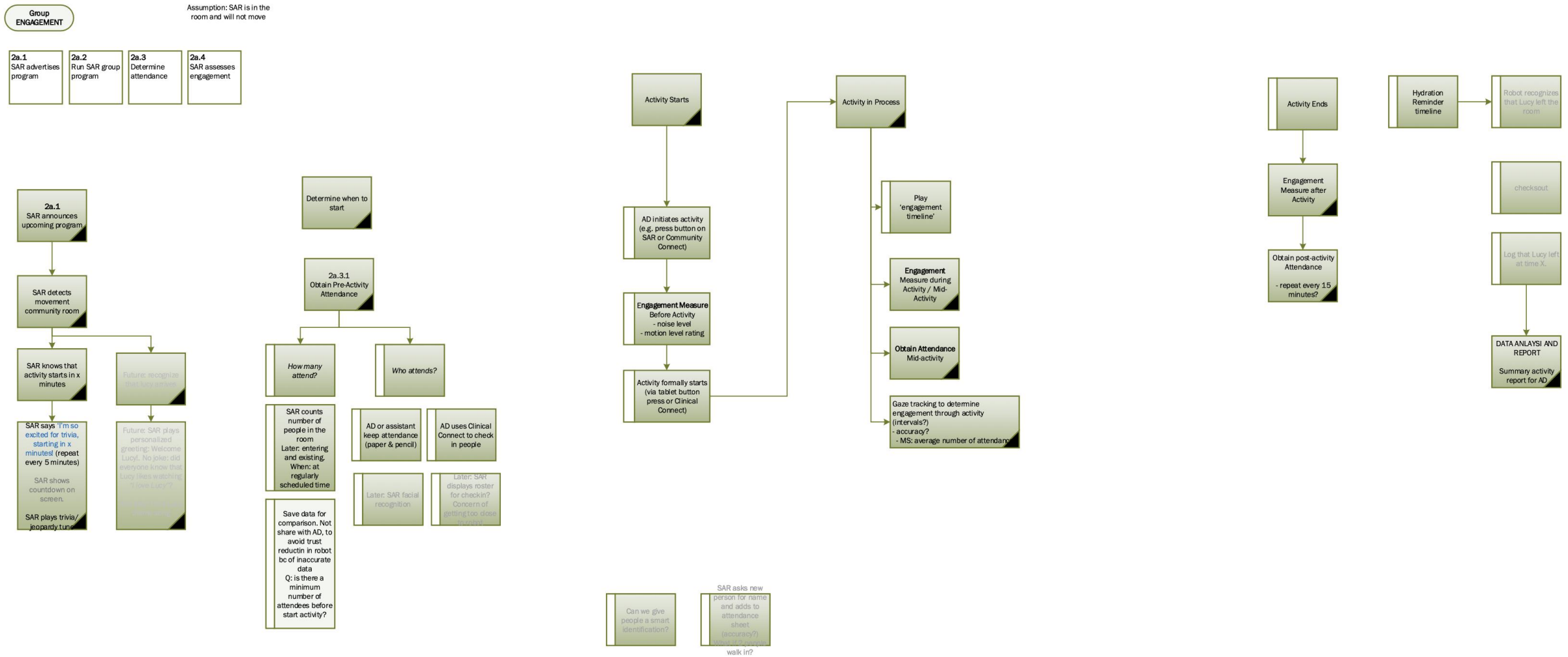
My role:

- Lead UX researcher in a 5-member UX team
- Journey map development
- Task analysis
- In depth literature review regarding technology design and older adults
- Voice interface error handling



Task analysis


PARTICIPATION
1.1.1 SAR(v) determines if Lucy is in her room.
Is Companion already running a program?
1.1.1.3 SAR(v) stops current program
Did SAR(v) detect body presence?
Did SAR(v) identify Lucy?
1.1.1.4 SAR(v) asks for person confirmation Lucy, are you there?
Did IoT detect body presence?
Was there definitely presence of response? X% confidence
Is the answer affirmative?
1.1.1.6 SAR(v) acknowledges answer
Outcome 1.1 Lucy is in the room.
Is the answer negative?
1.1.1.7 SAR(v) goes to sleep with cute animation, it was not Lucy who moved.
Outcome 1.2 Lucy is not in the room and did not receive the activity reminder.
Was there definitely absence of response? X % confidence
No, unclear if response
Is this the X time we checked?
1.1.1.8 SAR(v) acknowledges miscommunication and stops asking to not be annoying.
Outcome 1.3 Someone is in the room, but it is unclear who.
No, the answer is unclear
1.1.1.5 SAR(v) asks for repetition.
Is this the X time we checked?
1.1.1.1 SAR(v) goes to sleep
1.1.1.2 SAR(v) snoozes for X minutes
1.1.2 SAR(v) plays activity reminder
1.1.2.1 SAR(v) looks up profile for Lucy's "like" that is relevant for the activity reminder (e.g., what's her favorite TV show)
1.1.2.2 SAR(v) accesses theme song (music snippet) of Lucy's relevant "like" (e.g., favorite TV show)
1.1.2.3 SAR(v) plays activity reminder timeline
1.2.1 SAR(v) solicits interest in attending group activity
1.2.1.1 SAR(v) plays timeline to gather intention to attend.
IoT determines if Lucy left the room
1.2.1.2 SAR(v) person detection determines if Lucy left the room (in case Lucy left during reminder)
Is there a report, Lucy left the room during reminder w/ o answer)?
Outcome 3.1 Lucy left the room while the reminder was playing. She did not indicate if she was attending.
Is there a report, Lucy left the room after reminder (w/o answer)?
Outcome 3.2 Lucy left the room after the reminder finished playing. She did not indicate if she was attending.
Did Lucy say or press "Remind me later"
1.2.1.3 Restart at the beginning (1.0) after x minutes
Is the answer affirmative? (say or press "Yes")
1.2.1.4 SAR(v) says and displays excitement about answer (from timeline)
Outcome 3.3** Lucy received the reminder and said she would attend. (Assume that Lucy leaves, later combine with IoT and data on actually leaving room)
Is the answer negative? (say or press "No")
1.2.1.5 SAR(v) says and displays benefits for attendance (from timeline)
Did Lucy say that she will attend?
Was there a response at all?
1.1.1.5 SAR(v) asks for repetition
Outcome 3.4 Lucy received the reminder but is not responding.
1.2.2 SAR(v) solicits interest in activity options
1.2.2.1 SAR(v) offers engaging in group activity in the room (timeline)
Was there definitely presence of response? X% confidence
Is the answer affirmative?
Outcome 4.1 Lucy will not join the group activity. She received the reminder but wants to stay in her room and play the group program by herself.
Continue with individual engagement #1. SAR(v) starts scheduled group activity program in the room.
Was there definitely absence of response? X % confidence
Is the answer negative?
1.2.2.2 SAR(v) offers different activity in room. (timeline)
No, unclear if there Was a response
Is this the X time we checked?
1.1.1.7 SAR(v) goes to sleep with cute animation.
1.1.1.5 SAR(v) asks for repetition.
Was there definitely presence of response? X% confidence
Is the answer affirmative?
1.1.1.6 SAR(v) acknowledges answer
Outcome 4.2 Lucy will not join the group activity. She received the reminder but wants to stay in her room and play another program.
Continue with individual engagement #2. SAR(v) starts different activity program in the room
Was there definitely absence of response? X % confidence
Is the answer negative?
1.1.1.6 SAR(v) acknowledges answer
Outcome 4.3 Lucy will not join the group activity, and she does not want to engage in another individual activity.
No, unclear if there Was a response
Is this the X time we checked?
1.1.1.7 SAR(v) goes to sleep with cute animation.
1.1.1.5 SAR(v) asks for repetition.
1.3 SAR(v) notifies Activity Director of participation outcome
Outcome 1.1 Lucy is in the room.
Outcome 1.2 Lucy is not in the room and did not receive the activity reminder.
Outcome 1.3 Someone is in the room, but it is unclear who.
Save outcome. Do nothing.
Do nothing else.
Outcome 3.1 Lucy left the room while the reminder was playing. She did not indicate if she was attending.
Outcome 3.2 Lucy left the room after the reminder finished playing. She did not indicate if she was attending.
Outcome 3.3** Lucy received the reminder and said she would attend. (Assume that Lucy leaves, later combine with IoT and data on actually leaving room)
Outcome 3.4 Lucy received the reminder but is not responding.
Save outcome
Clinical Connect Activity Roster – flag Lucy as "maybe"
AD views Activity Roster for potential attendees
AD asks assistant to check with those who have responded no or maybe
Clinical Connect Activity Roster – flag Lucy as "Yes"
Q: Does AD want someone to go after "yes" response?
Clinical Connect Activity Roster – flag Lucy as "no response"
AD asks assistant to check with those who have responded no or maybe
Outcome 4.1 Lucy will not join the group activity. She received the reminder but wants to stay in her room and play the group program by herself.
Outcome 4.2 Lucy will not join the group activity. She received the reminder but wants to stay in her room and play another program.
Outcome 4.3 Lucy will not join the group activity, and she does not want to engage in another individual activity.
Clinical Connect Activity Roster – flag Lucy as "in-room attendance"
AD views log of programs engaged with alternativity in-room
AD views log of programs engaged with alternative activity
3. In-Room Engagement for Connectedness
3.1 SAR(v) assesses connectedness
3.2 Provide insights to AD+FAM
3.3 Suggest action items
Scenario 1: Lucy joined the group program and is returning to her room
Scenario 2: Lucy completed the group program in her room, on her own
Scenario 3: Lucy did not join the group program or any other activity.
1.1.1 SAR(v) determines if Lucy is in the room.
Is Lucy there?
SAR(v) pulls data about Lucy's activity and attendance to group program X
3.1.2 SAR(v) elicits conversation to measure Connectedness
Did Lucy attend group program in person?
3.1.2.1 SAR(v) plays introduction 1
3.1.2.3 SAR(v) play introduction 2
Is the answer affirmative?
3.1.2.4 SAR(v) plays snooze timeline
3.1.2.5.a SAR(v) speaks Connectedness introduction
3.1.2.5.b SAR(v) presents question and provides answer options.
3.1.2.6 SAR(v) captures emotion from voice
3.1.2.7 SAR(v) captures answer
Was there definitely presence of response? X% confidence
Is the answer affirmative?
1.1.1.6 SAR(v) acknowledges answer
3.1.2.8 Save confirmed answer. Go to next Question
Was there definitely absence of response? X % confidence
Is the answer negative?
1.1.1.6 SAR(v) acknowledges answer
Does user ask to repeat question?
No, unclear if there Was a response
Is this the X time we checked?
3.1.2.9 SAR(v) says Thank you.
1.1.1.7 SAR(v) goes to sleep with cute animation.
1.1.1.5 SAR(v) asks for repetition.
3.1.2.9 SAR(v) says thank you.
3.2.1 Analyze Data
3.2.2 Provide insights and recommended actions for AD
3.2.3 Provide insights and recommended actions for FAM
SAR(v) analyzes data, compares current assessment with previous data.
SURVEY/SME
- What does AD want to know?
- What does FAM want to know?
Plus Participation and Engagment (3-way interaction?)
Is connectedness stable?
No changes to programming and schedule
Inform FAM and AD that Lucy attended the group program and is doing well. [message? Dashboard?]
Is connectedness increasing?
Suggest similar programs in the future
Inform FAM and AD that Lucy attended the group program and is feeling more connected [message? Dashboard?
Is connectedness decrease
Suggested changes to programming
Inform FAM and AD that Icy is feeling less connected
Offer suggestions for televisit
No - this means we have no data
Schedule assessment of connectedness [who?]
Update profile and report on Clinical Connect. Discuss what insights to derive from attendance



Task analysis cont.

Focus Group Guidelines

The purpose of this study is to define and fine-tune the SAR system, conversation, and application flow during the development stage, test design hypotheses, and verify design assumptions. Although feedback from family members will be solicited, the study focuses on residents and the organization.

Research Questions:

- *What are the desired parameters that the SAR system should have?*
- *What social behaviors do user expect?*
- *What tasks would be acceptable that the SAR system tabletSARv do?*
- *How should the SAR system's perception, competence, and awareness be presented to the PWD and their partners in care?*
- *What is most valuable to users and stakeholders, and why?*
- *Will users accept the SAR system in their environment?*
- *What are facilitators and barriers?*
- *If the answer depends, then what does it depend on (user, task, environment)?*

Participants:

- *Family caregivers with in-person intervention experience (N=10)*

Materials:

- *Correct number of chairs**
- *Projector/screen/speakers*
- *Audio Recorders*
- *Extra Batteries*
- *Notepad**
- *Pens/highlighters*
- *White board markers**
- *Laminated, printed screenshots**
- *Markers**
- *Video conferencing link*
- *Large Post-It notes**
- *Name tags**
- *Consent Forms, printed and digital versions*
- *Questionnaires for participants with extra copies*
- *Bottles of water and light snacks**
- *Photo release*

**items for in-person only*

Informed Consent:

Obtain informed consent from participant

<Start recording>

INTRO TO STUDY AND APP

Introduction (5 min)

Welcome to this group discussion. My name is _____, and I work at _____. Assisting me is _____, who will be taking notes throughout our discussion. Please take a moment to silence your cell phones, so there are no interruptions during our talk. Thank you!

In addition to the notes my assistant will be taking, this group session will be audio recorded to ensure we do not miss any important thoughts or comments. Only members of our research team will have access to the recordings. If you do not feel comfortable being recorded, please say so, and you are free to leave. All information gathered from this discussion will be transcribed without any identifying information, and then all tapes will be destroyed. We also ask that each of you respect your fellow participants, and keep all conversations shared in this group session confidential.

Before we begin, I have a few points to make.

- First, to be consistent between participants, I will read directly from this script. I apologize if questions sound formal or repetitive. It's okay if your answers seem repetitive.
- To get through this entire script, I will closely watch the clock. There are times I may have to tell the group that we need to move on to the next topic.
- We would like to encourage you to take part in the discussion, however, please do not feel obligated to answer all questions.
- There are no right or wrong answers and everyone is welcome to speak. It is okay to say, "I don't know" or "I do not have an opinion."
- It is ok to get up during the session if you need to but there will also be an opportunity to take a few 5-minute breaks throughout the session.
- If at any time you feel like you would no longer like to participate, please say so, and of course, you are free to leave.
- As a reminder, all your answers are confidential.

Opening Questions (keep VERY brief) (5 min)

This research is part of a grant, funded by the National Institutes of Health. Our goal is to better understand what family caregivers think about using socially assistive robots (SAR) and SARv in assisted living facilities to help persons with dementia. Your information will help us to conduct research on this topic and, ultimately, to develop assistive robots that are helpful and easy to use.

To begin, we would like to go around the circle and allow everyone to introduce themselves and tell us, in one sentence. I'll start; again, I'm _____.

Play SARv Combo Intro Videos (15 min)

Now we can begin the interview. There is not rush for any part of this study. It is ok to get up during the session if you need to but there will also be an opportunity to take a few 5-minute breaks throughout the session. Any questions before we begin? Okay, let's get started!

First, let's define what we mean by the term "robot," since everyone seem to think of something different when we say this term. In this study, we will be talking about a very specific type of robot, called Socially Assistive Robots. Socially assistive robots provide assistance to human users, but this assistance is through social interaction. In other words, this robot's goal is to create close and effective social interaction while assisting in certain caregiving tasks. Since there are many different kinds of robots available, with varying capabilities, we have a serious of videos that will provide you with an idea of what the robot in our scenario is capable of doing.

- *Play introduction video* of SAR and SARv

Note:
Standard response to introduction video, "I missed something?" or "Can you show that again?":
For our discussions today it is not important that you saw every detail or understand everything about the robot. We want to focus on what you would want it to do.

Standard response to "can it do this or that?":
For our discussions today we are not going to focus too much on what it currently can or cannot do. We want to focus on what you would want it to do.

We would like to use a robot like this, named _____, to assist persons with dementia. _____ is a robot designed to interact socially with memory care residents in an assisted living facility.

One of _____ most unique features is that he can tailor his interactions to the resident based on information he is given about them. This information is stored in an electronic "resident profile."

Each electronic resident profile includes information about the resident's life events, memories, interests, challenges, and preferences.

Show participant screenshot

Using this electronic resident profile, as well as general information about the Assisted Living Facility's schedule (such as calendar of events), _____ can customize _____ interactions with each resident.

Scenarios Interview

Okay, now that I have told you a little bit about how _____ works, I would like to show you videos/demos so you get an even clearer idea of what the robot could do.

Throughout this interview, I am going to show you four scenarios that we currently think _____ might be helpful for. We would like your thoughts on what other things you think _____ might be able to help with or do.

When thinking about these demos, please draw from your own personal experience of dealing with dementia.

"SARv Trivia Invitation" Scenario

Our second video/demo will show how _____ can notify resident when a group trivia session is scheduled.

Play video demo
_____ is able to access group activity calendars and inform the resident to participate in group activities.

Interview Questions:

1. What are your first impressions of using _____ to provide residents with group activity reminders? *Prompt:* What do you like, what do you dislike?
2. What do you think would be the benefits of using _____ to provide activity reminders?
3. What are the concerns you have about using a robot like _____ to provide activity reminders?
4. What other types of interactions (besides activity reminder) might be helpful for _____ to provide?
5. How useful do you think _____ would be for providing residents with activity reminders such as group trivia?

Not at all useful	*Slightly useful*	*Somewhat useful*	*Moderately useful*	*Extremely useful*
1	2	3	4	5

"SAR Led Trivia" Scenario

Our third video/demo will show how _____ can play trivia with a single resident in a community room.

Play video demo

Interview Questions:

1. What are your first impressions of using _____ to play trivia with a group of residents? *Prompt:* What do you like, what do you dislike?
2. What do you think would be the benefits of using _____ to play trivia with a group of residents?
3. What are the concerns you have about using a robot like _____ to play trivia with a group of residents?
4. What other types of interactions (besides trivia) might be helpful for _____ to provide?

5. How useful do you think _____ would be for play trivia with a group of residents?

Not at all useful 1	*Slightly useful* 2	*Somewhat useful* 3	*Moderately useful* 4	*Extremely useful* 5

"SARv Led Trivia in the Room" Scenario

Our forth video/demo will show how _____ can play trivia with an individual resident in their room.

Play video demo

Interview Questions:

1. What are your first impressions of using _____ to play trivia with an individual resident in their room? *Prompt:* What do you like, what do you dislike?
2. What do you think would be the benefits of using _____ to play trivia with an individual resident in their room?
3. What are the concerns you have about using a robot like _____ to play trivia with an individual resident in their room?
4. What other types of interactions (besides trivia) might be helpful for _____ to provide?
5. How useful do you think _____ would be for play trivia with an individual resident in their room?

Not at all useful 1	*Slightly useful* 2	*Somewhat useful* 3	*Moderately useful* 4	*Extremely useful* 5

"Hydration Reminder" Scenario

Our fifth video/demo will show how _____ can remind residents to stay hydrated and record residents' water intake.

Play video demo

Interview Questions:

1. What are your first impressions of using _____ to remind residents to stay hydrated and record residents' water intake? *Prompt:* What do you like, what do you dislike?
2. What do you think would be the benefits of using _____ to remind residents to stay hydrated and record residents' water intake?
3. What are the concerns you have about using a robot like _____ remind residents to stay hydrated and record residents' water intake?

4. What other types of interactions (besides hydration remider) might be helpful for _____ to provide?
5. How useful do you think _____ would be for remind residents to stay hydrated and record residents' water intake?

Not at all useful 1	*Slightly useful* 2	*Somewhat useful* 3	*Moderately useful* 4	*Extremely useful* 5

ENDING QUESTIONS

Closing questions (5 min)

Thank you all for your participation and feedback. To wrap up, I would like to ask a couple concluding questions to make sure we have gathered all the important pieces you have shared.

1.
2.
3.

That concludes our questions for today. Before you leave, we would like for you to fill out a few questionnaires, and we will provide payment for your time. Thank you so much.

FINAL QUESTIONNAIRES (5-10 MIN)

- System Usability Scale
- Technology Acceptance questionnaire

USER:	SCENARIO	GOALS AND EXPECTATION
A person with dementia who lives in an assistive facility	**Stretching:** chair yoga, gentle but safe movements, involves mostly arm movements, stretching neck, some minimum leg movement	Goals of Care 360 Platform (SAR(v) and SAR): participation, engagement, and connectedness

JOURNEY PHASE - Participation (private rm)	JOURNEY PHASE – Engagement (main rm)	JOURNEY PHASE – Connectedness (main/private rm)	Possible pain points
SAR(v) will prompt notification to Participate in a stretch session	Lucy walks to the community room SAR providing stretching instructions SAR leads stretching / chair yoga	Lucy connects with robot and other residents	Lucy may not feel like participating (needs encouragement) Lucy may not know how to participate (needs clear instructions, slower paced, one instruction at a time) Lucy is distracted (needs encouragement, needs engaging/fun) Lucy may not hear SAR/SAR(v) (needs volume controls) Lucy may not see robot (consider position robot/television set up)
OPPORTUNITIES Educate benefits of stretching Provide positive reinforcement Facilitate social connections (e.g., your friend Betty is attending) Recommend other activity (e.g., stretch in private room, or do some other activity Use past data to encourage PWD to stretching (e.g., remember how good it feels last time you stretched) Measure frequency SAR(v) encourages patient to participate (do they more willing to listen to SAR(v), over time.) (compliance)	**OPPORTUNITIES** Clap/noise assessment – robot determines next song/stretch by sound level (divide noise level by # of people participating)? Face recognition? Assess how many people in room? Provide social encouragement (you can do it!) Time they remain engaged – how often the participate each week (delta from week to week) (will number of people in room influence accuracy of facial recognition, etc.....)	**OPPORTUNITIES** SAR encourage to connect with one another (e.g., discussions, paired/dyad stretching) Body language / how often smiles Self-report Researchers can video interaction and qualitatively code interactions SAR(v) assesses self report (engagement, enjoyment, loneliness, etc) (when they return to their room)	

USER:	SCENARIO	GOALS AND EXPECTATION
A person with dementia who lives in an assistive facility	**Trivia:** Trivia game, led by SAR and Care360	Goals of Care 360 Platform (SAR(v) and SAR): participation, engagement, and connectedness

JOURNEY PHASE - Participation (private rm)	JOURNEY PHASE – Engagement (main rm)	JOURNEY PHASE – Connectedness (main/private rm)	Possible pain points
SAR(v) will prompt notification to participate in a trivia session	Lucy walks to the community room SAR providing instructions for trivia SAR leads trivia (maybe reading out loud the questions)	Lucy connects with robot and other residents	Lucy may not feel like participating (needs encouragement) Lucy may not know how to participate (needs clear instructions, slower paced, one instruction at a time) Lucy is distracted (needs encouragement, needs engaging/fun) Lucy may not hear SAR/SAR(v) (needs volume controls) Lucy may not see robot (consider position robot/television set up)
OPPORTUNITIES Educate benefits of trivia Provide positive reinforcement Facilitate social connections (e.g., your friend Betty is attending) Recommend other activity (e.g., trivia in private room, or do some other activity Use past data to encourage PWD to trivia (e.g., remember how much fun you had) Measure frequency SAR(v) encourages patient to participate (do they more willing to listen to SAR(v), over time.) (compliance)	**OPPORTUNITIES** Clap/noise assessment Face recognition? Assess how many people in room? Provide social encouragement (you can do it! This is fun!) Time they remain engaged – how often the participate each week (delta from week to week) (will number of people in room influence accuracy of facial recognition, etc.....)	**OPPORTUNITIES** SAR encourage to connect with one another (e.g., discussions, work on trivia as a team) Body language / how often smiles Self-report Researchers can video interaction and qualitatively code interactions SAR(v) assesses self report (engagement, enjoyment, loneliness, etc) (when they return to their room)	

USER:	SCENARIO	GOALS AND EXPECTATION
A person with dementia who lives in an assistive facility	**Music Listening/Appreciation:** Play music, led by SAR and Care360	Goals of Care 360 Platform (SAR(v) and SAR): participation, engagement, and connectedness

JOURNEY PHASE - Participation (private rm)	JOURNEY PHASE – Engagement (main rm)	JOURNEY PHASE – Connectedness (main/private rm)	Possible pain points
SAR(v) will prompt notification to participate in music appreciation (listening)	Lucy walks to the community room SAR plays music SAR provides education ("this is music from the 1920s...)	Lucy connects with robot and other residents Robot could lead group discussions ("with a neighbor, discuss the song you just heard)	Lucy may not feel like participating (needs encouragement) Lucy may not know how to participate (needs clear instructions, slower paced, one instruction at a time) Lucy is distracted (needs encouragement, needs engaging/fun) Lucy may not hear SAR/SAR(v) (needs volume controls) Lucy may not see robot (consider position robot/television set up)
OPPORTUNITIES Educate benefits of music Provide positive reinforcement Facilitate social connections (e.g., your friend Betty is attending) Recommend other activity (e.g., music in private room, or do some other activity Use past data to encourage PWD to participate (e.g., remember how much fun you had) Measure frequency SAR(v) encourages patient to participate (do they more willing to listen to SAR(v), over time.) (compliance)	**OPPORTUNITIES** Clap/noise assessment Face recognition? Assess how many people in room? Provide social encouragement (you can do it! This is fun!) Time they remain engaged – how often the participate each week (delta from week to week) (will number of people in room influence accuracy of facial recognition, etc.....) Older adults have music requests	**OPPORTUNITIES** SAR encourage to connect with one another (e.g., discussions) Body language / how often smiles Self-report Researchers can video interaction and qualitatively code interactions SAR(v) assesses self report (engagement, enjoyment, loneliness, etc) (when they return to their room)	

USER:	SCENARIO	GOALS AND EXPECTATION
A person with dementia who lives in an assistive facility	**Video or photos:** video/photos (group, not individual), led by SAR and Care360 **"Hey did you know"** - discussions on hobbies	Goals of Care 360 Platform (SAR(v) and SAR): participation, engagement, and connectedness

JOURNEY PHASE - Participation (private rm)	JOURNEY PHASE – Engagement (main rm)	JOURNEY PHASE – Connectedness (main/private rm)	Possible pain points
SAR(v) will prompt notification to participate in a photo/video session	Lucy walks to the community room SAR shows and discusses pictures or video SAR provides education about pictures of video (history/hobbies)	Lucy connects with robot and other residents Robot could lead group discussions ("with a neighbor, discuss the song you just saw)	Lucy may not feel like participating (needs encouragement) Lucy may not know how to participate (needs clear instructions, slower paced, one instruction at a time) Lucy is distracted (needs encouragement, needs engaging/fun) Lucy may not hear SAR/SAR(v) (needs volume controls) Lucy may not see robot (consider position robot/television set up)
OPPORTUNITIES Educate benefits of learning Provide positive reinforcement Facilitate social connections (e.g., your friend Betty is attending) Recommend other activity (e.g., family pictures in private room, or do some other activity Use past data to encourage PWD to participate (e.g., remember how much fun you had) Measure frequency SAR(v) encourages patient to participate (do they more willing to listen to SAR(v), over time.) (compliance)	**OPPORTUNITIES** Clap/noise assessment Face recognition? Assess how many people in room? Provide social encouragement (you can do it! This is fun!) Time they remain engaged – how often the participate each week (delta from week to week) (will number of people in room influence accuracy of facial recognition, etc.....) Older adults have video/picture requests	**OPPORTUNITIES** SAR encourage to connect with one another (e.g., discussions) Body language / how often smiles Self-report Researchers can video interaction and qualitatively code interactions SAR(v) assesses self report (engagement, enjoyment, loneliness, etc) (when they return to their room)	

Assistive robot in using scenarios journey map