IES Institute of Education Sciences

APPENDIXES
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Regional Educational Laboratory Pacific
At McREL International

Evidence and Gap Map of Tier 2 Literacy Interventions for Grades K–3 in the Commonwealth of the Northern Mariana Islands

Appendix A. Study review protocol

Appendix B. Study details

Appendix C. List of 37 studies reviewed using the What Works Clearinghouse 5.0 evidence standards

See the full report on the Institute of Education Sciences website.

Appendix A. Study review protocol

This review protocol guided the research review of Tier 2 literacy interventions conducted for the Commonwealth of the Northern Mariana Islands (CNMI) Public School System (PSS).

Purpose statement

In 2019 only 24 percent of grade 3 students in the CNMI PSS were reading at or above grade level, as measured by the ACT Aspire (Grindal et al., 2021). This situation was exacerbated by the Covid-19 pandemic in 2020. More students have been identified for Tier 2 services—defined as targeted interventions for students at risk of not meeting benchmarks—than CNMI PSS can serve. Wanting to get students back on track faster, CNMI PSS asked Regional Educational Laboratory (REL) Pacific to identify the state of evidence on Tier 2 literacy interventions for students in grades K-3 and recommend interventions and strategies that CNMI PSS could implement to improve student literacy.

Key definition

In this review a Tier 2 early literacy intervention is defined as a supplemental instructional program delivered to students who require instructional support in addition to the Tier 1 core reading program. Tier 2 interventions include literacy learning goals for students and are designed to directly affect reading or writing achievement. Tier 2 interventions are intended to be preventive, with the goal of getting students on track with reading achievement. They are typically delivered in a small-group setting and include direct instruction, scaffolding, and student interaction (Wanzek et al., 2016).

Literature search methodology

Prior to conducting the literature search for potentially eligible studies of Tier 2 early literacy interventions, REL Pacific had a meeting with the CNMI Data Wayfinding Partnership for the Improvement of Literacy. During this meeting REL Pacific collected information about the Tier 2 literacy interventions that interested members of the

partnership, which included Achieve3000, Amira Reading, Lalilo, Reading Mastery, and HMH Into Reading. These interventions either were previously implemented in CNMI PSS or are of interest to partnership members.

To supplement this list, the REL Pacific study team referred to the Academic Interventions Tools Chart from the National Center on Intensive Intervention, updated in September 2021 (National Center on Intensive Intervention, 2021). This chart includes studies on programs beyond the core curriculum that focus on small groups of students to improve academic outcomes for students whose needs are not adequately addressed by core instruction. In addition, the study team conducted a Google search using keywords, such as "Tier 2 literacy interventions" and "Tier 2 early reading interventions," to identify additional interventions. This customized list of Tier 2 literacy interventions for grades K-3 served as specific search terms in the electronic search to identify literature relevant to the review and ensure a reasonable number of results.

The study team used standard What Works Clearinghouse (WWC) keywords for impact and study design in the electronic search. The search strategy included five categories of search terms: impact, outcomes, Tier 2 interventions, study design, and population. In searching each electronic database, these terms were combined using Boolean operators ("or" within each category and between sets of search terms). The search terms for literacy outcomes were derived and adapted from the WWC's *Systematic Review Protocol for English Language Arts Interventions, Version 4.1* (What Works Clearinghouse, 2021) (see box A1 for the full list of search terms by category). These terms were used to search for journal articles, research reports, or technical reports published between 2013 and 2023 across the following electronic databases:

- Academic Search Complete.
- Business Source Corporate Plus.
- Cochrane Database of Systematic Reviews.
- EconLit.
- E-Journals.
- Education Resource Information Center (ERIC, EBSCO version).
- JSTOR Journals.
- MEDLINE Complete.
- PubMed.
- PsycInfo.
- Science Direct

Box A1. Search terms by category

Impact	achiev*	effect*	growth	progress
	affect*	efficac*	impact*	reduc*
	benefit*	evaluat*	improv*	success*
	decreas*	gain	increas*	
Outcomes	Alphabetic*	Fluency	Phonetics	Reading
	Aural learning	Language	Phonics	Verbal development

	Comprehension	Letter identification	Phonological	Vocabulary
	Decoding	Lexicography	Print awareness	Vocalization
	ELA	Literacy	Print knowledge	Word recognition
	English language arts	Phonemic	Readability	Writing
Tier 2 interventions[a]	Tier 2 Literacy	Great Leaps	Peer-Assisted Learning Strategies	S.P.I.R.E. Hybrid
	Tier 2 Reading	Headsprout	Power Readers	Seeing Stars
	Achieve Intervention	HMH Into Reading	QuickReads	Smarty Ants
	Achieve3000	iRead	READ 180	Sound Partners
	Amira Reading	i-Ready Personalized Instruction	Read Aloud Small-Group Curriculum	Stepping Stones to Literacy
	Burst:Reading	iSPIRE	Read Naturally	Structured Supplemental Spelling Instruction
	ClassWide Peer Tutoring	Istation	Read Right	Supercharged Readers
	Early Intervention in Reading	Lalilo	Read Well	System 44 Next Generation
	Enhanced Core Reading Instruction	Learning Strategies Curriculum	Reading for All Learners	Tutoring Buddy
	Enhanced Proactive Reading	Leveled Literacy Intervention	Reading Mastery	Visualizing and Verbalizing for Language Comprehension
	Failure Free Reading	Lexia Core5 Reading	Reading Plus	Voyager Passport
	Fast ForWord	Lindamood Phoneme Sequencing	Reading Recovery	Words Their Way
	Fluency Formula	mCLASS	Recipe for Reading	
	Fundations	MindPlay Virtual Reading	Responsive Reading Instruction	
Study design	ABAB	crossover design*	mixed-method	quasiexperiment*
	alternating treatment*	cross-over design	multielement	quasi-experiment*
	assess*	difference in differences	multi-element	QED
	assign*	empirical	multiple baseline	random*

	baseline	evaluation*	multiple probe*	regression discontinuity
	causal*	experiment*	post test*	reversal design*
	changing criteri*	intervention*	posttest*	simultaneous treatment*
	comparison condition*	intervention condition*	post-test*	single case
	comparison group*	matched	pre test*	single subject
	control*	matched meta analy*	pretest*	treatment*
	control condition*	meta analy*	pre-test*	treatment revers
	control group*	metaanaly*	propensity score*	trial
	counterfactual	mixed method	quasi experiment*	withdrawal
Population	child*	elementary	grade*	kindergarten
				K-3

* Indicates a wildcard character.

a. This list represents the Tier 2 interventions identified through an initial meeting with the Commonwealth of the Northern Mariana Islands Data Wayfinding Partnership for the Improvement of Literacy and through the preliminary search conducted by the study team.

Additionally, the study team conducted a hand search of unpublished studies (grey literature) using the following organizations listed in the WWC's *Systematic Review Protocol for English Language Arts Interventions, Version 4.1* (What Works Clearinghouse, 2021):

- American Educational Research Association (AERA)
- American Evaluation Association (AEA)
- American Federation of Teachers (AFT)
- Association for Public Policy Analysis and Management (APPAM)
- Center for Data-Driven Reform in Education (CDDRE) at Johns Hopkins University
- Center for Research in Educational Policy (CREP)
- Center on Education Policy
- Center on Instruction
- Consortium for Policy Research in Education (CPRE)
- Florida Center for Reading Research (FCRR)
- Iowa Reading Research Center
- Language and Literacy Research Center (LLRC) at the University of Maryland
- Literacy Development and Research Center (LDRC) at Old Dominion University

- Literacy Research Association
- Literacy Research Center and Clinic (LRCC) at the University of Wyoming
- Minnesota Center for Reading Research (MCRR)
- National Education Association (NEA)
- National Institute of Child Health and Human Development (NICHD)
- National Reading Panel
- Pacific Resources for Education and Learning (PREL)
- Public Policy Research Institute at Texas A&M University
- Society for Research on Educational Effectiveness (SREE)
- Southwest Educational Development Laboratory (SEDL)

A lead reviewer visited each organization's websites and used the search term "Tier 2 literacy" on publications, repositories, and research report pages to find relevant literature. The electronic search yielded 256 studies, and the grey literature search identified an additional 11 studies.

Screening process and study eligibility criteria

The study team reviewed the abstracts and full texts of 267 studies identified through the literature search to determine their eligibility. To be eligible for review, studies had to meet the following relevancy criteria:

- **Publication date**. Published or produced from 2013 to 2023.
- **Study design**. Used randomized controlled trials, quasi-experimental designs, regression discontinuity designs, or single case designs.
- **Study population.** Included a student sample that met the following criteria:
    - *Grade range.* Any students in grades K–3 at the time they receive the intervention.
    - *Location*. The Tier 2 intervention must have been implemented in academic settings in the United States or its territories or in an Organisation for Economic Co-operation and Development country in which English is the primary or most commonly used language.
    - *Student characteristics.* The scope of the review erred on the side of inclusivity and included studies of students who were dual-language learners and students in special education.
- **Study outcomes**. Eligible outcome domains from the WWC's *Study Review Protocol, Version 5.0* included reading fluency, reading comprehension, phonics and related alphabetics, vocabulary, literacy achievement, writing quality, writing conventions, and academic dispositions (What Works Clearinghouse, 2023). The primary outcome of interest was in the literacy achievement domain since the purpose of the review was to support CNMI PSS's goal of grade 3 students reading at or above grade level.
- **Intervention.** Tier 2 early literacy interventions with the following characteristics:
    - Was a supplemental instructional program, provided in addition to Tier 1 core reading programs.
    - Was delivered in small groups or in one-on-one settings.

The screening process excluded 230 studies that did not meet these criteria, leaving 37 studies to undergo a full review by a WWC-certified reviewer. Of these 37 studies, 6 had previously been reviewed by the WWC, and these

were reviewed again using the *What Works Clearinghouse Procedures and Standards Handbook, Version 5.0* (What Works Clearinghouse, 2022).

Reviewing studies using What Works Clearinghouse standards

Certified reviewers examined all eligible studies using WWC version 5.0 standards (What Works Clearinghouse, 2022). As specified in the standards handbook, if the first reviewer of a study determined that it met standards, a second reviewer repeated the review before it was reconciled by a senior reviewer. If the first reviewer determined a study did not meet WWC standards, the reviewer sent the study to the senior reviewer (reconciler) for final disposition. The study team conducted author queries when the information in the original document was inadequate for assigning a WWC rating. Of the 37 studies eligible for review, 11 met WWC standards without reservations, 9 met standards with reservations, and 17 did not meet standards. The 20 studies that met WWC standards, with or without reservations, are described in detail in table B1 in appendix B.

Effect size calculation

For each study that met WWC version 5.0 standards with or without reservations, the study team computed domain-level effect sizes using the procedures described in appendix F of the *What Works Clearinghouse Procedures and Standards Handbook, Version 5.0* (What Works Clearinghouse, 2022).

Meta-analysis methodology for the evidence and gap map

The study team performed a meta-analysis of reviewed studies that met WWC version 5.0 standards with or without reservations to create the evidence and gap map. Consistent with the procedures stated in the WWC standards handbook (What Works Clearinghouse, 2022), the meta-analysis analyzed only the studies' main findings. To synthesize the evidence across studies, the study team calculated a weighted fixed-effects meta-analytic mean effect size for each relevant outcome domain, weighting the studies by the inverse of the variance of each study's effect size. Thus, studies that tested an intervention with large numbers of students received more weight than studies with small numbers of students. The statistical significance of each effect size in each outcome domain was calculated using a *z*-test. The study team then computed the domain-level improvement index for each intervention, which represents the difference in percentile rank between the average intervention group student and the average comparison group student.[1] For example, an improvement index of +8 on reading comprehension for Literacy First indicates that the average intervention group student would increase their percentile rank by 8 points on reading comprehension if they received the intervention relative to the average comparison group student.

Coding methodology for the supplemental matrix of intervention strategies

The framework for the supplemental matrix was structured using the seven key elements of Tier 2 reading interventions developed by the Michigan Multi-Tiered System of Supports (MiMTSS) Technical Assistance Center. The study team developed coding questions based on the definitions of seven key elements of Tier 2 literacy interventions (table A1). Using these questions, one reviewer coded intervention strategies specified in original documents and supplemented this information with data from other sources, such as the developer's website, intervention manuals, and WWC intervention reports, where applicable. Recognizing that documents often lack critical implementation details, the study team focused on recording strategies specified in each program model, rather than those implemented in the reviewed studies. During this review process the study team gathered

[1] Appendix E of the *What Works Clearinghouse Procedures and Standards Handbook, Version 5.0,* contains a detailed description of the procedure for computing the improvement indices (What Works Clearinghouse, 2022).

additional information on each intervention from study documents and developer websites, including the developer's name, intervention type, and intended grades for delivery. The study team also gathered information on cost ingredients for each intervention, such as intensity, duration, personnel requirements, pre-service training, in-service training, and costs per participant.

To ensure accuracy and consistency in the coding process, a reviewer documented the sources of the coded intervention components and noted any unique or specific aspects of the interventions. A lead reviewer then verified the sources and codes and addressed any questions or discrepancies before finalizing the codes.

Table A1. Coding questions for the supplemental matrix

MiMTSS key elements of Tier 2 literacy interventions	Intervention strategies	Coding question
Explicit instruction	Structured curriculum	Does the intervention provide instruction in three to four foundational skills (phonemic awareness, phonics, vocabulary, comprehension, and fluency)?
	Gradual skill-building	Does the intervention incorporate gradual skill-building, that is, skill-building in isolation and then integrating skills with other skills?
Small-group instruction	Group size: Three to four students	Is the intervention intended to be taught within small groups of students, that is, three to four students?
	One-on-one instruction	Is the intervention intended to be taught one-on-one?
Matching instruction to student needs	Responsive and targeted instruction	Does the intervention offer instruction that is responsive and targeted to the student's individual strengths and needs?
	Leveled reading materials	Does the intervention include leveled reading materials that can be customized to student needs?
	Learning pathways	Does the intervention offer different learning pathways adaptive to student performance?
Opportunities to practice	Guided practice	Does the intervention include opportunities for guided practice with an instructor or interventionist?
	Independent practice	Does the intervention include independent practice opportunities?
Frequent feedback	Corrective feedback	Does the intervention include tools to offer immediate, corrective feedback after practice or assessments?
	Supportive feedback	Does the intervention include tools to offer supportive feedback to encourage students to persist through activities?
Progress monitoring	Progress monitoring data	Does the intervention use progress monitoring data to identify students needing additional instruction?
	Embedded progress monitoring system	Does the intervention have an embedded progress monitoring system that allows instructors to chart student growth and needs?
	Mastery checks and other assessment tools	Does the intervention include other assessment tools, like mastery checks, to frequently assess student progress?
Fading supports	Peer support	Does the intervention include peer support?
	Scaffolded support	Does the intervention include scaffold supports?

MiMTSS is Michigan Multi-Tiered System of Supports.
Source: Authors' compilation from study documents and developer websites.

References

Grindal, T., Nunn, S., D'Amelio, E., & McCracken, M. (2021). *Factors associated with grade 3 reading outcomes of students in the Commonwealth of the Northern Mariana Islands Public School System* (REL 2021-116). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and

Regional Assistance, Regional Educational Laboratory Pacific. https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=REL2021116

National Center on Intensive Intervention. (2021). *Academic intervention tools chart*. https://charts.intensiveintervention.org/aintervention

Wanzek, J., Vaughn, S., Scammacca, N., Gatlin, B., Walker, M. A., & Capin, P. (2016). Meta-analyses of the effects of Tier 2 type reading interventions in grades K-3. *Educational Psychology Review*, *28*, 551-576. https://doi.org/10.1007/s10648-015-9321-7

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Appendix B. Study details

The electronic search for studies of Tier 2 early literacy interventions conducted between 2013 and 2023 yielded 256 studies, and a hand search identified 11 more studies. After an initial screening of study abstracts, the study team identified 65 studies eligible for full text screening and 37 studies eligible for WWC review. Of the 37 studies, 20 were determined to have met WWC standards, with or without reservations. The 20 studies that met WWC standards are described in detail in table B1.

Table B1. Detailed description of the 20 studies between 2013 and 2023 that met What Works Clearinghouse standards

Intervention and study citation	Study design	Final study rating	Sample description	Sample characteristics	Domain	Measure	Effect size
Achieve3000 Hill, D. V., & Lenard, M. A. (2016). *The impact of Achieve3000 on elementary literacy outcomes: Randomized control trial evidence, 2013-14 to 2014-15* (DRA Report No. 16.02). Wake County Public School System.	RCT	Meets standards without reservations	Grades 2-5; *n* = 6,235-7,296	Race/ethnicity data were reported only at the school level. In the 32 participating schools, the student population was 51 percent White, 26 percent Black, and 19 percent Hispanic. Of students in the study schools, 12 percent had disabilities, 9 percent were English learner students, and 7 percent were academically and intellectually gifted. Approximately one-third of the district's students were eligible for the National School Lunch Program.	Reading comprehension	North Carolina End-of-Grade Reading Comprehension	-0.007
					Reading fluency	Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Oral Reading Fluency	0.060
Early Reading Intervention Coyne, M. D., Little, M., Rawlinson, D. A., Simmons, D., Kwok, O. M., Kim, M., Simmons, M., Hagan-Burke, S., & Civetelli, C. (2013). Replicating the impact of a supplemental beginning reading intervention: The role of instructional context. *Journal of Research on Educational Effectiveness*, *6*(1), 1-23.	RCT	Meets standards with reservations	Kindergarten; *n* = 162	The analytic sample was 54 percent male, 61 percent White, 24 percent Latino, and 9 percent Black; 15 percent of students were English learner students.	Reading fluency	Woodcock Reading Mastery Tests-Revised (WRMT-R): Word Identification Subtest	-0.163
					Phonics and related alphabetics	WRMT-R/Normative Update Supplementary Letter Checklist: Letter Name	-0.046
						DIBELS: Nonsense Word Fluency	
						DIBELS: Phoneme Segmentation Fluency Subtest	
						Comprehensive Test of Phonological Processing: Sound Matching Subtest	
						WRMT-R: Word Attack Subtest	
						Comprehensive Test of Phonological Processing: Blending Words Subtest	
						Slosson Oral Reading Test-Revised	

Intervention and study citation	Study design	Final study rating	Sample description	Sample characteristics	Domain	Measure	Effect size
Early Vocabulary Intervention Coyne, M. D., McCoach, D. B., Ware, S. M., Loftus-Rattan, S. M., Baker, D. L., Santoro, L. E., & Oldham, A. C. (2022). Supporting vocabulary development within a multitiered system of support: Evaluating the efficacy of supplementary kindergarten vocabulary intervention. *Journal of Educational Psychology*, *114*(6), 1225.	RCT	Meets standards without reservations	Kindergarten; *n* = 817	The sample of students in the intervention and comparison groups was 48 percent female, 40 percent Latino, 22 percent Black, and 19 percent White; 41 percent of students were dual-language learners.	Vocabulary	Peabody Picture Vocabulary Test Fourth Edition (PPVT-IV)	0.032
						Expressive Vocabulary Test, Second Edition	
Guided Reading Denton, C. A., Fletcher, J. M., Taylor, W. P., Barth, A. E., & Vaughn, S. (2014). An experimental evaluation of guided reading and explicit interventions for primary-grade students at-risk for reading difficulties. *Journal of Research on Educational Effectiveness*, *7*(3), 268–293.	RCT	Meets standards without reservations	Grade 1; *n* = 103–112	The study sample was 46 percent female, 62 percent Black, 32 percent Hispanic, and 6 percent White; 92 percent of students were economically disadvantaged, 10 percent were receiving special education services, 3 percent were limited English proficient, and 57 percent were in schools in urban locations.	Reading comprehension	Gates-MacGinitie Reading Tests (GMRT): Reading Comprehension Subtest	0.029
					Reading fluency	Test of Word Reading Efficiency (TOWRE)	0.253
						Texas Primary Reading Inventory: Progress Monitoring for Beginning Readers	
					Phonics and related alphabetics	Woodcock-Johnson III (WJ III): Letter-Word Identification Subtest	0.217
						WJ III: Word Attack Subtest	

Intervention and study citation	Study design	Final study rating	Sample description	Sample characteristics	Domain	Measure	Effect size
i-Ready Reading Randel, B., Swain, M., Norman Dvorak, R., Spratto, E., & Prendez, J. Y. (2020). *Impact evaluation of mathematics "i-Ready" for striving learners using 2018-19 data: Final report* (2020 No. 048). Human Resources Research Organization.	QED	Meets standards with reservations	Grades 2-5; *n* = 22,928-44,896	About half (52.2 percent) of students were eligible for the National School Lunch Program, and half (50 percent) were classified as members of a historically marginalized race (Black, Asian, Pacific Islander, American Indian/Alaskan Native, or two or more races).	Literacy achievement	i-Ready Diagnostic	0.126
i-Ready Reading Jones, E., Larsen, R., Sudweeks, R. R., Young, K. R., & Gibb, G. S. (2018). Evaluating paraeducator-led reading interventions in elementary school: A multi-cutoff regression-discontinuity analysis. *Journal of Research on Educational Effectiveness*, *11*(4), 507-534.	RDD	Meets standards with reservations	Grades 1-6; *n* = 121-210	The study sample was 44 percent female, 20 percent English learner students, and 8 percent of students were receiving special education services (had an Individualized Education Program).	Literacy achievement	Kaufman Test of Educational Achievement II-Brief Form Reading Test (KTEA-II BFR)	-0.030
Istation Wolf, B., Ross, S., Eisinger, J., Reid, A., & Armstrong, C. (2020). *Evaluation study of the Istation early reading program in Idaho*. Center for Research and Reform in Education.	QED	Meets standards with reservations	Grades K-4; *N* = 7,341-29,353	Pilot schools were in predominantly rural areas (64 percent) and had a mean enrollment of 353 students; 75 percent of students were White, 18 percent were Latino, 57 percent were economically disadvantaged, 11 percent were receiving special education services, and 10 percent were English learner students.	Literacy achievement	Idaho Standards Achievement Test (ISAT): ELA composite Idaho Reading Indicator	-0.003

Intervention and study citation	Study design	Final study rating	Sample description	Sample characteristics	Domain	Measure	Effect size
LetterWorks D'Agostino, J. V., Rodgers, E., Harmey, S., & Brownfield, K. (2016). Introducing an iPad app into literacy instruction for struggling readers: Teacher perceptions and student outcomes. *Journal of Early Childhood Literacy*, *16*(4), 522–548.	RCT	Meets standards without reservations	Grade 1; *n* = 50	The study sample included 92 percent economically disadvantaged students, 52 percent Black students, 29 percent White students, and 12 percent Hispanic students.	Reading fluency	Slosson Oral Reading Test-Revised	0.167
					Phonics and related alphabetics	DIBELS: Letter Naming Fluency Subtest	0.759
Leveled Literacy Intervention Ransford-Kaldon, C., Ross, C., Lee, C., Sutton Flynt, E., Franceschini, L., & Zoblotsky, T. (2013). *Efficacy of the Leveled Literacy Intervention System for K–2 urban students: An empirical evaluation of LLI in Denver Public Schools*. University of Memphis, Center for Research in Educational Policy.	RCT	Meets standards without reservations	Grades K–2; *n* = 285	The study population consisted primarily of racial/ethnic minority and economically disadvantaged students. In 11 of the 13 schools, 72–97 percent of students were eligible for the National School Lunch Program; in one school, 48 percent of students were eligible for the National School Lunch Program; no data were reported for the remaining school. About 69 percent of study participants were Hispanic, and 34 percent were classified as English learner students.	Reading comprehension	Developmental Reading Assessment (DRA)	-0.040

Intervention and study citation	Study design	Final study rating	Sample description	Sample characteristics	Domain	Measure	Effect size
Lexia Core5 Hurwitz, L. B., & Vanacore, K. P. (2022). Educational technology in support of elementary students with reading or language-based disabilities: A cluster randomized control trial. *Journal of Learning Disabilities 56*(6), 1-14.	RCT	Meets standards with reservations	Grades K-5; *n* = 100-115	This study took place in a midsize school district in the Chicago metropolitan area. Of the approximately 5,000 students enrolled in grades K-8 in the district, 17 percent were receiving special education services, and 14 percent of students were eligible for the National School Lunch Program. Of students in the district, 72 percent were White, 15 percent were Hispanic, 6 percent were Asian, 5 percent were Black, and 3 percent were of two or more races. English learner students made up 14 percent of the students.	Literacy achievement	Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP): Growth Reading	0.191
					Reading fluency	easyCBM Passage Reading Fluency	-0.100
Literacy First Caverly, S., & Stoker, G. (2021). *Literacy First: Evaluation summary report*. American Institutes for Research.	RCT	Meets standards without reservations	Grades K-2; *n* = 320-630	Across all grades 86 percent of study participants were Hispanic, 7 percent were Black, 2 percent were White; and 5 percent were another race; 10 percent were receiving special education services, 62 percent were limited English proficient students, 51 percent were male, and 83 percent were economically disadvantaged.	Reading comprehension	Iowa Test of Basic Skills: Reading Comprehension	0.190
					Literacy achievement	State of Texas Assessments of Academic Readiness (STAAR): Reading	0.213
					Reading fluency	DIBELS Oral Reading Fluency	0.361
					Phonics and related alphabetics	DIBELS Nonsense Word Fluency	0.333

Intervention and study citation	Study design	Final study rating	Sample description	Sample characteristics	Domain	Measure	Effect size
Literacy Now Graham, G. (2021). *Literacy Now reading intervention program: A cohort analysis of reading achievement at selected HISD Campuses, 2020-2021* (Research Educational Program Report). Houston Independent School District.	QED	Meets standards with reservations	Grade 2; *n* = 151	Students in the reading intervention program were predominately at risk (81.7 percent) and economically disadvantaged (84.3 percent). A small percentage of students were identified as special needs (3.8 percent) and an even smaller percentage as gifted/talented (1.9 percent). The ethnic composition of the group was 43.7 percent Black and 43.8 percent Hispanic. Participants in the program identified their home language as English (69.0 percent), followed by Spanish (21.8 percent). The sample was 52.5 percent male.	Literacy achievement	Istation Indicators of Progress (ISIP)	0.067
Peer-Assisted Learning Strategies (PALS) Fuchs, D., Cho, E., Toste, J. R., Fuchs, L. S., Gilbert, J. K., McMaster, K. L., Svenson, E., & Thompson, A. (2021). A quasiexperimental evaluation of two versions of first-grade PALS: One with and one without repeated reading. *Exceptional Children*, *87*(2), 141-162.	QED	Meets standards with reservations	Grade 1; *n* = 339	The study sample included 54 percent male students, 47 percent White students, 32 percent Black students, and 21 percent other race/ethnicity. Of the study sample, 45 percent were eligible for the National School Lunch Program, 7 percent were receiving special education services (had an Individualized Education Program), and 12 percent were English learner students.	Phonics and related alphabetics	Wechsler Individual Achievement Test (WIAT): Spelling Subtest WRMT-R: Word Attack Subtest	0.214

Intervention and study citation	Study design	Final study rating	Sample description	Sample characteristics	Domain	Measure	Effect size
PALS (modified) Leinen, A. B. (2017). *The effects of combining peer-assisted learning strategies and incremental rehearsal on non-Spanish-speaking English language learners' reading achievement.* [Doctoral dissertation, University of Minnesota].	RCT	Meets standards without reservations	Grades K-3; *n* = 36	Of students in the sample, 81 percent attended a charter school, 67 percent were male, and 3 percent were receiving special education services. All students in the sample were eligible for the National School Lunch Program, and all were English learner students. Karen was the home language of 42 percent of students, 39 percent were Hmong, 9 percent were Somali, and 3 percent were Chinese. The grade distribution was 22 percent kindergarten, 22 percent grade 1, 33 percent grade 2, and 22 percent grade 3.	Reading fluency	FastBridge Decodable Words (CVC)	-0.102
						FastBridge Sight Words	
						FastBridge Curriculum-Based Measurement (CBM) Reading Fluency	
					Phonics and related alphabetics	FastBridge Letter Sounds	0.625
						FastBridge Nonsense Words (NSW)	
QuickReads Trainin, G., Hayden, H. E., Wilson, K., & Erickson, J. (2016). Examining the impact of QuickReads' technology and print formats on fluency, comprehension, and vocabulary development for elementary students. *Journal of Research on Educational Effectiveness*, *9*(sup1), 93-116.	RCT	Meets standards without reservations	Grades 2-5; *n* = 294-373	Students in this study were 67.1 percent White non-Hispanic, 15.2 percent Hispanic, 7.9 percent Black, 2.1 percent Asian, 1.8 percent Native American, and 5.6 percent other/not reported. Students were 48.9 percent male, and 11 percent were identified as English learner students.	Reading comprehension	GMRT: Vocabulary Subtest	0.083
						GMRT: Comprehension Subtest	
Reading Recovery Sirinides, P., Gray, A., & May, H. (2018). The impacts of Reading Recovery at scale: Results from the 4-year i3 external evaluation. *Educational Evaluation and Policy Analysis*, *40*(3), 316-335.	RCT	Meets standards without reservations	Grade 1; *n* = 6,888	Approximately 60 percent of the students were male, 19 percent were English learner students, 43 percent were White, 19 percent were Hispanic or Latino, 13 percent were Black, and 44 percent were another race/ethnicity. In the study schools 55 percent of students were eligible for the National School Lunch Program.	Literacy achievement	Iowa Test of Basic Skills (ITBS): Total Score	0.698
						Observation Survey of Early Literacy Achievement (OSELA): Total Score	

Intervention and study citation	Study design	Final study rating	Sample description	Sample characteristics	Domain	Measure	Effect size
Reading Recovery Bates, C. C., D'Agostino, J. V., Gambrell, L., & Xu, M. (2016). Reading Recovery: Exploring the effects on first-graders' reading motivation and achievement. *Journal of Education for Students Placed at Risk*, *21*(1), 47–59.	QED	Meets standards with reservations	Grade 1; *n* = 1,806	The sample was 60 percent male, 53 percent were a racial/ethnic minority, 70 percent were eligible for the National School Lunch Program, and 10 percent were English learner students.	Academic disposition	Me and My Reading Profile (MMRP)	0.73
Seeing Stars Christodoulou, J. A., Cyr, A., Murtagh, J., Chang, P., Lin, J., Guarino, A. J., Hook, P., & Gabrieli, J. D. (2017). Impact of intensive summer reading intervention for children with reading disabilities and difficulties in early elementary school. *Journal of Learning Disabilities*, *50*(2), 115–127.	RCT	Meets standards without reservations	Grades K–4; *n* = 47	Of the 47 students who participated in the study, 81 percent were White, 6 percent were Black, 4 percent were American Indian or Alaska Native, 2 percent were multiracial, and 2 percent were Hispanic. Nearly two-thirds of students were male (64 percent), and their average age was 7.72 years.	Reading fluency	WRMT–R: Word Identification Subtest	0.336
						TOWRE-2: Sight Word Efficiency Subtest	
						DIBELS Oral Reading Fluency	
					Phonics and related alphabetics	WRMT–R: Word Attack Subtest	0.876
						TOWRE-2: Phonemic Decoding Efficiency Subtest	
Sound Partners Kuhn, J., & Albers, C. A. (2022). Early literacy intervention for culturally and linguistically diverse students with varying English language proficiency levels. *Journal of Applied School Psychology*, *38*(4), 283–315.	SCD	Meets standards without reservations	Grades K–2; *n* = 3–5	The study sample comprised 11 students who were recruited based on the school's fall universal screening of students identified as at risk of academic failure and in need of Tier 2 or 3 English literacy intervention. Of the 11, 8 were English learner students, and 3 were native English speakers; 8 students were Asian, 1 was White, 1 was Black, and 1 was multiracial.	Phonics and related alphabetics	AIMSweb Letter Sound Fluency	0.952
						AIMSweb Phoneme Segmentation Fluency	
						AIMSweb Nonsense Word Fluency	

Intervention and study citation	Study design	Final study rating	Sample description	Sample characteristics	Domain	Measure	Effect size
Tier 2 Literacy Intervention (Unbranded) Case, L., Speece, D., Silverman, R., Schatschneider, C., Montanaro, E., & Ritchey, K. (2014). Immediate and long-term effects of Tier 2 reading instruction for first-grade students with a high probability of reading failure. *Journal of Research on Educational Effectiveness*, *7*(1), 28–53.	RCT	Meets standards without reservations	Grade 1; *n* = 123	The study sample was 54 percent male, 71 percent White, 11 percent Black, 9 percent multiracial, and 9 percent another or unknown race/ethnicity.	Reading fluency	TOWRE-2: Phonemic Decoding Efficiency Subtest	0.112
						WRMT-R: Word Identification Subtest	
					Phonics and related alphabetics	WRMT-R: Word Attack Subtest	0.226

RCT is randomized controlled trial. QED is quasi-experimental design. SCD is single case design. RDD is regression discontinuity design.
Source: Authors' compilation from study documents and developer websites.

Appendix C. List of 37 studies reviewed using the What Works Clearinghouse 5.0 evidence standards

An asterisk denotes studies that Regional Educational Laboratory Pacific What Works Clearinghouse–certified reviewers rated as meeting standards with or without reservations.

Baker, S. K., Smolkowski, K., Chaparro, E. A., Smith, J. L., & Fien, H. (2015). Using regression discontinuity to test the impact of a Tier 2 reading intervention in first grade. *Journal of Research on Educational Effectiveness*, *8*(2), 218–244. https://eric.ed.gov/?id=EJ1057097

*Bates, C. C., D'Agostino, J. V., Gambrell, L., & Xu, M. (2016). Reading Recovery: Exploring the effects on first-graders' reading motivation and achievement. *Journal of Education for Students Placed at Risk*, *21*(1), 47–59. https://eric.ed.gov/?id=EJ1089839

Burton-Archie, S. H. (2014). *Reading intervention: The effectiveness of leveled literacy intervention*. [Doctoral dissertation, Walden University]. https://eric.ed.gov/?id=ED566215

*Case, L., Speece, D., Silverman, R., Schatschneider, C., Montanaro, E., & Ritchey, K. (2014). Immediate and long-term effects of Tier 2 reading instruction for first-grade students with a high probability of reading failure. *Journal of Research on Educational Effectiveness*, *7*(1), 28–53. https://eric.ed.gov/?id=EJ1030356

Case, M. (2015). *The impact of Reading Recovery on the reading achievement of first grade students*. [Master's thesis, Southern Wesleyan University]. https://eric.ed.gov/?id=ED562327

*Caverly, S., & Stoker, G. (2021). *Literacy First: Evaluation summary report*. American Institutes for Research. https://www.literacyfirst.org/wp-content/uploads/2021/08/Literacy_First_Summary_Report_K-3_FINAL_for-UT1.pdf

*Christodoulou, J. A., Cyr, A., Murtagh, J., Chang, P., Lin, J., Guarino, A. J., Hook, P., & Gabrieli, J. D. (2017). Impact of intensive summer reading intervention for children with reading disabilities and difficulties in early elementary school. *Journal of Learning Disabilities*, *50*(2), 115–127. https://eric.ed.gov/?id=EJ1129862

Colon, G. (2016). *PALS for ELLs: Friend or foe? Effects of peer-assisted learning strategies on reading skills of English language learners with and without disabilities.* [Doctoral dissertation, State University of New York at Buffalo]. https://eric.ed.gov/?id=ED589216

Consortium for Policy Research in Education. (2021). *Amira Learning in Savannah-Chatham County Public Schools.* Teacher's College, Columbia University. https://s3.amazonaws.com/prod-hmhco-vmg-craftcms-public/research/Amira-Research-Study_SCCPSS-and-WCSC-2020-21_FINAL.pdf

Cook, M., & Ross, S. (2021). *Evaluation of Istation's Early Reading Assessment and Curriculum in Spartanburg County School District 7 final report*. Johns Hopkins University School of Education, Center for Research and Reform in Education. https://eric.ed.gov/?id=ED616981

*Coyne, M. D., Little, M., Rawlinson, D. A., Simmons, D., Kwok, O. M., Kim, M., Simmons, L., Haggan-Burke, S., & Civetelli, C. (2013). Replicating the impact of a supplemental beginning reading intervention: The role of instructional context. *Journal of Research on Educational Effectiveness*, *6*(1), 1–23. https://eric.ed.gov/?id=EJ994735

*Coyne, M. D., McCoach, D. B., Ware, S. M., Loftus-Rattan, S. M., Baker, D. L., Santoro, L. E., & Oldham, A. C. (2022). Supporting vocabulary development within a multitiered system of support: Evaluating the efficacy

of supplementary kindergarten vocabulary intervention. *Journal of Educational Psychology*, *114*(6), 1225. https://eric.ed.gov/?id=EJ1372751

*D'Agostino, J. V., Rodgers, E., Harmey, S., & Brownfield, K. (2016). Introducing an iPad app into literacy instruction for struggling readers: Teacher perceptions and student outcomes. *Journal of Early Childhood Literacy*, *16*(4), 522–548. https://eric.ed.gov/?id=EJ1118174

D'Agostino, J. V., Lose, M. K., & Kelly, R. H. (2018). Examining the sustained effects of Reading Recovery. *Journal of Education for Students Placed at Risk*, *22*(2), 116–127. https://eric.ed.gov/?id=EJ1137243

*Denton, C. A., Fletcher, J. M., Taylor, W. P., Barth, A. E., & Vaughn, S. (2014). An experimental evaluation of guided reading and explicit interventions for primary-grade students at-risk for reading difficulties. *Journal of Research on Educational Effectiveness*, *7*(3), 268–293. https://eric.ed.gov/?id=EJ1032919

Erickson, J., Derby, K. M., McLaughlin, T. F., & Fuehrer, K. (2015). An evaluation of Read Naturally on increasing reading fluency for three primary students with learning disabilities. *Educational Research Quarterly*, *39*(1), 3–20. https://eric.ed.gov/?id=EJ1166728

*Fuchs, D., Cho, E., Toste, J. R., Fuchs, L. S., Gilbert, J. K., McMaster, K. L., Svenson, E., & Thompson, A. (2021). A quasiexperimental evaluation of two versions of first-grade PALS: One with and one without repeated reading. *Exceptional Children*, *87*(2), 141–162. https://eric.ed.gov/?id=EJ1281711

Gibson Jr., L., Cartledge, G., Keyes, S. E., & Yawn, C. D. (2014). The effects of a supplementary computerized fluency intervention on the generalization of the oral reading fluency and comprehension of first-grade students. *Education and Treatment of Children, 37*(1), 25–51. https://eric.ed.gov/?id=EJ1070161

Glass, A. (2018). *A mixed method analysis of leveled literacy intervention with second grade students in an urban Midwest public school.* [Doctoral dissertation, Lindenwood University]. https://eric.ed.gov/?id=ED592231

*Graham, G. (2021). *Literacy Now reading intervention program: A cohort analysis of reading achievement at selected HISD campuses, 2020–2021* (Research Educational Program Report). Houston Independent School District. https://eric.ed.gov/?id=ED614673

*Hill, D. V., & Lenard, M. A. (2016). *The impact of Achieve3000 on elementary literacy outcomes: Randomized control trial evidence, 2013–14 to 2014–15* (DRA Report No. 16.02). Wake County Public School System. https://eric.ed.gov/?id=ED581879

*Hurwitz, L. B., & Vanacore, K. P. (2022). Educational technology in support of elementary students with reading or language-based disabilities: A cluster randomized control trial. *Journal of Learning Disabilities 56*(6), 1–14. https://eric.ed.gov/?id=EJ1400431

*Jones, E., Larsen, R., Sudweeks, R. R., Young, K. R., & Gibb, G. S. (2018). Evaluating paraeducator-led reading interventions in elementary school: A multi-cutoff regression-discontinuity analysis. *Journal of Research on Educational Effectiveness*, *11*(4), 507–534. https://eric.ed.gov/?id=EJ1202592

Kamps, D., Heitzman-Powell, L., Rosenberg, N., Mason, R., Schwartz, I., & Romine, R. S. (2016). Effects of reading mastery as a small group intervention for young children with ASD. *Journal of Developmental and Physical Disabilities*, *28*(5), 703–722.

*Kuhn, J., & Albers, C. A. (2022). Early literacy intervention for culturally and linguistically diverse students with varying English language proficiency levels. *Journal of Applied School Psychology*, *38*(4), 283–315. https://eric.ed.gov/?id=EJ1367355

*Leinen, A. B. (2017). *The effects of combining peer-assisted learning strategies and incremental rehearsal on non-Spanish-speaking English language learners' reading achievement*. [Doctoral dissertation, University of Minnesota]. https://eric.ed.gov/?id=ED575375

Marshall, T. M. (2014). *An evaluation of project iREAD: A program created to improve sight word recognition*. [Doctoral dissertation, The College of William and Mary]. https://eric.ed.gov/?id=ED556954

Miles, K. P., McFadden, K. E., Colenbrander, D., & Ehri, L. C. (2022). Maximising access to reading intervention: Comparing small group and one-to-one protocols of Reading Rescue. *Journal of Research in Reading*, *45*(3), 299–323. https://eric.ed.gov/?id=EJ1344259

O'Callaghan, P., McIvor, A., McVeigh, C., & Rushe, T. (2016). A randomized controlled trial of an early-intervention, computer-based literacy program to boost phonological skills in 4- to 6-year-old children. *British Journal of Educational Psychology*, *86*(4), 546–558. https://eric.ed.gov/?id=EJ1120013

Putman, R. S. (2017). Technology versus teachers in the early literacy classroom: An investigation of the effectiveness of the Istation integrated learning system. *Educational Technology Research and Development*, *65*(5), 1153–1174. https://eric.ed.gov/?id=EJ1155653

*Randel, B., Swain, M., Norman Dvorak, R., Spratto, E., & Prendez, J. Y. (2020). *Impact evaluation of mathematics "i-Ready" for striving learners using 2018-19 data: Final report* (2020 No. 048). Human Resources Research Organization. https://eric.ed.gov/?id=ED610444

*Ransford-Kaldon, C., Ross, C., Lee, C., Sutton Flynt, E., Franceschini, L., & Zoblotsky, T. (2013). *Efficacy of the Leveled Literacy Intervention System for K-2 urban students: An empirical evaluation of LLI in Denver Public Schools*. University of Memphis, Center for Research in Educational Policy. https://ies.ed.gov/ncee/wwc/Study/85470

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*Sirinides, P., Gray, A., & May, H. (2018). The impacts of Reading Recovery at scale: Results from the 4-year i3 external evaluation. *Educational Evaluation and Policy Analysis*, *40*(3), 316–335. https://eric.ed.gov/?id=EJ1186803

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*Wolf, B., Ross, S., Eisinger, J., Reid, A., & Armstrong, C. (2020). *Evaluation study of the Istation early reading program in Idaho*. Johns Hopkins University School of Education, Center for Research and Reform in Education. https://eric.ed.gov/?id=ED611345