SCOTTISH GOVERNMENT SOCIAL RESEARCH GROUP SOCIAL SCIENCE METHODS SERIES

Guide 5: Systematic Reviews

What are systematic reviews?

Evidence informed policy aims to put the best available research evidence at the heart of policy development and implementation. To enable this to happen, the best available evidence about an issue must be in an accessible form, usually in the form of a synthesis of available evidence. Systematic reviews are one of several tools that can be used to bring together a number of primary studies, to provide a review of existing evidence in the area under consideration. Other tools include scoping reviews, rapid evidence assessments and reviews of reviews. These different tools vary in how systematic they are, the size of the area/number of questions considered, the extent of the evidence base drawn upon, and the ways results are presented. Reviews may include statistical methods to combine studies (meta-analysis).

A *systematic review* addresses a specific question and aims to reduce bias in the review by being both systematic and explicit about how the review has been conducted, irrespective of the type of primary study included in the review. This involves using a stepwise approach to determine relevant keywords and search strings as well as deploying a specified methodology to include and exclude articles based on a predetermined relevance and quality criteria (Petticrew and Roberts, 2006).

In the past systematic reviews focused on measuring the effects of interventions, often using meta-analysis techniques to produce statistical summaries of the combined results of primary studies (See, for example, Cochrane or Campbell Reviews). However, increasingly systematic reviews are being carried out in areas other than just effectiveness. In addition, different questions are likely to be answered using different methodologies, resulting in different types of findings. Therefore, a range of synthesis techniques have been developed to address different types of questions using different types of primary studies.

Types of Systematic Review Synthesis

Table 1: Synthesis Methods used in Systematic Reviews

Technique	Overview
Meta-analysis	A statistical technique for combining the findings from independent studies which aims to produce generalisable lessons. See Cochrane Collaboration reviews for examples.
Meta-ethnography	An interpretive approach for synthesising the results of qualitative research on similar topics (see, Noblit and Hare, 1988 for an introduction).
Thematic synthesis	A narrative approach involving the identification of prominent or recurrent themes in the literature, and summarising the findings of the different studies under thematic headings.
Descriptive synthesis	A database or map describing studies relating to a particular research question: highlighting similarities and differences and identifying patterns of factors (Categories may include, e.g. year published, key concepts studied, approach, methodology etc.)
Realist synthesis	An approach to reviewing research evidence on complex social interventions, which provides an explanatory analysis of how and why they work (or don't work) in particular settings . Aims to test and refine theory (See, Pawson, 2006)
Critical interpretive synthesis	An iterative approach which aims to generate a synthesising argument by considering different forms of evidence (qualitative, quantitative and conceptual) alongside each other.

In order for a review to be a systematic review, irrespective of the synthesis method or type of primary study /included in the review, there are stages and tasks that must be undertaken, as outlined below.

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Conducting a systematic review

Systematic reviews generally follow four main stages:

1. Planning the review
   - Pre-test literature (identify the need for a review – check if review already exists; complete first stage keyword searches in major databases and read selected papers) to provide a guide of the size of the literature base, significant theoretical contributions within the literature and potential keywords for future searches.
   - Recruit expert panel (preferably, this should include policy, practice, and academic representatives) to provide advice on review focus, sources of evidence, and relevance and quality evaluation criteria.

2. Developing the research protocol with an expert panel.
   - Outline the research question or questions. These must be well thought-out and clearly defined.
   - Develop and justify the search criteria (key words and search strings, and parameters); which period of time the review will cover (e.g. papers published between 2000 and 2008); and where will the searches be conducted (e.g. databases such as ISI Web of Knowledge, whether articles will be limited to English language publications – which is often necessary because of resource issues but which may introduce bias as a result).
   - Develop and justify the selection criteria. This involves outlining the procedures for selecting articles, papers and reports for full review. Firstly in terms of relevance - what areas of research are relevant to the review question, and secondly regarding quality (what type of articles should be included e.g. conceptual, empirical, or both and how will quality be measured e.g. only including articles that provide a thorough description of the methodology used).
   - Provide an overview of outcomes to be recorded in the review (what data will be extracted from articles and how will it be analysed).

3. Completing searches, selecting literature and extracting data.
   - Use research protocol to conduct keyword searches and select articles to take forward for full review. Firstly, the titles and abstracts should be read and evaluated in terms of the relevance criteria. Secondly, the articles that have passed the relevance criteria should then be evaluated in terms of the quality criteria. Ideally, selection (and data extraction) of articles for inclusion in a review should be undertaken by at least two individuals independently.
   - A research diary of the process should be kept, outlining the number of articles found, rejected and selected at each stage, including reasons for rejection.
   - If any modifications are made to the research protocol there should be well argued reasons for doing so and they should be made explicit in the research diary.

4. Analysing, synthesising and presenting results.
   - The combined results of the selected papers should be analysed and synthesised using one or more of the methods described in Table 1.
   - Write up a clear and succinct systematic review report which highlights the methodology used, provides an overview of the results and presents answers to the review questions.
   - All written reports should recognise the strengths and weaknesses of the review, including gaps in the research literature.

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What are the advantages and disadvantages of systematic reviews?

The advantages :

- They are transparent, explicit about what was done in the review.
- They can be replicated and updated.
- They minimise the duplication of effort.
- They reduce bias as conclusions are not overly influenced by the most accessible research.
- They allow decisions to be made on the best available evidence.
- Researchers and policy makers can easily judge the quality of the review's findings.
- They make efficient use of existing data and can improve future research design.
- If meta-analysis is used, they can improve generalisability of smaller statistical studies.

The disadvantages:

- Planning and managing a systematic review is time consuming and resource intensive (reviews typically take 6-18 months to complete).
- Systematic reviews can be unpredictable, it may be necessary to revise (broaden or restrict) inclusion/exclusion criteria in the light of initial results.
- The effectiveness of systematic reviews is dependent upon the quality and/or extent of the data available from of the original primary studies and on the methods used to combine them.
- Findings from systematic reviews may not be directly relevant to the policy context and setting.
- Commissioning a Systematic Review can be costly.
- It can be difficult to locate relevant 'unpublished' research.

Examples of the use of systematic reviews in the UK

The Role of Teaching Assistants in Secondary Schools, UK (2007)

Policy Context: There is a widely held belief that teaching assistants (TAs) lighten teachers' workloads, support learning and increase the level of pupil engagement, thus securing inclusion for pupils with special needs and raising standards. The National Agreement on workforce reform sets out plans to free teachers to focus on teaching and learning, and to develop the roles of TAs in schools; new teachers need to be prepared for working as part of a team. This requires information about the current roles of teaching assistants, and where they are most effective. This study aimed to examine stakeholders' perceptions of the role of teaching assistants in secondary schools.

Technique: An extensive search strategy was completed of studies performed between 1988 and 2005. More than 10,000 citations were reviewed, using inclusion and exclusion criteria successively to the titles and abstracts. Five hundred and eleven (511) papers were screened in full, with quality assurance (QA) screening supplied by the EPPI-Centre. The findings and conclusions of 168 studies were assessed in terms of quality and relevance. A descriptive synthesis of the 168 studies was produced and 17 studies were taken forward for in-depth review and thematic analysis.

Results: It was suggested that while TAs support learning under the direction of the teacher, they are semi-autonomous and make educational decisions in their interactions with pupils. Thus, further training was recommended for TAs and teachers to avoid the creation of dependence or a sense of intrusiveness.

Policy Output: A full technical report of the review was published in 2007. This included a thorough analysis of the studies and made recommendations for policy makers and practitioners.

http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=2353

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Crime Prevention Effects of Closed Circuit Television, UK (2002)

Policy context: Closed Circuit Television (CCTV) serves many functions and is used in both public and private settings. The prevention of crime (i.e., personal and property) is among its primary objectives in public spaces. However, the effectiveness of CCTV has yet to be proven and reports of its effective (or otherwise) implementation are frequently based on anecdotal evidence. This study examined the results of prior evaluation studies to form a clearer picture of the crime prevention effectiveness of CCTV.

Technique: A thorough search strategy was employed to locate relevant published and unpublished reports. Evaluations were only included in the review if they met the following criteria: (1) CCTV was the focus of the intervention; (2) there was an outcome measure of crime; (3) the evaluation design was of high methodological quality, with the minimum design involving before-and-after measures of crime in experimental and control areas; (4) there was at least one experimental area and one comparable control area; and (5) the total number of crimes in each area before the intervention was at least 20. This resulted in 22 studies being taken forward for full review. Descriptive synthesis and statistical meta-analysis were used to evaluate and analyse the evaluations and their results.

Results: Of the 22 evaluations, the introduction of CCTV reduced crime in 11 cases; however, in five cases an increase in crime was observed. Five schemes had no significant effect, and the effect of the one remaining scheme was unclear. The effect of CCTV in most settings (city centre, public house, public transport) was mixed, however there was a clear decrease in crime in car parks where CCTV had been installed. From the meta-analysis it was concluded that CCTV had a significant desirable effect on crime, although the overall reduction in crime was a very small (four per cent).

Policy Output: The results of this study brought about the commissioning of additional empirical studies which led to the publication of the National CCTV Strategy in October 2007.

http://www.homeoffice.gov.uk/rds/pdfs2/hors252.pdf

Examples of the use of systematic reviews in the Scottish Government

Effectiveness of Interventions to Prevent Suicide and Suicidal Behaviour, (2008)

Policy Context: This review was commissioned in 2005 following a scoping exercise which identified the need for a review of the known effectiveness of interventions to prevent suicide and suicidal behaviour. It was part of a programme of research to support *Choose Life,* the National Strategy and Action Plan to Prevent Suicide aimed at addressing the rising rate of suicide in Scotland.

Technique: Broad initial search parameters were set and comprehensive database searches completed. Inclusion criteria were: English language; empirical studies, outcomes to include all completed suicide and suicidal behaviour, and studies with a focus on 'intentional' behaviour only. 26,085 citations were found in the original searches. These were narrowed to the most relevant citations through restricting the search to empirical evaluations and screening abstracts. Finally, two reviewers read the full-text of every remaining citation and agreed on those that should be included in the review. This resulted in a final total of 37 systematic reviews and 200 primary empirical studies. A descriptive synthesis of the interventions was produced and qualitative and qualitative studies were examined separately to produce both thematic and statistical overviews.

Results**: The review concluded that even commonly used pharmaceutical interventions demonstrate a rather equivocal profile in terms of their impact on reductions in suicidal behaviour and ideation, and there was currently little evidence of any effective pharmaceutical intervention for self-harm. Evidence for non-pharmaceutical interventions was promising, although limited, in some areas. The review highlighted that very few interventions have been evaluated by more than a very small number of studies and the number of high quality studies is even smaller.

Policy Output: A substantial report, including policy recommendations, was published in 2008.

http://www.scotland.gov.uk/Publications/2008/01/15102257/0

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On-line resources

Systematic reviews:

http://www.campbellcollaboration.org/ - Systematic reviews in social research (crime and justice; education; social welfare)

http://www.cochrane.org/ - medicine and health

both Cochrane and Campbell collaborations produce handbooks (available on-line) in conducting reviews

Reviews used as a basis in practice guidelines

http://www.scie.org.uk/ - social research

http://www.nice.org.uk/ - health

On-line resources, including the conduct of systematic reviews

http://www.york.ac.uk/inst/crd/index.htm - Centre for Reviews and Dissemination site with access to reviews libraries and other systematic review resources

http://www.trentrdsu.org.uk/resources_systematic.html - links to tutorials etc, also resources

http://beta.civilservice.gov.uk/networks/professional/gsr/resources/gsr-rapid-evidence-assessment-toolkit.aspx - rapid evidence assessment toolkit

Other resources

http://www.nationalschool.gov.uk/policyhub/evidence_hotlinks/ - sources of evidence

http://www.shef.ac.uk/scharr/ir/netting/ - gateway to resources on the internet with a focus on health reviews

http://www.kcl.ac.uk/schools/sspp/interdisciplinary/evidence - links to various resources in social research reviewing

http://eppi.ioe.ac.uk/cms/ - social research reviews and methods

http://www.york.ac.uk/inst/chp/srspsc/index.htm - social policy systematic reviews and methods

http://www.leeds.ac.uk/sociology/realistsynthesis/ - realist Synthesis website:

Critical appraisal (checklists)

http://www.sign.ac.uk/methodology/checklists.html - checklists (with guidance notes) aimed at reviewing to produce clinical guidelines

http://www.phru.nhs.uk/Pages/PHD/resources.htm - checklists - aimed at reviews in health