

A Usability Study of a Physical Activity Mobile Health Application Prototype Informed by the Multi-Process Action Control Framework: Part 2

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BACKGROUND: Mobile health applications (mHealth apps) have greater impact on short term physical activity (PA) behaviour compared to long term.¹ The multi-process action control (M-PAC) framework promotes longer term PA behaviour by combining reflective and regulatory constructs with reflexive constructs.²

Objective:

To gather user feedback of the second M-PAC app prototype.

Methods: Following the focus group study (Part 1), we made several modifications to the M-PAC app (see below). We subsequently recruited adults who weren't meeting 150-min/week of moderate- to vigorous-intensity PA (MVPA). They used the M-PAC app for two weeks and then participated in semi-structured interviews and filled out the Mobile App Usability Questionnaire (MAUQ). The interviews were recorded, transcribed and analysed with content analysis, informed by Nielsen's usability heuristics;³ MAUQ scores were analysed with descriptive statistics.

M-PAC App Modifications

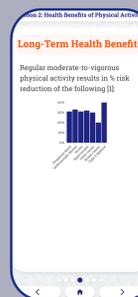


Added a forgot password feature

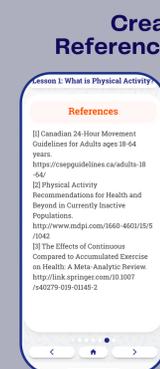
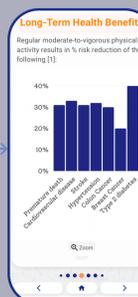
Added cards and reduced text



M-PAC App Modifications



Optimized image loading and size



Created a References Module



Created a link placeholder image

Results

14 participants took part in Phase 2. They were primarily women (85%) with a mean age 41.38 (SD = 12.92) years and reported on average 66.07 (SD = 57.92) minutes of MVPA per week. Most had at least a college or university degree (69%), all self-reported having above average abilities to use the functions of their smartphone, and most had previously downloaded a mobile app to help increase their PA (62%) (e.g., Fitbit, Optimity, Carrot, Habitshare, MyFitnessPal, C25K, ParticipACTION app, 7M workout). The most common brand of smartphone was Apple iPhone (n = 5) and Samsung (n = 4).

Layout and Information. Thirteen participants liked the layout and information (e.g., modules took a reasonable amount of time to complete). Six participants thought the content layout was inefficient (e.g., too many cards for a lesson), the content and questions were too basic, and some content lacked references.

Appropriateness of Language. Seven participants acknowledged that the language was clear and easy to understand. They also reported challenges, including the lessons lacking descriptive titles. Some participants did not understand the meaning of the app's name (M-PAC App) and thought it did not represent the app's intent.

Backing out or Undoing an Action. One participant mentioned returning to the app's home screen was inconvenient.

Consistency in Language and Features. Six participants recognized something they disliked, including inconsistent link descriptions, notification sounds appeared too frequently, and colour labelling for the priority goals not following convention. Two participants liked the conventional colour schemes (e.g., active links were blue) and ability to connect to conventional devices like Fitbits.

Errors and Mistakes. Some participants reported problems connecting to Google Fit, and several broken links. Several users encountered general visual glitches, such as slow image loading and data not fully displaying. Other errors include the app being unresponsive, typos, problems with modifying weight and blood pressure, step counts being inconsistent with other trackers, and text not fitting on the screen.

Forgetting Acronyms. Three users did not understand what the app's name (i.e., Pathverse, M-PAC app) represents.

Efficiency of Interface and Navigation. Nine participants thought the app was well-structured and easy to navigate. Challenges included difficulty finding the tracker feature, inability to return to home screen after finishing a lesson, goals requiring daily re-entering, active minutes couldn't be entered for previous dates, and the progress of unfinished lessons wasn't saved.

Visual Design. Four users liked the visual design, stating it had visually pleasing graphics, engaging diagrams, and the colour scheme helped user navigation (e.g., blue active links turned purple when clicked). Seven participants did not enjoy visual design for reasons such as the colour scheme was not aesthetic and lacked novelty, the graphic content did not include diverse body types, and the icon of the app were not attractive or meaningful to the users.

Ease in Diagnosing and Resolving Errors. Two users reported that no information was provided for the potential reason for errors (i.e., no error messages/codes).

Help and Documentation. One participant mentioned that the app did not provide information or warnings about upcoming updates.

Additional Suggestions on Features. Participants desired access to new lessons overtime, to take notes and make personal input during lessons, add comments to daily active minutes, and receive incentives and user's PA progress.

Overall Feedback. Eleven participants had an overall positive overall and one overall negative experience using the app.

MAUQ mean scores: Total = 5.06 (SD = 1.20), Usefulness = 4.17 (SD = 1.31), Ease of Use and Interface 5.36 (SD = 1.27), Satisfaction = 5.52 (SD = 1.42)

Conclusion: The second M-PAC app prototype was deemed usable and acceptable. The findings will inform the development of the minimum viable product which will undergo subsequent feasibility testing.

References

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- Rhodes RE, La H, Quinlan A, Grant SJ. Enacting physical activity intention: Multi-process action control. In: *Motivation and Self-Regulation in Sport and Exercise*. Taylor & Francis; 2021:8-20.
- Nielsen J. *Usability Engineering*. Morgan Kaufmann; 1994.