

LEADING CHANGE TOOLKIT™

TO HELP CHANGE AGENTS AND
CHANGE TEAMS MAKE LASTING
IMPROVEMENTS IN HEALTH CARE

Perceived Characteristics of Innovating (PCI)

Pragmatic Testing and Content Validity Data

Summary of Pragmatic properties

The PCI had an overall **objective pragmatic score** of **16** out of **20**. According to this objective pragmatic assessment, the PCI's strengths include being available in the public domain, having acceptable language, not requiring training for administration, and having less than 50 items. The PCI lost scores because there are limited instructions for interpreting scores.

Based on two RNAO stakeholders, the PCI was rated **3** out of **4** for **likelihood to use**. The PCI has an overall **stakeholder facing assessments** score of **19** out of **24**.

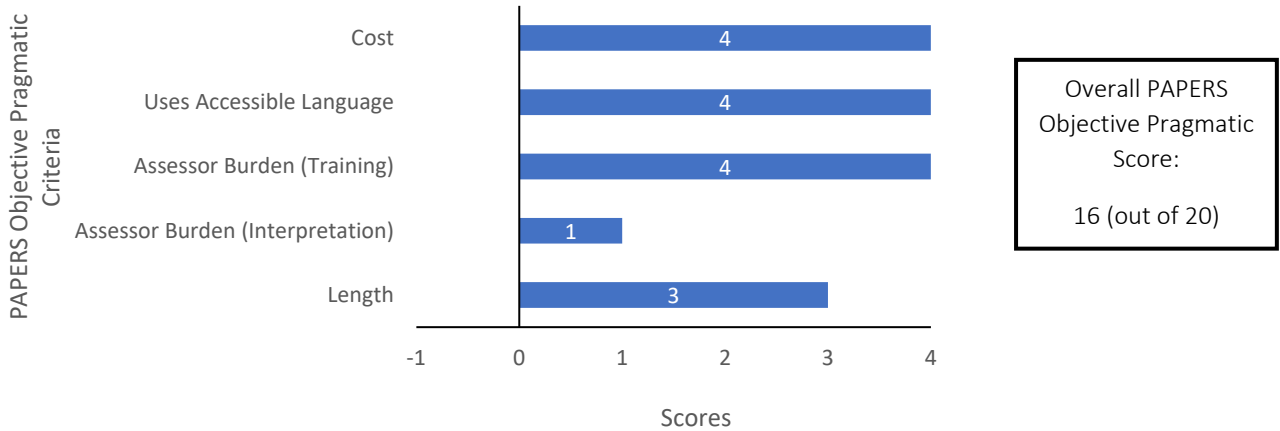
Tool Pragmatic Properties

Tools were assessed for pragmatic properties with the PAPERS tool (Stanick et al. 2019); a validated tool for measuring a tool's acceptability, ease of use, appropriateness, and usefulness. Objective pragmatic properties were assessed by two research assistants independently and with consensus for each tool. Stakeholder facing pragmatic properties were assessed independently by at least two stakeholders (e.g., champions) for each tool. A mean score was calculated from participants' responses for each of the stakeholder facing PAPERS survey questions.

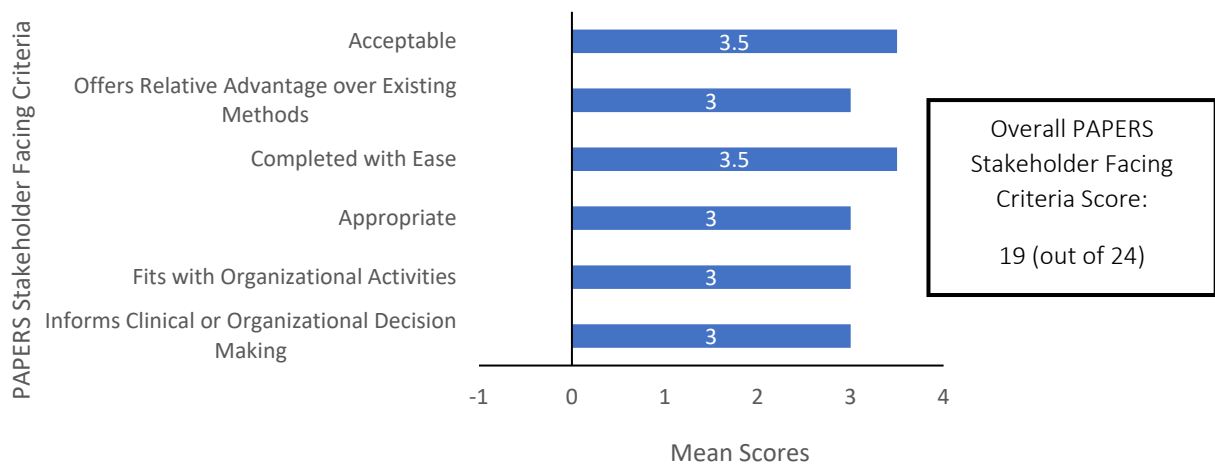
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PAPERS Objective Pragmatic Criteria - Scoring details below



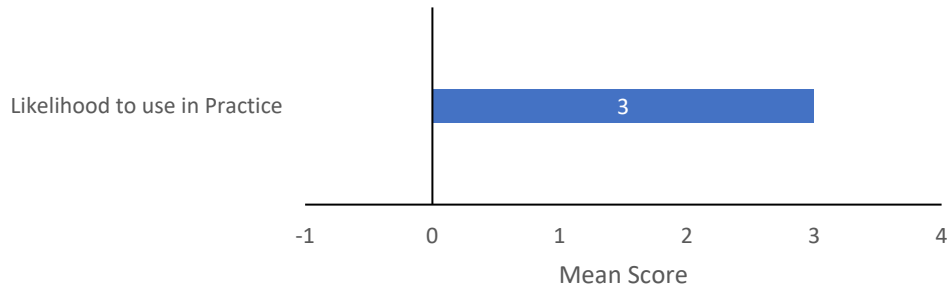
PAPERS Stakeholder Facing Criteria (n =2 stakeholders) - Scoring details below



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Likelihood to Use the Tool in Practice (n = 2 stakeholders) - Scoring details below



Content Validity

Summary of Content Validity

According to our assessment using an adapted version of a checklist by Mokkink et al. (2010), the PCI has evidence of content validity.

Content validity refers to the degree to which the content of the tool is an adequate reflection of the construct being measured. In the case of the Perceived Characteristics of Innovating (PCI), this refers to the extent that individuals can use the PCI to assess barriers/facilitators to knowledge use, monitor knowledge use, and the sustainability of knowledge use by assessing the following eight domains:

- Voluntariness
- Relative Advantage
- Compatibility
- Image
- Ease of Use
- Result Demonstrability
- Visibility
- Trialability

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General Requirements	Yes	No
1. Was there an assessment of whether all items refer aspects of the construct to be measured?	X	
2. Was there an assessment of whether all items are relevant for the study population? (e.g., age, gender, disease characteristics, country, setting)	X	
3. Was there an assessment of whether all items are relevant for the purpose of the measurement instrument? (discriminative, evaluative, and/or predictive)	X	
4. Was there an assessment of whether all items together comprehensively reflect the construct to be measured?	X	

Adapted from: Mokkink, L.B., Terwee, C.B., Knol, D.L., Stratford, P.W., Alonso, J., Patrick, D.L., Bouter, L.M. and De Vet, H.C. (2010). The COSMIN checklist for evaluating the methodological quality of studies on measurement properties: a clarification of its content. *BMC medical research methodology*, 10(1), 1-8.

According to our assessment using an adapted version of a checklist by Mokkink et al. (2010), the PCI tool has evidence of content validity.

Content Validity Requirement 1:

- The tool developers performed a literature review to extract existing instruments that measure attributes of innovations as outlined by Rogers (1983). The tool developers pooled the items from these existing instruments, mapped them according to the characteristics of innovations (Rogers, 1983) and deleted items that were too specific to a particular context or innovation, redundant, or ambiguous (Moore & Benbasat, 1991).
- The tool developers subjected the pooled items into four rounds of sorting activities detailed below (Moore & Benbasat, 1991):
 - The first round of sorting involved four judges (secretary, administrative clerk, student, and professor); these judges were asked to independently sort items that they think measure the same concept and then to provide a label for that concept.
 - The second round of sorting involved the same four judges as the first round. The tool developers asked judges to sort the items according to the eight characteristics of innovations as defined by Rogers (1983).

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- The item pool was refined according to the findings of the first and second round of sorting before they were subjected to the third and fourth sorting rounds. Items were deleted if they cannot be mapped to a particular characteristic of innovations.
- The third round of sorting was performed with five faculty staff from another university and followed the procedures as the first round of sorting.
- The fourth round was performed with the same five participants as the third round and followed the same procedures as the second round of sorting.

Content Validity Requirement 2:

- The tool developers refined the PCI tool using the feedback garnered from the sorting activities. The first set of sorting had a sample of four individuals with varying expertise (secretary, administrative clerk, student, and professor). The second set of sorting had a sample of five faculty staff recruited from a different university (Moore & Benbasat, 1991).
- The PCI tool was tested for reliability and ease of completion multiple times. Firstly, the PCI tool was tested with a convenient sample of 40 individuals from business faculties of two universities. Then the PCI tool was pilot tested at a head office of a utility company ($n = 75$). The PCI was also field tested in seven companies from a variety of industries (two utilities, two resource based, two government department, and a natural grain pool) with a cumulative sample of 540 participants. The participants of the field test included executive and middle management (21%), first-line supervisors (25%), nonmanagement professionals (24%), and technical and clerical staff (30%) (Moore & Benbasat, 1991).

Content Validity Requirement 3:

- The tool developers reported that the second and fourth rounds of sorting determined that the PCI items were discriminant in measuring the characteristics of innovations (Rogers, 1983). In the second round of the sorting activities, the participants had an average raw agreement score of 0.86 and an average Kappa of 0.83 (Moore & Benbasat, 1991). This indicated that, for the most part, the participants mapped the items to similar characteristic of the innovation (Rogers, 1983). During the fourth round of sorting, the participants had an

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average raw agreement score of 0.85 and an average Kappa of 0.82 (Moore & Benbasat, 1991).

Content Validity Requirement 4:

- The PCI tool was informed by existing instruments that measure the characteristics of innovations (Rogers, 1983). The tool developers formulated new items for characteristic of innovations that were not well examined in previous instruments (Moore & Benbasat, 1991).
- Further, the tool developers stated that the first and third rounds of sorting determined many possible groupings (potentially subscales) that can inductively arise from items pooled from existing instruments. The participants in the first round of sorting had an average raw agreement score of 0.83 and an average Kappa of 0.80. The participants of the third round of sorting had an average raw agreement score of 0.75 and an average Kappa of 0.71. These scores indicated that the participants from both rounds created similar groupings or grouped relatively the same items together (Moore & Benbasat, 1991).

Limitations:

- The tool developers did not provide adequate descriptions of the individuals that participated in the sorting activities. Hence, it is difficult to determine the validity of their assessments (Moore & Benbasat, 1991).

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References

- Mokkink, L.B., Terwee, C.B., Knol, D.L., Stratford, P.W., Alonso, J., Patrick, D.L., Bouter, L.M. and De Vet, H.C. (2010). The COSMIN checklist for evaluating the methodological quality of studies on measurement properties: a clarification of its content. *BMC medical research methodology*, 10(1), 1-8.
- Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information systems research*, 2(3), 192-222. <https://doi.org/10.1287/isre.2.3.192>.
- Rogers, E.M. (1983). *Diffusion of Innovations* (3rd ed.). The Free Press.
- Stanick, C. F., Halko, H. M., Nolen, E. A., Powell, B. J., Dorsey, C. N., Mettert, K. D., Weiner, B. J., Barwick, M., Wolfenden, L., Damschroder, L. J., & Lewis, C. C. (2019, Nov 20). Pragmatic measures for implementation research: development of the Psychometric and Pragmatic Evidence Rating Scale (PAPERS). *Translational Behavioral Medicine*. <https://doi.org/10.1093/tbm/ibz164>