Usability of a Mobile App for Customized Exercise Prescription in Individuals with Spinal Cord Injury: *A Mixed-Methods Approach*

Sara Nataletti, Ph.D[1,2]; Anushua Banerjee, BS[1]; Alex W.K. Wong, Ph.D, DPhil[2,3]; Arun Jayaraman, PT, Ph.D[1,2,4]

1 Max Nader Lab for Rehabilitation Technologies & Outcomes Research, Shirley Ryan AbilityLab, Chicago, USA
2 Dept. of Physical Medicine & Rehabilitation, Northwestern University Feinberg School of Medicine, Chicago, USA
3 Center for Rehabilitation Outcomes Research, Shirley Ryan AbilityLab, Chicago, USA
4 Dept. of Physical Therapy and Human Movement Science, Northwestern University Feinberg School of Medicine, Chicago, USA

Introduction

- Individuals with **Spinal Cord Injury** (SCI) **face barriers to physical activity**, increasing risk of secondary health conditions.[1]
- **Smartphone-based exercise programs** can reduce these barriers by improving accessibility and clinician support[2].
- **Aim:** Evaluate the user experience of a customized exercise app[3] to optimize its acceptability, appropriateness, and feasibility

Methods

Participants

Demographics (N=12)		N (%)
Sex	Male	6 (50)
	Female	6 (50)
Race	White	8 (67)
	Asian	1 (8)
	Multiracial (including Hispanic/Black/African American)	2 (17)
	Unknown	1 (8)
Employment Status	Full/Part Time Employed	3 (25)
	Unemployed	2 (17)
	Disability Leave	3 (25)
	Retired	4 (33)
SCI Injury Level	C1-C8	3 (25)
	T1-T12	6 (50)
	L1-L5	3 (25)
Primary Mobility Mode	Walking (with or without AD.)	6 (50)
	Manual Wheelchair	3 (25)
	Power Wheelchair	1 (8)
	Equally walk and use wheelchair	2 (17)
		Median (Range)
Age (years)		51 (30-77)

Data Collection

- Participants completed a **two-week trial** using the customized app to exercise.
- Post-trial surveys: AIM, IAM, FIM, and uMARS.
- Qualitative feedback was collected through two focus groups and one interview.

Data Analysis

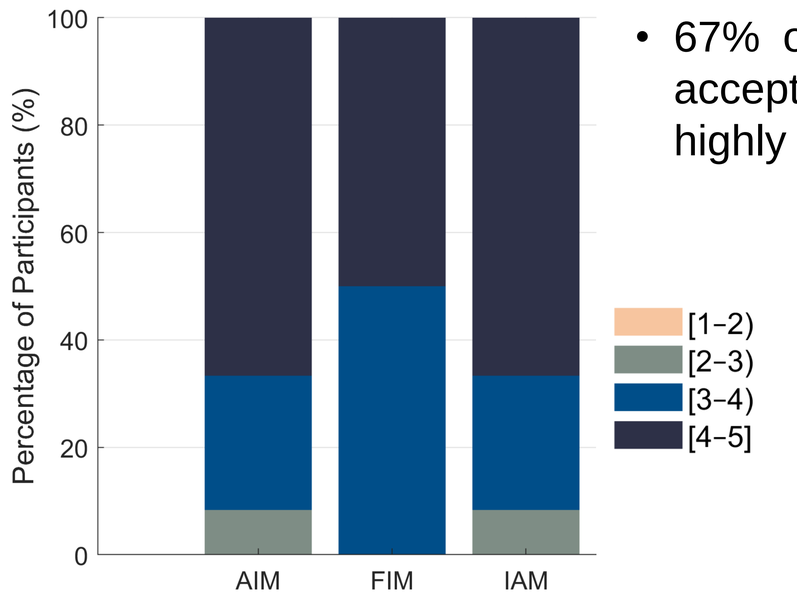
- **Quantitative:** Descriptive statistics summarized survey scores (1–5 scale).
- **Qualitative**: Thematic analysis using NVivo; codes developed from uMARS/CFIR.

Conclusion

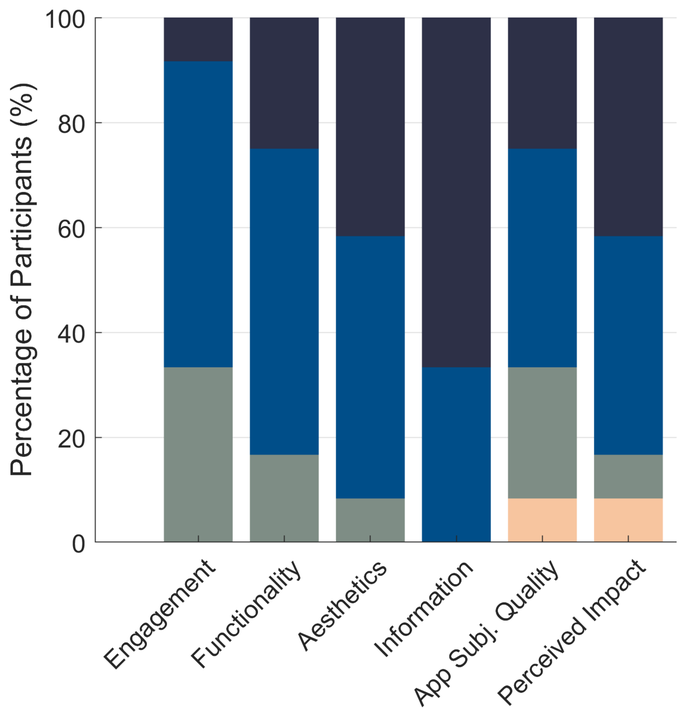
- The app was rated **highly for usability**, **credibility**, and **clear content.**
- The app supported engagement through **flexible scheduling** and **progress tracking**;
- Users recommended **adding reminders** and **improving the app's navigation**

Results

Quantitative Findings



- 67% of participants rated the app highly acceptable and appropriate; 50% rated it highly feasible.



- Information received the highest ratings, ~67% of scores rated as 'Good-Excellent' followed by Aesthetic
- 25% of the participants rated the overall quality of the app as 'Good-Excellent

Qualitative Findings

- **Engagement** (37%):Users liked flexible scheduling and tracking, but wanted more reminders

*"I kind of need that **reminder** because my day gets away from me every day."*

- **Functionality** (14%)**:** Clear instructions helped; issues with navigation and device features.

*"I didn't understand the exercise lingo at first, but the **step-by-step guide** was helpful"*

- **Information** (17%) **& Aesthetics** (12%): Content and Layout was clear and accessible.

*"Seeing how I **improved week to week** was very reassuring."*

- **Perceived Impact** (28.4% cited): Boosted motivation and accountability, especially with clinical oversight

*"It makes me **more motivated**. Give me a chance to just start my whole day moving rather than laying around"*

Main Theme	Sub-Theme	References N (%)
Engagement		1 (0.4)
	Interactivity	39 (13.4)
	Customization	36 (12.3)
	Entertainment	20 (6.9)
	Target Group	8 (2.7)
	Interest	3 (1.0)
Functionality		1 (0.4)
	Performance	27 (9.3)
	Easy of Use	9 (3.1)
	Navigation	3 (1.0)
Aesthetics	Visual Appeal	6 (2.0)
	Layout	3 (1.0)
	Graphics	3 (1.0)
Information	Visual Information	28 (9.6)
	Quality of Information	22 (7.5)
Perceived Impact	Attitudes	38 (13.0)
	Intention to Change	19 (6.5)
	Help Seeking	11 (3.8)
	Awareness	6 (2.0)
	Behavior Change	5 (1.7)
	Knowledge	4 (1.4)

References

1. van den Berg-Emons RJ et al. https://doi.org/10.1016/j.apmr.2008.04.024
2. Cowan RE et al. https://doi.org/10.1038/sc.2012.53
3. Nataletti S et al. https://doi.org/10.1016/j.dhjo.2024.101667

Contact Information

snataletti@sralab.org