Review Article

SLP-educator classroom collaboration: A review to inform reason-based practice

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Abstract

Background and aims: Increasingly, speech language pathologists are engaging in collaborative classroom services with teachers and other educators to support children with developmental language disorder and other communication impairments. Recent systematic reviews have provided a summary of only a small fraction of the available evidence and recommended the use of reason-based practice in the absence of a sufficient empirically driven evidence base. The purpose of this paper was to provide a broad (but critical) review of the existing evidence.

Main contribution: Papers were gathered through review of reference lists in the recent systematic reviews and other published works, as well as general internet searches. A total of 49 papers were identified either reporting empirical evidence pertaining to SLP-educator collaborative classroom activities, empirical evidence pertaining to consultative services, classroom instruction, or small group intervention in the classroom, or providing information, discussion, surveys, or reviews related to the topic. Evidence pertaining to vocabulary, oral language, phonological awareness, curriculum-based language, and written language were summarized together with qualifications based on elements of the research design.

Conclusion and implications: Although much of the evidence must be interpreted with considerable caution, the present review is informative for clinicians looking to adopt a reason-based approach to practice.

Keywords

Classroom, consultation, developmental language impairment (DLI), education, specific language impairment (SLI)

Increasingly, speech language pathologists (SLPs) are engaging in collaborative classroom services with teachers and other educators to support children with developmental language disorder (DLD) and other communication impairments. Importantly, educators and SLPs have different—but complimentary skills and knowledge, which lays the groundwork for an important partnership. Collaboration, by definition, refers to working together to achieve shared goals, and there can be no doubt that SLPs, teachers, and other school educators share common goals in providing educational access to children with communication impairments generally, and DLD specifically. The need for SLP-educator collaboration is well recognized with the American Speech-Language-Hearing Association (ASHA)'s Ad Hoc Committee on the Roles and Responsibilities of School-based SLPs (2010) describing collaboration with educators as a responsibility of SLPs. Nevertheless, the research-based evidence for the effectiveness of a collaborative approach to service delivery has been labeled 'inadequate' (Cirrin et al., 2010). Indeed, Cirrin et al. suggested that clinicians rely on reason-based practice and their own data to guide service delivery decisions. In order to assist clinicians in this regard, the present paper provides a broader overview of the available evidence than has been included in recent systematic reviews constrained by specific inclusion criteria (Cirrin et al., 2010; McGinty & Justice, 2006).

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SLP service delivery in schools

In a school environment, SLPs employ a wide range of service delivery models depending on a variety of factors. Suleman et al. (2014) described services that largely happen outside of the classroom such as removing individuals or small groups from the classroom for intervention sessions ('pull out') or that involve the SLP indirectly affecting the child's educational program by providing modeling or coaching to relevant educators in the use of strategies to promote specific skills ('consultation'). Collaborative SLP-educator classroom-based services would include the SLP providing support to identified students while the teacher instructs the whole class, with the SLP teaching particular curriculum content falling within the expertise of the SLP such as phonological awareness, or the SLP and teacher engaging in team-teaching of content by jointly delivering a lesson (Suleman et al., 2014; Prelock, Miller, & Reed, 1995; see also Dohan & Schulz, 1998).

Why classroom-based services?

Over recent decades, there has been growing interest in SLP-educator classroom collaboration for many reasons including learning theory, functional goal setting, inclusive educational philosophies, differentiated instruction in the classroom, and response to intervention. In the field of speech language pathology, the concept of generalization of speech therapy gains made in-clinic to out-of-clinic environments has been an ongoing concern across a range of disorder areas including treatment targeting aphasia (Thompson, 1989), stuttering (Finn, 2003), speech sound disorders (Dunn, 1983), and DLD (Peterson, 2007). In response to such concerns, there has been a move to more naturalistic treatment that occurs in the target individual's regular environmental setting and incorporates incidental communication drivers as they occur (e.g., Kaiser, 1993; Sundberg & Partington, 1998). For school-based SLPs, there has been growing interest in classroom-based services as a way of providing intervention directly in the setting in which the developing skills are needed (Pershey & Rapking, 2003; Prelock, 2000). It has been suggested that the authenticity of the setting promotes faster generalization (McGinty & Justice, 2006).

Together with the potential benefits to generalization through classroom-based services, SLPs are interested in pursuing functional communication goals that help the child perform specific activities required in daily life. Functional goals in an educational context relate to academic, social, emotional, and vocational progress (Ehren, 2000). As a result, school-based SLPs are encouraged to incorporate communication goals that will facilitate school success for children with DLD (e.g., ASHA's Ad Hoc Committee on the Roles and Responsibilities of School-based SLPs, 2010). It follows from this notion that the classroom itself would be the natural context in which to address educationally related communication goals. It is important to note, however, that this view is not universally held. It has been suggested that learning may be optimized through judicious use of interventions outside the classroom in controlled environments (Lindsay & Desforges, 1986; Lindsay & Dockrell, 2002). This latter view emphasizes the importance of individualized solutions for optimizing intervention for children with DLD.

In parallel with the shifts in speech language pathology concerning generalization and functional goals, several driving forces out of education have served to encourage SLP-educator classroom collaboration. One factor is the movement towards an inclusive framework for individuals with disabilities requiring that persons with disabilities receive the support necessary to facilitate their effective education as part of the general education system (United Nations Convention on the Rights of Persons with Disabilities, 2006). According to this view, children with disabilities should have the opportunity to be educated in the 'Least Restrictive Environment (LRE)', that is, in the general classroom along with non-disabled peers to the greatest extent possible (Individuals with Disabilities Education Act of 1990, 1990). The notion that all students should have equal access to quality education is incorporated widely in governmental education reports around the world (e.g., Australia's Education for All National Review, 2015; Ontario's Learning for All, 2013; UK's Department of Education white paper, Education Excellence Everywhere, 2016; US Equity and Excellence Commission's, For Each and Every Child, 2013). For children with DLD, educational activities, themselves, may pose a barrier to access because they often involve complex oral and written language (Bauer, Iyer, Boon, & Fore, 2010). Due to the growing pressures for students to learn the skills and knowledge needed to function in today's world, it has been argued that educational curriculums are becoming increasingly rigorous and dependent on a student's deep understanding, reasoning, and problem solving (Capacity Building Series, 2013). As a result of the complexity of the materials, the need to provide classroom support to facilitate curriculum access for children with DLD has become increasingly important (Nippold, 2010).

More recently, there has been growing recognition of the need for differentiated instruction in the classroom. In simple terms, differentiation means tailoring instruction to meet individual needs. The idea is to provide different avenues to learning depending on the individual needs of different students in the classroom such as providing reading materials at varying readability levels, manipulatives, choice in assignments, and

engaging work contexts (Tomlinson, 2000). In principal, there is much to admire about the theory related to differentiated instruction, but in practice, the demands of implementing differentiated instruction in a busy classroom of 20–30 students with multiple needs is concerning (Bauer et al., 2010; Myhill & Warren, 2005). In a 2008 nationwide survey of 900 teachers by the Fordham Institute, 84% reported that differentiated instruction was difficult to implement. Some evidence consistent with this view comes from a study on scaffolding, the temporary support provided for the completion of a task otherwise too challenging for a learner. Silliman, Bahr, Beasman, and Wilkinson (2000) compared use of *directive scaffolding* involving direct teaching of concepts with corrective feedback to student responses and *supportive scaffolding* involving cues to elicit reasoning and contributions to extend emerging understanding. Scaffolding by a general educator and special education teacher conducting emergent reading groups including two children with DLD and two typically developing children was observed over 13 sessions. Results revealed that more than 99% of all scaffolding employed was categorized as directive for all participants. The researchers concluded that instruction was undifferentiated.

Why might teachers struggle to implement differentiated instruction in a large classroom (Bauer et al., 2010; Myhill & Warren, 2005)? First, frequency: The sheer number of demands for differentiation among a classroom of children with multiple needs might exceed that which can be effectively delivered by a single classroom teacher. Secondly, the teacher might lack the expertise to provide effective differentiation for children with particular needs such as those with DLD. In both cases, the presence of a SLP in the classroom can provide needed and necessary assistance. The SLP in the classroom not only provides another pair of hands to help with the work, but also brings expert understanding of DLD permitting more effective implementation of a differentiated instruction framework (Palinscar, Collins, Marano, & Magnusson, 2000). Importantly, no one person or profession has sufficient expertise to execute all of the functions associated with providing educational services to all children in the classroom (Hadley et al., 2000). By working together, an effective SLP-educator collaboration has the potential to support more students more effectively in the classroom.

Hand-in-hand with the principal of differentiated instruction has come the notion of response to intervention (RTI), a multi-tiered instructional approach to the early identification and support of students with special needs. RTI incorporates high-quality instruction in the general education classroom followed by more intense interventions for struggling learners involving supplemental learning activities at tier 2 and special education at tier 3. In this system, the focus of special service provision moves away from costly and time-consuming individual assessments to progress monitoring for all students implemented throughout the tiers with movement to higher tiers based on documented lack of progress. Formal comprehensive assessments may not occur until the child is considered appropriate for tier 3 services. The potential role of SLPs working in collaboration with educators in RTI was discussed in a special topics issue of *Topics in Language Disorders* (Ehren & Nelson, 2005; Graner, Faggella-Luby, & Fritschmann, 2005; Troia, 2005). At tier 1, SLPs may assist with the design of progress monitoring and high quality instruction incorporating language in the curriculum (e.g., Justice, McGinty, Guo, & Moore, 2009); at tier 2, SLPs may collaborate in the planning, implementation, and progress monitoring of supplemental instruction for learners struggling in language- and literacy-related aspects of the curriculum (e.g., Koutsoftas, Harmon, & Gray, 2009), and at tier 3, SLPs will be involved in providing specialized assessment and treatment for children with DLD and other communication disorders.

The challenge of change

In addition to the alignments with current developments in the fields of education and speech language pathology outlined above, SLP-educator classroom collaboration affords many opportunities for growth (Ehren, 2000; Throneburg, Calvert, Sturm, Paramboukas, & Paul, 2000; Wilcox, Kouri, & Caswell, 1991): Teachers have the opportunity to observe and reinforce strategies being taught, and SLPs gain a greater understanding of the skills the child needs to succeed in the classroom, curriculum and social context (Nippold, 2011). For children receiving services, in-class intervention means that valuable instructional time is not missed and affords greater opportunities for generalization. As well, 'at-risk' children who would not otherwise receive SLP services may benefit from the enhanced language environment achieved through the collaboration.

Despite the potential benefits, there are barriers to establishing SLP-educator classroom collaborations as well. SLPs and educators must achieve a shared understanding of their respective roles and expertise as a necessary and first step to building a collaborative relationship. Educators must acknowledge the added value an SLP can bring to their educational context, and SLPs must be able to maintain their intervention focus (Ehren, 2000; Hartas, 2004; Ritzman, Sanger, & Coufal, 2010). SLPs can help to establish a firm starting point for collaboration by shifting from the more traditional mindset of 'providing teacher training'

to 'partnering with teachers' and adopting language consistent with the latter view.

Of course, establishing a collaborative relationship takes time, time for both planning and implementation, which can be another significant barrier. If resources are very scarce, SLPs and educators might lack sufficient time to jointly plan and carry out effective collaborative teaching (Bauer et al., 2010; Hartas, 2004; Throneburg et al., 2000). Consider also, the potential impact of insufficient resources on the quality of consultative approaches in which the SLP provides indirect services by training educators to incorporate communicative strategies for target children. Inadequate access to consultation might result in little-to-no educator uptake of appropriate strategies. Another concern arises regarding identifying someone available to work with a child in the classroom who has the necessary knowledge and skills to implement programming suggestions from the SLP (Law, Lindsay, Peacey, Gascoigne, Soloff, Radford, & Band, 2002). A potential example of such constraints comes from a series of studies by Boyle and McCartney and colleagues reporting a manualized language therapy program for primary school children with DLD delivered to small groups by SLPs (Boyle, McCartney, Forbes, & O'Hare, 2007), speech and language assistants (Boyle, McCartney, O'Hare, & Forbes, 2008), or by mainstream school staff through consultation with the SLPs (McCartney, Boyle, Ellis, Bannatyne, & Turnbull, 2011). Expressive language gains were reported in the first two, but not the latter study. In the case of the consultancy approach (McCartney et al., 2011), mainstream staff failed to implement the amount of language-learning activity required to adhere to the therapeutic program possibly because the staff simply did not have sufficient resources to manage the added demands of providing the intervention program. Indeed, there is evidence that SLP consultation may not necessarily lead to changed teacher behaviour (Noell & Witt, 1999), that teachers may not report benefiting from SLP consultations (Dockrell & Lindsay, 2001), and may have little access to SLPs for consultation (Baxter, Brookes, Bianchi, Rashid, & Hay, 2009). The bottom line is SLP-educator collaboration will be ineffectual (or nonexistent) if the partners lack the necessary time or other resources to implement services appropriately.

Evidence Based Reviews of Service Delivery

In the past decade, two systematic reviews have examined SLP school-based service delivery for young children. In 2006, McGinty and Justice reviewed three studies that directly compared pull-out and classroom-based services for children ages 2–8 years, and measured outcomes related to vocabulary (Throneburg et al., 2000; Valdez & Montgomery, 1997; Wilcox, Kouri, & Casell, 1991). The authors reported converging evidence (2/3 studies) of a benefit to collaborative classroom-based services over pull-out services when addressing vocabulary goals. Caution was recommended in interpreting the results given the small sample sizes, large confidence intervals for effect sizes, lack of blinding of assessors, and absence of fidelity checks in some studies. An additional six articles comparing service delivery models but not meeting the review criteria were listed in the appendix.

In a more recent review (2010), Cirrin et al. reviewed five studies that addressed the influence of SLP service delivery model (including frequency and intensity) for children ages 5–11 years on a range of speech, language, and educational outcomes (Boyle, McCartney, Fobes, & O'Hare, 2007; Kohl, Wilcox, & Karlan, 1978; Throneburg et al., 2000; Howlin, 1981; Bland & Prelock, 1995). Of the included studies, three addressed vocabulary outcomes and three, language and literacy outcomes more broadly. Given the small number of studies, the authors reported that no conclusions regarding service delivery were justified and clinicians were encouraged to rely on reason-based practice and their own data to guide service delivery decisions. Articles ($n = 39$) that did not fit criteria (e.g., participants outside of age range, no identified speech or language impairment, service not clearly delivered by SLP) were listed in the appendix. Comparing across the two reviews (McGinty & Justice, 2006; Cirrin et al., 2010) with regards to vocabulary outcomes, only the Throneburg et al. study was common to both and both reviews rated this study highly. However, the findings for the two additional studies included by Cirrin et al. were either unclear (Kohl et al., 1978) or reported no differences based on service delivery (Boyle et al., 2007).

These systematic reviews (Cirrin et al., 2010; McGinty & Justice, 2006) involving 7 studies in total lead to the inescapable conclusion that the evidence-base regarding school-based SLP service delivery models is insufficient. It is also true, however, that these reviews included only 7 of the 44 unique studies related to the topic identified in the search process (across both studies removing duplicates). Of course, a rigorous evidence-based review must exclude studies that fail to address the specific question under consideration. For the present purposes, however, a more eclectic approach was adopted and all research addressing classroom-based SLP collaborative or consultative services was considered relevant and potentially important for guiding and encouraging discussion regarding current practice. The comprehensive search

strategy included a review of the 44 papers identified in the systematic reviews, gathering relevant papers identified in study reference lists, and completing general internet searches on the topic of SLP-educator/teacher classroom/collaboration. A total of 49 published papers were gathered on the topic, of which 14 reported empirical evidence pertaining to SLP-educator collaborative classroom activities, 14 reported empirical evidence pertaining to consultative services, classroom instruction, or small group intervention in the classroom, and 21 were information, discussion, survey, or review papers (see coding notation in References[1]).

SLP-Educator Classroom Collaboration: Evidence and Discussion

Vocabulary. Six studies were identified that focused on vocabulary intervention and outcomes in developmental language disorder (DLD)-educator classroom collaborations (see Table 1). The studies varied in terms of the target population (preschool, DLD: Wilcox et al., 1991; Valdez & Montgomery, 1997; kindergarten, at risk: Ellis, Schlaudecker, & Regimbal, 1995; Hadley et al., 2000; kindergarten-gr. 3, typical & DLD: Throneburg et al., 2000; secondary school in areas of socioeconomic disadvantage: Murphy, Franklin, Breen, Hanlong, McNamara, Bogue & James, 2016) and methodological rigor. Nevertheless, all incorporated some randomization (at individual, Wilcox et al.; classroom, Throneburg et al.; Hadley et al.; and school levels, Murphy et al.; note though, Ellis et al. relied on random assignment to classes completed by the school), demonstrated no baseline differences (or accounted for differences if they occurred), and reported on data lost to attrition (or had no attrition). These three quality indicators are considered necessary for a randomized clinical trial to provide strong evidence of causality by the What Works Clearinghouse (U.S. Department of Education, 2013). Of note, however, acceptable reliability (Throneburg et al.; Hadley et al.; Wilcox et al.), fidelity (Murphy et al.), and blinding (Murphy et al.) were incorporated in only some of these studies.

Throneburg et al. (2000) compared growth on a study-specific measure of targeted vocabulary in 12 classrooms with one each of kindergarten, gr. 1, 2, and 3 receiving services under 1 of 3 conditions: (1) Pull-out – Weekly 50-minute small-group or individual sessions held outside the classroom for 12 weeks. (2) Classroom-based – Weekly 40-minute SLP-delivered whole class language lessons for 12 weeks with additional weekly 15-minute small group pull-out session. (3) Collaborative – Weekly 40-minute SLP-teacher planned and team taught lessons for 12 weeks with additional weekly 15-minute small group pull-out session. Results revealed a significant advantage for the collaborative co-teaching approach over either of the other conditions for children with speech and language needs ($n = 32$). When considering all participants ($n = 177$), greater gains were observed in either classroom-based condition compared to the pull-out condition. The authors suggested that the collaboration might have fostered greater sharing between the teacher and SLP leading to more carry over of activities for the students who needed it most (i.e., those with speech and language needs). Limitations to implementation include the considerable SLP planning time required for the collaboration, and the lack of measurement regarding generalization.

The corroborating evidence from the remaining five studies that targeted vocabulary is summarized in Table 1. The two studies targeting at-risk children of 5–6 years (Ellis et al., 1995; Hadley et al., 2000) both compared classroom level intervention to a business-as-usual classroom and either provided direct in-classroom joint teaching (Hadley et al.) or consultative services through suggestions for classroom teaching of target vocabulary/concepts (Ellis et al.). Greater gains were noted for the experimental classroom in both cases, however generalization was observed by Hadley et al. on standardized vocabulary measures but not by Ellis et al. on a study-specific measure. In studies comparing classroom and individual/pull-out treatment for preschool children with DLD, Wilcox et al. (1991) observed no group differences on a study-specific measure but a classroom advantage on a generalization measure, and Valdez and Montgomery (1997) found no group difference on a standardized expressive language measure but a pull-out advantage on a receptive language measure. Murphy et al. (2016) reported raw but not standard score increases on 2/5 standardized vocabulary/word knowledge measures for 128 adolescents attending schools in low income areas compared to those in business-as-usual matched classrooms ($n = 75$) suggesting some generalization after a teacher-implemented classroom adaptation of Joffe's (2011) Vocabulary Enrichment Programme (VEP). In this study involving consultative services, the SLP provided 5 hours of teacher training, and the intervention was completed by the teacher in 24, 40-minute class periods. Taken together, this evidence provides compelling evidence that targeted vocabulary can be effectively taught through SLP-educator collaboration in the classroom. However, evidence regarding generalization is largely equivocal.

Oral Language. Five studies were identified that focused on aspects of oral language and involved SLP-educator collaboration (see Table 1). Three of the studies addressed narrative language and

Table 1 Evidence summary for SLP-educator consultative or collaborative partnerships targeting language goals in the classroom

Study	Sample	Intervention groups	Results	Critical analysis	Effect size[a]
Vocabulary					
Throneburg et al., 2000	K-gr. 3, 4 classes each Collaboration (n = 74; 12 S&L) Classroom (n = 60; 11 S&L) Pull-out (n = 43; 9 S&L)	Collaboration – joint planning (40 min/wk); team taught 5 targets/wk in 40 min weekly session for 12 wks plus 15 min weekly small group pull out session Classroom – SLP taught same vocabulary on same schedule but teacher not involved plus 15 min weekly small group pull out session Pull-out – 50 min/wk; target vocabulary & other goals	Greater gain on targeted vocabulary for collaboration & classroom than pull out for all kids; greater gain for children with speech and language needs in collaboration than either classroom or pull-out	Random assignment at class level for 2/3 groups (not collaborative); baseline equivalence of groups demonstrated; no attrition reported; acceptable reliability; fidelity not reported; no blinding	Children without S&L needs: -Collaboration > pull-out, d = 1.3 -Classroom > pull-out, d = 1.1 Children with S&L needs: -Collaboration > pull-out, d = 0.7
Hadley et al., 2000	K-gr. 1, at-risk 2 collaborative classes (n = 46) 2 control classes (n = 40)	Collaboration – joint planning (1 hr/wk); 20 words/concepts each wk; SLP 2.5 days/wk in class including 25 min/wk small group on phonological awareness Control – paraprofessional on same schedule	Standardized vocabulary scores higher for collaboration than control *see also phonological awareness section	Random assignment at class level; baseline equivalence of groups demonstrated; 13/99 participants lost to attrition; reliability (standardized tests only) & fidelity not reported; no blinding	Receptive vocabulary, d = 0.45; expressive vocabulary, d = 0.42
Ellis et al., 1995	K, at-risk 1 consult class (n = 20) 1 control class (n = 20)	Consult – SLP and teachers selected concepts; teachers targeted concept 80 min/wk; SLP provided ideas in weekly meetings; Control – business-as-usual	Scores higher for consult vs. control for target concepts; no difference on untrained concepts	School assigned children randomly to kindergarten classes, but experimental teacher interested in collaboration; statistical analysis controlled for preexisting group difference in concept knowledge; no attrition reported; reliability (standardized tests only) & fidelity not reported; no blinding	Data unavailable
Wilcox et al., 1991	Preschool, DLD 10 in classroom 10 individual	Play-based interactive modeling of 10 target words; team implementation in classroom; minimum 10 models of target for 24 sessions	No difference on target words; classroom intervention higher scores than individual on generalization measure	Random assignment to groups; baseline equivalence demonstrated; no attrition reported; acceptable reliability; fidelity not reported; no blinding	Data unavailable
Valdez & Montgomery, 1997	Preschool, DLD 20 in classroom 20 pull-out	90 min, 1/wk for 6 months Collaboration: joint identification of goals, planning, implementation Both interventions targeted concept development	No group differences in gain on CELF total and expressive language score; greater receptive language score gain for group receiving pull-out	Random assignment to groups; baseline equivalence demonstrated; 1 child lost from pull-out condition; reliability (standardized tests only) & fidelity not reported; no blinding	Data unavailable

(continued)

Table 1 (continued)

Study	Sample	Intervention groups	Results	Critical analysis	Effect size[a]
Murphy et al., 2016	Gr. 7-8 (11-13 year olds), low income; 7 Experimental class (n = 128); 5 Business-as-usual (n = 75)	Consult – teacher training by SLP in 2 sessions of 2.5 hrs for VEP adapted for classroom. 12 topics each covered in 2 40-min classes by English teacher (sometimes team taught with resource teacher) in term 1; Business-as-usual English class in term 1 & intervention in term 2	Raw scores higher for experimental group on 2/5 standardized vocabulary measures including 1 expressive & 1 receptive measure. Standard/ scaled scores no group differences	Random assignment at the school level; baseline equivalence demonstrated; 11 participants with missing data not included; fidelity monitored; reliability (standardized tests only) not reported; some blinding	Significant effects, d = 0.15-0.22; nonsignificant effects, d = 0.001-0.12 (exception, d = 0.25 for 1 measure with discrepant SDs)
Narrative Language / Expressive Language					
Gillam et al., 2014	Gr. 1, low & high risk; 1 Experimental class (n = 10/11); 1 Business-as-usual (n = 7/12)	Experimental – SLP provided narrative language instruction in classroom 30 min, 3 times/wk for 6 wks; Business-as-usual – student SLP assisted teacher on same schedule	Narrative gains in experimental group were clinically significant for high risk group; Targeted vocabulary gains in experimental with low risk group showed greatest gains	Recruitment tactic not specified; baseline equivalence demonstrated; 3 lost to follow up from control group; acceptable reliability; fidelity monitored; blinding	Narrative gain vs. matched control: high risk, d = 0.93; low risk, d = 0.42; vocabulary gain vs. matched control: high risk, d = 0.94; low risk, d = 2.43
Spencer et al., 2015	Preschool, at-risk; 2 Experimental classes (n = 36); 2 Business-as-usual (n = 35)	Experimental – whole class narrative language program: model, gestures, retell; 4x/wk for 3 wks, 15-20 min each	Story retell and comprehension score gains higher for experimental than control group; No difference on story production	Random assignment at class level; baseline equivalence demonstrated; missing data at follow up (n = 3) set to group follow up mean; acceptable reliability; fidelity monitored; blinding	Reported d ranged 0.39-0.56 for significant & 0.1-0.15 for nonsignificant effects
McIntosh et al., 2007	Preschool, low income; 1 Experimental class; 1 Control class (n = 97, total)	Experimental – SLP designed & teacher implemented 10 wks phonological awareness (term 1) & 10 wks general language (term 2) tasks for books chosen by the teacher. SLP & teacher meetings 4 times/term.; Control – not reported (assumed business as usual)	Experimental higher than control on standardized language test at term 3 follow up but not directly after intervention	Random assignment to classes; baseline equivalence not demonstrated; attrition not reported; reliability (standardized test only) & fidelity not reported; no blinding	After follow up, d = 0.42 compared to 0.25 immediately post & 0.2-0.21 at pretests
Smith-Lock et al., 2013	School for DLD, 5 year olds; Experimental (n = 22); Control (n = 18)	Experimental – 3 expressive goals: SLP in classroom 1/wk for 1 hour, 8 wks; class lesson, then 3 small groups led by teacher, assistant & SLP; Control – business as usual with focus on comprehension	Experimental higher than control group gain on treated but not untreated grammatical targets	Random assignment to groups; baseline equivalence demonstrated; 6 participants with missing data not included but did not differ from remainers; acceptable reliability; fidelity monitored; some blinding	Treated, d = 0.65; untreated, d = –0.18

(continued)

Table 1 (continued)

Study	Sample	Intervention groups	Results	Critical analysis	Effect size[a]
Motsch et al., 2008	School for DLD, 8-10 years old (in Germany) 23 Experimental classes (n=63) 22 Control classes (n=63)	Experimental – 6 wks daily incorporation of training on grammatical targets focusing on context with well-controlled, known vocabulary Control – individualized targets incorporated as possible	Gains higher for experimental than control on trained targets, but performance did not reach mastery	Included all students meeting screening cut off at school; baseline equivalence demonstrated; 12 participants not included due to missing data; no blinding	Data unavailable
Phonological Awareness					
Hadley et al., 2000	K-gr. 1, at-risk 2 collaborative classes (n=46) 2 control classes (n=40)	*See vocabulary section	Collaborative group gains higher than control group for trained & untrained phonological awareness tasks (including more challenging tasks)	*See vocabulary section	Significant effects: d=0.28-1.17; non-significant (only rhyme): d=0.17
McIntosh et al., 2007	Preschool, low income 1 Experimental class 1 Control class (n=97, total)	*See narrative language / expressive language section	Experimental higher than control on standardized phonological awareness measure post intervention	*See narrative language / expressive language section	Immediately post intervention, d=0.53-0.77; remaining data not reported
Koutsoftas et al., 2009	Low income preschools 34 low scorers on a phonological awareness measure in January	Tier 2 – 2x/wk, 6 wks, 20-25 min each, teacher or SLP, small groups in classroom; scripted instruction targeting initial sound awareness	Single subject responses to probe tasks – 71% with med-large treatment effects	Recruited from 5 classrooms in schools participating in early reading partnership; single subject design (individual baselines); attrition not reported; acceptable reliability; fidelity monitored; no blinding	Reported individual effects, d=0.6-1.9
van Kleek et al., 1998	School for children with communication disorders 2 groups of 8 (3-4; 5-6 years old); 8 historical control data	Phonological awareness activities at centres to which children rotated (10-15 min) for 12 wks in each of 2 terms (1-rhyme; 2-phonological awareness)	Experimental scores higher than control 95% confidence interval on measures phonological awareness but not rhyme	Recruited from 2 classrooms; baseline equivalence not demonstrated; attrition, reliability & fidelity not reported; no blinding	Data unavailable
Curriculum-Based Language (School Age)					
Bland & Prelock, 1996	Gr.1-4 classrooms Collaborative (n=7 DLD) Pull-out (n=7 DLD)	Collaboration – interdisciplinary training (7 sessions of 2 hours), planning (30 min/wk) to establish common curriculum and communication goals, team teaching (SLP-educator) 30-45 min/wk Pull out – 1-2 times/wk, total 30-45 min, incorporated academic vocab	Measured Fall and Spring for 3 years! No group differences in number of different words and utterance length Higher gains for collaborative vs. pull-out in number of intelligible utterances and complete utterances	Recruited from children receiving therapy in school, group dependent on class assignment; baseline equivalence not demonstrated but indicated in some analyses; attrition, reliability & validity not reported although project director checks conducted; no blinding	Data unavailable

Table 1 (continued)

Study	Sample	Intervention groups	Results	Critical analysis	Effect size[a]
Kaufman et al., 1994	Gr. 3, typical; 1 Experimental class (n = 16); 1 Business-as-usual control (n = 16)	Experimental – LIC program plus communication skills unit by SLP & teacher, 1/wk for 3 wks, 45 min each; focused on adequacy of explanations to peers/adults	Experimental better than control group on 1/4 measures of identifying poorer quality explanations, & 4/4 measures of providing better justifications	Recruitment tactic not specified; statistical analysis accounted for pretest performance; attrition, fidelity not reported; acceptable reliability; no blinding	Significant effects, d = 0.83-1.74; non-significant effects, d = 0.01-0.78
Starling et al., 2012	Secondary school; 7 teachers/21 DLD collaborative training; 6 teachers/22 DLD wait condition	Collaboration – 10 weekly, 50 min meetings with SLP targeting modifying language of instruction (oral & written); Wait group– did not receive intervention until after study	Trained teachers higher levels of use than untrained teachers for modifications; DLD students of trained vs. untrained teachers better written expressive and listening comprehension (WIAT-III); no difference on oral expression & reading comprehension	Schools (n = 2) randomly assigned to group; baseline equivalence demonstrated; data missing for 1 participant from each group (n = 2); acceptable reliability; fidelity monitored; blinding	Teacher levels of use, d = 1.2-4.2; Student outcomes ranged d = 0.67-1.05 for significant & 0.2-0.25 for nonsignificant effects
Drew, 1998	Summer school, 32 poor readers, 6-10 years; Small groups	'Everyone Can Read' designed & implemented by SLP: phonics-based, sight words, repetition, pleasure of reading (11-12 hours total)	22 improved reading age by more than 6 months; 4- no benefit; older children benefited more	All summer school students recruited; single group design (no control); attrition, reliability, fidelity not reported; no blinding	Data unavailable
Farber & Klein, 1999	6 schools, K & gr. 1; 12 Experimental classes (n = 319); 12 Control classes (n = 253)	Experimental – MAGIC; SLP and teacher, 2.25 hours/wk; weekly 1 hour planning meetings; goals: improve literacy, increase oral language, improve communication	Gains greater for experimental than control group on listening comprehension and writing; reading approached significance; No difference in speaking	Schools recruited regionally, all students in classes recruited, classes randomly assigned to group; Post-test only design (no pretest scores); attrition, fidelity no reported; acceptable reliability; no blinding	Data unavailable
Curriculum-Based Language / Emergent Literacy (Preschool)					
Wilcox et al., 2011	Speech and language needs; 3-5 year olds; Random assignment; unbalanced; 19 Experimental classes (n = 80); 10 Business-as-usual (n = 38)	Experimental – TELLs; code-focused (phonological awareness, alphabet, print concepts, writing) & oral language (vocabulary, sentence length and complexity); 12 biweekly themes, all day, all year; training – 22 hours, 30 min. weekly in-class mentor (SLP) support	Gains greater for experimental group on vocabulary, sentence length, phonological awareness; No difference on sentence complexity, print concepts	Random assignment at class level; statistical analyses accounted for pretest differences; 3 classes not included withdrew; acceptable reliability; fidelity monitored; some blinding	Reported d ranged 0.47-1.32 for significant & -0.22-0.39 for nonsignificant effects
Justice et al., 2010, 2009	Typical; 3-5 years old; 11 Experimental classes (n = 66); 9 Business-as-usual (n = 72)	Experimental – Read It Again!, 30 wk curriculum, 2 times/wk for 20-30min; 1.5 days training – teachers, SLP, assistants; whole class focus on narrative, vocab, print awareness, phonological awareness	Gains greater for experimental than control group on language (grammar; vocabulary) and emergent literacy (print and phonological awareness); No difference on alphabet	Random assignment at class level; baseline equivalence demonstrated; 12-21% missing data managed with intent-to-treat analysis; acceptable reliability; fidelity monitored; blinding	Significant effects, d = 0.15-0.82; non-significant effect, d = 0.19 (for measure with large SDs)

(continued)

Table 1 (continued)

Study	Sample	Intervention groups	Results	Critical analysis	Effect size[a]
Girolametto et al., 2012	Educator groups: 10 trained, 10 control; each recruited 3-4 kids	Control – 2 professional training days Experimental – Professional development: ABC & Beyond Hanen program (4 workshops with SLP; 3 classroom visits; video feedback)	Greater gains for trained than untrained teachers in making print references, and child using decontextualized language	Random assignment to groups; baseline equivalence demonstrated; no attrition; acceptable reliability; fidelity monitored; blinding	Teacher utterances, $d = 1.9$; children's language, $d = 1.8$

Note:

[a] – Effect size: Cohen's d calculated on mean differences in selected comparisons based on published data, or converted from t-values or eta-squared values for group gain comparisons, or as reported for gains compared across groups in the original paper

K: kindergarten; gr.: grade; S&L: children with speech and language needs; wk: week; min: minute; hr: hour; CBL: Curriculum-Based Language; LIC: Language-in-Classroom; MAGIC: Maximizing Academic Growth by Improving Communication; TELL: Teaching Early Language and Literacy; VEP: Vocabulary Enrichment Programme; CELF: Clinical Evaluation of Language Fundamentals; WIAT-III: Wechsler Individual Achievement Test; SDs: standard deviations

populations of varying risk level (at risk; low income; low/high risk) in either preschool (Spencer, Petersen, Slocum, & Allen, 2015; McIntosh, Crosbie, Holm, Dodd, & Thomas, 2007) or gr. 1 (Gillam et al., 2014), and the remaining two compared classroom-based services to business-as-usual classrooms in schools for children with DLD (5 year olds: Smith-Lock et al., 2013; 8–10 year olds: Motsch et al., 2008). With regards to methodological rigor, only two of these studies incorporated any randomization of participants (McIntosh et al., 2007; and at the classroom level: Spencer et al.), all (but one: McIntosh et al., 2007) between-group studies demonstrated baseline equivalence of groups, but none specifically addressed attrition. Further, the majority (exceptions: Motsch et al.; McIntosh et al., 2007) incorporated some blinding of assessors, and Gillam et al. reported treatment fidelity checks. It is clear that caution is warranted in interpreting the results from this group of studies. Note that one study (Gallagher & Chiat, 2009) comparing direct group intervention (96 hours) and classroom-based services (11 hours) for preschool children was not included in the review due to the highly discrepant difference in hours of service across the treatment conditions.

Gillam et al. (2014) identified children in two grade 1 classrooms as either high or low risk based on a cut-off standard score of 90 on the *Test of Narrative Language* (Gillam & Pearson, 2004). For the experimental classroom (low risk: $n = 10$; high risk: $n = 11$), the SLP provided 30-minute, full class narrative language instruction sessions targeting story grammar and related vocabulary, elaboration, and independent storytelling 3 times per week for 6 weeks. In the business-as-usual classroom, a student SLP assisted the teacher on activities of the teacher's choice on the same schedule as the SLP intervention in the experimental class. Study specific outcome measures included a narrative probe, and a vocabulary probe specific to the targeted story grammar. Growth at posttest was assessed relative to the 95% confidence interval around the pretest scores. Although higher scores on the narrative probe at posttest were observed for both the high and low risk experimental but not control groups overall, only the high-risk experimental group showed a clinically significant change reflected by posttest scores in excess of the pretest score 95% confidence interval. In fact, posttest scores did not differ for the high vs. low risk groups who completed the narrative language intervention. In the case of the vocabulary probe, the pattern was opposite: Although both clinically significant, the posttest gains were much larger for the low- than high-risk experimental groups and not observed in the control groups. The authors argued that classroom-based narrative language with embedded vocabulary instruction can lead to clinically significant change in narrative

language and vocabulary, but opportunities for vocabulary review may be insufficient for learning in children with the lowest language skills.

The corroborating evidence for the remaining four studies targeting oral language is summarized in Table 1. Similar to Gillam et al. (2014), Spencer et al. (2015) compared a whole class preschool narrative language program implemented in 15-20 minute lessons, 3 times per week for 4 weeks ($n = 36$) to a business-as-usual classroom ($n = 35$) at a Head Start preschool. Significantly greater gains in the experimental group were found on program-specific outcome measures of narrative recall and story comprehension, but not story generation. It was suggested that the lack of a change on the expressive measure could have been related to the low dose of intervention (4 weeks). In another study of preschool children ($n = 97$) attending school in a low income area, McIntosh et al. (2007) reported standardized test score gains at 3-month follow up but not immediately post intervention compared to a business-as-usual classroom for those in an experimental classroom receiving a SLP-designed and teacher implemented 10-week classroom-based language intervention focused on story retelling, categorization, and following directions. One additional study by Khan and Paddick (2014) provided a description of a similar program adapted for First Nations children but was not included in the review due to the lack of empirical data reported.

The two small-scale studies implemented in schools for children with DLD reported highly similar results (Smith-Lock et al., 2013; Motsch et al., 2008). In both cases, expressive grammatical targets were the focus of SLP classroom-based interventions for 3-6 weeks in an experimental classroom and outcomes on study-specific measures were compared to a business-as-usual classroom. Results revealed greater gains for the experimental than control groups on treated but not untreated targets (Smith-Lock et al.) and without attaining mastery of the skill (Motsch et al.). Taken together, these studies are highly suggestive of an overall benefit to the narrative language skills of young children of direct classroom teaching of narrative skills (Gillam et al.; Spencer et al.). For specific expressive language goals, however, the findings are more guarded (Smith-Lock et al.; Motsch et al.): Despite positive change, children with DLD may fail to reach mastery of an expressive language skill presented solely through whole class teaching. It may be that a hybrid approach involving some small group/individual intervention followed by classroom support would increase the impact of interventions addressing specific oral language targets.

Phonological Awareness. Four papers (see Table 1 for summary) were identified that focused specifically on phonological awareness classroom-based intervention (without incorporating other literacy-related skills). In addition to vocabulary for Hadley et al. (2000) and narrative/expressive language for McIntosh et al. (2007), these studies also targeted phonological awareness and so were included in this group. Neither of the other studies (Koutsoftas et al., 2009; van Kleek et al., 1998) incorporated randomization, demonstrated baseline equivalence, or considered attrition (although it did not appear that there was data loss due to attrition). Koutsoftas et al. incorporated a multiple baseline design, and treatment fidelity checks, but assessors also acted as interventionists. van Kleek employed a historical control group, did not report fidelity checks, and did not have blinded assessors.

Hadley et al. (2000) compared outcomes from two kindergarten-gr.1 classes ($n = 46$) receiving SLP-educator collaborative classroom-based services targeting vocabulary and rhyme/initial sound awareness to two kindergarten-gr. 1 business-as-usual comparison classes ($n = 40$). In the collaborative program, SLPs and educators met weekly over the academic year for joint planning and the SLP worked in the classroom 2.5 days per week to facilitate language and lead one weekly 25-minute small-group rhyme/initial sound awareness activity centre to which all students rotated. A paraprofessional assisted the classroom teacher in the business-as-usual classroom on the same schedule. Pre/post phonological awareness skills were measured in September and April of the academic year using grade-level subtests from the *Phonological Awareness and Literacy Screening* (PALS; Swank et al., 1997). The PALS measured skills targeted (rhyme, initial sound awareness, letter-sound knowledge) and not targeted in the intervention (syllable and phoneme deletion). Results revealed significantly greater gains for the experimental vs. comparison groups for all phonological awareness subtests except rhyme reflecting changes in both trained and untrained skills after a high dose of intervention.

Table 1 summarizes the corroborating evidence from the remaining three studies. Prior to their language intervention and with the same participants, teachers in the McIntosh et al. (2007) study implemented a 10-week phonological awareness intervention designed by the SLP. Significant gains favouring the experimental group on a standardized measure of phonological awareness were observed at post intervention. The remaining two studies showed positive benefits of small group phonological awareness intervention over 6 weeks in low-income preschoolers (Koutsoftas et al., 2009) and over 12 weeks in each of 2 academic terms in school age children with DLD (van Kleek et al., 1998). The study by Koutsoftas et al. is unique in that it incorporated an RTI approach: All preschoolers were screened in January of the academic year after four months of the school's universal instruction

incorporating phonological awareness. Low scorers on the January phonological awareness screen ($n = 34$) completed 20-25-minute small group initial sound awareness activities in the classroom 2 times per week for 6 weeks conducted by the SLP or teacher. On study-specific treatment probes, 71% of participants showed intervention and post-intervention gains relative to baseline performance reflecting medium-to-large effects. Taken together, these studies provide compelling evidence for benefits of classroom and small group phonological awareness interventions. The findings also indicate that SLPs can be instrumental in providing such interventions.

Curriculum-based Language. A total of 8 studies were found reporting curriculum level SLP-educator partnerships aimed at enriching language models and improving access to the curriculum through language (see Table 1). Of these, 4 involved SLP-educator classroom collaborations for elementary school children (Bland & Prelock, 1996; Kaufman, Prelock, Weiler, Creaghead, & Donnelly, 1994; Drew, 1998; Farber & Klein, 1998), 1 involved SLP-educator consultative services for secondary school students (Starling et al., 2012), and 3 involved SLP-educator consultative services for preschool children (Girolametto et al., 2012; Justice et al., 2010; Wilcox et al., 2011). All of the studies compared experimental and control groups except one (Drew), but only 2 incorporated full randomization with either a balanced (Girolametto et al.) or unbalanced design (Wilcox). Two additional studies incorporated some randomization: Starling et al. at the school level, and Farber and Klein at the whole class level. Baseline equivalence (Starling et al.; Girolametto et al.; Justice et al.; Wilcox et al.) and attrition (Starling et al., Girolametto et al.; Justice et al.; Wilcox et al.) were reported consistently for the studies involving preschool children and secondary school students only. As well, blinding of assessors (Girolametto et al.; Justice et al.; Wilcox et al.; Starling et al.), reliability of outcome measures (Farber & Klein; Starling et al.; Girolametto et al.; Justice et al.; Kaufman et al.; Wilcox et al.), and treatment fidelity (Starling et al.; Girolametto et al.; Justice et al.; Wilcox et al.) were reported consistently for the studies involving preschool children and secondary school students only. It is clear that considerable caution is warranted in interpreting these studies, especially those involving elementary school children.

In a small scale study of children with DLD in grades 1 through 4, Bland and Prelock (1996) compared language sample characteristics of 7 children receiving 30–45-minute pull-out speech and language sessions 1-2 times per week incorporating academic curriculum to 7 children in whose class a transdisciplinary 'Language-in-the-Classroom' approach was being implemented.

To develop and implement the Language-in-the-Classroom curriculum, SLPs and educators completed transdisciplinary training, met weekly to establish common goals and activities, and co-taught weekly in the classroom for 30–45 minutes. Language samples collected in the Fall and Spring of each academic year for three years were coded for number of different words, mean length of utterance, utterance completeness, and utterance intelligibility. For the latter two measures only, significantly higher scores using nonparametric statistics were found for the experimental group. The authors argued that the advantage of the classroom-based services for discourse skills rather than expressive form was consistent with the focus of the Language-in-the-Classroom program on communication effectiveness. In another of Prelock's studies (Kaufman et al., 1994), in a classroom already implementing the Language-in-the-Classroom curriculum, an additional 3-week communication skills unit was implemented involving SLP delivery of a once weekly 45-minute whole class session about adequacy of peer- or adult-directed explanations. Compared to a business-as-usual control class ($n = 16$), the experimental class ($n = 16$) improved on their ability to identify poor quality explanations and provide justifications.

Farber and Klein (1999) reported an SLP-educator collaboration implementing a kindergarten-gr.1 curriculum-based language and literacy program across 6 schools over the academic year entitled, *Maximizing Academic Growth by Improving Communication* (MAGIC). For 12 experimental classes ($n = 319$), the SLP and teacher met for weekly planning meetings and conducted weekly 2.25-hour co-teaching sessions aimed at increasing oral language, improving communication, and improving literacy in the classroom. On a program-specific outcome measure, higher scores were observed for listening comprehension and writing but not reading or spoken language for the experimental group compared to business-as-usual control classes ($n = 253$). Drew (1998) also reported a SLP-educator collaboration of a 12-hour summer program for poor readers aged 6-10 years targeting phonics, sight reading, and reading for pleasure (see also, Fleming & Forester, 1997, for a descriptive report of a similar program). Greater than 6-months age-equivalent reading growth was found for 69% of participants. Taken together, these studies provide some suggestive evidence of the benefits of SLP-educator collaboration in improving oral language in kindergarten-to-gr. 4 classrooms.

Starling et al. (2012) reported an interesting consultative-collaboration with secondary school teachers aimed at improving access of children with DLD to the teacher's instructional language. A group of 7 teachers with at least 1 child with DLD in the classroom

(DLD: $n = 21$; 12-14 years old) participated in 10 SLP-delivered 50-minute weekly sessions aimed at reducing the information processing load of oral and written language instructions, and simplifying and explaining unfamiliar vocabulary. The control group (who received the same training after the study) was comprised of 6 teachers and 22 children with DLD in the same age range. Reported level of use of the strategies was higher for the trained than untrained teachers. Significantly greater increases on standardized measures of listening comprehension and written expression (but not oral expression and reading comprehension) were found for the children with DLD whose teachers did, compared to did not, receive the training. Although just one study, these findings are compelling as a demonstration of effective SLP-educator collaboration with adolescent students with DLD.

Finally, the three studies implementing curriculum-based language and literacy programs in preschools (Girolametto et al., 2012; Justice et al., 2010; Wilcox et al., 2011) reported positive results. For the two studies implementing a general use program for all children either over 30 weeks with 11 experimental ($n = 66$) and 9 business-as-usual ($n = 72$) classes (Justice et al.) or with 10 trained (39 children) and 10 untrained (37 children) educators in workshops (4), class visits (3), and video feedback (Girolametto et al.), significantly higher language and emergent literacy skills on standardized (Justice et al.) or rating measures (Girolametto et al.) were found for experimental compared to control groups. Wilcox et al.'s *Teaching Early Literacy and Language* (TELLS) program was implemented for preschool children with speech and language needs in 19 classes ($n = 80$) compared to 10 business-as-usual classes ($n = 38$). In the TELLS program, 12 biweekly themes focusing on oral language and emergent literacy were taught by the teacher throughout the day after 22-hours of training and with the SLP providing 30-minutes of weekly, in-class (mentor) support. Standardized language and emergent literacy measures revealed significantly higher vocabulary, sentence length, and phonological awareness (but not sentence complexity or print concepts) for the experimental compared to control groups. As well, the experimental classes were found to be more language rich on a rating measure of the classroom language and literacy environment. Compared to previous findings of low use of language strategies (Bickford-Smith et al., 2005), high use of directive language, and insufficient language models for language growth in preschools (Turnbull et al., 2009), findings such as these studies involving SLP-educator collaboration in preschools lead Justice et al. (2009) to conclude that the presence of a SLP-educator collaborative framework may be necessary to achieve high quality language and literacy instruction.

Writing. Nelson and colleagues (Nelson & Van Meter, 2006; Nelson, Bahr, & Van Meter, 2004) have championed a SLP-educator classroom collaboration approach to addressing written expression. Their work provides case summaries, and some preliminary results for class groups. Nelson's *Writing Lab Approach* involves regular SLP-teacher planning meetings, and joint written language support to the whole class 3 times per week for a class period (45-60 minutes) in the school computer room. Curriculum-based writing is targeted involving recursive writing (planning, organizing, drafting, revising, editing, publishing, presenting), authentic projects, and oral and written language. The positive results reported provide practice-based evidence for SLP-educator classroom collaboration around written expression in grades 1-5 (see Table 1).

Summary

School-based SLPs have the responsibility to support the academic, social, emotional, and vocational progress of children with communication disorders (Ehren, 2000). In order to achieve this, SLPs are increasingly working collaboratively with teachers and other school educators in the classroom, an approach serving to bring together respective expertise to achieve a more effective educational program for target children and others. Establishing such collaborative relationships can be challenging, but the importance of success in this area cannot be underestimated.

Unfortunately, the optimal service delivery option for school-based SLP provision remains poorly understood based on recent systematic reviews (Cirrin et al., 2010; McGinty & Justice, 2006) leading to the recommendation that clinicians rely on reason-based practice and their own data to guide service delivery decisions (Cirrin et al.). Reason-based practice involves the implementation of scientific thinking in practice (Stanovich & Stanovich, 2003). For example, SLPs use an empirical approach when they form hypotheses about a child's language processing struggles, implement and evaluate the effectiveness of a candidate strategy, and modify strategies based on observations. No more applicable to teaching than speech language pathology, Pearson (1999) stated, 'We have a professional responsibility to forge best practice out of the raw materials provided by our current and most valid reading of research . . .' (p. 245). In reason-based practice, approaches theoretically linked to a research-base are implemented with contextual sensitivity, and evaluated to determine the quality and impact of the program (Stanovich & Stanovich, 2003). Such an approach is especially important when the evidence base is lacking, as is clearly the case with regards to service delivery options for school-based speech language pathology services. Given the highly

variable conditions across school systems, classrooms, professionals and students, it could be argued that the evidence-base can never be expected to adequately cover all eventualities making reason-based practice a perpetual responsibility for the SLP.

The present review summarized available evidence descriptively in relation to SLP-educator classroom-based services targeting vocabulary, oral language, phonological awareness, curriculum-based language, and writing. Consistent with the findings from the systematic reviews (Cirrin et al., 2010; McGinty & Justice, 2006), there is reasonably compelling evidence that targeted vocabulary and phonological awareness can be effectively taught through SLP-educator collaboration in the classroom. For oral language, evidence for an overall benefit from direct classroom teaching of narrative skills is highly suggestive, although weaker outcomes for specific expressive language targets suggests a hybrid approach involving both small group/individual intervention and classroom support might be most beneficial. With regards to the benefits of a curriculum-based consideration of language, the most compelling evidence exists for preschool programs. Cautious optimism is warranted for studies aimed at curriculum-based language and writing for elementary and secondary school students. It is hoped that this evidence, taken together, will inform the reason-based approach to SLP-educator collaborations aimed at finding the best service solutions for students with DLD and other communication impairments.

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Note

1. Superscript alphabets in the References section indicate that the study was coded as (a) addressing classroom collaboration with empirical evidence, (b) addressing consultative services, classroom instruction, or small group intervention outside of the classroom with empirical evidence, and (c) providing information, discussion, survey, or review data.

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