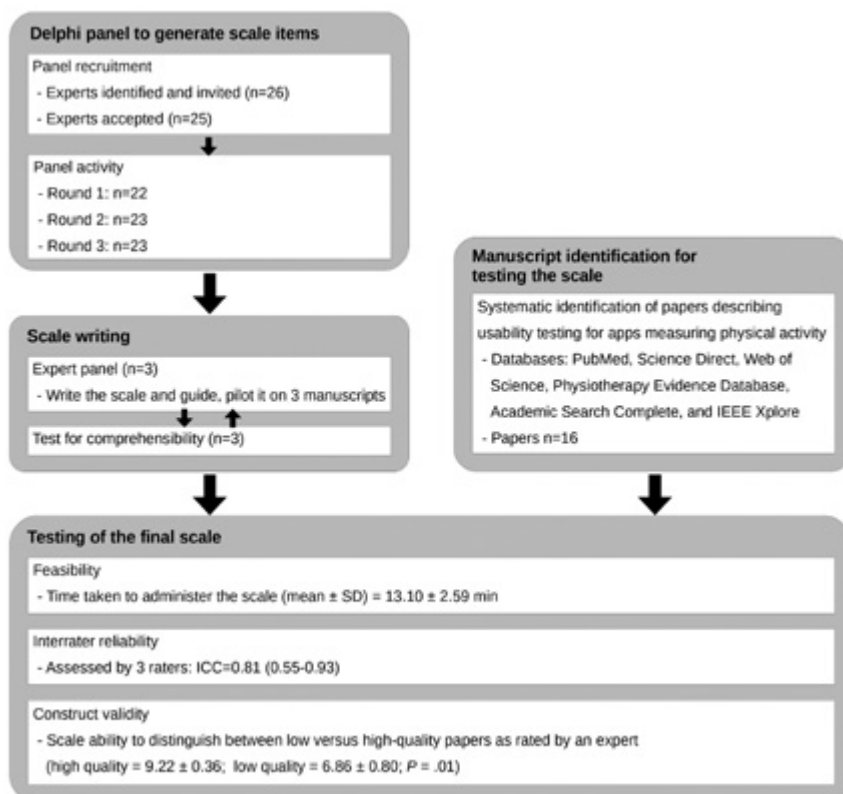# A scale to assess the methodological quality of studies assessing usability of eHealth products and services: a Delphi study followed by validity and reliability testing

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The usability of eHealth and mHealth applications is of paramount importance as it impacts the quality of care. Methodological quality assessment is common practice in the field of health for different designs and types of studies and this assessment is guided by scales or guidelines for methodological quality assessment. However, there is no validated instrument to assess the methodological quality of studies on the usability of eHealth products or services. Therefore, we aimed to develop a scale to assess the methodological quality of studies assessing usability of eHealth solutions. This scale was piloted on studies assessing the usability of mobile apps measuring aspects of physical activity and to perform a preliminary analysis of its feasibility, reliability, and construct validity on studies assessing the usability of mobile apps measuring aspects of physical activity.

The first step in the process of development of this scale was a 3-rounds Delphi panel used to generate a pool of items considered important when assessing the quality of studies on usability. These items were used to write the scale and the guide to assist its use. The scale was then used to assess the quality of studies on the usability of mobile applications for physical activity, and assessed in terms of feasibility, inter-rater reliability, and construct validity.

Twenty-five experts participated in the Delphi panel and a 15-item scale was developed. This scale was shown to be feasible (Mean±SD time of application=13.10±2.59 minutes), reliable (ICC=0.81; 95% CI=0.55-0.93) and able to discriminate between low- and high-quality studies (high quality: Mean±SD = 9.22±0.36; low quality: Mean±SD = 6.86±0.80; P=.01). In synthesis, the scale developed can be used both to assess the methodological quality of usability studies as well as to inform its planning.

Delphi panel to generate scale items

Panel recruitment
- Experts identified and invited (n=26)
- Experts accepted (n=25)

Panel activity
- Round 1: n=22
- Round 2: n=23
- Round 3: n=23

Scale writing
Expert panel (n=3)
- Write the scale and guide, pilot it on 3 manuscripts

Test for comprehensibility (n=3)

Manuscript identification for testing the scale
Systematic identification of papers describing usability testing for apps measuring physical activity
- Databases: PubMed, Science Direct, Web of Science, Physiotherapy Evidence Database, Academic Search Complete, and IEEE Xplore
- Papers n=16

Testing of the final scale

Feasibility
- Time taken to administer the scale (mean ± SD) = 13.10 ± 2.59 min

Interrater reliability
- Assessed by 3 raters: ICC=0.81 (0.55-0.93)

Construct validity
- Scale ability to distinguish between low versus high-quality papers as rated by an expert (high quality = 9.22 ± 0.36; low quality = 6.86 ± 0.80; P = .01)