# LAC Reads Capacity Program:
## A systematic review of the early grade reading literature from LAC

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# Overview of LRCP

- 5 year project funded by USAID
- Began in 2014
- Led by AIR in partnership with Juárez and Associates
- Targeted countries include:

| Dominican Republic | Jamaica |
|---|---|
| Guatemala | Peru |
| Haiti | Nicaragua |
| Honduras | Eastern Caribbean |

# Program Goal

The LAC Reads Capacity Program increases the impact, scale, and sustainability of early grade reading interventions in the LAC region. This is achieved through the development and dissemination of state-of-the-art knowledge resources and the provision of technical assistance to host country governments and other key stakeholders.

# Structure of the LRCP

**Result 1**
**Evidence and Resources**
- Evidence and resources on EGR are collected, consolidated, and systematized for practical use by LAC region stakeholders

**Result 2**
**Dissemination**
- Up-to-date knowledge about EGR is actively disseminated to targeted audiences and stakeholders

**Result 3**
**Capacity Building**
- Institutional capacity to implement proven approaches for improving EGR outcomes for poor and disadvantaged children is expanded

**Result 4**
**Sustainability**
- Sustainable platforms are in place through which efforts to improve EGR in priority LAC countries will be continued and strengthened

# What is a systematic review?

- A comprehensive, unbiased, and reliable summary of the evidence around a particular research question.

- According to Waddington, et al., (2012) systematic reviews have:

  - A clear protocol for systematically searching *all* relevant published and unpublished evidence over a defined time period

  - Transparent criteria for the inclusion or exclusion of studies

  - Transparent criteria for assessing the quality of each piece of evidence

  - A thorough analysis and reporting of findings

# Defining key terms

- Early Grade: Children from birth through grade 3 regardless of age.

- Evidence: a research or empirically derived body of facts that can be used to make informed decisions about education interventions (i.e., policies, practices, or programs)

- Resources: documents and materials that are either pedagogical in nature to be used directly or indirectly by teachers in the classroom or have been developed at an institutional level with the purpose of supporting or informing education

# Purpose of the review

- Provide a summary of the evidence on improving early grade reading skills in the LAC region over the last 25 years (since Education for All).  1990 - Present

# In conducting this review, we will:

- Organize, categorize and conduct a quality review of the existing evidence to help users of the review make more informed decisions based on the quality of the evidence provided.

- Identify gaps in the existing LAC early grade reading evidence, both to inform our audiences about them and to encourage researchers in the LAC region to continue adding to the knowledge base for EGR practices in the region.

- Synthesize the existing EGR literature from the LAC region and package it in accessible ways for our different stakeholder groups

# Expected outcomes will be:

- an online database which catalogues the existing EGR evidence from or on the LAC region

- summaries of the evidence organized into different topic areas and targeted to different stakeholders

- evidence gap maps to highlight existing research gaps in EGR in LAC; and

- customized plans to build the capacity of stakeholders in the region

# Research Questions

o What are the existing intervention- and non-intervention-based studies and literature from or on the LAC region involving reading programs, practices, policies and products focused on improving reading skills for children from birth through grade 3?

o What is the quality of the existing EGR evidence (experimental, quasi-experimental, qualitative, and theoretical) in the LAC region and what is its practical use for varied LAC region stakeholders?

o What are the gaps in the evidence base on EGR in the LAC region as compared to what we know globally about best practices in EGR?

# Research questions continued

o What is the impact of reading programs, practices, policies and products aimed at improving the reading skills for children from birth through grade 3 on reading outcomes in the LAC region?

o What strategies have been successful and what is the evidence for this success and which strategies were unsuccessful and why?

# Conducting the review

**Search for EGR evidence and resources**
1. Internet searches
2. Review of bibliographies
3. Identification of unpublished literature
4. Surveys with experts in the field

**Application of inclusion criteria**
1. Timeframe of publication (since 1990)
2. From or on the LAC region
3. Pertaining to children birth – grade 3
4. Focused on reading or writing
5. Has research question and methodology

**No to any 1** → **Excluded**

**Yes to all 4**

**EGR Evidence – Key indicators**
- Citation
- Country/region
- WB income level
- Type of document
- Document accessibility
- Language of publication
- Target group
- Key terms/tags
- Type of evidence
- Other

→ **Quantitative Intervention Quality Review Protocol**

→ **Qualitative Intervention Quality Review Protocol**

→ **Mixed Methods Intervention Quality Review Protocol**

→ **Non-Intervention Quality Review Protocol**

# Types of searches

1. Online searches:
   a) Databases
   b) Development focused databases/websites
   c) LAC-Region Databases and Websites
   d) Reading science and education psychology focused databases/websites
2. Review of bibliographies of solid articles and reports for other references
3. Identification of unpublished literature
4. Surveys with experts in the field

# Next steps after quality review

- **Conduct evidence gap mapping:**
  - identify areas in need of further research on EGR in the LAC region according to both the availability and quality of evidence.

- **Analyze the data:**
  - Meta-analyses
  - Qualitative synthesis

- **Dissemination of Evidence:**
  - Packaged according to different stakeholder needs (determined through stakeholder mapping and analysis)

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# Using computer science to improve the quality of systematic literature review

Evgeny Klochikhin, PhD

CSSIP, American Institutes for Research

# Outline

1. The context
2. Data
3. Approach
4. Results and validation
5. Analysis
6. Conclusion

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# The context

- Systematic literature reviews are widely spread in international development and education work

- Often costly and time consuming

- Human judgment plays significant role in identifying what is relevant and what not

- Hard to define boundaries of the "knowledge universe" in a robust way

# Advantages of using computer science

- Cost effective: machine learning facilitates decisions on relevance and data extraction

- Robustness improvements: how to capture data more systematically?

- Better coverage: how to get more data sources?

- Less subject to human error: humans curate/validate the selections but model has only one set of relevance parameters through all documents

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# Data sources

- Sage
- Science Direct
- Taylor&Francis
- Wiley
- Cochrane Library
- JSTOR Arts & Sciences Collections I through X and Business III
- Within EBSCO:
  - *Academic Search Premier*
  - *EconLit*
  - *Education Source*
  - *ERIC*
  - *Psychology and Behavioral Sciences Collection*
  - *PsycINFO*
  - *SocINDEX with Full Text*
- WorldCat
- Development Experience Clearinghouse

# Outline

1. The context
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3. <span style="color:red">Approach</span>
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# Approach 1: Use search terms (Boolean logic)

1. **English:** (Read* OR Litera* OR writ* OR communic*) AND (primary sch* OR primary grad* OR "grades 1 through 3" OR "grades 1 to 3" OR "grades 1-3" OR "first through third" OR "Grade 1" OR first grade* OR "grade 2" OR second grade* OR "grade 3" OR third grade* OR early grade* OR elementary OR kinder* OR pre-school* OR preschool* OR prekindergarten* OR preK OR pre-K OR "early childhood") AND (Latin America* OR Caribbean OR South America* OR Antigua* and Barbuda OR Argentin* OR Aruba OR Bahama* OR Barbados OR Beliz* OR Bermud* OR Bolivia* OR Brazil* OR "British Virgin Islands" OR "Cayman Islands" OR Chile* OR Colombia* OR Costa Ric* OR Cuba* OR Curaca* OR Dominica* OR "Dominican Republic" OR Ecuador* OR El Salvador* OR French Guiana* OR Grenada* OR Guadeloup* OR Guatemala* OR Guyana* OR Haiti* OR Hondura* OR Jamaica* OR Martinique OR Mexic* OR Mont Serrat OR "Netherlands Antilles" OR Nicaragua* OR Panama* OR Paraguay* OR Peru* OR "Puerto Ric*" OR "Saint Barthelemy" OR "Saint Kitts and Nevis" OR Saint Lucia* OR "Saint-Martin" OR "Saint Vincent and the Grenadines" OR "Sint Maarten" OR Surinam* OR "Trinidad and Tobago" OR "Turks and Caicos" OR Uruguay OR "Virgin Islands" OR Venezuela)

2. **Spanish:** (Leer OR Lecto-escritura OR Alfabetiz* OR "Ambiente letrado") AND ("la escuela primaria" OR "grados de primaria" OR "grados 1ero a 3ero" OR "grados 1 a 3" OR "grados 1-3" OR "de primer grado a tercer grado" OR "Grado 1" OR "primer grado" OR "primeros grados" OR "primer grado" OR "grado 2" OR "segundo grado" OR "grado 3" OR "tercer grado "OR "grados iniciales" OR "grados tempranos" OR "educación preescolar" OR "Educación maternal" OR "jardín de infancia" OR "Jardines de infancia" OR Kinder* OR preescolar OR pre-kindergarten OR "primera infancia " OR "Educación Inicial") AND ("Latino América" OR Caribe OR "Sud América" OR "América del Sur" OR "Antigua y Barbuda" OR Argentin* OR Arub* OR Baham* OR Barbados OR Belice* OR Bermud* OR Bolivi* OR Brasil OR "Islas Vírgenes Birtánicas" OR "Gran Cayman" OR Chil* OR Colombi* OR "Costa Rica" OR Cub* OR Curaca* OR Dominica* OR "República Dominicana" OR Ecuador* OR "El Salvador" OR "Guayana Francesa" OR Grenada* OR Guadalupe OR Guatemal* OR Guyana* OR Guayana OR Haiti* OR Hondur* OR Jamaic* OR Martinic* OR Méxic* OR "Mont Serrat" OR "Antillas Holandesas" OR Nicaragu* OR Panamá* OR Paraguay* OR Perú* OR "Puerto Ric*" OR "San Bartolomé" OR "Saint Kitts y Nevis" OR "Saint Lucia" OR "Saint-Martin" OR "Saint Vincente y Granadines" OR "San Martín" OR Surinam OR "Trinidad y Tobago" OR "Turks y Caicos" OR Uruguay OR "Islas Vírgenes" OR Venezuel*)

3. **French:** …

4. **Dutch:** …

5. **Portuguese:** …

# Approach 1: Use search terms

- Different databases have different search interface
- Making systematic searches across multiple databases is practically impossible
- Collect as much as possible (better filter later than lose at start)

# Approach 2: Use wikilabels

## Wikipedia pages

- ✓Dual language
- ✓Emergent literacies
- ✓First language
- ✓Fluency
- ✓Free writing
- ✓Grammar
- ✓Language education
- ✓Language proficiency
- ✓Listening
- ✓Literacy

- ✓Orthography
- ✓Outcome-based education
- ✓Phonemic awareness
- ✓Phonics
- ✓Phonological awareness
- ✓Reading (process)
- ✓Reading comprehension

- ✓Second-language acquisition
- ✓Second language
- ✓Spoken language
- ✓Transitional bilingual education
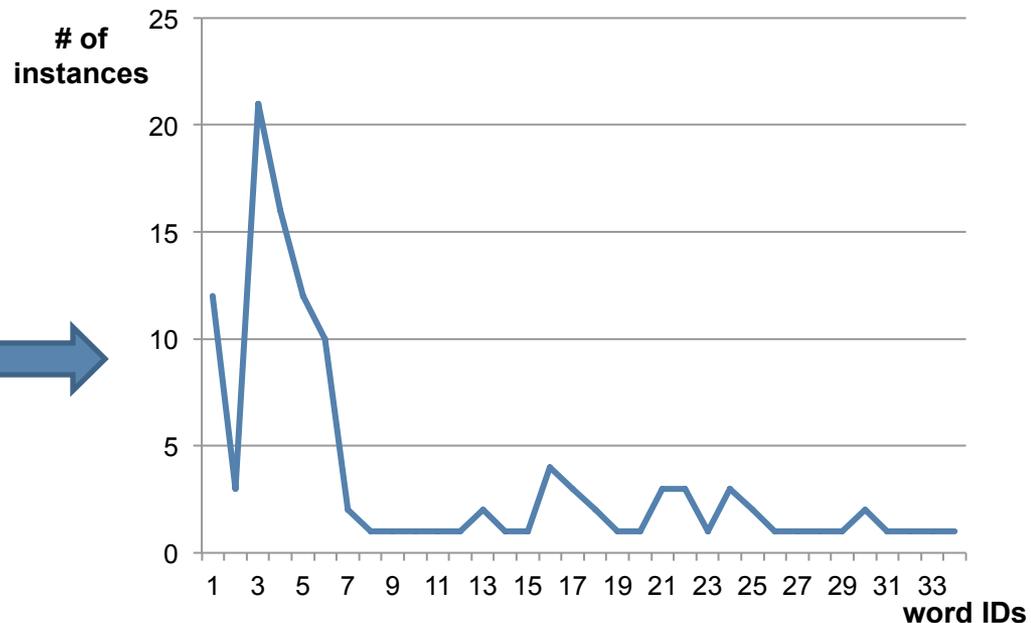- ✓Understanding
- ✓Vocabulary
- ✓Writing

# Approach 2: text as 'bags-of-words'

- Vector space representation of text – every word has its unique id (e.g., 'literacy'=0, 'education'=1, 'primary'=2, 'school'=3, etc.) and the number of occurrences within the document:
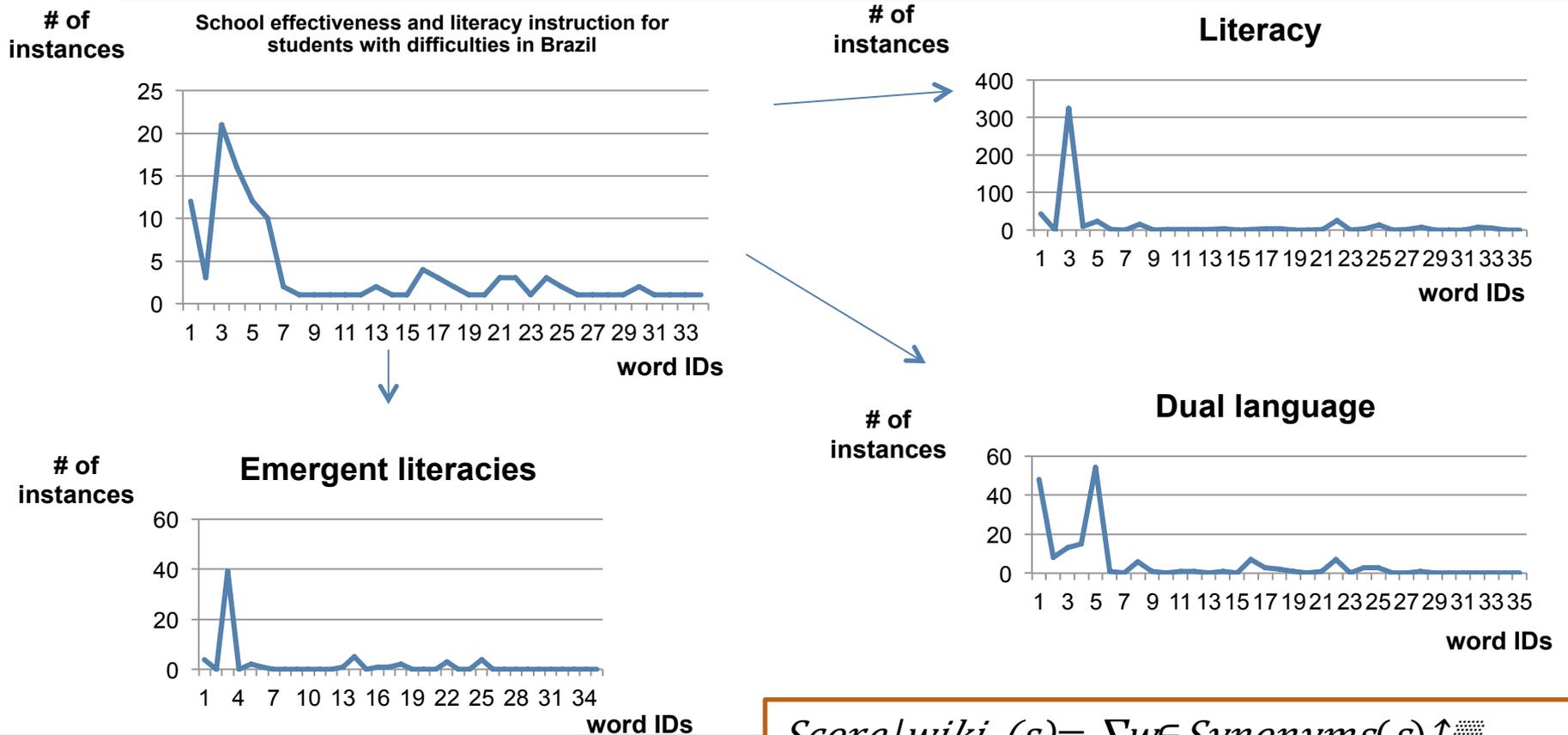
**School effectiveness and literacy instruction for students with difficulties in Brazil**

**Abstract**

Many students in Brazilian primary schools perform below expected levels in literacy. Despite evidence that schools can be organized to promote high-quality literacy instruction and achievement, few school effectiveness studies focus explicitly on literacy and few literacy studies examine school factors. Also, few studies explore how schools can be effective at teaching students with difficulties. Presuming that improving literacy achievement requires whole-school effort, this dissertation examines school factors that may influence literacy achievement in a sample of schools focusing on raising achievement of students with literacy difficulties in Brazil. The research was conducted in schools that had participated in the Escola Que Vale Program, a literacy professional development program…

# Approach 2: fitting the labels

**# of instances**

**School effectiveness and literacy instruction for students with difficulties in Brazil**



**# of instances**

## Literacy



**# of instances**

## Emergent literacies



**# of instances**

## Dual language



$$Score{\downarrow}wiki\ (s)= \sum w{\in}Synonyms(s){\uparrow}▓\ tf{\downarrow}wiki\ (w)/|Synsets(w)|$$

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# Results: 9,696 abstracts from all sources

- Computing and Engineering in Afterschool. Afterschool Alert. Issue Brief No. 62
- Negotiating worlds: a young Mayan child developing literacy at home and at school in Mexico.
- Learning the ABCs in a Haitian Preschool: A Teacher's Story.

- Ritual literacy: the simulation of reading in rural Indian Mexico, 1870-1930.
- The use of Curriculum-Based Measurement with language-minority students.
- Users' attitudes towards Web 2.0 communication tools in collaborative settings: A case study with early childhood education students

**WikiLabeling –
857 docs**

**277**

Search term
approach –
**694 docs**

- They Call Me "Maestra": Preservice Teachers' Interactions with Parents in a Reading Tutoring Program
- Intercultural Education and Literacy: An Ethnographic Study of Indigenous Knowledge and Learning in the Peruvian Amazon. Studies in Written Language and Literacy, Volume 7.
- Social capital and student learning: Empirical results from Latin American primary schools

# Validation

- Create samples (n=100) where 80% of documents are defined as relevant by machine learning and 20% are irrelevant

- Distribute among experts

- Compute type **I** (false negatives) and type **II** errors (false positives):

  - ✓ *recall=|{relevant documents}∩{retrieved documents}|/|{relevant documents}|*

  - ✓ *precision=|{relevant documents}∩{retrieved documents}|/|{retrieved documents}|*

# Validation

| | Expert 1 | Expert 2 | Expert 3 | Expert 4 | AVERAGE |
|---|---|---|---|---|---|
| Type I | 0 | 0.04 | 0.02 | 0.06 | **0.03** |
| Type II | 0.66 | 0.68 | 0.66 | 0.68 | **0.67** |

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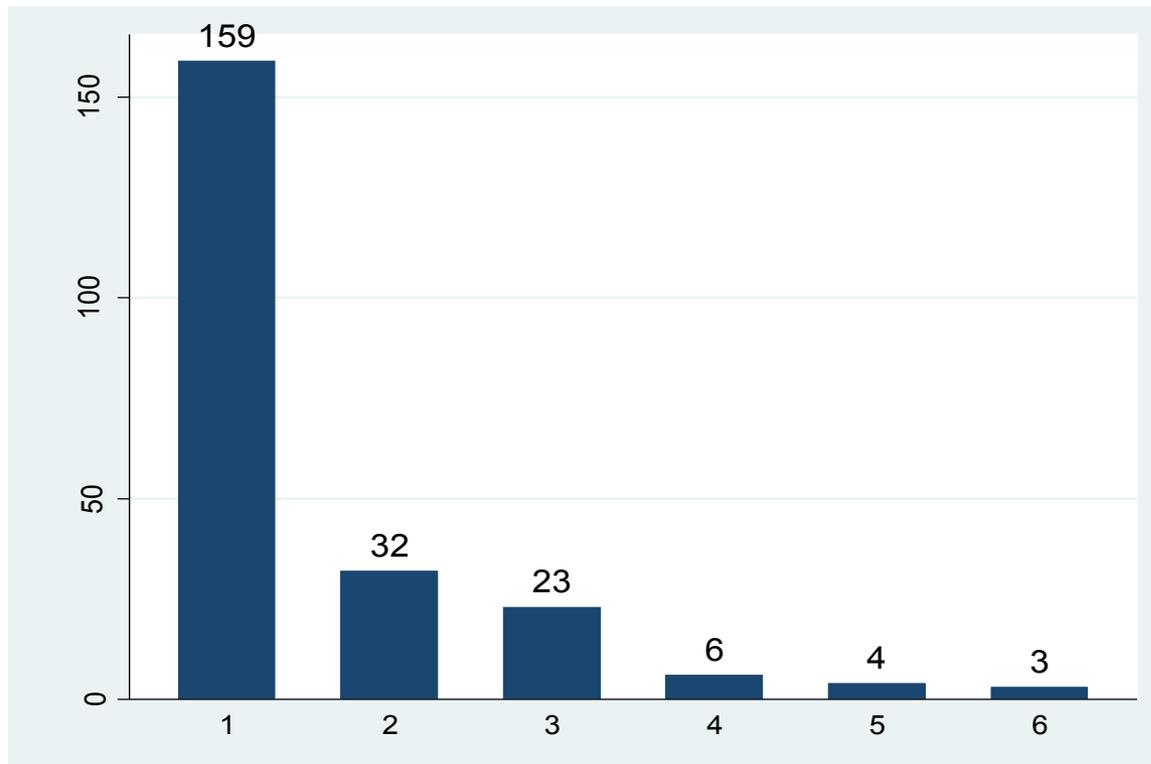6. Conclusion

# Approach 3: topic modeling (D. Newman)

- The topic model is an algorithm that automatically learns topics (themes) from a collection of documents
  - It works by observing words that tend to co-appear in documents, for example *gene* and *dna, or climate* and *warming*
  - The topic model assumes each document exhibits multiple topics
  - The topic model learns topics *directly from the text*

- Each topic is displayed by showing its top-20 words, for example:
  - phonological awareness correlation cognitive reader task spelling showed ability relationship group suggest processing spanish-speaking visual significantly similar good tested ...
  - This is a topic about *Phonological Awareness in Spanish-speaking children*

# Top-5 topics

(out of 25; based on 137 clearly relevant articles)

| Topic ID | Label | Full topic |
|---|---|---|
| 4 | Influence of socioeconomic measures on early literacy outcomes | skill preschool low literacy spanish sample habilidades vocabulary high chilean childrens socioeconomic measure emergent implication discussed author kindergarten attended |
| 2 | Teacher literacy practices and the effect on student learning outcomes | teacher literacy practice classroom intervention student effect finding school impact effective present new family control develop class work collected |
| 7 | Phonological awareness in Spanish-speaking children | phonological awareness correlation cognitive reader task spelling showed ability relationship group suggest processing spanish-speaking visual significantly similar good tested |
| 1 | Writing as an essential component of literacy | writing linguistic difference public observed grade process developed role based ninos considered lectura significant analyzed inicial type two term |
| 12 | Evaluations and assessments of literacy | instrument aged assessed studied statistical test better yr ass initial ability 1st according evaluated beginning evaluate preschooler show evidence |

# Reviews of Education: What Gets Included?



Evans & Popova, 2015

# Systematic Review: Definition

- Systematic critical appraisal of literature
- Synthesis of literature (Waddington et al., 2012)

# Inclusion Randomized Controlled Trials, Quasi-Experimental Evaluations, and Multivariate Regression
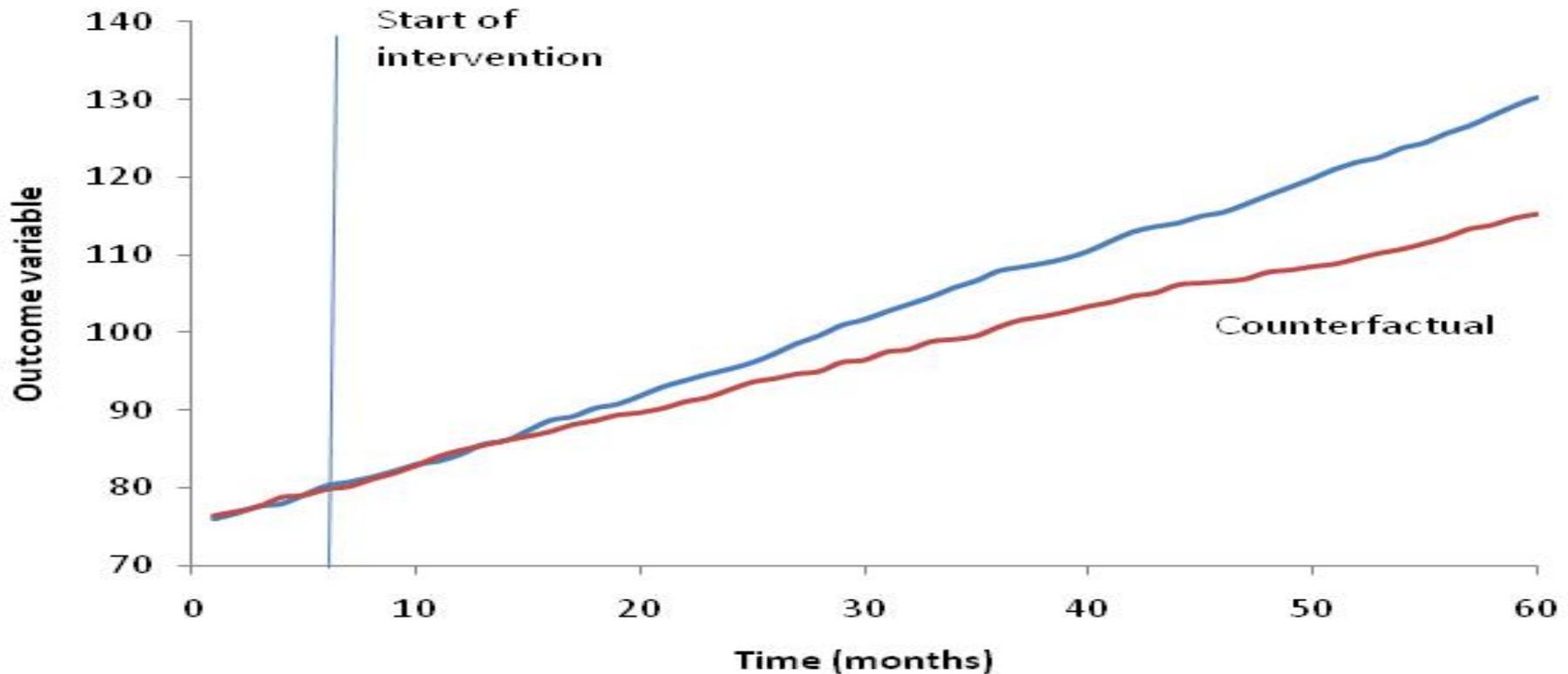
# Inclusion Qualitative Studies

Systematic reviews that only include quantitative evidence can be considered too rigid, failing to address other important questions, such as why an intervention does not work (Snilstveit, Oliver, & Vojtkova, 2012)

- In-Depth Interviews
- Ethnography
- Focus-Groups

# Inclusion Non-Intervention Studies

Systematic reviews that only include evaluations may not be able to teach us much about the mechanisms of learning how to read

- Regression studies
- Factor analysis
  - Fluency, phonological awareness, language, decoding, letter knowledge comprehension etc.

# Risk of Bias Assessment Quantitative

1. Selection bias: "It is not clear whether the randomization was successful. The randomization was based on a relatively small sample of 4 treatment and 4 control schools. The authors do not show a table demonstrating balance across observable and unobservable characteristics."

2. Performance bias: "The beneficiary teachers and control teachers come from the same school, suggesting that bias resulting from spillovers is an important concern."

3. Outcome Reporting Bias: "There are serious inconsistencies in the reporting. The results reported in the text do not match those reported in the tables."

4. Other biases: "The study uses self-reported measures of literacy."

# Risk of Bias Assessment Qualitative

1. Recruitment of participants: "The authors did not explain how the participants were selected."

2. Data collection tools: "The authors did not describe their interview guides and data format."

3. Data saturation: "There was no mention of data saturation as reason for stopping for recruitment."

4. Researcher-participant relationship: "The authors did not report information about the researcher-participant relationship."

5. Data-analysis: "The authors did not describe the analysis of the data in sufficient detail."

# Effects Self-help Groups on Economic Empowerment: RCTs + Medium-Risk Selection-Bias Studies

| Study ID | ES (95% CI) | % Weight |
|---|---|---|
| Banerjee et al., 2014 India | 0.01 (-0.04, 0.05) | 20.32 |
| De Hoop et al., 2014 India | 0.03 (-0.21, 0.27) | 12.15 |
| Pitt et al., 2006, Bangladesh | 0.12 (0.03, 0.21) | 18.81 |
| Deininger and Liu, 2013 India | 0.28 (0.20, 0.36) | 19.34 |
| Desai and Joshi, 2012, India | 0.28 (0.12, 0.45) | 15.45 |
| Sherman et al., 2010, India | 0.30 (-0.11, 0.70) | 6.80 |
| Kim et al., 2009 + Pronyk et al., 2006, South Africa | 0.45 (0.06, 0.84) | 7.14 |
| Overall (I-squared = 86.8%, p = 0.000) | 0.18 (0.05, 0.31) | 100.00 |

NOTE: Weights are from random effects analysis

0.18 (0.05, 0.31)

-.842    0    .842

Impact SHGs on Economic Empowerment Based on RCTs and Medium Risk of Bias Quasi-Experimental Studies

# Effects on Economic Empowerment High-Risk Selection-Bias



Study ID — ES (95% CI) and % Weight

| Study ID | ES (95% CI) | % Weight |
|---|---|---|
| Osmani, 2007, Bangladesh | 0.37 (-0.10, 0.83) | 29.31 |
| Nessa et al., 2012, Bangladesh | 0.65 (0.41, 0.89) | 53.34 |
| Swendeman et al., 2009, India | 1.15 (0.47, 1.83) | 17.36 |
| Overall (I-squared = 42.1%, p = 0.178) | 0.65 (0.33, 0.98) | 100.00 |

NOTE: Weights are from random effects analysis

0.65 (0.33, 0.98)

-1.83    0    1.83

Impact SHGs on Economic Empowerment Based on High Risk of Bias Studies

# Character of this Systematic Review

1. Include all evidence regardless of the quality
2. Weigh the importance of the evidence based on the quality
3. Aim for maximum use of high-quality evidence among policy makers

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