Interventions for English Learners With Learning Disabilities: 2002–2022

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Abstract

This systematic review addresses the research gap in understanding the efficacy of experimental interventions designed to improve the academic outcomes of English Learners with Learning Disabilities (ELswLD). After conducting a rich evaluation of reviews related to English Learners and to students who have disabilities, we contextualize the need for a review that examines intervention research for K-12 students at the intersection of these populations that are twice affected by language and language development intricacies. A four-step literature search process identified 15 studies examining the intervention of K-12 ELswLD published between 2002 and 2022. Specifically, among the 15 selected studies, three interventions addressed vocabulary learning, three focused on mathematics problem-solving skills hindered by English vocabulary, six targeted reading comprehension, and three aimed to improve writing skills. The studies were analyzed for their characteristics, including research design, participants, intervention strategies, intensity/duration, dependent variables, and results. We also discuss the practical implications from the selected studies. Research findings revealed limited research on specific intervention approaches for ELswLD and the scarcity of technology-enhanced intervention. This review synthesizes these findings and offers valuable insights for researchers and practitioners seeking to improve academic outcomes for ELswLDs. The interventions will be of interest to educators interested in language development that leads to improving academic outcomes of English learners with learning disabilities.

Keywords: *English learners, learning disabilities, literature review, interventions, academic outcomes*

The National Joint Committee on Learning Disabilities (NJCLD) defines learning disabilities (LD) as "a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities" (2016). Specifically, students with LD encounter problems relate to basic reading abilities, reading fluency, reading comprehension, written expression, mathematical computation, mathematical problem solving, speaking, and listening comprehension (Individuals with Disabilities Education Improvement Act, 2004). In the United States (U.S.) an additional population, which includes those with IQs below 75 and who also have adaptive behavioral deficits, delineated as an intellectual disability, is not included among students with LD.

School-aged students in kindergarten through 12th grade (K-12) with LD are the largest group of students qualifying for special education service under the Individuals with Disabilities Education

Improvement Act of 2004, and their academic performance lags that of their typically developing peers (U.S. Department of Education, Institute of Education Sciences, 2021). Furthermore, an estimated 35.7% of U.S. students with LD are also identified as English learners (ELs; U.S. Department of Education, Office of Special Education Programs, 2022).

The term *English learners* continues to evolve within the education field and is not agreed upon unanimously (see Webster & Lu, 2012). The federal definition was updated from *Limited English Proficiency* to *English Learner* with the passage of the Every Student Succeed Act of 2015. Some states use the terms *English Language Learner* (e.g., California, New York) or *Emergent Bilingual* (e.g., Texas). The shifts in terminology indicate attempts to identify the population by a neutral term (Webster & Lu, 2012). We ascribe to the notion that an EL is a student whose home language (i.e., either first language and/or language spoken in the home) is other than English and whose proficiency with English inhibits their academic success (see Council for Exceptional Children, n.d.).

The conflation of EL and LD can significantly affect the academic performance and social-emotional wellbeing of ELs with LD (ELswLD) (Williams & Vaughn, 2020). These challenges stem from both language barriers and underlying disabilities, leading to complex learning needs that necessitate targeted interventions and support for effective resolution (Williams & Vaughn, 2020). Accordingly, research-based interventions have been developed to assist certain populations of students who struggle with particular skills. We define interventions as a set of targeted actions, explicitly identified as an independent variable under investigation, designed to improve a student's academic performance.

Previous Reviews and Meta-Analyses

A multitude of literature reviews and meta-analyses have investigated ELs with or without disabilities. Between 2002 to 2022, 20 studies focusing on ELs were published. Specifically, eight studies focused on ELs with disabilities (Cannon & Guardino, 2012; Gaias et al., 2020; Kang & Scott, 2021; Lavín et al., 2020; Lee & De La Paz, 2021; Lei et al., 2020; Soto-Boykin et al., 2021; Wang & Williams, 2014), three studies focused on Response to Intervention (RTI) for students who were ELs and at risk (Cho et al., 2021; Choi et al., 2012; Thorius & Sullivan, 2013), and nine studies centered on ELs without disabilities (Arizmendi et al., 2021; Edmonds et al., 2009; Goodwin & Ahn, 2010; Hur et al., 2020; Jitendra et al., 2021; Larson et al., 2020; Ludwig et al., 2019; Moore & Klingner, 2014; Reed et al., 2013).

Among the nine studies that focused on ELs without disabilities, three were meta-analyses (Arizmendi et al., 2021; Goodwin & Ahn, 2010; Jitendra et al., 2021). Two of these were related to math vocabulary interventions (Arizmendi et al., 2021; Jitendra et al., 2021), while one centered on a morphological intervention aimed at improving literacy achievement for children with literacy difficulties (Goodwin & Ahn, 2010).

As for the remaining six studies that focused on ELs without disabilities, two literature reviews concentrated on dual-language learners (DLL) — children who are learning two or more languages as a result of their home usage of a language other than or in addition to English (Hur et al., 2020; Larson et al., 2020), and four reviews addressed on reading interventions (Edmonds et al., 2009; Ludwig et al., 2019; Moore & Klingner, 2014; Reed et al., 2013). Among the two reviews focused on DLL, Larson et al. (2020) explored how social validity was measured and implemented in early language intervention research. Hur et al. (2020) studied early literacy interventions for DLLs and their effects on English literacy skills. Finally, for the four literature reviews focused on reading interventions, Ludwig et al. (2019) investigated the effectiveness of reading interventions for ELs and identified factors that influence learning outcomes; Moore and Klingner (2014) revealed the necessity of addressing the diverse learning needs of ELs in research and intervention strategies; Reed et al. (2013) demonstrated gaps in the research concerning various student populations and contexts; and Edmonds et al. (2009) underscored the importance of tailored interventions to address the needs of ELs. In sum, for ELs without disabilities, research is overwhelmingly focused on literacy interventions, early identification, and the importance of contextual factors affecting instructional outcomes.

The three studies related to RTI include one meta-analysis (Cho et al., 2021) and two literature reviews (Choi et al., 2012; Thorius & Sullivan, 2013). Specifically, Cho et al. (2021) revealed that structured cognitive instruction in text features enhanced reading skills for ELs. Thorius and Sullivan (2013) raised concerns about integration of RTI with general education instruction for ELs, suggesting the need for improved alignment across

tiers of RTI with curriculum in general education settings. Finally, Choi et al. (2012) highlighted the effective application of RTI for ELs, particularly emphasizing the success of direct instruction integrated with linguistic and cultural elements.

Among the eight studies concentrated on ELs with disabilities, six were literature reviews (Cannon & Guardino, 2012; Gaias et al., 2020; Kang & Scott, 2021; Lavín et al., 2020; Lee & De La Paz, 2021; Soto-Boykin et al., 2021) and two were meta-analyses (Lei et al., 2020; Wang & Williams, 2014). Specifically, Lee and De La Paz (2021) identified effective writing instruction elements for students with LD and ELs in science education. Soto-Boykin et al. (2021) explored how early childhood researchers describe children and caregivers from linguistically minoritized communities. Gaias et al. (2020) reviewed the representation of race and ethnicity in educational intervention research and recommended improvements in both sampling and analysis. Lavín et al. (2020) highlighted the scarcity of published intervention studies focusing on ELswLD or emotional and behavioral disorders in special education. Kang and Scott (2021) explored the experiences of deaf and hard-of-hearing foreign language learners and identified the impact of communication methods, individualized learning goals, and technology. Cannon and Guardino (2012) addressed literacy strategies for deaf and hard-of-hearing English language learners.

In addition to these literature reviews, two meta-analyses were identified. Lei et al. (2020) performed a single-case meta-analysis on mathematics word problem-solving interventions for ELswLD. Wang and Williams (2014) conducted a meta-analysis on reading research with students who are deaf or hard of hearing, emphasizing the importance of consistent definitions and measurements in interventions. In sum, these studies cover a heterogeneous population with a variety of disabilities, each with varying degrees of manifestations that impact the effectiveness of educational interventions; none specific to LD.

While the number of interventions aimed at improving the academic outcomes of ELswLD is growing, there is a significant research gap in terms of empirical evidence and comprehensive research to understand the effectiveness of these interventions. Literature reviews have examined a variety of topics related to ELs, with some specific to students with LD (Cannon et al., 2012; Gaias et al., 2020; Kang & Scott, 2021; Lavín et al., 2020; Lee & De La Paz, 2021; Lei et al., 2020; Soto-Boykin et al., 2021; Wang & Williams, 2014). However, none of these reviews focused solely on empirical intervention for ELswLD. With the largest category of students with disabilities identified as having LD, it is imperative to understand intervention research specific to ELswLD.

Purpose of the Present Study

The purpose of our research, therefore, was to address the research gap in understanding the efficacy of experimental interventions designed to improve the academic outcomes of ELswLD. We specifically aimed at gaining a comprehensive understanding of the various interventions that have been employed and their respective effectiveness.

Research Questions

(1) What are the characteristics of experimental interventions designed for ELswLD published from 2002 to 2022?
(2) What practical implications inform future research and learning practices designed for ELswLD?

Methods

To identify studies for review, we followed a four-step literature search process (Booth et al., 2012). First, we conducted a comprehensive review of the existing literature to identify potential research gaps within the chosen field. Second, we gathered relevant academic sources and scholarly articles pertaining to the subject matter from reputable databases and scholarly repositories. Third, we identified and examined the literature directly relevant to the selected topic of study. Last, we sought validation and verification of the research findings by consulting with an expert or authority in the respective academic field.

Article Inclusion and Exclusion Criteria

Articles selected for inclusion were evaluated based on the following four criteria: (a) Studies published in peer-reviewed journals, excluding dissertations, conference presentations, book chapters, and theoretical papers; (b) Research published between 2002 and 2022. Our search covered the period from 2002 onward because prior to the implementation of No Child Left Behind (NCLB) legislation, there was no obligatory disaggregation of EL

data in state assessments and accountability frameworks; (c) Studies that applied an intervention. We define interventions as a set of targeted actions, explicitly identified as an independent variable, designed to improve a student's academic performance; and (d) Studies involving participants who were ELswLD. We also included studies involving participants with learning difficulties, such as reading difficulties, to broaden the range of studies reviewed. If any of these criteria were not met, a given study was excluded. Based on the inclusion and exclusion criteria, we utilized a flowchart to record the search procedure from identification through inclusion (see Figure 1).

Article Selection Process

We searched existing reviews and meta-analyses regarding the status of research on ELs and learning disabilities; existing studies helped us understand what has been learned and identify where a gap exists in the literature base related to interventions for ELswLD. We collected pertinent studies using journal recommendations, rankings, and database searches. We also asked four professors from the fields of special education and English learners to recommend journals they would search for intervention studies related to their field.

As a starting point, we utilized the Scimago rankings criteria for selecting prominent journals with high impact factor (Scimago Lab, n.d.). We then narrowed our focus to the top eight major journals likely to publish studies that include learning disabilities in the field of special education: *Journal of Learning Disabilities* (JLD), *Journal of Special Education* (JSE), *Learning Disability Quarterly* (LDQ), *Journal of Research on Educational Effectiveness* (JREE), *Journal of Educational Psychology* (JEP), *Educational Psychology Journal* (EPJ), *Exceptional Children* (EC), and *Journal of Emotional and Behavioral Disorders* (JEBD). A brief scan of these journals showed that the post NCLB requirement to include ELs in state evaluations and accountability systems increased the prevalence of specifying this population in the literature (Gage et al., 2013; Lavín et al., 2020). We then collaborated with the librarian at our institution who specializes in education research to guide our search in these databases: PsycINFO, EBSCO (i.e., Education Full Text), Linguistics and Language Behavior Abstracts (LLBA), and Electronic Registration Information Center (ERIC). We included primary keywords to generate results targeted to *interventions*, *ELswLD*, and *k-12*. The Boolean operator OR was utilized to combine all the keywords related to *English language learners (i.e., English language learners*, English learners, second language learners). In a similar way, the Boolean operation OR was employed to combine all the keywords related to learning disabilities (i.e., *learning dis*, learning disabilities, learning difficulties*). The Boolean operation OR was employed to combine all the keywords related to intervention (i.e. *intervention, strategies, best practices*). Additionally, the Boolean operation OR was employed to combine all the keywords related to K-12 (i.e., *k-12, elementary school, middle school, high school, secondary school*). Finally, the Boolean operator AND was used to combine intervention, English language learners, learning disabilities, and K-12 keywords.

Following the initial search process, we exported the search results from the various databases into EndNote, a reference management software, to facilitate organization and tracking of the retrieved articles. To promote efficient collaboration among the research team members, we also created a Google spreadsheet matrix, which served as a shared platform for collective assessment and evaluation of the identified articles.

The evaluation process began with two authors independently screening and assessing each article to determine its relevance and suitability for inclusion in the review. During this stage, articles were categorized into three groups: include, maybe, or exclude, with detailed notes provided to justify the decisions made for each article. This systematic and transparent approach allowed us to maintain consistency in the evaluation process and enabled us to address any discrepancies or differences in opinions among the team members. After the initial screening, the two authors participated in the verification process to ensure a comprehensive and thorough assessment of the articles; the interrater reliability rate (IRR) was 89.5%.

Lastly, we invited an expert, a faculty member in the special education department at our institution, to verify the search and coding process. The involvement of this expert served as an additional layer of scrutiny and validation, helping to minimize potential errors or biases in the study selection and data coding procedures. After the four-step search process, 15 peer-reviewed articles were included in the present review (see Figure 1; Page et al., 2021).
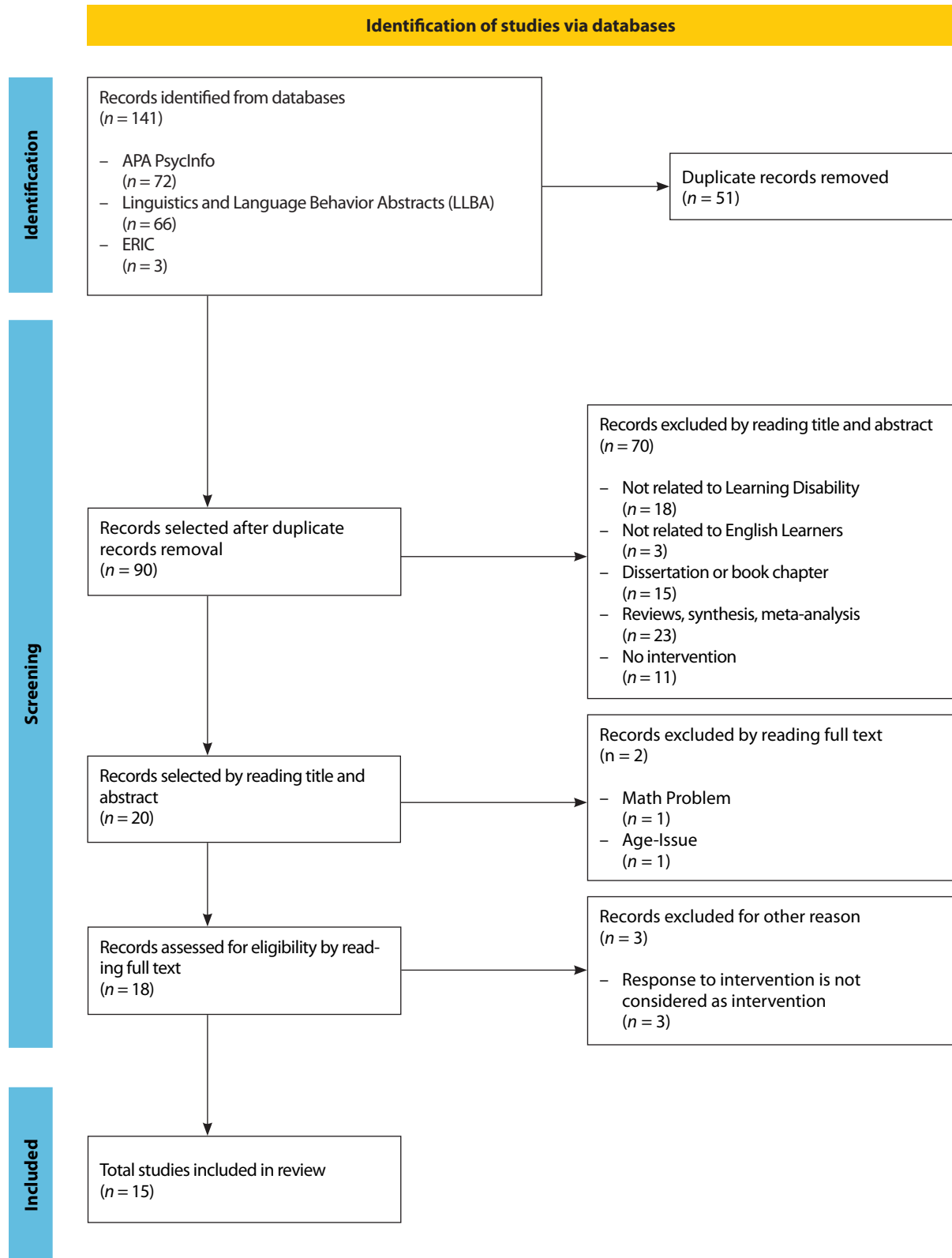
Identification of studies via databases

Identification

Records identified from databases
($n = 141$)

– APA PsycInfo
  ($n = 72$)
– Linguistics and Language Behavior Abstracts (LLBA)
  ($n = 66$)
– ERIC
  ($n = 3$)

Duplicate records removed
($n = 51$)

Screening

Records selected after duplicate records removal
($n = 90$)

Records excluded by reading title and abstract
($n = 70$)

– Not related to Learning Disability
  ($n = 18$)
– Not related to English Learners
  ($n = 3$)
– Dissertation or book chapter
  ($n = 15$)
– Reviews, synthesis, meta-analysis
  ($n = 23$)
– No intervention
  ($n = 11$)

Records selected by reading title and abstract
($n = 20$)

Records excluded by reading full text
(n = 2)

– Math Problem
  ($n = 1$)
– Age-Issue
  ($n = 1$)

Records assessed for eligibility by reading full text
($n = 18$)

Records excluded for other reason
($n = 3$)

– Response to intervention is not considered as intervention
  ($n = 3$)

Included

Total studies included in review
($n = 15$)

Figure 1
Prisma Search Flow Diagram

Coding the Characteristics of the Included Studies

We used the following variables to code the included studies: (a) *Participants*, including the total number of participants, their gender and age, and whether they were English learners or had LD or learning difficulties; (b) *Intervention strategy,* including the targeted skills (e.g., reading comprehension or writing) and an overview of the strategy; (c) *Intensity and duration of the intervention*; (d) *Dependent variable* (measure); and (e) *Results*.

Two coders extracted information from the studies. The first coder is an assistant professor of special education; the second coder is a doctoral student in Learning, Design, and Technology in her fourth year of study. The coding training procedure consisted of two stages: (a) reviewing the inclusion and exclusion criteria for articles, and (b) practicing coding using the codebook and one included study as an example.

In the first stage, both coders reviewed the inclusion and exclusion criteria to arrive at an understanding of the characteristics of participants they needed to record, particularly those related to disabilities and English learners. In the second stage, the first coder demonstrated the process of extracting information from one study and how to record it in the codebook. The second coder then practiced coding independently, requesting feedback from the first coder as needed.

After completing the two-stage training process, both coders independently coded the remaining 14 articles. The interrater reliability for coding was 94%. Any disagreements were resolved by rereading the included studies to identify the correct information. See Table 1 for the characteristics of the included studies.

Results

Fifteen studies examining interventions designed for ELswLD during 2002-2022 were identified.

RQ1: What Are the Characteristics of Interventions Designed for ELswLD Published From 2002 to 2022?

After analyzing the interventions designed for ELswLD from the 15 selected articles, several key characteristics emerged (see Table 1). These included research design, participant characteristics, intervention strategy, intensity/duration, dependent variable, and results.

Research Design

An analysis of the selected articles revealed that a variety of research designs were employed in the interventions. Among all 15 selected articles, seven interventions used group design (Berkeley et al., 2011; Denton et al., 2008; Driver & Powell, 2017; Lovett et al., 2008; O'Connor et al., 2021; Sáenz et al., 2005; Williams & Vaughn, 2020). Driver and Powell (2017) used a quasi-experimental design with nine third-grade participants, comparing their performance to a representative sample of third-grade students. Of the representative sample, 16% were ELs.

Other studies used a single-subject design (Cuenca-Carlino et al., 2018; De La Paz & Sherman, 2013; Helman et al., 2015; Jitendra et al., 2004; Jozwik & Douglas, 2017; Sanford et al., 2020; Viel-Ruma et al., 2010; Xin et al., 2020). Among these, Sanford et al. (2020) used a changing-criterion design. Across the four phases of the intervention, the mastery criteria were gradually increased. This design aimed to determine whether the dependent variable measurement covaried with the systematically implemented criteria changes. This diverse range of research designs allows for a comprehensive understanding of the effectiveness of interventions tailored to ELswLD, considering various methodologies and perspectives.

Participant Characteristics

Among the 15 articles, participants ranged in age from 1st to 11th grade. A total of 268 were male, and 171 were female. (Only one study did not specify participants' gender; Lovett et al., 2008). Among the participants, 34.2% were identified as having LD and 67.9% were specified as ELs. Participants in Denton et al.'s (2008) study were identified as having severe reading difficulties. Although the authors noted that most had LD, the exact number of students with LD was not specified. Similarly, participants in Lovett et al.'s (2008) study were identified as having a reading disability. However, it is unclear whether this equates to LD, as the authors used substantial achievement deficits on three standardized reading measures to screen the participants.

Three studies specified that their participants either had LD or were identified as being at risk for LD in mathematics, and all were ELs (Driver & Powell, 2017; Sanford et al., 2020; Xin et al., 2020). Students with an LD in mathematics encounter unique challenges. Since English is the primary language used in mathematics instruction, the linguistic complexity in mathematics can create additional challenges for ELs. Many mathematical

Table 1

Summary of Study Characteristics and Findings

Study	Research Design	Participants	Intervention Strategies	Intensity/Duration	Dependent Variable	Results
Berkeley et al. (2011)	Pre-post experimental group design	*N* = 57; M = 28; F = 29 LD = 5; ELL = 13 Grade: 7th Average age: 13.28	*Self-Questioning Strategy for Reading Comprehension in Social Studies* Overview of the strategy: a structured approach to engaging with the text: (a) "turn headings and subheadings into questions," (b) "read the section," (c) "stop!" and (d) "try to answer your question." Additional "fix-up" strategies included (a) "re-read that section," (b) "check your understanding of vocabulary," (c) "look for other text structures that can help you," and (d) "write down questions to ask your teacher."	Three lessons, each lasting 20 minutes Lesson 1: Introduced self-questioning strategy; explained purpose and modeled its use. Lesson 2: Guided practice applying the strategy with teacher support. Lesson 3: Students independently practiced the strategy.	Teacher-developed content-specific multiple-choice and open-ended tests, along with a strategy awareness survey.	Students in the self-questioning group outperformed those in typical practice, using strategies to enhance their recall of information.
Cuenca-Carlino et al. (2018)	Multiple probe across groups	*N* = 9 M = 6; F = 3 LD = 1; ELL = 9 Grade: 2nd and 3rd Average age: 7.9	*Self-Regulated Strategy Development (SRSD) for Writing* Overview of the strategy: the strategy framework includes the following six instructional stages: (a) develop and activate background knowledge; (b) discuss the strategy; (c) model the strategy; (d) memorize the strategy; (e) provide support; and (f) independent practice.	Participants received instruction 5 times per week for 25 min each session.	1. Essay components 2. Easy quality. 3. Essay length.	Results showed a positive effect of SRSD on students' essay quality and overall satisfaction with the SRSD instruction.

Note. All numbers based on data reported by authors of reviews. NR = not reported; N = number; M = male; F = female; LD = learning disability; ELL = English Language Learner.

Table 1. (continued)

Study	Research Design	Participants	Intervention Strategies	Intensity/Duration	Dependent Variable	Results
De La Paz & Sherman (2013)	Multiple-probe design across classrooms	*N* = 23 M = 11; F = 12 LD = 5; ELL = 12 Grade: 6th Average age: Unknown	*SRSD for Revising* Overview of the strategy: (a) define expository essays and analyze a sample; (b) introduce the FIX strategy: Focus on elements, identify problems, Execute changes; (c) model FIX with a sample essay; (d) practice revising in pairs or groups; and (e) apply FIX and self-regulation independently.	Participants received 45 minutes of strategy instruction, three times a week for 4 weeks.	1. ypes of revisions: Revisions were categorized as surface or nonsurface and scored for syntactic complexity (word, phrase, or T-unit). 2. Holistic quality: Grading assessed ideas, organization, coherence, sentence structure, and vocabulary quality.	Positive results were found for English learners, including those who were identified as having LD. Results were equally positive for students who were not English learners.
Denton et al. (2008)	Pre-/posttest experimental group design	*N* = 38 M = 26; F = 12 All participants were identified with severe reading difficulties, most with learning disabilities. ELL = 22 Grade: 6th–8th Average age: Unknown	*Multicomponent Reading Intervention* Overview of the strategy: The intervention was a significantly modified version of a phonics-based remedial program. The program includes ESL practices, vocabulary instruction, fluency, and comprehension strategies.	Based on attendance data, participants in the treatment group received an average of 43 sessions, each 40 minutes, over 13 weeks.	1. Reading comprehension 2. Word identification and spelling 3. Fluency 4. Social skills and problem behavior	Results indicated that treatment students did not demonstrate significantly higher outcomes in word recognition, comprehension, or fluency. The researchers noted that students with severe reading difficulties, especially ELLs and those with limited oral vocabularies, may need more intensive intervention than provided in this study.

Table 1. (continued)

Study	Research Design	Participants	Intervention Strategies	Intensity/Duration	Dependent Variable	Results
Driver & Powell (2017)	Quasi-experimental design compared the performance of nine participants to a representative sample of third-grade students	$N = 9$ $M = 4$; $F = 5$ All students were identified as at risk of LD in mathematics ELL $= 9$ Grade: 3rd Average age: 8.3	*Culturally and Linguistically Responsive Practice with Schema Instruction (CLR-SI) for Mathematical Word Problems* Overview of the Strategy: The intervention includes two phases Phase 1: Basic strategy instruction utilizes the RISE strategy: (a) read the problem; (b) illustrate the problem by visual representation; (c) solved for the unknown amount; and (d) explained what they were solving. Phase 2: CLR-SI integrates culturally and linguistically responsive pedagogy.	Participants received the intervention for 20-25 minutes, three times per week, across a total period of 10 weeks.	1. Word problem performance 2. Computational fluency (addition fluency & subtraction fluency)	The results showed improved word-problem performance among students who participated in the intervention, with positive feedback and satisfaction expressed about the tutoring.
Helman et al. (2015)	Multiple baselines across participants	$N = 3$ $M = 2$; $F = 1$ LD $= 3$ ELL $= 3$ Grade: 9th–10th Average age: 15.2	*The Clue Word Strategy (CWS) for Science Vocabulary* Overview of the strategy: (a) read a sentence with a target vocabulary word; (b) look for context clues that surround the unknown word; (c) re-read the sentence; (d) write the target vocabulary word; (e) break the vocabulary word into its morphemes (i.e., prefix, suffix, root); (f) write the meaning of each morpheme; (g) predict and write the meaning of the targeted science word; and (h) check the dictionary or the answer key sheet for the correct meaning.	Participants received six training lessons, conducted over a two-week period with three days per week, including explanations of context, morphemes, roots, prefixes, and suffixes. Following the training lessons, each student received a 45-min CWS instructional lesson three times per week until they reached mastery.	1. CWS probes (write and define the science morphemes and write the definition of the science word) 2. Test of Reading Comprehension– Fourth Edition 3. Word Knowledge Test 4. Morpheme Test 5. Strategy Use/ Strategy Knowledge Test 6. Child Intervention Rating Profile	All three participants demonstrated positive improvement in various aspects of morphological awareness, including defining intervention words, using science vocabulary in sentences, identifying and explaining morpheme meanings, and writing the meaning of isolated morphemes.

Table 1. (continued)

Study	Research Design	Participants	Intervention Strategies	Intensity/Duration	Dependent Variable	Results
Jitendra et al. (2004)	Multi probe across participants	Year 1 Study $N = 7$ $M = 6; F = 1$ $LD = 5, ELL = 1$ Grade: 1st–3rd Average age: 7.9 Year 2 Study $N = 5$ (two of them also participated in Year 1) $M = 3 F = 2$ $LD = 3 ELL = 0$ Grade: 2nd–3rd Average age: 8.7	*Read Well Program* Overview of the strategy: Read Well is a comprehensive reading curriculum consisting of 38 instructional units, tailored for beginning readers and students in second or third grade who require remedial support at a first-grade reading level. It emphasizes systematic instruction in phonological awareness, phonics, fluency, vocabulary, and comprehension.	Year 1 Study Participants received four days a week, with each session lasting between 20 to 40 minutes. Year 2 Study: Participants received intervention varied from 30–45 minutes per lesson at their individual learning pace.	Year 1 Study 1. Phonemic segmentation fluency 2. Alphabetic understanding and decoding 3. Word accuracy 4. Passage fluency 5. Reading comprehension 6. Consumer satisfaction 7. Spelling (added in Year 2)	Year 1 showed that Read Well improved passage fluency, though reading and comprehension results varied. Differences in participant traits and instruction time likely influenced outcomes. Year 2 results indicated growth in reading, spelling, and comprehension for most participants.
Jozwik & Douglas (2017)	Multiple probe across participants	$N = 6$ $M = 4; F = 2$ $LD = 2$ Tier 3 intensive literacy intervention support = 4 $ELL = 6$ Grade: 5th Average age: 10.8	*Multicomponent Academic Vocabulary Instruction* Overview of the strategy: It combined explicit vocabulary instruction (e.g., modeling, guided practice with feedback, independent practice), self-regulation procedures (i.e, self-goal setting, self-recording, self-evaluating), and cooperative learning structures (e.g., think-pair-share, inside-outside-circle) into multicomponent academic vocabulary instruction.	Intervention sessions took place across five consecutive school days per word set in 25-min sessions.	1. Vocabulary knowledge scale 2. Oral word-reading test 3. Expressive-definition test 4. Social validation questionnaire	Participants demonstrated improved word reading and definition skills beyond baseline levels following the intervention. Follow-up measures indicated sustained positive effects. Teachers noted that the explicit instruction, cooperative learning structures, and self-regulation strategies were effective and practical for implementation.

Table 1. (continued)

Study	Research Design	Participants	Intervention Strategies	Intensity/Duration	Dependent Variable	Results
Lovett et al. (2008)	Experimental design	*N* = 166 students with reading disability M = Unknown; F = Unknown ELL = 76 Grade: 2nd–8th Average age: 10.22	*Remedial reading instruction* Overview of the strategy: The remedial reading interventions focused on basic word identification and decoding skills. It included (a) PHAST (Phonological and Strategy Training) decoding program; (b) PHAB/DI (Phonological Analysis and Blending/Direct Instruction) decoding program with spelling and writing; and (c) PHAST decoding program with spelling and writing.	All participants received one hour of intervention daily, four to five days per week, for a total of 105 hours of instruction.	1. Measure of language and cognitive abilities 2. Test of visual naming speed 3. Phonological processing measures 4. Standardized reading measures 5. Experimental outcome measures 6. Other measures of academic achievement	Participants who received the remedial reading interventions performed better than participants who received special education reading. However, whether a child was ELL or not did not significantly affect the intervention outcomes or growth during intervention.
O'Connor et al. (2021)	Multi-year study experimental design	*N* = 64 M = 43; F = 21 LD = 47, ELL = 45 Grade: 7th Average age: Unknown	*Creating Habits That Accelerate Academic Vocabulary of Students (CHAAOS)* Overview of the strategy: The vocabulary intervention strategy focused on highly useful academic words. The chosen words were divided into three sets and taught over three 4-week cycles. Instruction emphasized cumulative learning, contextualized usage, and ample practice with feedback.	All participants received 15 minutes of instruction per day, four days a week, for a total duration of 12 weeks.	1. Proximal measures 2. Near-transfer measures 3. Maintenance of taught vocabulary words 4. Far-transfer measures	Students who received the instruction learned significantly more words than students in control classes and maintained those words' meanings three months later. Conclusion: If students could learn key academic words and retain their meanings, their generalized vocabulary might also grow.

Table 1. (continued)

Study	Research Design	Participants	Intervention Strategies	Intensity/Duration	Dependent Variable	Results
Sáenz et al. (2005)	Experimental design	*N* = 119 M = 67; F = 52 LD = 20, ELL = 119 Grade: 3rd–6th Average age: 10.4	*Peer-Assisted Learning Strategies (PALS) on Reading Performance* Overview of the strategy: PALS is a reciprocal classwide peer-tutoring strategy that includes (a) partner reading with story retell; (b) paragraph shrinking; and (c) prediction relay. Student pairs rotate every 3-4 weeks. Within each pair, students alternate between the roles of tutor and tutee during each lesson. Teachers were also required to join the students' team.	Participants received 35-minute instruction, three times a week for a 15-week period.	1. Reading: The Comprehensive Reading Assessment Battery 2. Teacher and Student Questionnaires	PALS improved the reading comprehension of ELL with and without LD in transitional bilingual education classrooms.
Sanford et al. (2020)	Single-subject changing-criterion design	*N* = 4 M = 2; F = 2 LD = 1, ELL = 4 All students required both mathematics and language supports. Grade: 4th Average age: 10.3	*PLUSS Intervention Strategy on Mathematics* Overview of the strategy: (a) pre-teaching of critical vocabulary and priming background knowledge; (b) language modeling and opportunities for practice; (c) use of visual and graphic organizers; (d) systematic and explicit instruction; and (e) strategic use of native language and teaching for transfer.	Participants received a total of 34 intervention sessions.	1. Vocabulary acquisition 2. Story problem application	Results showed a positive impact of PLUSS intervention on students' word identification skills and story problem application.

Table 1. (continued)

Study	Research Design	Participants	Intervention Strategies	Intensity/Duration	Dependent Variable	Results
Viel-Ruma et al. (2010)	Multiple probe across participants	*N* = 6 M = 4; F = 2 LD = 6, ELL = 3 Grade: 9th–11th Average age:16	*Abbreviated Expressive Writing I Program* Overview of the strategy: The program includes direct instruction in mechanics (capitalization, use of commas and quotation marks), sentence construction (punctuation, introductory phrases), and paragraph/story composition (including use of varied sentence structures), and editing.	Participants received 90-minute instruction per day for a five-week period.	1. Correct word sequences 2. Text length 3. The spontaneous writing portion of the Test of Written Language, 3rd Edition	Results were variable, but there appeared to be a positive trend in student writing performance as measured by correct word sequence, length of text, and results on TOWL-3. The trends for the students who were ELLs were similar to those of the English-only speakers.
Williams & Vaughn (2020)	Experimental design	*N* = 85 M = 60; F = 25 LD = 71, ELL = 85 Grade: 9th Average age: Unknown	*Reading Intervention for Adolescents (RIA)* Overview of the strategy: Phase 1 focuses on foundational reading skills: word study, fluency, vocabulary, and comprehension. Phase 2 emphasizes activating and building prior knowledge, introducing and reinforcing academic vocabulary, facilitating deep content understanding.	Participants received 3.75 to 4.25 hours of intervention each week for a total of nine months. (Phase 1 lasted from Sep to Dec; Phase 2 lasted from Jan to May).	1. Word reading: The Sight Word Efficiency and the Phonemic Decoding Efficiency from the Test of Word Reading Efficiency–Second Edition. 2. Vocabulary: MacGinitie Reading Test-4 (GMRT-4) vocabulary subtest 3. Comprehension: GMRT-4 comprehension subtest and the Test of Silent Reading Efficiency and Comprehension.	Results indicated no significant differences between the RIA intervention groups and the control group except for a moderate effect on proximal vocabulary. Adolescent English learners may have heterogeneous deficits in reading, which makes it difficult to design an intervention to address those needs.

Table 1. (continued)

Study	Research Design	Participants	Intervention Strategies	Intensity/Duration	Dependent Variable	Results
Xin et al. (2020)	Adapted multiple-probe design across participants	$N = 4$, $M = 2$; $F = 2$ LD in mathematics = 4, ELL = 4 Grade: 3rd Average age: 8.9	*Conceptual Model-Based Problem Solving (COMPS) Program* Overview of the strategy: The COMPS program integrates (a) content specific visual scaffolding, including mathematical model-based problem representation; and (b) linguistic scaffolding involving a series of word problem story grammar prompting questions.	Participating students worked with the COMPS tutor one-on-one on a laptop computer four times a week, with each session lasting about 20-30 min, for an average of 28 sessions.	1. Additive word problem solving criterion test 2. Algebraic model expression test 3. The mathematics problem solving subtest of the Stanford Achievement Test- 10th edition.	Participants improved their performance on the criterion test as they engaged in the COMPS diagram equation for problem representation and solving. All students showed dramatic improvement in algebraic model expression. Two of the four students showed improvement in solving problems in the standardized test.

terms, such as subtract, sum, and value, have specific definitions that may confuse ELs. Furthermore, the syntactic and semantic features of mathematical expressions, such as *the same as*, can also be difficult for these students to understand. As a result, ELs must navigate not only the mathematical problems but also the language used to understand the mathematical concepts.

Intervention Strategy

The interventions in the selected articles were designed to address four specific academic areas where ELswLD may face challenges. Three interventions focused on vocabulary learning (Helman et al., 2015; Jozwik & Douglas, 2017; O'Connor et al., 2021). Specifically, Helman et al. (2015) taught students to use clues in a sentence to learn targeted science vocabulary words. Participants also broke the vocabulary words into their morphemes and predicted the words' meaning based on those morphemes. Jozwik and Douglas (2017) employed a multi-component approach to teach academic words, incorporating strategies such as modeling, guided practice with feedback, and independent practice. This approach also included elements of self-regulation and cooperative learning to reinforce the acquisition of academic vocabulary. O'Connor et al. (2021) implemented an intervention that incorporated cumulative learning, contextualized usage, and extensive practice with feedback to teach participants highly useful academic words. The intervention consisted of three 4-week cycles. In each cycle, participants learned 16 academic words.

Three interventions addressed mathematics problem-solving skills hindered by English vocabulary (Driver & Powell, 2017; Sanford et al., 2020; Xin et al., 2020). These studies specified that their participants either had LD or were identified as being at risk for LD in mathematics in addition to being ELs. To support participants in learning mathematics problem-solving, Driver and Powell (2017) provided prompts such as (a) reading the problem, (b) illustrating the problem through a visual representation or writing an equation, (c) solving for the unknown amount, and (d) explaining their solution to help them understand the problem, develop a plan, execute the plan, review their work, and check for accuracy. In Sanford et al. (2020), participants used visuals and graphic organizers to help understand mathematical concepts, such as line symmetry. Similarly, Xin et al. (2020) implemented an intervention that included virtual manipulatives, such as Unifix cubes, to help students understand fundamental mathematical concepts essential for de-

veloping additive reasoning and problem-solving skills. To support participants in learning mathematics problem-solving, the interventions included additional strategies to enhance language learning, such as the use of native language and drawing on personal experiences (Driver & Powell, 2017; Sanford et al., 2020), pre-teaching critical vocabulary and priming background knowledge in mathematics (Sanford et al., 2020), and providing linguistic and interactive scaffolding to help participants understand mathematical concepts (Xin et al., 2020).

Six interventions addressed reading comprehension (Berkeley et al., 2011; Denton et al., 2008; Jitendra et al., 2004; Lovett et al., 2008; Sáenz et al., 2005; Williams & Vaughn, 2020). Of these, three focused on a phonics-based remedial program that emphasizes systematic instruction in phonological awareness, phonics, fluency, vocabulary, and comprehension, along with phonological and strategy training in decoding (Denton et al., 2008; Jitendra et al., 2004; Lovett et al., 2008). Berkeley et al. (2011) used a self-questioning strategy to improve reading comprehension in social studies. Participants were taught "fix-up" strategies when they were unable to answer their own questions, such as re-reading the section, checking their understanding of vocabulary, identifying other text structures, and writing down questions to ask the teacher. Sáenz et al. (2005) implemented a reciprocal classwide peer-tutoring strategy to enhance reading. In this approach, participants alternated between the roles of tutor and tutee during each lesson to learn and practice reading strategies. Williams and Vaughn (2020) emphasized teaching foundational reading skills by activating and building prior knowledge, introducing and reinforcing academic vocabulary, and facilitating a deep understanding of content.

Finally, three interventions focused on improving writing skills (Cuenca-Carlino et al., 2018; De La Paz & Sherman, 2013; Viel-Ruma et al., 2010). Two of these studies utilized Self-Regulated Strategy Development (SRSD). Specifically, Cuenca-Carlino et al. (2018) used SRSD to help participants write quality essays, while De La Paz and Sherman (2013) focused on revising writing using the FIX strategy: Focus on elements, Identify problems, and Execute changes. SRSD supported participants in learning the strategies skilled writers use, while also emphasizing self-regulation skills. Viel-Ruma et al. (2010) implemented a program that explicitly taught the overall writing process, including writing mechanics, sentence construction, paragraph composition, and editing.

Intensity/Duration

All studies specified the intensity of the interventions, which varied significantly in terms of session duration, frequency, and total length. For example, in O'Connor et al. (2021), to establish participants' vocabulary learning habits, each session lasted a 15 minutes, conducted four times a week for 12 weeks. On the other hand, Viel-Ruma et al. (2010) implemented longer sessions of 90 minutes over five weeks. Thus, intervention intensity was quite variable. Notably, Jitendra et al. (2004) conducted interventions in Year 1 four days a week, with each session lasting 20 to 40 minutes. Later, they changed the intervention time in order to accommodate participants' individual needs, so they could progress at their own pace, highlighting the flexibility of intervention timing to consider participants' needs and characteristics.

Dependent Variable

The studies used a variety of dependent variables (DV), with some having multiple DV within the same study. For example, Berkeley et al. (2011) looked at social studies content knowledge and the use of a self-questioning strategy. Five studies had a DV related to reading performance, skills, and comprehension (Denton et al., 2008; Jitendra et al., 2004; Lovett et al., 2008; Sáenz et al., 2005; Williams & Vaughn, 2020), and seven had a DV related to vocabulary (Denton et al., 2008; Helman et al., 2015; Jitendra et al., 2004; Jozwik & Douglas, 2017; O'Connor et al., 2021; Sanford et al., 2020; Williams & Vaughn. 2020). Jitendra et al. (2004) also looked at phonics and decoding. Three studies focused on writing, including essay components (Cuenca-Carlino et al., 2018), text revision (De La Paz & Sherman, 2013), and word sequence and text length (Viel-Ruma et al., 2010). Two studies had DV of word problem performance in mathematics (Driver & Powell, 2017; Xin et al., 2020). Finally, Sanford et al. (2020) focused on vocabulary acquisition in mathematics and its application in story problems.

Results

The comprehensive findings reveal favorable effects, with ELswLD demonstrating improved performance in the specific academic areas targeted by the interventions. Out of the 15 research studies examined, 13 reported positive results (Berkeley et al., 2011; Cuenca-Carlino et al., 2018; De La Paz & Sherman, 2013; Driver & Powell, 2017; Helman et al., 2015; Jitendra et al., 2004; Jozwik & Douglas, 2017; Lovett et al., 2008; O'Connor et al., 2021; Sanford et al., 2020; Sáenz et al., 2005; Viel-Ruma

et al., 2010; Xin et al., 2020). In contrast, two studies indicated no or partial significant impact of the interventions (Denton et al., 2008; Williams & Vaughn, 2020). Participants in Denton et al.'s (2008) research had significant reading difficulty and were non-responders to the reading intervention. The researchers noted that these participants may require more intensive interventions than those implemented in this study. Williams and Vaughn (2020) investigated the impact of Reading Intervention for Adolescents (i.e., RIA) and found that it had a significant positive effect on proximal vocabulary skills (effect size of 0.41). However, it did not significantly influence other reading outcomes (e.g., word decoding, sentence comprehension). The researchers suggested that adolescent English learners often have heterogeneous deficits in reading, which makes it challenging to design interventions that effectively address their varied needs.

These generally positive findings highlight the potential of research-based interventions in improving the academic outcomes of ELswLD, while also calling for continued research to address the unique challenges faced by these learners. Notably, three studies compared participants who were ELs with those who were not (De La Paz & Sherman, 2013; Lovett et al., 2008; Viel-Ruma et al., 2010). The intervention outcomes showed that the interventions were effective in improving performance for both groups of participants with LD.

What Practical Implications Inform Future Research and Learning Practices Designed for ELswLD?

The practical implications from the selected research highlight the need for using targeted interventions, fostering collaborative approaches, and providing inclusive educational opportunities to support the academic success and language development of ELswLD.

Enduring Need for ELswLD Research

O'Connor et al. (2021) emphasized the need for longer-term studies to determine whether small improvements in academic language for ELs contribute meaningfully to high school academic success. Regarding reading interventions, Sáenz et al. (2005) suggested PALS (Delquadri et al., 1986) as an effective practice for promoting reading comprehension among ELs but note its limitations in improving oral reading fluency. Lovett et al. (2008) confirmed the value of systematic and explicit phonological reading remediation for EL students significantly delayed

in reading development. However, there is still a need to explore function-specific interventions for reading difficulties in ELswLD, a sentiment shared by Denton et al. (2008), who particularly stressed the importance of considering interventions for reading difficulties in older ELs and those with severe reading difficulties. Delving deeply into function specifics will help refine evidence-based practices.

Technology Interventions

Researchers highlighted the significance of targeted language support interventions for ELs with specific learning needs. Relatively few studies incorporated technology to facilitate the intervention. Only two of the 15 articles incorporated technology in the form of computer-assisted programs (Xin et al., 2020) and video presentations (Sanford et al., 2020) in the intervention. The primary focus of these interventions was to address the challenges related to mathematics problem-solving hindered by English vocabulary and both were found to have positive impact. In the study by Xin et al. (2020), participants used a program called Conceptual Model-Based Problem Solving (COMPS; Xin, 2012) as a tutor to learn mathematics concepts step by step. The program included three modules, with Modules A building on foundational ideas, and Modules B and C focused on engaging students in representing and solving various additive word problems.

In the study by Sanford et al. (2020), participants learned mathematics using visuals and graphic organizers. In order to make the concepts more concrete, the intervention included video presentations to demonstrate line symmetry. Although relatively few research studies have incorporated technology to aid teaching, educational technology that makes abstract mathematical ideas and examples more concrete can be an effective component of interventions.

Effective Teaching Strategies

Regarding writing interventions, Viel-Ruma et al. (2010) highlighted the potential benefits of the direct instruction writing program for students with LD in written expression and ELs with deficits in writing. Additionally, De La Paz and Sherman (2013) suggested that future research compare the FIX strategy to other forms of revising instruction, such as writing workshop classrooms that encourage revision through sharing and peer review. Moreover, Cuenca-Carlino et al. (2018) recommended that teachers providing instruction to ELs adopt a culturally responsive mindset and hold high expectations for student learning. Considering ELs' culture and language needs during instruction is essential, and

instructional support, such as visuals, gesture cues, and native-language assistance when available, can enhance the intervention for ELs within the writing intervention framework.

Discussion

This research review explored the effectiveness of interventions designed for ELswLD. By analyzing 15 articles published between 2002 and 2022, we have examined the characteristics of interventions designed for ELswLD, highlighted the limited intervention support available for this group, and emphasized the scarcity of technology-facilitated interventions.

Specifically, among the 15 studies, three interventions addressed vocabulary learning, three focused on mathematics problem-solving skills hindered by English vocabulary, six targeted reading comprehension, and three aimed to improve writing skills. All interventions were packaged with step-by-step teaching strategies. Some of the studies incorporated effective teaching strategies, such as collaborative learning and direct instruction. For collaborative learning, Jozwiak and Douglas (2017) implemented cooperative learning structures as part of a multicomponent academic vocabulary instruction. Participants in their study worked in pairs or groups to share ideas and engage in collective thinking. Sáenz et al. (2005) used a reciprocal classwide peer-tutoring strategy to teach reading. Participants were paired with a peer, with pairs rotating every three to four weeks. Within each pair, students alternated between the roles of tutor and tutee during each lesson. For direct instruction, De La Paz and Sherman (2013) demonstrated a specific revising strategy that included direct instruction in common revision tactics. Using direct instruction, teachers clearly explained and model new skills, such as revising texts, allowing students to learn and imitate effectively.

However, while these studies demonstrated the effectiveness of the interventions, two studies showed partial or no significant positive results (Denton et al., 2008; Williams & Vaughn, 2020). This highlights a concerning reality: Interventions explicitly tailored for ELswLD are severely limited. Researchers in both studies indicated that ELs with significant reading difficulties require more intensive interventions and argued that English learners often exhibit heterogeneous deficits in reading, which underscores the importance of incorporating culturally responsive teaching in

interventions. This finding aligns with previous research, including Lavín et al. (2020), which emphasized the dearth of published intervention studies for English learners with LD. Remarkably, this issue has persisted for over three decades, as Ysseldyke called for culturally diverse learner-focused research already in 1987.

To support ELswLD to learn new concepts in a different language, interventions in both Driver and Powell's (2017) and Sanford et al.'s (2020) studies integrated culturally and linguistically responsive pedagogy. One of the strategies involved allowing the use of native language and teaching for transfer. The use of a first language provides a foundation of linguistic understanding and cognitive skills. With such a foundation, students can transfer the skills to learn new concepts in a different language (Salmona Madriñan, 2014).

Future research for ELswLD may consider using culturally responsive teaching that connects students' languages and experiences in their cultures to what they learn in the classroom. Culturally relevant pedagogy acknowledges and values the diverse cultural backgrounds, experiences, and identities of students (Ladson-Billings, 1995; Paris & Alim, 2017). By incorporating students' cultural perspectives and knowledge into the learning process, educators create a more inclusive and equitable classroom environment and a personalized approach that recognizes and respects the unique cultural backgrounds of each student. For learners with LD, this approach can be transformative as it considers their individual strengths and challenges within the context of their cultural identities. By drawing on familiar cultural references, examples, and experiences, educators can make the curriculum more relatable and engaging, leading to increased motivation and active participation.

Lastly, our research has uncovered a notable scarcity of technology-facilitated interventions for ELswLD. This finding supports previous research noting that the digital divide and inequality among marginalized populations, such as students with disabilities, continue to suffer from this opportunity gap (Banister & Fischer, 2010; Tyson, 2015). Given the widespread use of technology in education, the scarcity of its integration in these interventions is an area worth exploring further. Future research could investigate the potential benefits of incorporating technology in content-specific interventions for ELswLD, particularly in different academic domains. The effects of design consideration for this population should be examined (see Greer et al., 2013) in light of the need to consider the cognitive load while

learning using technology (Mayer, 2005), given that students with LD typically have cognitive load deficits (Swanson & Saenz, 2005). Additionally, examining the impact of diverse technological tools on intervention outcomes might offer insights into more effective and engaging approaches to supporting the academic development of ELswLD.

Limitations and Future Work

One limitation of this review is the combined consideration of LD and learning difficulties during the article selection process. Different countries use different criteria for diagnosing LDs; the international variability in how learning disabilities are defined (Sideridis, 2007) made our review include studies with learners with LD and learning difficulties. Future research could refine the scope by providing a definition of LD to ensure consistent inclusion criteria across studies. A more precise definition of LD could also improve the identification and support provided to students with LDs.

The second limitation is that the scope of the review was confined to a specific time frame and set of sources, which might have led to the exclusion of relevant studies that were published after the literature search was conducted. Third, limited generalizability of the findings from individual studies due to narrow participant demographics and specific research settings presents another notable constraint. Additionally, the outcomes of the interventions were assessed using various measures, which further compounds the limited generalizability. To address these limitations, future work should prioritize conducting studies with more diverse and representative samples.

Conclusion

Through a meticulous analysis of 15 articles targeted to ELswLD published between 2002 and 2022, our study has shed light on the effectiveness of intervention designed for ELswLD. One of the primary concerns that emerged from our review is the severe limitation in interventions explicitly tailored for ELswLD. Another observation is the scarcity of technology-facilitated interventions for ELswLD. Given the digital divide and the opportunity gap experienced by marginalized populations, including students with disabilities, this finding underscores the need to explore and harness the potential benefits of incorporating technology in content-specific interventions for ELswLD. Furthermore, our research highlights the importance of implementing culturally

responsive interventions. By acknowledging and valuing students' diverse cultural backgrounds, experiences, and identities, educators create an inclusive and supportive classroom environment, particularly beneficial for students with learning disabilities. Taking decisive action to continue research specific to this population is crucial for creating a more inclusive and equitable education system that empowers ELswLD to thrive academically.

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