

Assessing Mobile Device Proficiency for a Smart Home Intervention in Individuals with Complex Disabilities

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OBJECTIVE

To assess mobile device skills as part of the initial assessment of a smart home technology intervention for individuals with complex disabilities.

PARTICIPANTS

A convenience sample of 13 individuals who use a power wheelchair and have difficulty independently controlling or accessing their environment.



DESIGN

This case series study, part of a larger research project, involved participants completing a short version of the Mobile Device Proficiency Questionnaire (MDPQ-16) and participating in an observational assessment of mobile device skills. The assessment included five tasks and observational guidelines on device positioning, manual and voice access, and cognitive aspects.

Task	Input Method	Task Completion Time	Observation/Errors/Comments:
Make a Phone Call Instructions: Verbally prompt user to call evaluator phone number. Answer the user to call and ask them to speak with evaluator name.	<input type="checkbox"/> Manual <input checked="" type="checkbox"/> Voice	01:46	Completed independently. Required repetition of "wake up" command several times to activate item number overlay, but was able to complete.
Send a Text Message Instructions: Verbally prompt user to send a text message to evaluator phone number reading "Hello."	<input type="checkbox"/> Manual <input checked="" type="checkbox"/> Voice	01:14	Completed independently. Made new text using voice control but did not copy phone number from recent call. Able to self correct errors.
Find Local Temperature Using Weather App Instructions: Reply to user's text with: "Using weather app on your phone can you tell me what local temperature currently is?"	<input type="checkbox"/> Manual <input checked="" type="checkbox"/> Voice	00:34	Completed independently with voice control - no noted errors.
Use the Internet to find the best Pittsburgh Pizza Place & Distractor Phone Call Instructions: Reply to the user's text with: "Using your phone, look up the best pizza place in Pittsburgh according to WPH news". During task, evaluator calls user unexpectedly & goes to work.	<input type="checkbox"/> Manual <input checked="" type="checkbox"/> Voice	02:39	Completed independently. Used a variety of voice control and commands to complete task.
Download, Move, & Delete an App, Move App Icon on Home Screen, Delete App Instructions: Reply to user's text with: "1) Download the Streaks app. 2) Move the Streaks app icon to a different page. 3) Delete the app icon"	<input type="checkbox"/> Manual <input checked="" type="checkbox"/> Voice	02:53	Requires OT assistance to double tap side button when downloading app. Reports installing assistive touch in the past but had not been successful. At first, stated she did not know how to move icon to a different page but was able to independently problem-solve to complete task.

OUTCOME MEASURES

MDPQ-16 and identified mobile device skill performance

Mobile Device Assessment



FUNCTIONAL LIMITATIONS

- Tapping (single and double tap)
- Touch Gestures (swipe, scroll, pinch)
- Text Entry

KNOWLEDGE LIMITATIONS

- Unfamiliar with Device Operating System
- Limited Knowledge of Accessibility Features
- Limited Digital Literacy

EXTERNAL FACTORS

- Improper Device Mounting or Positioning
- Prosthetic or Orthoses Inhibiting Device Interaction



Enable Accessibility Features



Adapt or Modify Task Setup

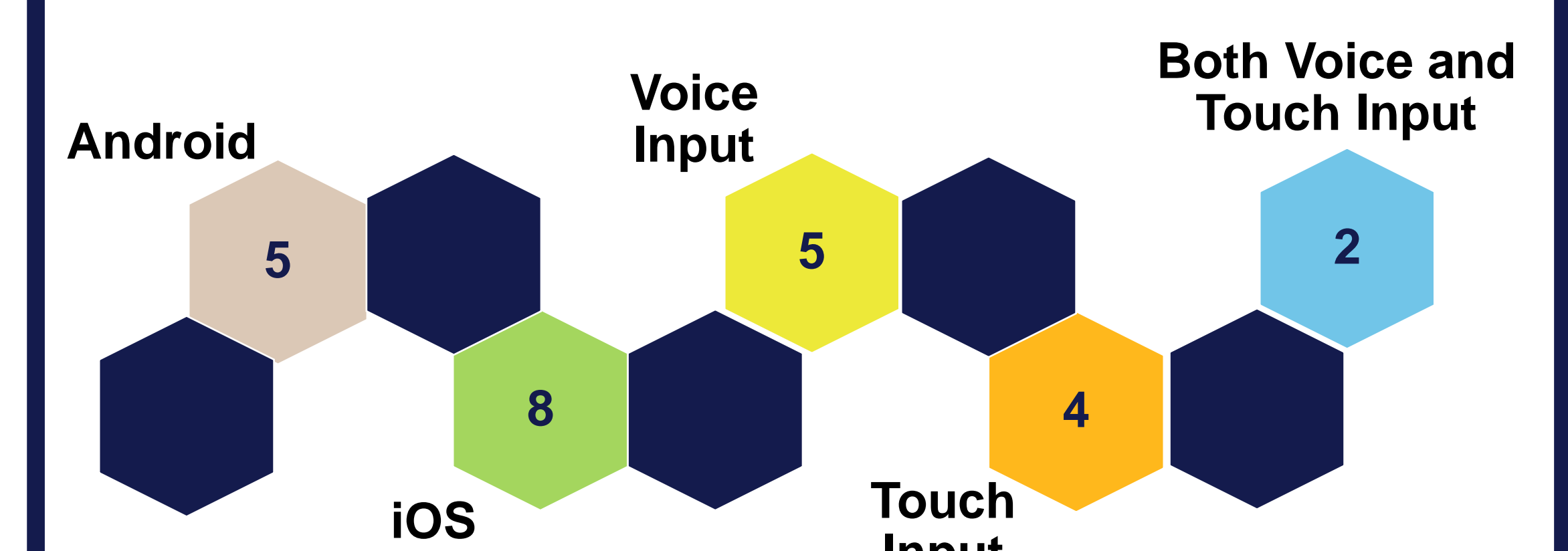


Education to Improve Knowledge Gaps

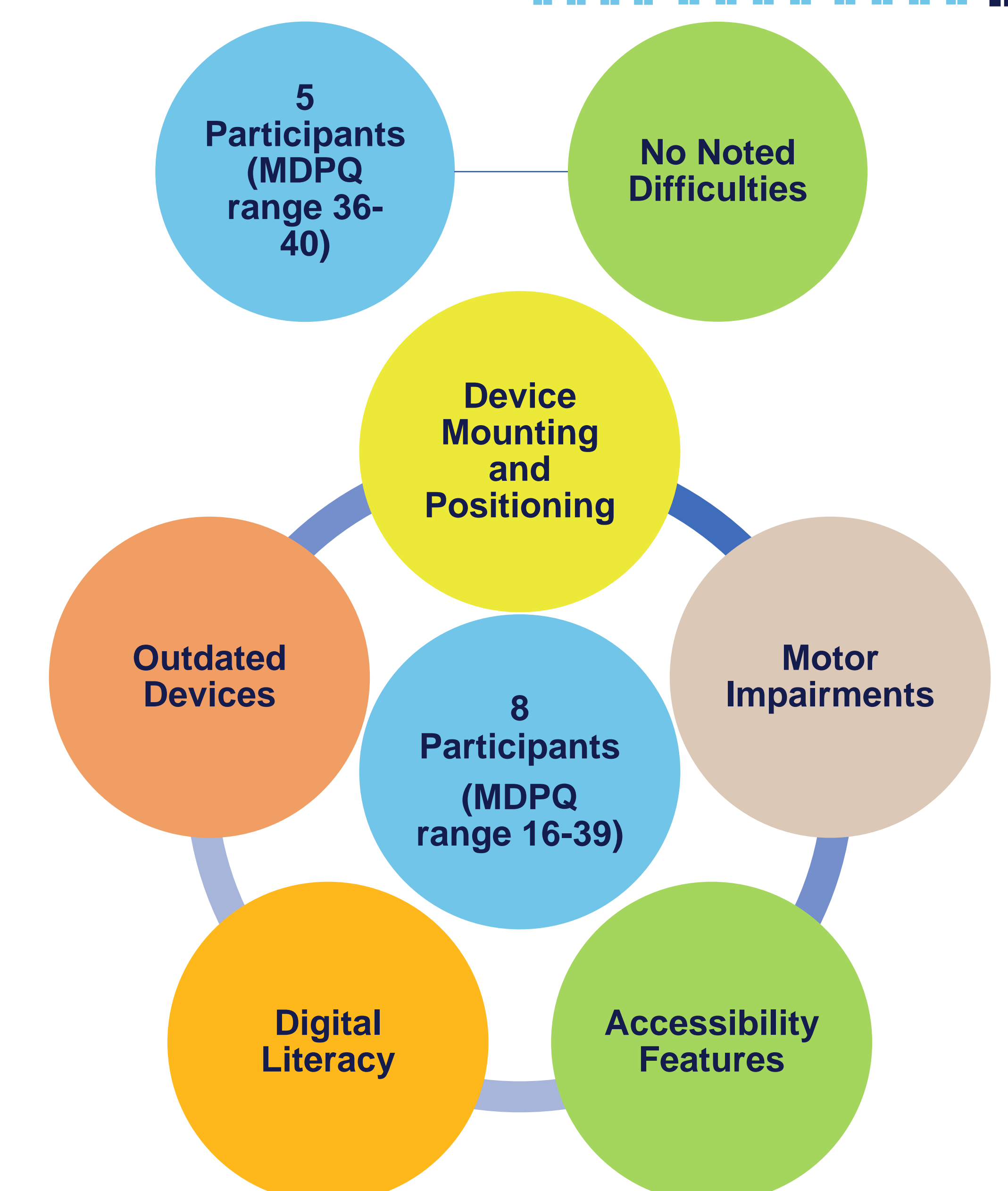
RESULTS



Eleven out of 13 participants completed the MDPQ-16, with an average score of 31±9 (range: 16-40, max 40 for top proficiency).



Twelve completed the mobile device assessment



CONCLUSIONS

- Relying solely on the MDPQ-16 yielded inadequate insight into participants' mobile device skills.
- The observation-based mobile device assessment revealed specific areas of knowledge or functional deficits, enabling clinicians to tailor necessary skill training and adaptation recommendations.
- The MDPQ-16 is an inadequate assessment to use alone when understanding participants' mobile device skills but should be used in conjunction with an observation-based mobile device assessment to ensure foundational mobile device proficiency is achieved prior to smart technology training.