Step-by-Step Guide for the Critical Appraisal and Selection of Data Collection Instruments

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Disclaimers

The Step-by-Step Guide for the Critical Appraisal and Selection of Data Collection Instruments, described in this presentation, was developed by the presenter, has been used by the presenter as a nursing education teaching strategy at the University of Northern Colorado and is part of an article submitted for publication.
This session will provide an overview of the Step-by-Step Guide for the Critical Appraisal and Selection of Data Collection Instruments.

The presenter will share how the Step-by-Step Guide can be used by nurse clinicians, educators and researchers in the critical appraisal and selection of data collection instruments.

Additionally, the presenter will share actual examples of the current use of the guide and lead a discussion about the use of guide (as time allows).
Objectives

- Explain the purpose of the Step-by-Step Guide and give an example of how you would use this guide in the critical appraisal and selection of a data collection instrument.

- Using the Step-by-Step Guide choose the best and most appropriate measurement method and best associated research instrument(s) to capture a phenomena of interest for healthcare research, clinical outcomes measurement, quality improvement, translation of evidence into practice and/or academic program evaluation.
This presentation is organized around the following key topics:

- Introduction
- The Step-by-Step Guide, What is it?
- Questions & Discussion
- References
It is essential that when conducting outcomes measurement, quality improvement, implementing evidence into practice and performing academic evaluation that the most appropriate, precise, valid, and trustworthy instrument(s) be used.

Today, there is a vast selection of existing data collection instruments/tools to choose from.

Existing instruments can be located through reports of their use either in the literature or through conference proceedings, or through internet searches and/or by word of mouth.

*Bottom Line Up Front*
Introduction BLUF*

- Once a potential instrument has been located, the instrument must be systematically appraised prior to use.

- If an appropriate instrument cannot be located and the decision is made to develop an instrument, some of the critical assessment questions contained in the Step-by-Step Guide can be used to ensure thoughtful measurement instrument development.
Introduction BLUF*

- The common quantitative measurement approaches used in healthcare and education research, include physiological measures, observations, interviews, questionnaires, and scales (Grove, Burns & Gray, 2013).

- Instruments are often found that measure some of the study variables, but not all, or the content may be related but different from what is needed for a study and some instruments found may have little or no documentation of their psychometric properties.

- Often beginning researchers come to the conclusion that no appropriate method of measurement exists and that they must develop a tool. At the time this solution may seem to be the most simple however this solution is not recommended unless all else fails.

- However, with the use of The Step–by–Step guide the beginning researcher can critically assess existing tools and make an informed decision about the selection or non–selection of data collection instruments.
Step-by-Step Guide

Step I: Articulate the Key Elements of the Proposed Study

Step II. Identify/Find an Existing Instrument

Step III. Describe the Instrument

Step IV. Assess the Instrument

Step V. Discuss the Over-All Impressions/Concerns

Step VI. Justify Your Decision to Select or Non-Select the Instrument
Step 1

Articulate the Key Elements of the Proposed Study

- Statement of the Phenomenon of Interest
- Study Purpose/Aims
- Research Question(s) and/or Hypotheses or PICO(T) Questions
- Research Design and Study Framework
- Study Setting
- Sample Characteristics
- Conceptual and Operational Definitions
- Measurement Plans (if you have in mind a measurement tool, for this study what would it look like?)
Identify an Existing Instrument

- Conduct database searches (e.g., Medline or CINAHL)
- Review journals devoted to measurement (e.g., Journal of Nursing Measurement)
- Identify publications in which relevant instruments are used
- Review one or more of the reference books that have published measurement tools (although dated e.g., McDowell, 2006).
- Review Dissertation Abstracts online
- Network with other researchers.
Step III

Describe the Instrument

- Instrument Category
- Background/History
- Instrument Availability & Access
- Architecture – how is the instrument constructed
- What is measured?
- Special – Physiology Measurement Instruments
- What population is associated with this instrument
- Accessibility of the instrument.
- Level of data collected.
Step IV

Critical Appraisal of the Instrument

Instrument Purpose – What research questions have been addressed with this instrument/tool; How has this instrument been used in research?

Conceptual Base
- Content – congruent with the stated purpose of the instrument?
- What concepts does the instrument measure and how?

Content
- Is the content current?

Instrument Use
- Instructions available for use of the instrument?
- What skills and/or special training are required of the researcher to use the instrument?
- Psychometric properties what is it and how was it determined?
  - Reliability
  - Validity
- Use in prior research – Major variables studied
Step IV (cont)

**Measurement & Analysis**

- Does the instrument measure what it claims to measure?
- How sensitive is the instrument to detecting small differences in the phenomenon that it is reported to measure (effect size?)
- How precise are the scores of the instrument?
- Feedback on prior use from other sources (e.g., other articles, colleagues, etc.)
- Instrument use commensurate with the proposed study’s phenomena of interest and sample population.
- In previous studies what type of quantitative statistical procedures were done to analyze the data from this instrument/tool?
Step V

Discuss & summarize your impressions of the proposed instrument

- Pros (e.g., no adaptation needed, adequate psychometric information, readily available, etc)
- Cons (e.g., adaptation needed, psychometric information in question, not readily available, costly, etc.)
- Applicability of the instrument for use in the proposed study......why is this instrument a “fit” for your study? Does this instrument “fit” with each of the items of Step I of The Guide?
- Other comments
Step VI

Justify your decision to select, select and adapt, or non-select the instrument for the proposed study

- List specifically why you would select or select and adapt this instrument for use in this study OR
- List specifically why you would keep looking for an instrument more in line with your requirements but keeping this one in “reserve”.
- List specifically why you would not select this instrument to use in this study and what are the key components of the “perfect” or “near perfect” instrument for your study.**

** Seems a bit redundant, however now that you have completed the assessment of the proposed tool has your description changed as to what the “perfect” tool looks like for your study?
Use of the Step–by–Step Guide

Evaluation of measurement instruments/tools for the use in:

- Research
- Quality Improvement & Translation of Theory and Evidence into Practice Studies/Projects
- Clinical Practice – Outcomes Measurement

Facilitate the development of a measurement instrument.
**Step 1: Articulate the Key Elements of the Proposed Quantitative Study**

<table>
<thead>
<tr>
<th>Element</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenomena of Interest</td>
<td>What is the phenomena of interest to be studied?</td>
</tr>
<tr>
<td>Study Purpose/Aims</td>
<td>What is/are the purpose(s)/aim(s) of the proposed study?</td>
</tr>
<tr>
<td>Research Question(s) and/or Hypotheses or PICO(T) Questions</td>
<td>What is/are the research question(s), and/or hypotheses or PICO(T) questions?</td>
</tr>
<tr>
<td>Research Design</td>
<td>What is the research design (descriptive, correlational, quasi-experimental, experimental, mixed-methods)?</td>
</tr>
<tr>
<td>Theoretical Framework</td>
<td>What is the proposed theoretical/conceptual framework for this study?</td>
</tr>
<tr>
<td>Study Setting</td>
<td>Where will the proposed study take place (hospital, clinic, classroom, etc)?</td>
</tr>
<tr>
<td>Sample (population)</td>
<td>Subjects or things to be studied? What are their characteristics?</td>
</tr>
<tr>
<td>Conceptual Definitions</td>
<td>For each variable to be measured, provide a word picture or mental image.</td>
</tr>
<tr>
<td>Operational Definitions</td>
<td>Provide a description of how people or things will be measured (include what type(s) of measurement instrumentation is proposed for each, e.g., physiological, questionnaires, scales, etc)</td>
</tr>
<tr>
<td>Measurement Plans</td>
<td>What do you expect to measure and how?</td>
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## Step II. Identify an Existing Instrument

<table>
<thead>
<tr>
<th>Element</th>
<th>Questions</th>
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</thead>
<tbody>
<tr>
<td>Identifying an Existing Instrument</td>
<td>• What is the name of the instrument you selected?</td>
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<tr>
<td></td>
<td>• What sources, databases etc did you search to locate this instrument?</td>
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<td></td>
<td>• What is the citation or other needed information for locating this instrument?</td>
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<tr>
<td></td>
<td>• List the citation of at least one research study using this instrument. Note if the instrument was used in these studies as you intend to use the instrument in your study.</td>
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<td>• Is this instrument used “commonly” in patient care?</td>
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<td>• Why did you select this instrument?</td>
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<td></td>
<td>• Were there several instruments of interest to your study for you to select from (or was this one the only one you could locate)?</td>
</tr>
</tbody>
</table>
Summary

- Explain the purpose of the Step-by-Step Guide and give one example of how you would use this guide in the critical appraisal and selection of a data collection instrument.

- Using the Step-by-Step Guide choose the best and most appropriate measurement method and best associated research instrument(s) to capture a phenomena of interest for healthcare research, clinical outcomes measurement, quality improvement, translation of evidence into practice and/or academic program evaluation.
Questions/Discussion
References

Thank you.

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