

## Background

Systematic literature reviews identify, select, appraise, and synthesize relevant literature on a particular topic. Typically, these reviews look at studies with similar methods, but interest in a new form of literature review, mixed studies review (MSR), is growing. MSRs include original qualitative, quantitative and mixed methods studies. This allows researchers and decision/policy-makers to obtain in-depth answers to complex research questions.

## Problem and objective

In systematic MSRs, reviewers have to appraise the quality of studies with different methods. However, such appraisal remains challenging. To address this challenge, a pilot Mixed Methods Appraisal Tool (MMAT) has been developed at McGill University, Montreal, Canada (Pluye et al., 2009). The current version contains a tutorial, and 19 criteria (Table 1).

## Setting/Participants

The center for Participatory Research at McGill (PRAM) is performing a MSR on benefits of health-related participatory research (PR). There were 23 PR projects, which comprised of 120 papers, retained for the PRAM review up to January 2010. From this sample, 19 projects were retained, and four were excluded because no intervention was mentioned in the primary or related papers. Each appraised project, included one or more than one empirical evaluation study. As a result 32 evaluation studies were appraised using the MMAT.

## Methods

Two independent reviewers used the MMAT to appraise these studies. For each criterion, the presence or absence were reported as 1 and 0, respectively. Then, the reviewers discussed their responses. For the dichotomized responses pre- and post-discussion, SPSS 18 software was used to calculate the kappa statistic. A kappa negative was interpreted as indicating no agreement; a kappa between 0 and 0.20, slight agreement; between 0.21 and 0.40, fair agreement; between 0.41 and 0.60, moderate agreement; between 0.61 and 0.80, substantial agreement; and between 0.81 and 1.00, almost perfect agreement (Garson, 2010; Landis & Koch, 1977).

## Mixed Methods Appraisal Tool (MMAT)

Table 1. The MMAT: See criteria and tutorial at <http://mixedmethodsappraisaltoolpublic.pbworks.com>

Study domains	Methodological quality criteria
<b>1. Qualitative</b>	1.1 Qualitative objective or question 1.2 Appropriate qualitative approach or design or method 1.3 Description of the context 1.4 Description of participants and justification of sampling 1.5 Description of qualitative data collection and analysis 1.6 Discussion of researchers' reflexivity
<b>2. Randomized controlled</b>	2.1 Appropriate sequence generation and/or randomization 2.2 Allocation concealment and/or blinding 2.3 Complete outcome data (80% or above) and low withdrawal/drop-out (below 20%).
<b>3. Non-randomized controlled</b>	3.1 Participants were recruited to the intervention and control groups in a way that minimized confounders. 3.2 Participants in the intervention and control group were comparable. 3.3 Evidence of an absence of contamination. 3.4 Complete outcome data (80% or above) or an acceptable response rate (60% or above).
<b>4. Quantitative observation (no control group)</b>	4.1 Appropriate sampling and sample 4.2 Justification of measurements (validity and standards) 4.3 Control of confounding variables or an acceptable response rate (60% or above).
<b>5. Mixed methods</b>	5.1 Combination of qualitative and quantitative data collection-analysis techniques or procedures 5.2 Justification of the mixed methods design 5.3 Integration of qualitative and quantitative data or results

## Results

Table 2. Kappa scores per criterion (NA= Not Applicable)

Criterion	Pre-discussion		Post-discussion	
	Kappa	p Value	Kappa	p Value
1.1	NA	NA	NA	NA
1.2	0.526	0.073	1	0.003
1.3	1	NA	1	NA
1.4	0.250	0.257	0.526	0.073
1.5	-0.174	0.571	1	0.003
1.6	0.400	0.134	1	0.003
2.1	1	0.005	1	0.005
2.2	1	0.005	1	0.005
2.3	1	0.005	1	0.005
3.1	0.333	0.273	0.571	0.121
3.2	0.333	0.414	1	0.014
3.3	NA	NA	NA	NA
3.4	0	1	1	0.014
4.1	0.615	0.035	1	0.005
4.2	0.545	0.053	0.714	0.035
4.3	0.600	0.038	0.783	0.011
5.1	1	NA	1	NA
5.2	1	NA	1	NA
5.3	1	NA	1	NA

Results are presented in Table 2.

Depending on the criterion, the inter-rater reliability ranged from no agreement ( $\kappa = -0.174$ ) to perfect agreement ( $\kappa = 1.00$ ) pre-discussion.

Post-discussion, the inter-rater reliability varied from moderate agreement ( $\kappa = 0.526$ ) to perfect agreement ( $\kappa = 1.00$ ).

## Conclusion

The development of a novel tool is an iterative process. Our results suggest the current pilot version of the MMAT is promising. This pilot study faced at least two limitations: the sample size was small, and the reliability of specific criteria for appraising mixed methods was tested with only one study. We are planning further research and development of the MMAT with an international team of expert reviewers to improve the content validity, and to re-examine its reliability using an adequate set of empirical studies to test all criteria.

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