Centers for Systematic Reviews
Texas A&M University Libraries

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guides.library.tamu.edu/systematicreviews
Module 0: Introduction to reviews
Objectives for Module 0

1. Define literature reviews, systematic reviews, & meta analysis
2. Describe the role of reviews in research and evidence based practice
3. List key systematic review organizations in education
4. List steps for systematic reviews
5. Describe services library offers
Module 0: Intro to SRs

A. Characteristics
B. Role in research & evidence based practices
C. SR organizations
D. Overview of steps
E. Systematic review service
Part A: Characteristics

- Definitions
- Comparing types
- Examples
- Advantages
- Limits
- Myths
Narrative Reviews

**Narrative reviews:** aim to summarize the critical points of current knowledge of a particular topic. Also called literature reviews

Lit review can be written as

- As introduction to a study to:
  * Demonstrate how a study fills a gap in research
  * Compare a study with other research
- As a separate work to provide:
  * Organize/describe a topic
  * Describe variables influencing a particular issue/problem
Systematic review: a research method that aims to answer question(s) by analyzing studies meeting a specified criteria\(^1\)
It is a study of studies

- 5 main steps
- Throughout the process be:
  * Transparent: record & report all methods
  * Follow standards and evidence based practices
  * Minimize bias

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\(^1\) Medical Research Library of Brooklyn. Evidence Based Medicine tutorial. Accessed 2/27/07
From: http://library.downstate.edu/ebm/2700.htm
Meta-analysis: a statistical method which combines data from studies

* Usually starts with a systematic review
* Run tests to determine if study data can be combined
* Combine study data into 1 study

Comparing review types

Narrative Reviews
- Depend on authors’ inclination (bias)
- Author selects any criteria
- Search any databases
- Methods not usually specified
- Can’t replicate review

Systematic Reviews
- Scientific approach to a review article
- Criteria determined at outset
- Comprehensive search for relevant articles
- Explicit methods of appraisal and synthesis

Narrative Review → Systematic Review → Meta analysis

Subjective → Objective
A Primary Approach to Reading: Review of Early Literacy Interventions Implemented in Pediatric Settings

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Children who begin school with less developed early literacy skills often have a difficult time catching up to their peers, and children who are poor readers in the first few years of school continue struggling with reading when compared with their peers at later grades. Before school entry, schools may be limited in their regular access to families. In contrast, pediatricians are poised to assist with prevention-oriented literacy efforts for young children, as almost all children see health care providers regularly for well-child visits before starting school. The purpose of this review was to examine the literature on early literacy interventions implemented in pediatric health settings. Across 14 studies, results indicated that all interventions included providing books to participants, most included anticipatory guidance from the physician, and about two thirds included modeling of reading skills in the waiting room. Typically examined outcomes were parent attitudes and behaviors, and results demonstrated improvements in these areas. A number of studies also focused on child attitudes and skills or on the home literacy environment. The results of pediatric literacy interventions are promising, but additional research is needed. Implications for school psychologists are discussed.
Example: Systematic Review

Do Volunteers in Schools Help Children Learn to Read? A Systematic Review of Randomised Controlled Trials

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SUMMARY  The aim of unpaid volunteer classroom assistants is to give extra support to children learning to read. The impact of using volunteers to improve children’s acquisition of reading skills is unknown. To assess whether volunteers are effective in improving children’s reading, we undertook a systematic review of all relevant randomised controlled trials (RCTs). An exhaustive search of all the main electronic databases was carried out (i.e. BEI, PsycInfo, ASSIA, PAIS, SSCI, ERIC, SPECTR, SIGLE). We identified eight experimental studies, of which seven were RCTs. One of the RCTs was excluded because it did not meet the inclusion criteria. One RCT randomised intact classes and the other six studies randomised individual children and could therefore be included in a meta-analysis. All of the trials were fairly small, with the largest including 99 pupils. Four of the trials showed a positive outcome, while three showed a negative effect and the remaining study was equivocal. We pooled the four most homogeneous trials. The pooled data indicated an effect size of 0.19, which was not statistically significant (p = 0.54, 95% confidence interval = −0.31 to 0.68). Overall, volunteering appeared to have a small effect on reading outcomes. However, the confidence intervals were wide, which could conceal a potentially large benefit or a harmful effect. Thus, more good quality RCTs are required in order to provide more conclusive evidence.
A meta-analysis of the relationship between student attitudes towards reading and achievement in reading

Yaacov Petscher
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A meta-analysis of the relationship between attitudes in reading and achievement in reading was conducted to provide a statistical summary to the observed variability in the magnitude of previously reported effect sizes. A total of 32 studies, with a total sample size of 224,615 were used, and included a total of 118 effect sizes. A multi-level approach was used in meta-analysis to determine if variance in the magnitude of effect sizes could be partitioned to study (level 1) and moderator (level 2) levels by using a mixed model approach. Results from the meta-analysis indicated that the mean strength of the relationship between reading attitudes and achievement is moderate ($Z_r = .32$), while stronger for students in elementary school ($Z_r = .44$) when compared with middle school students ($Z_r = .24$). Findings related to selected moderator variables are discussed, with suggestions for future research.
Why do we need reviews?

* Too much literature for one individual
* hidden biases
* Any individual may be fallible
* Any individual study may have limited relevance
* Identify gaps in current research
* Provide organized evidence for decision making
* Help in planning new interventions

Undertaking new primary studies without clear understanding of previous research may result in:
  o Unnecessary
  o Inappropriate
  o Irrelevant
  o Unethical research

Gough, D., Oliver, S., and Thomas, J. An introduction to systematic reviews. (2012) Los Angeles, SAGE.
Limitations

* Results may be inconclusive
* There may be no trials/evidence
* Existing trials may be of poor quality
* Practice does not change just because there is evidence of effect/effectiveness

1 Medical Research Library of Brooklyn. Evidence Based Medicine tutorial. Accessed 2/27/07
   From: http://library.downstate.edu/ebm/2700.htm
Myths

“Systematic Reviews…
* are same as ordinary reviews only bigger
* include only randomized controlled trials
* are substitute for conducting good quality individual studies
* involve statistical synthesis
* must be done by experts
* can be done without help of experienced librarians
* have no relevance in real world”

Part B: Role in education research & evidence based practices

- Evidence based education
- What is evidence?
- Types of Evidence
- Evidence pyramid
- Impact of reviews
- Need for reviews
Evidence Based Education

Professional Wisdom + Empirical Evidence → Guide decisions for delivering instruction
Professional Wisdom

* Judgment gained through experience
* Consensus views
* Increased wisdom is shown by:
  * Easily adapting techniques to match population
  * Identification of new needs
Empirical Evidence

* Research from:
  - Education
  - Psychology
  - Sociology
  - Economics
  - neuroscience

Data on performance used to:
  * Monitor
  * Compare
  * Evaluate
Need both

Without wisdom

* Adapt to population needs
* Operate in areas where there is no research
* Incorporate new technologies

Without evidence

* Generate cumulative knowledge
* Avoid fads and/or biases
* Resolve competing approaches
Evidence Pyramid

- Depicts various types of studies
- Increases from bottom to top:
  - Amount of data to produce research
  - Level of trust
  - Number of people involved in research
- Decreases from bottom up:
  - Number of study type
  - Susceptibility to bias

Secondary studies

By study collection:
* **Objectively**: systematic reviews, meta analyses, evidence based guidelines
* **Subjectively**: Narrative reviews, consensus guidelines

By type of evidence synthesized: experimental, observational, descriptive, mixed

Increase in publication

Systematic Reviews/ Meta Analyses in ERIC database (1980-2011)
Impact of reviews

* Lead to changes in practices, guidelines, policies for schools, educators, and the law
* Many grants now require SR done as part of proposal
* Public demand for information on research

Part C: Systematic Review Organizations

- International organizations
- U. S. Organizations
- And more!
Systematic review organizations

* **What?**
  - Organizations that write and distribute reviews

* **Who?**
  - Non-profit and private groups
  - International, national

* **How?**
  - Volunteer
  - Appointed by government
  - Hired researchers
EBE Organizations/Sites

* National
  * Council for Exceptional Children
  * Ed.gov’s Doing What Works
  * National Center for Education Evaluation
  * National Center for Educational Statistics
  * What Works Clearinghouse

* International
  * Campbell Collaboration
  * EPPI-Centre
Name: What works clearinghouse

Sponsor: Institute of Education Sciences

Reviews and methods

Site: http://ies.ed.gov/ncee/wwc/
**Name:** Campbell Collaboration  
**Description:** International and non-profit organization that prepares, maintains, and disseminates systematic reviews  
**Topics:** education, social welfare, crime and justice  
**Site:**  
http://www.campbellcollaboration.org/
**International: EPPI Centre**

* **Name:** EPPI-Centre
* **Sponsor:** Social Science Research Unit at the Institute of Education, University of London
* **Databases:** Database of Education Research
* **Site:** http://eppi.ioe.ac.uk/cms/
Part D: Steps of Systematic Review

Main steps
Need for documentation
✎ Activity
Step 1: Define & document

1. Define & document
   1.1 Define research question
   1.2 Relevant reviews
   1.3 Define search criteria
   1.4 Define project
   1.5 Define team

2. Search & save

3. Select & expand

4. Appraise & code

5. Synthesize & write
Step 2: Search & save

2.1 Previous searches
2.2 Select databases
2.3 Develop search
2.4 Save & document
2.5 Translate for other databases & summarize
Step 3: Select & expand

1. Define & document
2. Search & save
3. Select & expand
4. Appraise & code
5. Synthesize & write

3.1 Screen by abstract
3.2 Select by full text
3.3 Expand search
3.4 Update the search
3.5 Evaluate the search
Step 4: Appraise & code

1. Define & document
2. Search & save
3. Select & expand
4. Appraise & code
5. Synthesize & write

Appraisal/coding plan
Qualitative analysis
4.1 Assess
4.2 Code
Quantitative analysis
4.3 Selection
4.4 Data extraction
Step 5: Synthesize & write

- Synthesis of data
- Parts of review
- Standards
- Getting published
What to document

**Objectives**
Describe objective of review

**Criteria**
List criteria for search

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Red boxes:
processes to describe

Blue boxes:
Articles moving through the process

Green boxes:
Articles removed from flowchart

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1. All literature
2. Expanded search
3. Database search
4. # Articles retrieved from database search
5. Remove duplicates
6. # of articles with dups removed
7. Relevancy check
8. # screened
9. # and Reasons not selected for screening

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What to document

- All literature
- Expanded search
- Database search
- # Articles retrieved from database search
- Remove duplicates
- # of articles with dups removed
- Relevancy check
- # screened
- # and Reasons not selected for screening
Documentation continued

# screened
• # and reasons not selected for full text selection process

Screening abstracts

# in selection process
• # & reasons selected for assessment

# in assessment
• # & reasons not selected for SR synthesis

Full text selection

Critical assessment

# of included in SR synthesis
• # and Reasons not selected for screening

Assessment for meta analysis

# included in quantitative synthesis
Part E: SR Service

- Systematic Review service
- Consultations
- Presentations
  - Worksheet for meeting with librarian
Who can use the service?
* all Texas A&M University students, faculty, and staff
* All Texas A&M Health Science Center

What is offered?
* Consultations
* Presentations
* Format:
  – in-person
  – online
Consultations

* Initial consultation
  – Set up criteria
  – Research plan
  – Locate relevant reviews

* Follow up consultations
  – Continue search
  – Demonstrate steps/provide examples

Request a consultation
Role of librarian

**as support:**
- guidance with systematic review steps
- databases need to be searched
- searching techniques and methods
- training on information management

**as contributor:**
- guidance with systematic review steps
- Design search strategy
- consultation on information management

**as author:**
- contributor plus:
  - management of searches
  - write methods section
  - creating tables about the process of the review
  - Screening and/or coding as appropriate

**Consultant is level for theses or dissertations.**
* Timing:
  * Varies 15 min - 4 hours
  * Multiple meetings is best
  * After assignment and topic has been selected
* Provide introduction to:
  – Systematic reviews
  – Methods
  – Search techniques
Next steps

• Have questions?
• Meet with a librarian
• Read articles/books

• See guide at link below

guides.library.tamu.edu/systematicreviews