Development of a Mixed Methods Appraisal Tool

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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.

2

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
http://www.google.ca/imgres?imgurl=http://www.catherinestones.net

MIXED METHODS APPRAISAL TOOL
for systematic mixed studies reviews

MIXED STUDIES REVIEWS
DEFINITION & EXAMPLE

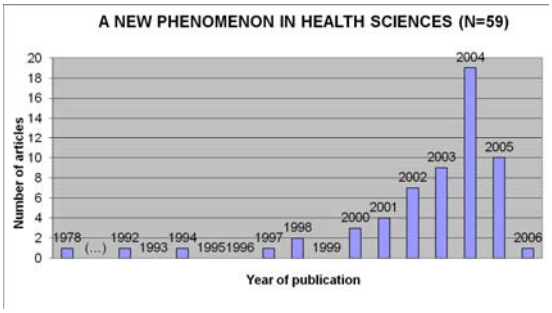
Pluye et al. (2009) International Journal of Nursing Studies, 46(4):529-546.

MIXED STUDIES REVIEWS

Definition

- Literature review of qualitative, quantitative and mixed methods primary studies, e.g., outcome and process studies
- In contrast to literature reviews of (1) quantitative experimental studies, or (2) quantitative observational studies, or (3) qualitative research
- Mixed methods research applied to reviews (data sources being documents, e.g., research papers)

MIXED STUDIES REVIEWS



MIXED STUDIES REVIEWS

	SYSTEMATIC*	*REPRODUCIBLE*	*CONVENIENCE*
Question (N=59)	X	*X*	*X*
Identification (N=40)	X	*X*	
Selection (N=40)	X	*X*	
Appraisal (N=17)	X		
Synthesis (N=59)	X	*X*	*X*
Number (%)	**17 (29%)**	*23 (39%)*	*19 (32%)*

**Needs for a mixed methods appraisal tool*

Mixed Studies Reviews

Suggested reading

- **Pope et al. (2007).** Synthesizing qualitative and quantitative health evidence: A guide to methods. Maidenhead: Open University Press.

Types of synthesis (example)

Analysis or *approach/design	TYPE
Quantitative case survey*	QUAL-QUAN to QUAN (patterns)
Content analysis	QUAL-QUAN to QUAN (variables)
Bayesian analysis (specialized MSR)	*QUAL to QUAN (probabilities)*
Boolean analysis (research on MSR)	*QUAL to QUAN (configurations)*
Lexical-semantic analysis (research on MSR)	*QUAL to QUAN (textual statistics)*
Qualitative multiple case study*	QUAN-QUAL to QUAL (patterns)
Thematic analysis – see example below	**QUAN-QUAL to QUAL (themes)**
Grounded Theory (step within a GT study)*	*QUAN-QUAL to QUAL (theory)*
Critical interpretive synthesis (specialized MSR)*	*QUAN-QUAL to QUAL (theory)*
Realist synthesis (specialized MSR)*	*QUAN-QUAL to QUAL (configurations)*
Narrative synthesis (separate QUAL & QUAN) • EPPI examples	Interpreting QUAN & QUAL results

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)

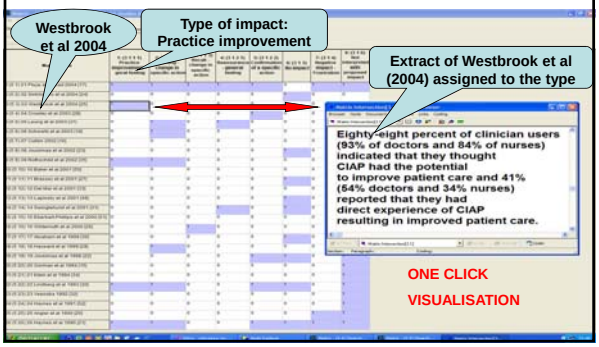
SELECTION
Detailed examination of 605 full-text papers using inclusion-exclusion criteria

APPRAISAL
Methodological quality appraisal of 40 studies

SYNTHESIS
26 studies
(quan & qual)

EXAMPLE

Qualitative thematic data analysis: Types of CIRT impact



MIXED METHODS APPRAISAL TOOL
based on 'quality criteria' of mixed methods research
(mixed studies reviews = mixed methods applied to reviews)

MIXED METHODS RESEARCH

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

*Pluye et al. Les méthodes mixtes pour l'évaluation de programme. In Ridde & Dagenais (eds.), *Théories et pratiques en évaluation de programme,* Presses de l'Université de Montréal, 2009, pp. 123-141.

17

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

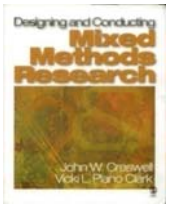
- Measurement
- Generalizability based on statistical inferences

18

Mixed Methods Research

Suggested reading

Creswell & Plano Clark (2007). *Designing and conducting mixed methods research*. London: Sage.



Mixed Methods Research : Quality

Good Reporting of A Mixed Methods Study (GRAMMS)

O'Cathain et al. *J. Health Services Research & Policy, 2008, 13*(2), 92-98.

- 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)

Creswell & Plano-Clark. Designing and conducting mixed methods research. Sage, 2007.

21

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

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

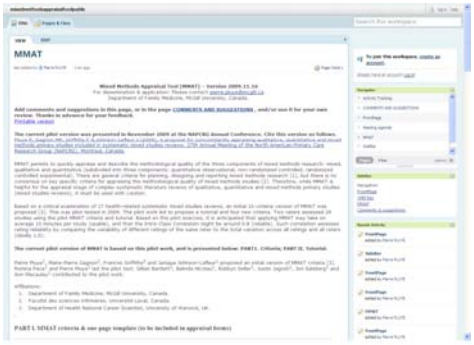
Description of design – Integration of data/results
Two types of concomitant design

DESIGNS	DESCRIPTION
EMBEDDED **• QUAL(quan)** **• QUANT(qual)**	• Concomitant assessment QUAL and QUAN • Integration during data collection/analysis E.g., Randomized Controlled Trial combined with a qualitative case study
TRIANGULATION QUAL+QUAN	• Concomitant assessment QUAL and QUAN • Integration during data collection/analysis E.g., Convergence, illustration, multi-level and transformation

PART 2. MIXED METHODS APPRAISAL TOOL (MMAT)

- Pilot version: Tour & public website
- Pilot test: Ease-of-use & reliability

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



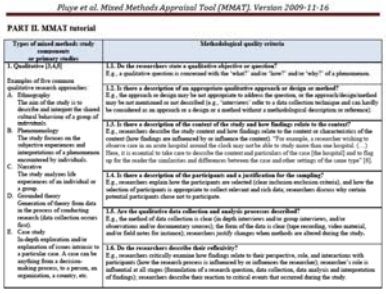
MMAT TOUR (see package)


Pluye et al. Mixed Methods Appraisal Tool (MMAT). Version 2009-11-16

McGill

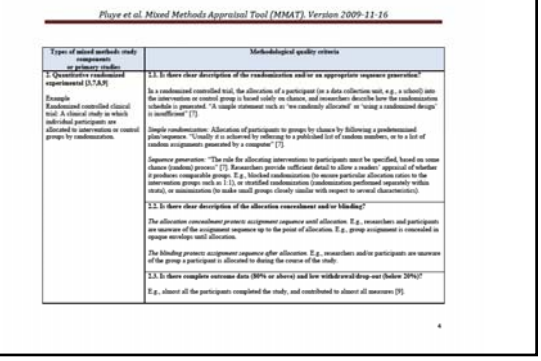
Mixed Methods Appraisal Tool (MMAT) – Version 2009.11.14

QUALITATIVE

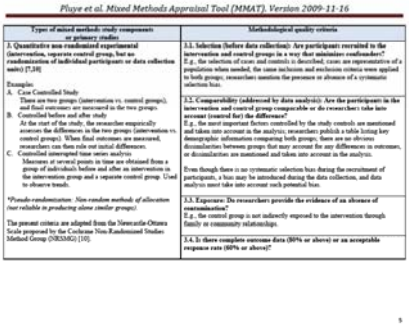

Pluye et al. Mixed Methods Appraisal Tool (MMAT). Version 2009-11-16

PART II. MMAT tutorial

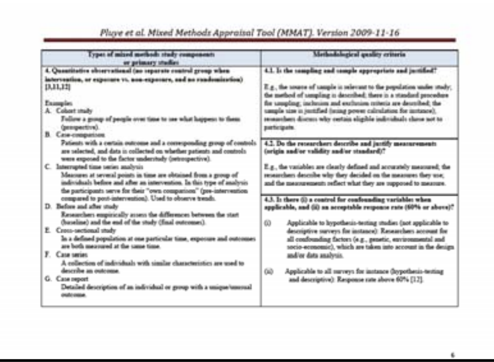
QUANTITATIVE RANDOMIZED & CONTROLLED


Pluye et al. Mixed Methods Appraisal Tool (MMAT). Version 2009-11-16

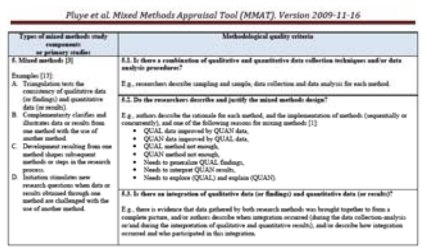
QUANTITATIVE NON-RANDOMIZED


Pluye et al. Mixed Methods Appraisal Tool (MMAT). Version 2009-11-16

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

Pilot test: Ease-of-use & reliability

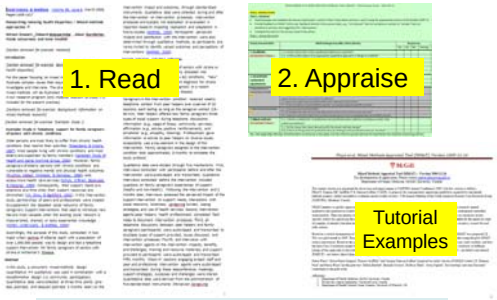
Promising results

- 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)

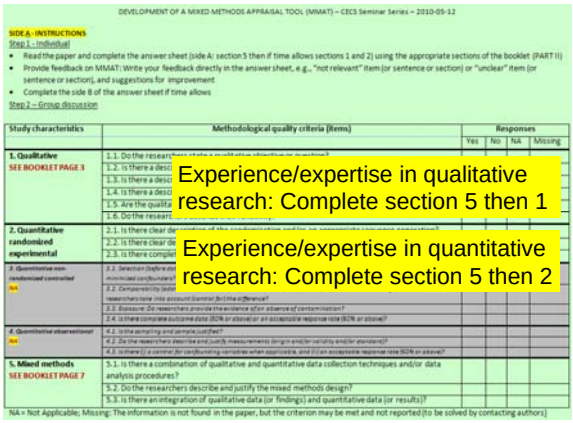
PART 3. EXERCISE

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

Paper, answer sheet, booklet



Paper copies will be re-used – Tutorial available online
http://mixedmethodsappraisaltoolpublic.pbworks.com



PART 4. DISCUSSION

Study characteristics	Methodological quality criteria (items)	YES?
1. Qualitative	1.1. Do the researchers state a qualitative objective or question?	
	2. Is there a description of an appropriate qualitative approach or design or method?	
	1.3. Is there a description of the context of the study and how findings relate to the context?	
	1.4. Is there a description of the participants and a justification for the sampling?	
	1.5. Are the qualitative data collection and analysis processes described?	
	1.6. Do the researchers describe their reflexivity?	
2. Quantitative randomized experimental	2.1. Is there clear description of the randomization and/or an appropriate sequence generation?	
	2.2. Is there clear description of the allocation concealment and/or blinding?	
	2.3. Is there complete outcome data (80% or above) and low withdrawal/drop-out (below 20%)?	
3. Quantitative non-randomized controlled	*3.1. Selection (before data collection): Are participants recruited to the intervention and control groups in a way that minimized confounders?*	
	3.2. Comparability (addressed by data analysis): Are the participants in the intervention and control group comparable or do researchers take into account (control for) the difference?	
	3.3. Exposure: Do researchers provide the evidence of an absence of contamination?	
	3.4. Is there complete outcome data (80% or above) or an acceptable response rate (60% or above)?	
4. Quantitative observational	*4.1. Is the sampling and sample justified?*	
	4.2. Do the researchers describe and justify measurements (origin and/or validity and/or standard)?	
	4.3. Is there (i) a control for confounding variables when applicable, and (ii) an acceptable response rate (60% or above)?	
5. Mixed methods	5.1. Is there a combination of qualitative and quantitative data collection techniques and/or data analysis procedures?	
	5.2. Do the researchers describe and justify the mixed methods design?	
	5.3. Is there an integration of qualitative data (or findings) and quantitative data (or results)?	

Thank you