



Development of ASSIST Checklist for Use of Smart Home Technology as Assistive Technology

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Speaker Disclosures/Session Disclosure

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Learning Objectives

1. Identify two potential benefits of using a formal assessment tool in the provision of mainstream smart home technologies as assistive technology for persons with physical disabilities.
2. Identify mainstream smart home technologies that can be used to support at least 5 different daily activities which persons with physical disabilities may have difficulty completing independently.
3. Identify at least two key factors to advocate for provision of mainstream smart home technologies as assistive technology in the service delivery process to increase access for persons with disabilities.

Outline

- Background
- Overview of the ASSIST Project
- Rationale for the ASSIST Functional Performance Index (AFPI)
- AFPI Structure and Design
- AFPI Content Validity
- AFPI Test-Retest Reliability (Ongoing)
- AFPI Review for Comments/Suggestions

Background

Mainstream Smart Home Technologies as AT



+ Pros

- Readily available
- Affordable
- Wide variety
- Customizable
- Smart

- Cons

- Accessibility, usability, and integration with existing AT not considered
- No standard protocol and universal compatibility between products
- Wide variety
- No service delivery

ASSIST Project

- **Autonomy, Safety, and Social Integration via Smart Technologies (ASSIST)**
- To develop and evaluate ASSIST - a comprehensive technology-based intervention in people with physical disabilities residing in the community who are at risk of institutionalization.

Smart speakers
Access to smartphones

- iOS switch control
- iOS voice control
- Android switch access
- Android voice access
- Head (Sesame Enable)
- Joystick
- ...

Telca (multiple devices)

Access



Home hubs
Smart devices

- Light bulbs and switches
- Thermostats
- Shades
- Doorbell, door locks, automatic doors
- Microbot
- ...

Automation routines

Home Automation



IADL

- Shopping
- Money management
- Scheduling (transportation, appointment, medication)
- Communication (email, text)

Community Integration

- Social networking
- Finding accessible facilities
- ...

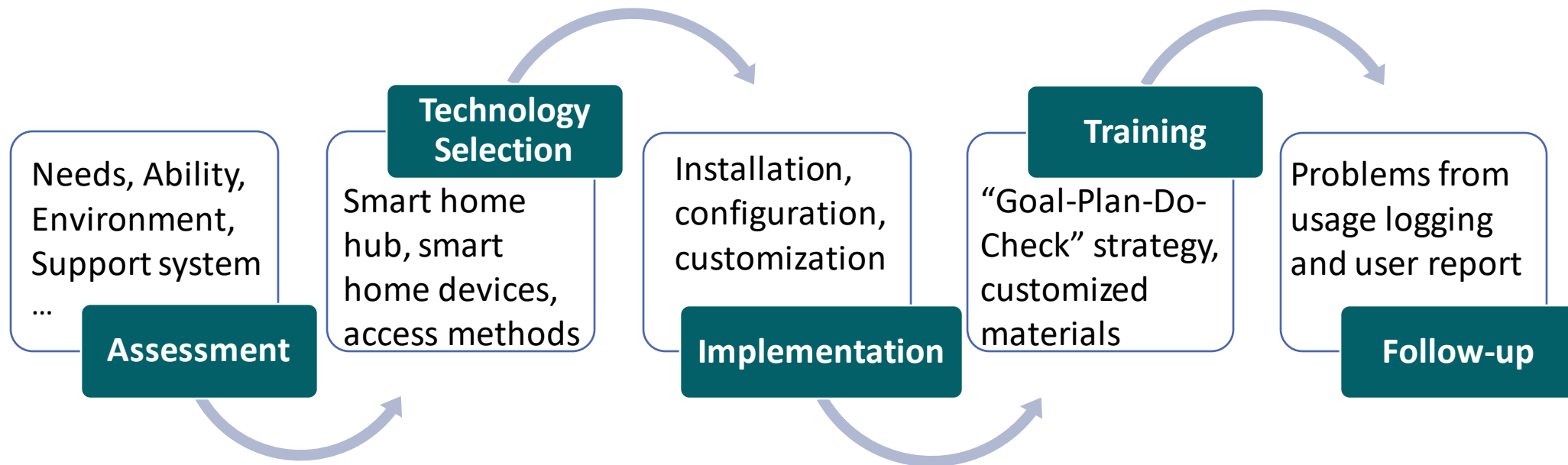
Apps



ASSIST Service Delivery Model

ASSIST Development Guided By:

Human Activity Assistive Technology Model¹ and Cognitive Orientation to Daily Occupational Performance (CO-OP)²



ASSIST Functional Performance Index

Purpose

1. Assessment: Identify occupational performance deficits that could be addressed using mainstream smart home technology as AT
2. Outcome Measure: Assess the impact of smart home technologies provided with AT services on the client's functional performance

Key Features

Client Centered

Diverse Item Bank for Persons with Severe Physical Disabilities

Consider Environmental & Personal Contextual Factors

Review of Existing Measures

- **Functional Performance Assessments**

- Assessment of Life Habits (LIFE-H)^{3,4}
- Spinal Cord Injury Function Index using AT (SCI-FI/AT)⁵

- **Home Modification / Accessibility Assessments⁶**

- In-Home Occupational Performance Evaluation (I-HOPE)⁷
- Client-Clinician Assessment Protocol (C-CAP)⁸
- Comprehensive Assessment and Solution Process for Aging Residents (CASPAR)⁹

- **Assistive Technology Assessments**

- Individually Prioritized Problem Assessment (IPPA)¹⁰
- Matching Person and Technology (MPT) Assessment¹¹

Questionnaire

Follow the next three steps (Check the appropriate boxes)	Step 1	Step 2		Step 3
	This life habit is:	Types of assistance used (Check 1 or more, as required)	Level of difficulty	Level of satisfaction
N.B.: Keep in mind that answers should reflect the person's usual way of carrying out life habits.	Accomplished (By the person or someone else)	Human assistance* (Check only 1)	Without or with a little difficulty	Very satisfied
	Not accomplished (Step to step 3)	No assistance	With some difficulty	Satisfied
	Not applicable (Skip to the next life habit)	Adaptation**	With a lot of difficulty	Disatisfied
		Assistive device**		Very dissatisfied
		Light		
		Significant		
		Complete		

Communication

Communicating with another person at home or within the community (making your needs known, expressing your ideas...)

LIFE-H

SCI-FI/AT

Form I and II SCI-FI/AT Short Forms

System ID _____ Patient Number _____ 1. Post-Injury Year _____

Interviewer, please ask either Tetraplegia OR Paraplegia Fine Motor questions.

FINE MOTOR - TETRAPLEGIA	Unable to do	With much difficulty	With some difficulty	With a little difficulty	Without any difficulty	Unkn
1. Are you able to make and receive calls on a cell phone?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Using both of my hands together, I can turn the pages of a book...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Are you able to pick up a small object (e.g. pack of gum)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Are you able to pick up a piece of paper?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Are you able to open mail?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Are you able to write out a wet washcloth?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I can turn the knob on a door...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Are you able to remove something from your back pocket?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

FINE MOTOR - PARAPLEGIA	Unable to do	With much difficulty	With some difficulty	With a little difficulty	Without any difficulty	Unkn
1. Are you able to change the bulb in a table lamp?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are you able to remove something from your back pocket?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Are you able to water a houseplant?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Choose the response that is most like you:						
4. How much difficulty do you currently have holding a screw and screwing it in tight with a manual screwdriver?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. How much difficulty do you currently have pounding a nail with a hammer to hang a picture?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. How much difficulty do you currently have removing wrappings from small objects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. How much difficulty do you currently have opening medications or vitamin containers (e.g. childproof containers, small bottles)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. How much difficulty do you currently have reaching behind your back to put a belt through a loop?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

First assessment

IPPA-Pre

Complete a separate form for every identified problem

Problem no.

Problem

How do you rate the importance of this problem? (circle the most appropriate number)

1 2 3 4 5 6 7
Of no Most
importance at all important

How do you rate the level of difficulty you have with this problem in everyday life? (circle the most appropriate number)

1 2 3 4 5 6 7
Not difficult Too difficult
at all to perform activity

Follow-up assessment

IPPA-Post

Complete a separate form for every identified problem.

Problem no.

Problem

How do you rate the level of difficulty you have with this problem in everyday life? (circle the most appropriate number)

1 2 3 4 5 6 7
Not difficult Too difficult
at all to perform activity

Has using the assistive device solved this problem as much as you expected it would? (circle the most appropriate number)

-2 -1 0 +1 +2
Much less Less than As More than Much more
than expected expected than expected than expected

Have there been important changes in your disability, not related to the use of assistive technology?

1 2
yes no

If yes, please describe what has changed



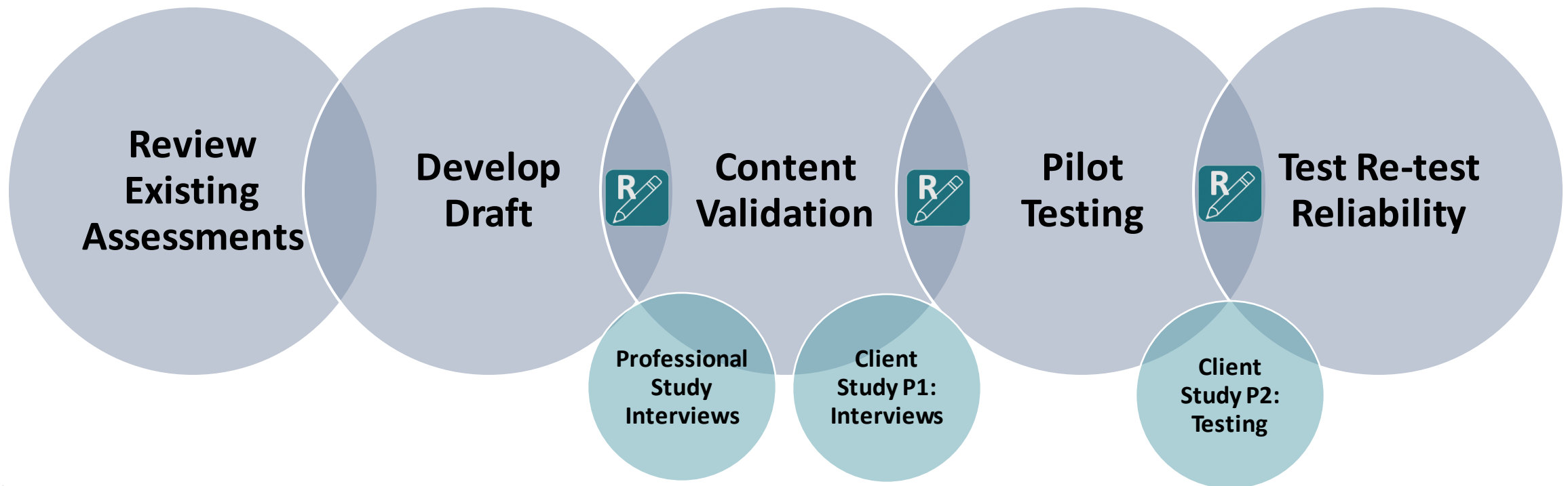
Gaps in Existing Assessments/Outcomes




Lack of assessment/ outcome tools specific to delivery of AT for environmental control (ECU or Smart Home Tech)

- Variability in measurements used to assess the impact of AT use on functional performance and participation¹²
- Variability specificity of task and activities in item bank
- Variability in how functional performance is measured
 - Measures used and sensitivity of rating scale
 - Self report vs. clinician rating

ASSIST FPI Development



 = Revise

Domain Definition

- Identify behaviors and traits being measured

Content Validation

- Assess items by clarity/importance and revise as needed to finalize version for pilot testing

One to One Administration

- Test with a few individuals to check for clarity of wording, directions, rating scales/ qualifiers, activities, and cultural relevance → revise as needed

Field Testing & Analyses

- Test with larger group, item analyses (factor analyses of subscales, item difficulty/variability), preliminary reliability testing

Revisions

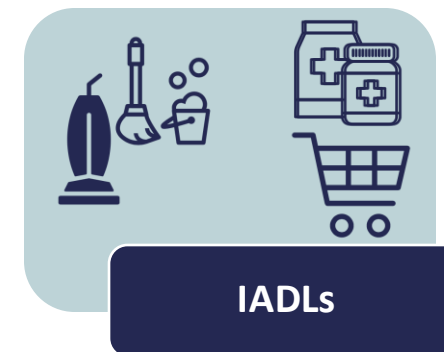
- Based on analysis of field testing

Measure Validation

- Complete psychometric testing, reliability and validity needed to be considered a valid assessment

AT Outcome Measure Development⁴

Final Item Bank includes 54 items within 5 Domains



Existing smart home technology that may support a client's performance has been identified for all activities in the item bank

Outcome Rating Scales and Qualifiers

- Client rating of their **activity performance**
 - Type and amount of assistance amount used to complete task
- Client rating of **difficulty** experienced completing the task
- Client rating of **satisfaction** with activity performance
- **Clinician rating of activity performance**
 - Based on level of assistance provided and safety concerns observed when client performs the task

Combination of self-report and clinician rating to support client centered assessment and intervention model

The screenshot shows a digital form titled "Open and Close the Main Exterior Door" with an icon of a door. It contains five sections, each with a question and a "Help" button:

- Section 1:** "How do you most commonly open and close the main exterior door of your home?" (with a red asterisk and "must provide value"). Response options: "Complete the task with assistance (human, animal, or technology)", "Complete the task on my own", "Do not complete the task due to lack of ability or resources", and "Not applicable (the task is not part of my life)".
- Section 2:** "What assistance do you most commonly use to open and close the main exterior door of your home?" (with a red asterisk and "must provide value"). Response options: "Human assistance only", "Non-human assistance (animal or technology) only", and "Both human and non-human (animal or technology) assistance".
- Section 3:** "How much human assistance do you most commonly receive to open and close the main exterior door of your home?" (with a red asterisk and "must provide value"). Response options: "Complete human assistance", "Significant human assistance", and "Some human assistance".
- Section 4:** "How much difficulty do most commonly have opening and closing the main exterior door of your home?" (with a red asterisk and "must provide value"). Response options: "A lot of difficulty", "Some difficulty", "A little difficulty", and "No difficulty".
- Section 5:** "Which answer best describes your current level of satisfaction with how you most commonly open and close the main exterior door of your home?" (with a red asterisk and "must provide value"). Response options: "Very Satisfied", "Satisfied", "Dissatisfied", and "Very Dissatisfied".

ASSIST Functional Performance Index

Administration

- **Method:** Computer based via REDCap
- **Time:** 45-60 minutes
- **Process:** →

1. Clinician reviews instructions with client

2. Client answers questions to rate their activity performance, difficulty, and satisfaction for each item

3. Review results together, then client selects the top 10 items they want to focus on improving their participation and ranks them highest to lowest priority

4. Clinician assess client's performance for the selected activities and rates their performance based on amount of assistance provided and safety risks observed

5. Clinician reviews and discusses the results with the client and uses shared decision making to select 3-5 items to focus on addressing

ASSIST Functional Performance Index Draft 1

		Task
Home Access	Entering the apartment/house	Unlock the door from outside
		Open the door from outside
		Close the door from inside
		Lock the door from inside
	Leaving the apartment/house	Unlock the door from inside
		Open the door from inside
		Close the door from outside
		Lock the door from outside
	Garage Access	Open and Close garage door
	Handling visitors (e.g., attendants)	Answer doorbell
Let visitors into the building Let visitors into the apartment/house		
Inside door access	Open/close sliding door	
	Open/close hinged door	
	Open/close pocket door	
Environment Control	Lighting Control	Turn on/off ceiling lights
		Turn on/off lamps
		Turn on/off outdoor lights
	Temperature Control	Turn on/off and adjust thermostat
		Turn on/off and adjust ceiling fan
		Turn on/off and adjust floor/tower fan
Window Control	Lock/unlock windows	
	Open/close windows	
	Adjust window treatment	
Rest and Sleep	Sit up/ lay down in bed	
	Reposition in bed	
	Use of tech and/or apps to support quality of sleep	

ADLS	Bathing	Turn on/off shower head
		Adjust/ determine appropriate water temperature
		Get shampoo/body wash out of container
ADLS	Grooming	Turn bathroom sink on/ off
		Adjust/ determine appropriate water temperature
		Get toothpaste or hand soap out of container
ADLS	Toileting	Wipe/perineal care
IADLS	Bathing	Call 911
		Call emergency contact
		Call for help when phone is not nearby (bathroom, bed)
		Monitor home security/ respond to security threats
		Respond to smoke alarm
	Home Management	Vacuum/ mop floors
		Cut grass/ maintain lawn
		Clear snow from sidewalks in winter months
		Complete or schedule home maintenance task
	Pet Care	Feed pet
Let pet go to the bathroom		
Play with pet		
Shopping	Check fridge, cabinets, closets etc. to determine needed food and household items	
	Prepare shopping list	
	Complete shopping	
Community Mobility	Access transportation	
	Identify accessible routes and community locations	
IADLS	Financial Management	Bill Pay
		Banking and Budgeting
IADLS	Health Management	Complete pressure relief as your doctor recommends
		Managing and taking medications
		Management of healthcare supplies (ordering, tracking)
		Scheduling and attending <u>doctors</u> appointments
Mobile Device/ Computer Use	Communication and Social Participation	Make a voice call
		Make a video call
		Send /read text messages
	Other Device Use	Send/read emails
		Post to/read social media networks
		Locate information on the internet
Mobile Device/ Computer Use	Other Device Use	Download and use apps on a mobile device to complete daily activities

Content Validation

Provider Study Interviews

- Activities providers currently use smart home tech to support client performance
- Review of ASSIT FPI
 - Relevance of task in item bank
 - Relevance of outcomes measures
 - Understandability of instructions and assessment tool form
 - Administration format
 - Any additional feedback

Client Study Interviews

- Activities clients currently have difficulty completing and/or receive assistance from caregiver to complete (paid or unpaid)
- Activities clients use smart home tech to support their performance

Provider Study

Qualitative study conducted to:



- Understand the service delivery methods used by professionals from different disciplines when using mainstream smart home technologies as AT
- Collect feedback on version 1 of the ASSIST Functional Performance Index (AFPI)



Demographics

 **15** Participants

Practice Settings

- 6 Home health or community-based services 
- 5 Inpatient rehabilitation
- 4 Outpatient rehabilitation
- 6 Independent business 
- 1 School

Professional Backgrounds

- 8 OT
- 2 SLP
- 1 PT
- 1 RE
- 7 ATP
- 2 Technology Specialist
- 5 Certified Aging-in-Place Specialist
- 2 State AT Program Directors
- 1 Independent Living Specialist



Provider Study Interviews

Support Need for Smart Home AT Outcome Measure

Theme: Informal service delivery process – Lack of formal outcome and assessment measures

- Despite different roles and professions, professionals tend to start with a similar process which includes considerations of client goals and abilities.
- Only 2 out of 15 professionals used some custom surveys for outcome evaluation.

PT: “We don't really have any formal way of determining the effectiveness of it. It's more informal that I try and reach back out to the client two, three, four weeks after to see if it's working, see if they like it ... And honestly, I think that's one area that we could improve on.”

ATP: “I've created a kind of questionnaire that I just go through.”

Tech Specialist “... obviously the challenge is people that don't know what they don't know.”

OT: “We would have kind of a process that we would follow. We tried searching for an evaluation that sort of met the needs and we never really found one. My client need sets are so highly variable that I've not had a standardized assessment that I bring into it.”

OT: “This was something that we had a challenge taking on in at our organization and we were really trying to find ways to measure these outcomes. And you know, I think some of our outcomes were based on individual experiences and anecdotal in nature. So we implemented kind of data collection using the goal attainment scaling to try to capture outcomes of groups of individuals.”

Provider Study Interviews

Current Smart Home Tech Use in Services

Smart Home Devices Providers Most Commonly Used with Clients



Smart Doorbell



Smart Speaker



Smart Tech for TV Control



Smart Door Lock



Smart Plug



Smart Thermostat



Smart Light Bulb



Smart Switch

Additional Smart Home Devices Used with Clients



Smart Vacuum



Smart Microwave



Smart Blinds



Smart Tech for Medication Management



Smart Faucets



Smart Shower

Provider Study Interviews

ASSIST Functional Performance Index Feedback

Comprehensive tool to support the assessment process and measure outcomes

"I really liked the different types of parameters and how you're collecting data. I like that it's a self report on performance. I like that you have the satisfaction piece in there too...that satisfaction piece is such an important part... And then I like that there's the clinical observation aspect as well, because that may not always be consistent with how an individual reports their own function. "

"I like that you look at what they perceive as their ability to do it for task mastery, and then contrast that and compare that with the clinician's observation."

" The fact that you account for you know, hey, they're doing this, but they're unsafe while they're doing it. That is taking into account one component of it that some measures don't even consider. So, I just wanted to say that I appreciate that a lot. "

"It makes sense to me like how it's, how it's laid out and just reading through, like, I can think of like clients, like examples of where many of these different things were applicable in different situations. So, I think it makes sense that it's all captured here. "

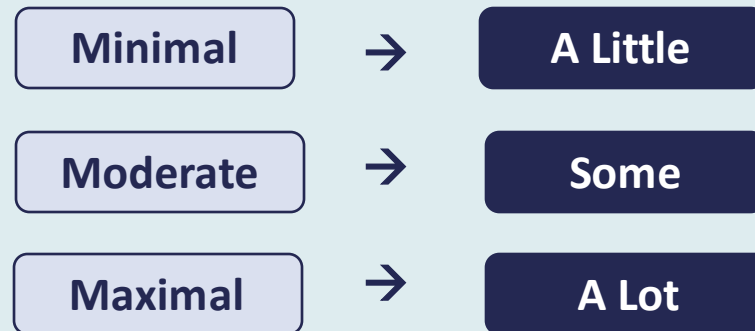
"It's a pretty comprehensive tool... I think it looks like a great tool to organize your approach when selecting smart technology for an individual."

"I like it though it kind of covers everything that you could see us covering in a home assessment, and just kind of going through the list of things. Yeah I like that it's really comprehensive. It balances the patient's their perception, their satisfaction and actual clinical assessment of performance, so it does balance that well."

Suggested Changes

- Use laymen's terms for the qualifiers on difficulty and assistance rating scales
- Consolidate home access tasks in item bank
- Consider an adaptive administration format and/or computerized
- Add supervision or verbal cues option to clinician rating scale

Rating Scale Changes



Item Bank Consolidation

Environmental Control	Home Entry	Opening and Closing the Main Exterior Door Locking and Unlocking the Main Exterior Door
	Garage Entry	Opening and Closing the Garage Door
	Handling Visitors	Answering the Doorbell Letting Visitors In Your Home
	Lighting Control	Turning On, Off, and/or Dimming the Lights in ALL Areas of Your Home (interior/exterior) That You Want/Need to Control the Lighting
	Tempature Control	Controlling the Thermostat to Turn Heating/Cooling On, Off, or Adjust the Temperature Turning On, Off, and/or Adjusting the Speed of Ceiling or Plug-in Fan(s)
	Window Control	Opening and Closing the Windows Openaing, Closing, and/or Adjusting Window Treatments (Curtians or Blinds)

Client Study

Mixed-Methods study conducted to:

- Assess content validity of ASSIST Functional Performance Index item bank to ensure the task are
- Assess Test re-test reliability

3-6 sessions conducted via Zoom



Demographics


 **15** Participants

Ages: 24-76 years old

Gender: 10 female, 5 males

Severe Physical Disabilities

- Cerebral Palsy
- Multiple Sclerosis
- Spinal Cord Injury
- Arthrogryposis
- Multiplex Congenita
- Ehlers Danlos
- Congenital Myasthenic syndrome
- Fibromyalgia

- Live in residential setting
 - Receive home & community-based services waiver
 - 33% Live alone and 66% Live with caregiver, parent, spouse or roommate
- 

Client Study

Session 1: Interview

- **Semi structured interviews** to understand participants
 - Current activity performance and assistance needed or currently utilized
 - Caregiver supports and their impact on activity performance
 - Experience using mainstream smart technologies (smartphones, tablets, computers, and smart home devices)
- **Thematic Analysis**
 - 3 researchers complete TA separately followed by group discussion and review to identify major & sub-themes

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- 33% Live alone and 66% Live with caregiver, parent, spouse or roommate



Client Study Interviews

Major Themes

1. Activities that require human assistance
2. Challenges that may be addressed with smart technologies
3. Wide range of current tech usage
4. Influence of comfort & experience
5. Instructions and technical support
6. Concern for cost – impacting access
7. Implications of home environment
8. Influence of Caregivers
9. Value independence
10. Safety & Security

THEME 7: *"The smart plugs are tricky, but interesting and something that could be plugged and unplugged easily, you know? And that might be something that I could use. Like I said, it can't be a permanent thing because I do rent."*

THEME 8: *"And that happens a lot. Last time somebody wasn't around, um... I had a caregiver who was in the hospital last week. And a period of time when a backup couldn't get here for a couple of hours. And I had to go to the bathroom. Well eventually nature took its course. Which meant that when somebody did show up, they had to put an extra 45 minutes into their shift to clean up the consequence...And that doesn't – it's not good for my health. It's not good for my dignity. Um... certainly not good for my stress level."*

THEME 2: *"The water temperature. Oh, cause sometimes like whenever the aid steps out the room sometimes the water ends up getting hotter. And then we go back to get it colder. Like, trying to find the middle. I wish I could find the middle. I had caregivers that just put the cold water, only turned it a little bit and it would be too cold, or it gets burnt. Cold and hot. That's it. For me that's hard."*

THEME 6: *"I was just gonna say that currently lights are the only thing I have set up. Partially cause of cost. Cause even the lightbulbs alone, per bulb, are pretty expensive compared to the average lightbulb."*

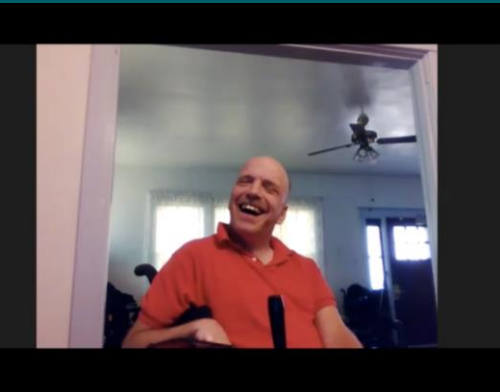
THEME 4: *"Well, I loved it (ring doorbell) because I was able to see who was at the door. And I was able to see who was at coming up the ramp."*

THEME 2: *"That is an issue. I can't reach the thermostat for the heat. Oh, I can't reach the light switch...And the control for my heat I can't reach that well...Yeah. And in fact, in January I was trying to reach my heat and I was standing up and on my bed and I fell and I broke my collarbone."*

THEME 10: *"Yeah, and I hear a lot about you have to be careful what you say because it records what you say....I don't know if that's true. Like she has asked me to learn my name, and I said... I decline it all the time because I'm afraid... you know. I don't know, maybe I'm overcautious or what but...Right. And I'm just very wary of those kinds of things so I decline it all the time."*

THEME 5: *"...you know, when it comes to my phone I would rather just go to the store and ask a person, how should I handle this, you know? ...I'm too broad when I ask for information. And I have to spend maybe minutes or, or hours, not hours but a long time searching for one little thing ... I'm not always aware of how to narrow my search down."*

Over 90% of the tasks included our item bank were mentioned as tasks clients currently require assistance to complete, have difficulty completing, or currently use smart home technology to complete the task



Common Tasks Users Received Assistance with or Have Difficulty Completing



Environmental Control Tasks



ADLs



Vacuuming & Mopping

Most Common Tasks Clients Currently Use Smart Home Tech to Complete



Smart Speaker



Smart Tech for TV Control



Smart Light Bulb

Task Removed from Item Bank

- Open/Close Interior Doors
- Cut grass/ Maintain Lawn
- Clear snow from sidewalks in winter months

Task Added to the Item Bank

- Charging phone, tablet and/or computer

Client Study

Pilot Testing

- 4 participants
- Completed ASSIST Functional Performance Index twice, 3-7 days apart
- Completed via REDCap
- Clinician provided instructions on completing the assessment and was present throughout to assist as needed


Step 1

 **Entering and Exiting Your Home**

Do you have difficulty or require assistance entering and exiting your home from the main exterior door?
(Check all that apply)
* must provide value

- Yes, with locking and unlocking the main exterior door
- Yes, with opening and closing the main exterior door
- Yes, with home entry tasks that are not listed above
- No, I do not have difficulty or require assistance with home entry

Step 2

 **Locking and Unlocking the Main Exterior Door**

Which answer best describes **your current ability to lock and unlock the main exterior door of your home?**
* must provide value

- I require complete physical assistance
- I require a lot of physical assistance
- I require a little physical assistance
- I do not require physical assistance but have a lot of difficulty completing this task on my own
- I do not require physical assistance but have a little difficulty completing this task on my own

Do you currently use any assistive technology/device(s) to **lock and unlock the main exterior door of your home?**
* must provide value

- Yes
- No

Which answer best describes **your current level of satisfaction with your ability to lock and unlock the main exterior door of your home?**
* must provide value

- Very Satisfied
- Satisfied
- Dissatisfied
- Very Dissatisfied

Client Study Pilot Testing

Changes Based on Results and Client Feedback

Problems

- Demonstrated difficulty rating level of assistance or difficulty associated with task performance
 - Suggested adding percentages to help quantify a little and a lot of on rating scales
- Confusion regarding what context the participant should be rating their performance
- Confusion if assistive technology use included mainstream technology
- Item Bank Clarity Concerns
 - Self-management
 - Lighting Control
 - Completing Shopping Trip
 - Sleep

Revisions

- Restructure question format and sequence
- Improve clarity of instructions
 - Revised rating scale explanations and added qualifiers
 - Performance is to be rated based on how the client most commonly performs the task
 - Use of Technology is complete a task includes AT and mainstream technology devices
- Expandable help buttons added under question prompts to view explanations of rating scales as needed
- Item Bank Revisions
 - Defined self management and provided examples tasks
 - Added to cue to consider all areas of home
 - Split shopping into 2 task: online & shopping in a store
 - Sleep Task removed

Updated ASSIST Functional Performance Index



How do you most commonly open and close the main exterior door of your home?

* must provide value



Complete the task with assistance (human, animal, or technology)

Complete the task on my own

Do not complete the task due to lack of ability or resources

Not applicable (the task is not part of my life)

reset

What assistance do you most commonly use to open and close the main exterior door of your home?

* must provide value

Human assistance only

Non-human assistance (animal or technology) only

Both human and non-human (animal or technology) assistance

reset

How much human assistance do you most commonly receive to open and close the main exterior door of your home?

* must provide value



Complete human assistance

Significant human assistance

Some human assistance

reset

How much difficulty do most commonly have opening and closing the main exterior door of your home?

* must provide value



A lot of difficulty

Some difficulty

A little difficulty

No difficulty

reset

Which answer best describes your current level of satisfaction with how you most commonly open and close the main exterior door of your home?

* must provide value



Very Satisfied

Satisfied

Dissatisfied

Very Dissatisfied

reset

ASSIST Functional
Performance Index

Scoring

Assistance Type Selected	Level of Difficulty Selected	SCORE
Not Applicable		0
Not Completed		0
Complete human assistance with or without non-human assistance	+ a lot of difficulty	1
	+ some difficulty	2
	+ a little difficulty	3
	+ no difficulty	4
Significant human assistance with or without non-human assistance	+ a lot of difficulty	5
	+ some difficulty	6
	+ a little difficulty	7
	+ no difficulty	8
Some human assistance with or without non-human assistance	+ a lot of difficulty	9
	+ some difficulty	10
	+ a little difficulty	11
Non-human assistance only	+ no difficulty	12
	+ a lot of difficulty	13
	+ some difficulty	14
OR No assistance	+ a little difficulty	15
	+ no difficulty	16

Use of the ASSIST Functional Performance Index to support Assessment Process for using Smart Home Tech as AT



Understand Clients Baseline Functional Performance



Identify tasks which existing smart home technologies may improve functional performance



Supplemental ASSIST Environmental Characteristics
Evaluation Checklist (in development)

Next Research Steps

In Progress →

Test re-test reliability testing

- Intra-class correlation (ICC) coefficient of at least 0.75.

Planned →

ASSIST Pilot study

- Use of ASSIST Functional Performance Index to support assessment and measure intervention outcomes

Future Directions →

Further psychometric testing with larger sample size



Questions?

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