Development of a Mixed Methods Appraisal Tool

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Canadian Cochrane Symposium, Workshop, May 2010

LEARNING OBJECTIVE

At the end of this workshop, you will be able to apply a Mixed Methods Appraisal Tool for concomitantly appraising the methodological quality of primary studies retained in a systematic mixed studies review.

PLAN

Background
• Mixed studies review (tool usage)
• Mixed methods research (criteria)
Mixed Methods Appraisal Tool
• Pilot version: Tour & public website
• Pilot test: Ease-of-use & reliability

Exercise
Discussion

Presentations

Pierre Pluye & Romina Pace
FMED 501 - Mixed studies reviews
• Dr. Pluye
• 1-credit graduate course (summer)
DENT672 - Applied mixed methods in health research
• Drs. Levine, Nicolau and Pluye
• 3-credit graduate course (winter)
Cochrane collaboration: CCC & RCF

Mixed Methods Appraisal Tool: Pilot test, workshops, CIHR grant application (content validity & reliability)

Presentations

Name & Affiliation
Research interests
Do you have experience or expertise in
• Quantitative research (e.g., epidemiology)?
• Qualitative research (e.g., ethnography)?
• Mixed methods research?
• Mixed studies reviews?

PART 1. BACKGROUND

A Mutual Understanding
Catherine Stones: Artwork & Illustrations
Mixed Studies Reviews

Suggested reading


Types of synthesis (example)

<table>
<thead>
<tr>
<th>Analysis or approach/design</th>
<th>Type</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative case survey*</td>
<td>QUAL-QUAN to QUAN (patterns)</td>
<td></td>
</tr>
<tr>
<td>Content analysis</td>
<td>QUAL to QUAN (variables)</td>
<td></td>
</tr>
<tr>
<td>Bayesian analysis (specialized MSR)</td>
<td>QUAL to QUAN (probabilities)</td>
<td></td>
</tr>
<tr>
<td>Bayesian analysis (research on MSR)</td>
<td>QUAL to QUAN (configurations)</td>
<td></td>
</tr>
<tr>
<td>Lexical-semantic analysis (research on MSR)</td>
<td>QUAL to QUAN (textual statistics)</td>
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</tr>
<tr>
<td>Qualitative multiple case study*</td>
<td>QUAN-QUAL to QUAL (patterns)</td>
<td></td>
</tr>
<tr>
<td>Thematic analysis – see example below</td>
<td>QUAN-QUAL to QUAN (themes)</td>
<td></td>
</tr>
<tr>
<td>Grounded Theory* (step within a GT study)</td>
<td>QUAN-QUAL to QUAN (theory)</td>
<td></td>
</tr>
<tr>
<td>Critical interpretive synthesis* (specialized MSR)</td>
<td>QUAN-QUAL to QUAN (theory)</td>
<td></td>
</tr>
<tr>
<td>Realist synthesis* (specialized MSR)</td>
<td>QUAN-QUAL to QUAL (configurations)</td>
<td></td>
</tr>
<tr>
<td>Narrative synthesis (separate QUAL &amp; QUAN)</td>
<td>Interpreting QUAN &amp; QUAL results</td>
<td></td>
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</tbody>
</table>

* Needs for a mixed methods appraisal tool
A SIMPLE EXAMPLE

Clinical Information-Retrieval Technology (CIRT) increasingly used in routine practice

Review question
What are the impacts of information found in CIRT?

Pluye, Grad et al. International Journal of Medical Informatics, 74(9):745-768.

EXAMPLE

IDENTIFICATION
Databases + Hand search + Citation search
Inclusion/exclusion criteria assigned to 7,156 references (titles and/or abstracts)

SELECTION
Detailed examination of 605 full-text papers using inclusion-exclusion criteria

APPRAISAL
Methodological quality appraisal of 40 studies

SYNTHESIS
26 studies (quan & qual)

EXAMPLE

Qualitative thematic data analysis: Types of CIRT impact

Extract of Westbrook et al (2004) assigned to the type

Mixed Methods Research: Definition & History

Combination of quantitative and qualitative methods: Integration of data and/or results

A longstanding practice in research, e.g., evaluation studies*

Recently conceptualized in terms of mixed methods studies: First handbook in 2003

Mixed Methods Research : Rationale

Combine strengths of qualitative & quantitative

E.g., strengths of a qualitative assessment
• In-depth descriptions of complex phenomena
• Context-specific empirical findings
• Transferability of conceptual frameworks or theoretical models

E.g., strengths of a quantitative assessment
• Measurement
• Generalizability based on statistical inferences
Mixed Methods Research

Suggested reading

Mixed Methods Research: Quality

Good Reporting of A Mixed Methods Study (GRAMMS)
- Justification for using mixed methods
- Description of the design
- Description of each methods (sampling, etc.)
- Integration of data collection/analysis and/or results
- Limitations because of the mixing
- Insights gained from mixing

Overlaps with MMAT while independent development (next slides)

Justification: 7 reasons for combing qualitative (QUAL) and quantitative (QUAN) methods
- QUAL data/findings improved by QUAN data/results
- QUAN data/results improved by QUAL data/findings
- QUAL method not enough
- QUAN method not enough
- Needs to generalize QUAL findings
- Needs to interpret QUAN results
- Needs to explore (QUAL) and measure (QUAN)


Description of design – Integration of data/results
Two types of sequential design (2 steps or separate stages)

<table>
<thead>
<tr>
<th>DESIGN</th>
<th>DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td>EXPLANATORY</td>
<td>• QUAN then QUAL explanation</td>
</tr>
<tr>
<td>QUAN→QUAL</td>
<td>• Integration between/after the 2 phases</td>
</tr>
<tr>
<td></td>
<td>E.g., QUAN assessment (sample), then QUAL follow-up (sub-sample)</td>
</tr>
<tr>
<td>EXPLORATORY</td>
<td>• QUAL proposal then QUAN</td>
</tr>
<tr>
<td>QUAL→QUAN</td>
<td>• Integration between/after the 2 phases</td>
</tr>
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<td></td>
<td>E.g., tool development (QUAL content then QUAN factor analysis)</td>
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</table>

Description of design – Integration of data/results
Two types of concomitant design

<table>
<thead>
<tr>
<th>DESIGNS</th>
<th>DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td>EMBEDDED</td>
<td>• Concomitant assessment QUAL and QUAN</td>
</tr>
<tr>
<td>• QUAL(qual)</td>
<td>• Integration during data collection/analysis</td>
</tr>
<tr>
<td>• QUANT(qual)</td>
<td>E.g., Randomized Controlled Trial combined with a qualitative case study</td>
</tr>
<tr>
<td>TRIANGULATION</td>
<td>• Concomitant assessment QUAL and QUAN</td>
</tr>
<tr>
<td>QUAL+QUAN</td>
<td>• Integration during data collection/analysis</td>
</tr>
<tr>
<td></td>
<td>E.g., Convergence, illustration, multi-level and transformation</td>
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PART 2. MIXED METHODS APPRAISAL TOOL (MMAT)
- Pilot version: Tour & public website
- Pilot test: Ease-of-use & reliability

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All material available online  
http://mixedmethodsappraisatoolpublic.pbworks.com

MMAT TOUR (see package)

QUALITATIVE

QUANTITATIVE RANDOMIZED & CONTROLLED

QUANTITATIVE NON-RANDOMIZED
QUANTITATIVE OBSERVATIONAL

MIXED METHODS

REFERENCES

Pilot test: Ease-of-use & reliability

Methods
Summer of 2009
- Initial version tested by 4 reviewers for appraising 6 studies: 4 improvements and a tutorial
Fall of 2009
- Systematic mixed studies review on benefits of participatory research (PR), PRAM, McGill
- 23 PR programs (120 papers) retained up to January 2010
- Of those, 19 PR evaluation studies appraised using MMAT by 2 reviewers
- Corresponding to 32 evaluation components (qualitative, quantitative or mixed methods)

Pilot test: Ease-of-use & reliability

Methods (continued)
For each criterion (presence = 1 and absence = 0)
- Discussion of responses
- Consensus reached for 19 of 25 disagreements (76.0%)
- Calculation of an inter-reviewer reliability score (kappa) for each study (global score)
- Consistency between reviewers
  - Calculation of an intra-class correlation (ICC)
  - Two-way mixed model (absolute agreement type)
- Ease-of-use: Mean appraisal time

Promising results
- On average: 14 minutes per study
- Consistency of a "score/study": ICC = 0.963 post-discussion
- Post-discussion inter-rater reliability
  - With respect to 17 of the 19 scoring criteria (kappa / criterion)
    - perfect agreement for 13 criteria
    - substantial agreement for 2 criteria
    - moderate agreement for 2 criteria
  - With regards to the two remaining criteria (1.1 and 3.3)
    - Consistent score for all studies (kappa not calculated)
    - Inter-rater agreement: 88.9% (1.1) and 83.3% (3.3)
PART 3. EXERCISE

Development of a Mixed Methods Appraisal Tool for systematic mixed studies reviews

1. Read
2. Appraise

Experience/expertise in qualitative research: Complete section 5 then 1
Experience/expertise in quantitative research: Complete section 5 then 2

PART 4. DISCUSSION

Thank you