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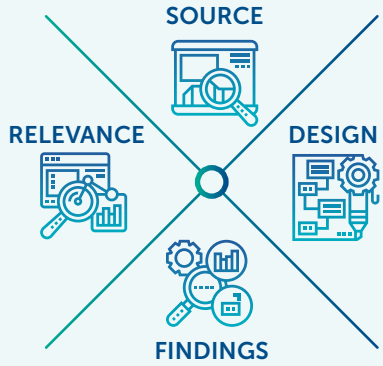
Reviewing Research Studies: Examples and Applications

Purpose

This guide is a companion to The Basics of Reviewing a Research Study reference guide and will provide you with four examples of how to apply the concepts for reviewing a research study. It provides considerations for each of the example studies under four main topics for reviewing studies:

- Study Source: Where the research comes from.
- Study Design: How the study was designed and carried out.
- Study Findings: The measures of the intervention's effectiveness and strength.
- Study Relevance: How the research may apply to your context.



Intended Use

This guide is intended to be used as a companion to The Basics of Reviewing a Research Study to help state education agency, school district, and school staff apply and practice the concepts of how to review research studies to identify high-quality, evidence-based interventions that meet their needs.

The guide presents four fictitious studies and provides, for each topic area, an evaluation of each element of the studies. For the purpose of this example, you work as the English Language Arts Director in a medium-sized urban district (approximately 6,000 students) that serves a student population that is 70% economically disadvantaged; 12% English learner students; 10% eligible for special education services; 35% Latinx/Hispanic, 21% African American, 2% Native American/Alaskan Native, and 42% White. Your district is looking to improve its kindergarten through grade 3 reading outcomes. You and your colleagues are most interested in exploring effective core reading programs to improve phonics instruction but will also consider intervention and supplemental programs for early grade literacy. Your school board has also suggested you explore professional learning opportunities for teachers and broader reading frameworks. You have assembled a group of staff including the district curriculum director, district reading coach, and several coaches and teachers from across the district. You are considering four potential strategies to improve K–3 reading outcomes and are reviewing the studies associated with each.

Example Studies

Below is a brief description of each of the studies you and your colleagues are reviewing to inform your selection of an evidence-based strategy to improve K–3 reading.

Study 1

- **Intervention:** K–2 reading intervention program to bring struggling students up to grade level, typically provided for 90 days.
- **Source:** Conducted by a university-affiliated research center not associated with the program. Your team accessed the study from ERIC.ed.gov. The study was published in a peer-reviewed journal.
- **Design:** Randomized Controlled Trial (RCT) that lasted for 180 days.
- **Sample:** The study included 427 student participants in nine schools across two school districts (one rural, one suburban); 85% economically disadvantaged, 4% English learners, and 9% eligible for special education services; 37% Hispanic, 34% African American, and 29% White. A total of 60 students dropped out of the study though the study did not specify how many from the treatment or control groups. Baseline scores for each group were reported.
- **Overall Results:** Students in K and grade 1 assigned to the intervention had statistically significantly higher scores on the aligned program assessment and Dynamic Indicators of Basic Early Literacy Skills (DIBELS) compared to K and grade 1 students in the control group. Students in grade 2 assigned to the intervention had statistically significantly higher scores, compared to grade 2 students in the control group, on the aligned program assessment only. No effect size was reported.
- **Subgroup Results:** All subgroup findings mirrored the main findings except English learners in the treatment group did not make statistically significant achievement gains compared to English learner students in the control group. This was true in all grades studied.

Study 2

- **Intervention:** Core reading program that emphasizes phonics mastery for K–3 students.
- **Source:** Conducted by the research team of the program publisher and published internally. Your team accessed the study from the program publisher's website. The study was not peer reviewed.
- **Design:** Treatment and comparison groups were followed over one semester in a correlational design with no statistical controls to account for differences between the groups and no pre-test measures. The study did not describe baseline characteristics of the groups to establish that they were not meaningfully different before the intervention.
- **Sample:** The study included 1,000 student participants in 10 schools in a suburban district in an Eastern state; 15% economically disadvantaged, 3% English learners, and 10% eligible for special education services; 25% Hispanic, 15% African American, and 60% White. No report of how many students dropped out of the study.
- **Overall Results:** Students who received instruction in the core reading program performed better than students who did not, as measured by the third-grade state language arts exam. The differences were statistically significant at $p<.05$. The reported effect size was .35.
- **Subgroup Results:** Results were consistent across subgroups.

Study 3

- **Intervention:** A framework to improve students' reading achievement scores.
- **Source:** Conducted and published by a third-party research team. Your team accessed the study from a foundation website describing itself as non-partisan. The study was not peer reviewed.
- **Design:** Correlational modeling and matching techniques were used to compare third grade reading scores from schools that have implemented the framework with matched, non-implementing schools' scores using statistical controls to account for differences between the groups. However, the study did not describe what characteristics were used to establish these statistical controls and there were no pre-test measures to establish the groups were not meaningfully different prior to the intervention.
- **Sample:** The study included 15,255 third grade students from 93 schools implementing the framework and 104 schools not implementing the framework from a Midwestern state. A total of 25 schools implementing the framework dropped out of the study, but no report of how many students this involved.
- **Overall Results:** There is a statistically significant, positive relationship between schools' usage of the framework and increased school-level student proficiency on the state's third grade English Language Arts exam. "Moderate" effect size reported.
- **Subgroup Results:** Results were consistent across all school types (e.g., urban, rural, charter, non-charter).

Study 4

- **Intervention:** Professional development model on reading instruction and student outcomes in first grade classrooms.
- **Source:** Conducted by an independent research team. Your team accessed the study from ERIC.ed.gov. The study was published in a peer-reviewed academic journal.
- **Design:** Teachers were randomly assigned to treatment and control groups. A small sample of students were also randomly selected from each teacher's classroom.
- **Sample:** The sample included a total of 165 first grade teachers at 55 urban and suburban schools and a sample of 143 of their students. The overall attrition of the student sample was 32%. Teacher attrition was smaller (5% for the intervention group and 6% for the control group). No baseline scores were reported for students or teachers.
- **Overall Results:** Teachers who took part in the professional development were more likely to practice target instructional strategies. This relationship was statistically significant ($p<.05$). Students who received instruction from the participating teachers were not more likely to score higher on DIBELS testing, and the results were not significant. No effect size reported.
- **Subgroup Results:** Results were consistent across subgroups.

Study Source: Where the research comes from

Element	Study 1	Study 2	Study 3	Study 4
Credibility	Accessed from ERIC.ed.gov	Accessed from the program publisher's website	Accessed from a foundation website describing itself as non-partisan	Accessed from ERIC.ed.gov
Peer Review	Yes	No	No	Yes
Independent Researcher	Yes; university-affiliated research center not associated with the program	No; research team is from the program publisher	Yes; third-party research team	Yes; independent research team

CONFIDENCE IN STUDY'S CREDIBILITY

Less confidence — More confidence

Study 2

- Study not from a credible source
- Not peer reviewed
- Researcher developed the intervention

Study 3

Study 1 and Study 4

- Study from a credible source
- Peer reviewed
- Researcher was independent from intervention development

Study Design: How the study was designed and carried out

Element	Study 1	Study 2	Study 3	Study 4
Study Design	Randomized controlled trial	Correlational design, but no statistical controls to account for differences between the groups	Correlational design with statistical matching and controls	Randomized controlled trial
Baseline Equivalency	Because assignment to groups was randomized, baseline equivalency is not necessary to establish	No; there were no pre-test measures and no description of characteristics to establish the groups were not meaningfully different prior to the intervention	No; there were no pre-test measures and no description of characteristics used to match groups and establish the groups were not meaningfully different prior to the intervention	Because assignment to groups was randomized, baseline equivalency is not necessary to establish
Sample	Large sample size (427 students) Multi-site (9 schools and 2 districts) Some attrition, with no report of which group the students dropped out from during the study	Large sample size (1,000 students) Multi-site (10 schools) Attrition not reported	Large sample size (15,255 students) Multi-site (197 schools) High attrition in the treatment group (25 schools implementing the framework dropped out of the study, but no report of how many students this involved)	Small sample size (165 teachers and 143 students) Multi-site (55 schools) High attrition (32% of students; 5% for intervention teachers and 6% for control teachers)
Outcome Measures	Pre-established measures (DIBELS) as well as a program-embedded assessment	Pre-established measures (state language arts exam)	Pre-established measures (state language arts exam)	Pre-established measures (DIBELS) as well as program-embedded teacher observation measures

CONFIDENCE IN STUDY'S DESIGN

Less confidence — More confidence

Study 2 Study 3 Study 4 Study 1

- Weaker research design
- No comparison group
- Smaller sample
- Many study participants drop out of the study
- Use of an outcomes measure designed by the developer
- None of the outcomes measured are relevant to the intervention

- Stronger research design
- Use of a comparison group
- Larger sample
- Few study participants drop out of the study
- Use of an established outcome measure not designed by the developer
- At least one of the outcomes measured is relevant to the intervention

Study Findings: The measures of the intervention's effectiveness and strength

Element	Study 1	Study 2	Study 3	Study 4
Statistical Significance	Yes, on both outcome measures for grades K–1 but only on the program-embedded assessment for grade 2. No statistically significant outcomes for English learner students	Yes, consistent across all groups	Yes, consistent across all school types	Statistically significant for teacher outcomes, but not for student outcomes, consistent across all groups
Effect Size	Not reported	Effect size was .35 and from a less rigorous study design, which can tend to produce larger effect sizes	Reported as "moderate" but not specified and from a less rigorous study design, which can tend to produce larger effect sizes	Not reported

STATISTICAL SIGNIFICANCE OF THE FINDINGS AND MAGNITUDE OF THE EFFECTS

All four studies

- No statistical significance on an outcome of interest
- Statistical significance on an outcome of interest

Study 3 **Study 2**

- Smaller effect size
- Larger effect size

Study Relevance: How the research may apply to your context

Element	Study 1	Study 2	Study 3	Study 4
Match to Your Population and Setting	Rural and suburban setting with some alignment with your student population	Suburban setting in an Eastern state with a less economically, linguistically, and ethnically diverse student population than yours	Diverse set of schools in a Midwestern state, but unsure of the specifics about the student population in the study	Urban and suburban setting, but unsure of the specifics about the student population in the study
Match to Your Needs	Targets reading outcomes for K–2 students struggling to read, though you hope to improve K–3 reading scores for all students	Targets K–3 phonics mastery which is well matched to your needs and desired outcomes	Targets reading achievement in third grade as a schoolwide framework, though you hope to find a more specified reading program	Primarily targets teacher-level outcomes, not student-level reading outcomes

RELEVANCE OF THE STUDY'S FINDINGS

Less relevant — More relevant

Study 4 **Study 3** **Study 1** **Study 2**

- Population in the study does not match your population
- Setting of the study does not match your setting
- Outcomes in the study do not match your outcomes of interest

- Population in the study matches your population
- Setting of the study matches your setting
- Outcomes in the study match your outcomes of interest

Next Steps

You and your team discuss and weigh all of this information to inform your decision about which intervention might best fit your needs and context, knowing there is no "right" or "wrong" answer. Collectively, you decide to do a deeper exploration of the intervention in Study 1 that targets struggling K–2 students since you have confidence in its source and design, its findings are positive and statistically significant (though you have some concerns about grade 2 outcomes and English learner outcomes that you want to further explore), and it is fairly relevant to your population, setting, and needs. You and your team agree to look for additional studies on the intervention that may fill in some gaps in the current study and help you decide if you want to adopt the program to improve K–3 reading achievement in your district.

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