

Systematically Applying UDL to Effective Practices for Students With Learning Disabilities

Learning Disability Quarterly
2018 Vol. 41(3) 179–191
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sagepub.com/journalsPermissions.nav
DOI: 10.1177/0731948717749936
journals.sagepub.com/home/ldq


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Abstract

Based on the premise that instruction should be designed from the outset to reduce barriers, Universal Design for Learning (UDL) guidelines provide a set of flexible options and scaffolds to ensure access for all learners. Using the UDL framework, teachers and researchers can systematically adapt effective practices that have been established by methodologically sound research studies to have meaningful gains for students with learning disabilities (LD). Specifically, we suggest that teachers can select an effective practice and then use the UDL framework to individualize the practice (while maintaining core components). Furthermore, we propose that researchers may use this approach to (a) clearly define how UDL was applied to a practice and (b) systematically measure the effects of UDL when applied to practices that have been established as effective by methodologically sound research. Although teachers and researchers can apply UDL to effective practices for all students, in this article, we highlight how secondary teachers can design and adapt effective practices for students with LD, who need intensive interventions to improve skills (e.g., reading comprehension, decoding) and access to grade-level curriculum.

Keywords

Universal Design for Learning (UDL), evidence-based practices (EBPs), learning disabilities

Despite the fact that the majority of students with learning disabilities (LD) are educated for 80% or more of the school day in general education settings and expected to meet the same rigorous expectations as peers without disabilities, the National Center for Learning Disabilities reported that students with LD continue to perform well below peers without disabilities in both mathematics and reading (Cortiella & Horowitz, 2014). As a result, many students with LD enter middle and high school lacking the foundational skills necessary to meet grade-level standards. The National Joint Committee on Learning Disabilities (2008) reported that many secondary students with LD are estimated to perform five grade levels below peers in reading and need intensive instruction in a variety of literacy-related areas (e.g., decoding, fluency, spelling, metacognition). In mathematics, researchers (e.g., Bryant, Bryant, & Hammill, 2000; Maccini, Mulcahy, & Wilson, 2007) have indicated that students with LD display several characteristics that can impede their ability to engage in higher level mathematical problem-solving (e.g., difficulty with multi-step problems, lack of fluency with basic mathematical computation). In secondary general education settings, mastery of these prerequisite skills is often expected and, therefore, students may not receive the necessary support to build or practice these skills within the general education curriculum. To

improve outcomes for students with LD, it is necessary for teachers to provide opportunities for specialized instruction to increase outcomes in skill-deficit areas while simultaneously ensuring access to the general education curriculum.

The Individuals With Disabilities Education Act (2004) mandates that students with LD, placed in inclusive settings, must have access to general education curriculum and be provided specialized instruction to meet their individual needs (Vaughn & Wanzek, 2014). In secondary classrooms, students with LD are likely to need specialized instruction to address skills not typically targeted within the grade-level curriculum. For example, grade-level standards for high school English Language Arts (ELA) include higher order tasks related to text analysis. For students to analyze a nonfiction text and support their analysis with strong textual evidence (e.g., Common Core State Standards R1.9-10.1; National Governors Association for Best Practices, Council of Chief State School Officers,

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2010), they require prerequisite skills of reading fluency and comprehension. Although teachers may provide accommodations that can support reading fluency and comprehension for a student with LD (e.g., text-to-speech software), it is also necessary to provide these students with specialized instruction to improve deficit areas (e.g., reading fluency, comprehension).

In the field of special education, there is a large body of research on specific interventions that are intended to improve academic performance for students with LD for specific outcome areas (e.g., fluency, reading comprehension, mathematical computation, and problem-solving). Many of these practices (e.g., repeated reading, self-monitoring, cognitive strategy instruction) are supported by decades of peer-reviewed research and can be utilized by teachers to provide specialized instruction. Although special education teachers are often trained in the use of these interventions, these practices can also be used by general education teachers or by both special and general education teachers in inclusive cotaught settings to target specific outcome areas for students with LD who may (a) spend the majority of the school day within the general education classroom and (b) need specialized instruction to improve specific deficit areas. To ensure that these practices are aligned to the individual needs of the student and the specific classroom, teachers can intentionally adapt the intervention (*a priori*) for their local settings and for their students. In this article, we describe how teachers can utilize effective, research-based interventions for students with LD in their classrooms and use the Universal Design for Learning (UDL) framework to adapt these practices for the needs of their students.

UDL in the Inclusive Classroom

The UDL framework, developed by CAST (www.cast.org), presents a set of guidelines that can be applied to the design and implementation of curriculum and instruction. There are two foundational concepts underlying the use of the UDL framework. In the early years of UDL's development, Rose and Meyer (2002) posited the groundbreaking notion that the curriculum, rather than the student, was disabled. Seeing the problem as residing in the curriculum, instead of the student, was a new way to consider educational challenges. A related idea was that of using UDL to "reduce barriers" within curriculum and instruction (Rose & Meyer, 2002). By identifying the barriers to learning that exist in their curriculum and instructional practices, educators can proactively consider ways to add flexibility, supports, and scaffolds that reduce and eliminate these barriers.

The UDL guidelines are organized under three main principles—providing multiple means of (a) representation, (b) action and expression, and (c) engagement—that are derived from research on learning networks in the brain

(Meyer, Rose, & Gordon, 2014). The UDL guidelines (see Figure 1) delineate ways in which options and supports can be proactively built in to increase access to curriculum and instruction. A key premise of UDL is that learner variability in the classroom is the norm. Teachers can address learner variability by designing lessons that proactively build in flexibility, choice, and engagement that can support all learners.

UDL is generally considered as a framework that can be used to design instruction for all learners, in contrast to modifying instruction for specific learners. Teachers can use UDL while planning lessons, considering how and where to include flexibility and supports that can benefit a range of students. In addition to using UDL to design whole class instruction, we suggest that teachers can use the UDL guidelines to design and adapt specific interventions targeting individual needs for students with LD.

Research on UDL

Numerous articles have been written about how UDL can be used in inclusive learning environments. Research studies on UDL application in K-12 settings indicate that the framework is effective in supporting various learning objectives for students in inclusive classrooms. However, in existing research literature, UDL is applied in varying ways to many different types of instructional practices, making it challenging to build an evidence base on how and when UDL is most effective (Rao, Ok, & Bryant, 2014). Although research indicates that there are positive outcomes associated with the use of UDL, the wide variation in how UDL is described and applied in research presents a challenge for defining when and how UDL is effective. One of the recommendations made for future research on UDL is to clearly describe how UDL is applied to better understand outcomes related to the use of UDL (Ok, Rao, Bryant, & McDougall, 2017). However, because UDL is often applied to multi-component curriculum and instructional practices, researchers may find it challenging to precisely and accurately describe how UDL was applied within a study. We suggest that to examine the effectiveness of UDL, researchers can narrow the scope of UDL application which may lend to a more feasible approach of clearly describing its application. More specifically, by applying UDL to specific interventions for students with disabilities and clearly articulating how UDL is applied, we can expand the UDL research base and provide models for effective applications of UDL in conjunction with already established effective practices.

In this article, we address ways in which UDL can be applied to specific interventions for students with LD to meet the needs of students, teachers, and researchers. We describe how (a) practitioners can use UDL as tool when designing and adapting effective practices for students with LD and (b) researchers can systematically examine the

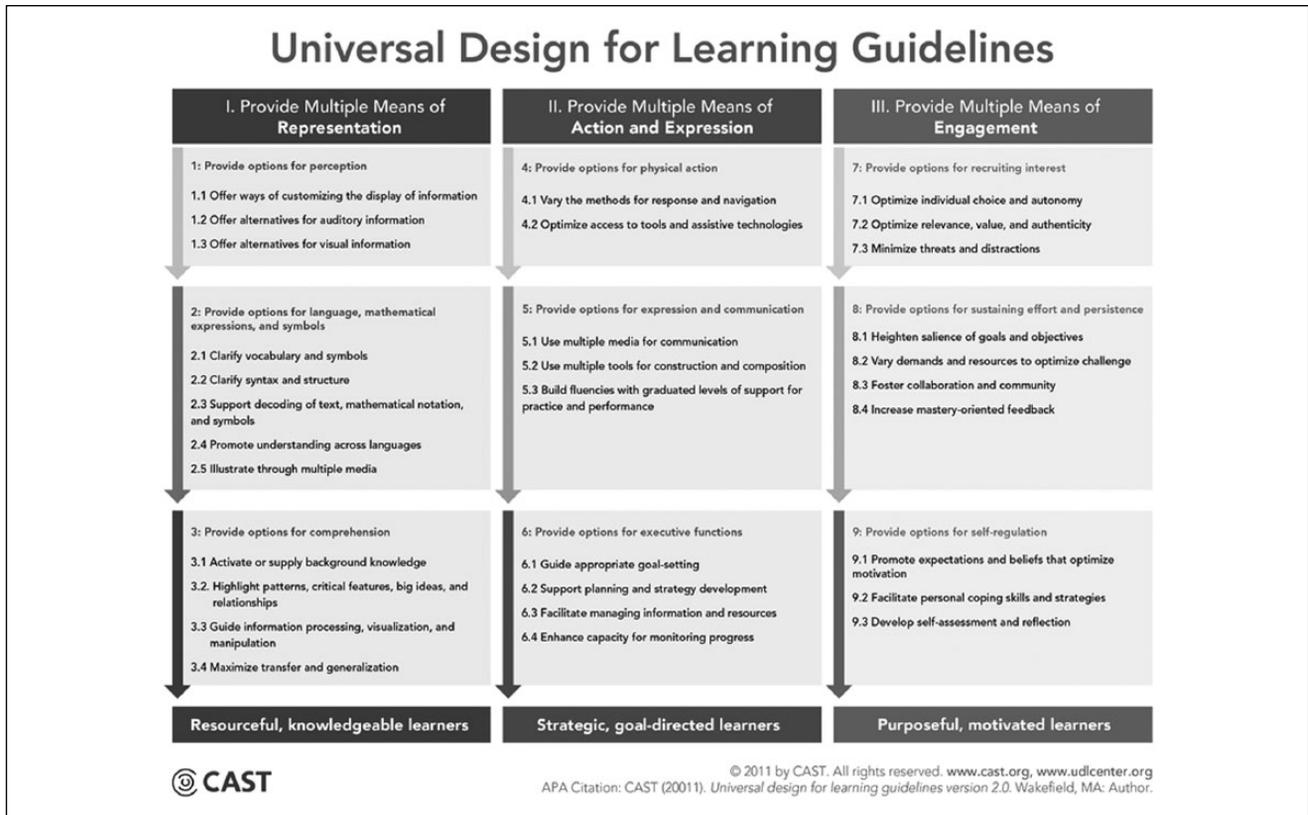


Figure 1. Universal Design for Learning guidelines v2.0.
 Source. Copyright CAST (2011)

outcomes associated with UDL when applied to effective practices. Bearing in mind that an essential premise of UDL is to proactively design instruction to address learner variability of all students, we present an additional method of utilizing UDL as an instructional design framework that can be applied to the design of specific interventions. We describe how UDL guidelines can be applied to effective practices for secondary students with LD to enhance and adapt the interventions (a priori) to support students' needs and preferences. In addition, we discuss how researchers may use this approach to design interventions and measure the efficacy of UDL when applied to practices that have been identified as effective through scientific research.

Effective Practices for Students With LD

Before we describe how UDL can be applied to specific interventions, it is important to understand how to identify and locate interventions that are supported by research as effective for students with LD. We use the term *effective practices* to refer to interventions and instructional strategies that have been validated by methodologically sound research to improve specific outcomes for the target population (e.g., students with LD; Cook, Smith, &

Tankersley, 2012). Furthermore, we focus our discussion on what Cook and Cook (2013) refer to as “micro” practices as opposed to “macro” practices. Specifically, micro practices are discrete practices that have clear components but are designed flexibly enough to incorporate into various contexts and settings (e.g., self-monitoring, repeated reading, classwide-peer tutoring), whereas “macro” practices tend to encompass whole curriculum practices (e.g., Read 180®). In this section, we describe considerations for teachers and researchers when selecting effective practices for students with LD.

When selecting practices and interventions to increase outcome areas for secondary students with LD, teachers should identify practices that are (a) designed to improve outcomes that align with the individual need of the student and (b) supported by methodologically sound research. That is, a teacher can be more confident regarding the effectiveness of a practice, when studies that support its effectiveness were conducted with high-quality methodology.

Identifying Effective Practices

To identify practices supported by methodologically sound research, organizations and researchers (e.g., the Council for Exceptional Children [CEC], 2014; Gersten et al., 2005;

Horner et al., 2005; U.S. Department of Education, Institute of Education Sciences [IES], What Works Clearinghouse [WWC], 2011) have established standards for classifying evidence-based practices (EBPs) for students with disabilities. Using a set of standards, researchers conduct systematic reviews to (a) identify methodologically sound studies and (b) determine whether a sufficient number of methodologically sound studies support the practice's effectiveness. When a practice is classified as an EBP for a specific population (e.g., students with LD), it is generally accepted as "effective" and teachers can be more confident that when implemented as intended (i.e., with fidelity), EBPs will improve targeted outcomes. For example, using standards by Gersten et al. (2005) and Horner et al. (2005), researchers identified self-regulated strategy development (SRSD) as an EBP for students with and at risk for LD (see Baker, Chard, Ketterlin-Geller, Apichatabutra, & Doablar, 2009).

Not all practices that are effective (i.e., improve outcomes for target population; Cook et al., 2012) are classified as EBPs. Some practices, that may indeed be effective for students with LD, are not classified as EBPs because (a) a formal review has not (yet) been conducted or (b) an insufficient number of methodologically sound studies currently support the practice (Cook et al., 2012). Thus, because a limited number of practices have been classified as EBPs for students with LD, teachers will likely need to rely on practices that are not EBPs but are supported by peer-reviewed research. For example, a teacher seeking to increase academic productivity in writing (e.g., quantity) for a student with LD may be interested in selecting self-monitoring for academic performance. To our knowledge, self-monitoring for students with LD has not been subject for systematic evidence-based review; however, self-monitoring for students with LD is supported as effective in multiple peer-reviewed studies (e.g., Goddard & Sendi, 2008; Harris, 1986; Harris, Graham, Reid, McElroy, & Hamby, 1994).

It is important to keep in mind that standards for EBP classification are extremely rigorous and many studies were published before standards existed; therefore, some practices may not meet prescribed criteria for EBP classification (Cook, Cook, & Cook, 2017). For a practice that has undergone a formal review and is not classified as an EBP, information from the review can be used to identify practices that may potentially be effective in improving outcomes for students with LD. In other words, researchers or teachers may decide to rely on peer-reviewed studies that support the effectiveness of a practice even though the practice has not been classified an EBP through a formal review. For example, Chard, Ketterlin-Geller, Baker, Doablar, and Apichatabutra (2009) conducted an evidence-based review of repeated readings for students with LD. Using EBP standards proposed by Gersten et al. (2005) and Horner et al. (2005), Chard et al. (2009) reviewed six single case design

and five group design studies. Although individual studies did not meet the methodological rigor of prescribed standards, authors noted that the peer-reviewed studies included in the review indicated a significant effect on outcomes for students with LD. Thus, a teacher seeking to increase reading fluency for students with LD may rely on the best available evidence (see Cook, Cook, & Collins, 2016) even when the practice is not classified as an EBP.

Locating Effective Practices

There are several ways for teachers to locate effective practices for students with LD. Although it is possible that some teachers may look to peer-reviewed journals, published EBP reviews or individual research studies to locate effective practices, it is likely that many teachers do not rely on these types of resources to select effective practices (e.g., Boardman, Aruguéllés, Vaughn, Hughes, & Klingner, 2005). However, several organizations have online tools for teachers seeking to identify effective practices for students with LD and many provide tools and resources to support implementation. Although some online resources identify EBPs (e.g., WWC; <https://ies.ed.gov/ncee/wwc/>), other organizations such as CEC's Division for Learning Disabilities (<http://teachingld.org/alerts>), University of Missouri's Evidence-Based Intervention Network (<http://ebi.missouri.edu>), and Vanderbilt University's IRIS Center (iris.peabody.vanderbilt.edu) provide practitioners with effective practices based on the best available evidence. Once an effective practice has been selected for a specific outcome area, the teacher can consider how to design the practice to balance implementation fidelity of core components and also meet the individual needs for the student with LD.

Balancing Implementation Fidelity and Individualization

When teachers use effective practices, it is important to find a balance between using them with fidelity and adapting them for specific students and settings. Effective practices have core components that are most likely to contribute to positive outcomes (Fixsen, Naoom, Blase, Friedman, & Wallace, 2005). These components are "theoretically important to the intervention" (Johnson & McMaster, 2013, p. 71). By maintaining implementation fidelity (i.e., implementing an intervention as intended) of these core components, teachers can have confidence in yielding similar results (i.e., positive effects) as the research studies that support the effectiveness of the practice.

Students with LD are entitled to specialized instruction to meet their individual learning needs. When planning specialized instruction, individualization is important to ensure that the intervention aligns with the needs of the individual

student. As teachers implement effective practices to improve target outcomes, it is important that they implement the core components of the practices to ensure fidelity while concurrently being able to adapt practices to one's specific context and environment (Johnson & McMaster, 2013; Leko, 2015). Maintaining critical components of an intervention yet purposefully adapting peripheral components (Leko, 2015) may enhance the effectiveness of the intervention. Webster-Stratton, Reinke, Herman, and Newcomer (2011) note that practices that are designed to allow adaptations may "maximize outcomes among individuals from diverse backgrounds and experiences" (p. 524). Adaptations can take into account the needs or interests of individual students or be responsive to localized school/classroom conditions and environments.

Teachers are encouraged to use professional judgment when adapting practices to meet needs of individual students (Cook, Tankersley, & Harjusola-Webb, 2008) and, therefore, it is important to find a balance between fidelity and adaptation (Leko, 2015). The call to use professional judgment when adapting effective practices has its pros and cons. Although it is open-ended and allows for individual discretion, there are no specific guidelines for the types of adaptations that might be reasonable. We suggest that the UDL framework can provide a structure that can guide professional judgment as teachers make design decisions to adapt effective practices. The UDL guidelines are broad enough that they can be applied to various types of instructional practices and approaches. As teachers consider a priori how to adapt a practice for their students and classroom context, they can refer to the UDL guidelines and make decisions about how to add flexibility and options to the effective practice they will use. As part of the design process (i.e., before implementing the practice), teachers can ensure that they maintain the core components of the practice and adapt it in alignment with UDL guidelines to provide multiple means of representation, expression, and engagement as appropriate for their context. The UDL guidelines can be an essential part of this instructional design process, serving as a basis for the professional judgment.

Key Considerations of UDL

When designing curriculum and instruction, UDL guidelines can be applied in various ways to increase flexibility and access for students with LD. By categorizing supports under the three principles of representation, expression, and engagement, UDL gives teachers clear guidelines for how to integrate flexibility and provide scaffolds to eliminate barriers, meet individual needs, and increase engagement by considering individual interests.

When considering barriers for students with LD, it is necessary for teachers to determine how the student's disability impacts their educational performance. Students

identified with LD have a wide range of characteristics (e.g., difficulty in decoding, fluency, mathematical computation and procedures, information processing, metacognition) that (a) impacts their ability to access grade-level curriculum and (b) requires specialized instruction to improve deficit areas (Mastropieri & Scruggs, 2014). Teachers can identify how the student's disability impacts them in their particular content area, identify potential barriers, and use UDL to proactively design their curriculum and instruction to meet the individual student's needs. For example, if a teacher identifies that a student with LD displays difficulty in decoding, reading fluency, and comprehension, the teacher may identify that reading the grade-level novel is a barrier for this student. Using the UDL guidelines (see Figure 1), the teacher can proactively determine that by providing the student with the book on tape (Guideline 2) may reduce the decoding barrier and, to support comprehension, the teacher may decide to assign smaller "chunks" (Guideline 3) of the novel, so she can check for understanding after the student reads (while listening to tape). Although these instructional choices remove barriers related to accessing the curriculum, which is the traditional application of UDL, the teacher will also need to determine how to provide specialized instruction to improve outcomes related to decoding, fluency, and comprehension.

To provide specialized instruction, teachers will need to select appropriate interventions (i.e., effective practices) that target specific outcome areas (e.g., decoding, fluency, reading comprehension). We suggest after a teacher selects an effective practice, the teacher can apply UDL guidelines proactively to targeted intervention to strategically meet the student's individual needs. In addition, by considering the student's strengths and interests, the teacher may maximize student engagement within specialized instruction. In the following sections, we describe methods for applying UDL to effective practices that are intended to increase specific outcome areas for students with LD.

Applying UDL to Effective Practices

Harn, Parisi, and Stoolmiller (2013) suggest that implementation fidelity of core components may actually be optimized when effective practices are adapted to match contextual variables within educational settings. Using UDL, teachers can clearly define which domains to address (representation, expression and action, and engagement) and undertake a process of intentionally and proactively considering the components of instruction that they will modify. In this section, we present two examples to illustrate how effective practices can be designed in alignment with UDL. We describe how self-monitoring and repeated reading, two practices with (a) clear components for implementation and (b) a number of peer-reviewed research studies supporting the effectiveness of the practice, can be

adapted using UDL. Specifically, we demonstrate how to retain core elements of these two practices while also intentionally and deliberately adapting elements in alignment with UDL guidelines (see Figure 1) to meet the individual needs of students with LD. To illustrate how interventions can be designed with UDL, we present how teachers might choose to adapt two familiar and commonly used effective practices for students with LD. In the examples below, we highlight how teachers can use UDL guidelines as they make decisions about adapting these two practices, taking into consideration students' needs, strengths, preferences, and interests.

Adaptations of effective practices can be approached in two ways. First, UDL-based adaptations can be applied to core components. That is, a teacher may change the format in which core components of a practice are delivered. A second way to adapt an effective practice is to maintain core components and add supplementary components to an effective practice with the intent of enhancing the intervention for target students. Using UDL as a menu of options, teachers can design adaptations a priori in one or both ways to meet individual needs of a student with LD within a specific context. The National Center on Universal Design for learning (<http://www.udlcenter.org/aboutudl/udlguidelines>) provides detailed descriptions of the UDL guidelines to provide teachers with guidance on how to use them when designing instruction. In the examples below, we illustrate how a teacher can adapt core components and add supplementary components while retaining the essence of the two effective practices. In these examples, we focus on how a teacher can apply UDL to an effective practice and use the practice with students to illustrate how the adaptation can be designed to measure how UDL is effective for specific groups of students. We emphasize that these UDL-based practices can be scaled appropriately and be embedded into inclusive settings and the options provided for all students as appropriate.

Self-Monitoring

Self-monitoring has been established as an effective practice by a body of peer-reviewed research. Several reviews of self-monitoring (see Bruhn, McDaniel, & Kreigh, 2015; Reid, 1996; Sheffield & Waller, 2010; Webber, Scheuermann, McCall, & Coleman, 1993) indicate that it is effective for improving behavioral and/or academic outcomes for students with LD. Thus, a teacher may select self-monitoring as one component of specialized instruction for a student with LD who needs specialized instruction to improve on-task behavior or academic performance in a specific outcome area (e.g., reading comprehension, math, writing). For example, Solis et al. (2012) suggest that the effects of self-monitoring enhance reading comprehension when combined with strategies such as explicit instruction in identifying main idea.

The two core components of self-monitoring require students to self-assess and self-record their own behavior (Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005). To integrate core components, a teacher would likely engage in the following steps for planning and implementation (Cook, Rao, & Collins, 2017):

1. Identify a target behavior
2. Select a cueing procedure
3. Determine medium for recording behavior
4. Teach student(s) to self-monitor
5. Implement self-monitoring

As a teacher designs a self-monitoring intervention, professional judgment is used to design and adapt the other components of this intervention. For example, the teacher can consider various options for cueing students and recording the target behavior, integrating adaptations that ensure relevance and appropriateness for specific students and classroom scenarios. Although all teachers implementing self-monitoring will make decisions regarding cueing and recording, we suggest referring to the UDL guidelines (see Figure 1) during the design phase, they can proactively consider what the barriers might be, specifically, for a student with LD. Teachers can then design self-monitoring to address barriers and can consider what additional components can be integrated to further motivate, engage, and increase educational outcomes for the student. In the following paragraphs, we denote how the core components of self-monitoring can be adapted in alignment with various UDL checkpoints.

The core components of self-monitoring can be adapted to meet the individual needs or preferences of students. Once the target behavior has been identified (e.g., on-task, work completion), the teacher can consider the core component "self-assessment" and decide on cueing procedures that are appropriate for specific needs of a student(s) with LD. For a student with LD who is displaying off-task behavior, the teacher will need to cue the students to self-assess their behavior as means to increase time on-task. If a teacher observes that a student avoids speaking up during class discussion and displays behaviors (e.g., puts head down on desk) when called on in class, the teacher may determine that this student does not like to be singled out among peers. By considering UDL Guideline 3 (provide multiple means of engagement), the teacher may choose to have a discrete cue using a cell phone or Motivator® which can vibrate on a random schedule, as opposed to a timer that can be heard by other students. This aligns with UDL by "minimizing threats and distractions" (Checkpoint 7.3) which suggests that teachers need to consider how to provide safe environment for the student.

UDL guidelines can also provide teachers with options to consider student preferences or interests. A teacher may

choose to “vary methods for navigation” (Checkpoint 4.1) and “optimize access to tools and assistive technologies” (Checkpoint 4.2) by letting the student choose whether to use traditional pencil-and-paper or integrate technology by self-recording the presence of the target behavior on an iPad. For a student with LD who displays difficulty with mathematical problem-solving, a teacher may use self-monitoring to allow self-assessment of following all steps of a previously taught strategy. If this same student enjoys technology and has access to a device in class, the teacher may consider the UDL checkpoint “optimize individual choice and autonomy” (Checkpoint 7.1) and decide to give the choice to choose a method of recording that aligns with this UDL checkpoint. For example, the teacher could provide either a checklist of steps using paper or pencil or upload the checklist to an iPad or laptop to allow the student to self-assess whether steps of problem-solving were completed.

In addition to applying UDL to core components of self-assessing and self-recording, it will likely be necessary for a teacher to proactively integrate other practices into self-monitoring to increase academic outcomes for secondary students with LD who also need intensive intervention in prerequisite skills (e.g., reading comprehension, mathematical problem-solving). For example, in Solis et al.’s (2012) review on reading comprehension interventions for students with LD, seven studies combined self-monitoring with explicit instruction in identifying the main idea. Thus, we suggest that teachers use the UDL guidelines to not only design the intervention, but also as guidance when determining the individual needs for a student with LD. For students with LD who have goals for increasing reading comprehension, UDL Guideline 3 provides teachers with guidance in providing options for comprehension. For example, teachers can “highlight patterns and big ideas” (Checkpoint 3.2) by integrating main idea instruction with self-monitoring to improve both comprehension and engagement for students with LD.

Adding additional components to self-monitoring interventions may also be appropriate for students with LD. Bruhn et al. (2015) found that teacher reinforcement and feedback were integrated in the majority of self-monitoring studies included in their review, and we suggest teachers to consider additional components such as these as a way to potentially maximize student engagement during self-monitoring. For example, UDL guidelines recommend the provision of options to (a) guide appropriate goal setting (Checkpoint 6.1), (b) increase mastery oriented feedback (Checkpoint 8.3), (c) facilitate personal coping skills and strategies (Checkpoint 9.2), and (d) develop self-assessment and reflection (Checkpoint 9.3). When planning a self-monitoring intervention, goal setting can be incorporated by teachers as they work with their students to determine weekly goals based on this individual student with LD. At the end of each week, the teacher and student can have a

short meeting to talk about whether the goals were met and what factors facilitated the students’ ability to meet the goals or not. In addition to these aspects of teacher feedback and self-assessment, the teacher can also help the student identify how she or he can maintain the desired behaviors and meet the targets in other settings, thereby “maximizing transfer and generalization” (Checkpoint 3.4).

If appropriate, the teacher may incorporate rewards when a student meets the weekly goal, by providing time for a preferred activity (e.g., time on the classroom iPad) or, if a teacher uses a token economy system in the classroom, extra currency. This can be motivating for some students and “optimize relevance, value, and authenticity” (Checkpoint 7.2).

Repeated Reading

Repeated reading, developed in the 1960s and 1970s (U.S. Department of Education, IES, WWC, 2014) is an instructional strategy intended to increase oral reading fluency. For younger students with LD, this practice is supported by both individual research studies and reviews of research to increase outcomes related to fluency and comprehension (e.g., Begeny, Krouse, Ross, & Mitchell, 2009; Dowhower, 1987; Herman, 1985; O’Shea, Sindelar, & O’Shea, 1985; Sindelar, Monda, & O’Shea, 1990; Therrien, 2004; Therrien & Hughes, 2008), and the National Institute of Child Health and Human Development (2000) recommends that teachers integrate this practice into reading instruction. Although evidence for repeated reading for older students with LD is more limited, Wexler, Vaughn, Edmonds, and Reutebuch’s (2008) meta-analysis indicated that repeated reading interventions that integrated a model reading component (e.g., audio-tape, adult reading) increased reading fluency. In addition, the U.S. Department of Education, IES, WWC (2014) evidence-based review found that repeated reading had an effect size of .28 on comprehension for secondary school students with LD included in Wexler, Vaughn, Roberts, and Denton’s (2010) study; the U.S. Department of Education, IES, WWC (2014) indicated that the effect size was substantial enough for repeated reading to be classified as having a “substantively important positive effect” (p. 4).

Although there is available evidence to support repeated reading as effective for secondary students with LD, as Wexler et al. (2010) reported, repeated reading alone may not improve overall reading performance with significant reading needs. Instead, research suggests that secondary students who struggle in reading need multicomponent interventions to improve overall reading ability (e.g., Scammacca et al., 2007; Scammacca, Roberts, Vaughn, & Stuebing, 2015; Wanzek et al., 2013). Struggling secondary readers may benefit from intensive interventions that include multisyllabic word instruction, fluency, vocabulary, and comprehension (Archer, Gleason, & Vachon, 2003) and as G. Roberts, Torgesen, Boardman, and Scammacca (2008) indicated,

repeated reading may have more value “when combined with focused word-learning instruction that is coordinated with the passages used for fluency practice” (p. 65).

Repeated reading may be appropriate for secondary students after explicit instruction in multisyllabic word and vocabulary instruction. Students may benefit from (a) applying newly learned strategies for decoding and (b) practicing reading grade-level vocabulary in context. In addition, teachers can apply UDL to make repeated reading, which was traditionally used with younger students, appropriate for secondary students and individualized to meet student needs. Repeated reading typically includes the following core components (U.S. Department of Education, IES, WWC, 2014):

- Teacher selects a passage of 50 to 200 words.
- Student and teacher sit in a quiet area and student reads passage a minimum of three times.
- Teacher corrects student when a word is misread or when a student hesitates for longer than 5 seconds.
- Student reads passage until satisfactory fluency level is reached.

In addition to the core components of repeated reading, U.S. Department of Education, IES, WWC (2014) suggests that teachers are able to vary the practice using methods such as choral reading, partner reading, and integrating audio recording. However, it is important for teachers to consider the individual students when considering these variations. For example, Wexler et al. (2010) suggest that teachers may avoid paired reading approaches when all students in the class have limited reading proficiency. However, a teacher in an inclusive setting, with a diverse group of fluent and nonfluent readers, may want to foster collaboration (Checkpoint 8.3) by purposefully using peer pairs. By purposefully pairing the student with LD with a more-fluent peer who can assist the student during reading, the teacher fosters collaboration that allows struggling readers to persist (Guideline 8). In addition, this effective practice allows teachers to consider variations to the types of texts, length of the passage, criteria for progressing to next passage, and the purpose for reading (e.g., character identification, comprehension). Thus, a teacher may use UDL guidelines to proactively design specific adaptations to increase engagement for individual students with LD.

These days, with digital tools and devices being readily available, a teacher could plan to “offer options for visual information” (Checkpoint 1.3) and “optimize access to tools an assistive technology” (Checkpoint 4.2) by adapting the practice to integrate technology along with repeated readings. Using either text-to-speech technology that automatically reads text aloud or using a teacher-created recording of the passage, the student can listen to the passage being read fluently before reading the passage independently.

This adaptation also provides a scaffold for the student, allowing the student to hear the sound of the words and to hear newly introduced vocabulary words read aloud before attempting them independently which can help to “clarify vocabulary and symbols” (Checkpoint 2.1) and to “promote understanding across languages” (Checkpoint 2.4). To “minimize threats and distractions” (Checkpoint 7.3), the teacher can provide options that allow the student to listen to the audio recording at a convenient time or use headphones. The teacher may also choose to read the passage aloud in person, instead of recording it for the student. This allows teachers to have choice and flexibility as well. If a teacher has read the passage aloud and created a recording (using audio recording apps on mobile devices or software on a computer), an added advantage is that the teacher can read with intonation and expression, modeling prosodic elements of reading for the student. This addresses UDL by “clarifying syntax and structure” (Checkpoint 2.2) and “builds fluencies with graduated support for practice/performance” (Checkpoint 5.3). The teacher can also choose to read the passage aloud in person or create a recording of the passage using an app on a mobile device or recording software on a computer. A teacher-created reading can include elements of prosody.

An adaptation to repeated reading that can foster engagement with students is to allow choice and options for self-regulation. A simple way to provide choice is to identify several texts that are at an instructional level for the student and to allow the student to choose which text to read. Texts can be varied to take into account students’ interests, cultural backgrounds, and other preferences. This can “optimize individual choice and autonomy (Checkpoint 7.1), “optimize relevance, value, and authenticity” (Checkpoint 7.2) and “heighten salience of goals and objectives” (Checkpoint 8.1).

For students with LD, a teacher may be interested in “enhancing the capacity for monitoring progress” (Checkpoint 6.4), “promoting expectations and beliefs that optimize motivation” (Checkpoint 9.1) and “developing self-assessment and reflection” (Checkpoint 9.3).

To support students with these skills, teachers can build in the opportunity to let students chart their progress, using pen-and-paper or charting apps or software on their devices. Being able to set goals and chart their own progress can be motivating for students and by systematically applying UDL when designing the repeated reading intervention, teachers can maintain the core components of the intervention while still using (guided) professional judgment to individualize the practice for individual students.

As previously discussed, repeated reading for secondary students with LD in inclusive secondary settings will likely need to be combined with additional interventions to improve reading outcomes. Although repeated reading has

shown to increase comprehension for secondary students (U.S. Department of Education, IES, WWC, 2014), a teacher may want to add additional components to the intervention to explicitly teach how a student can organize the information they have read during the repeated readings practice. For example, the teacher can explicitly teach the student to use a graphic organizer about key concepts in the passage and add to it as they continue to read a specific text, identify key ideas in the text (e.g., character, setting, problem, etc.), or, for students with difficulty in written expression, they can draw a photo to represent their understanding. These comprehension extensions can be leveled appropriately for the age, ability levels, and interests of the student. These adaptations align with UDL guidelines to “activate or supply background knowledge” (Checkpoint 3.1), “highlight patterns, critical features, big ideas, and relationships” (Checkpoint 3.2) and “maximize transfer and generalization” (Checkpoint 3.4).

Implications for UDL Research: Measuring and Establishing Efficacy

In the previous section, we describe how teachers can use UDL guidelines to address barriers and increase flexibility for students as design interventions and adapt effective practices for students with LD. In the following, we describe how researchers can use this approach to systematically measure the effects of UDL when applied to effective practices.

For researchers, this approach can be used to systematically design research studies to not only describe how they adapt, a priori, effective practices to meet the individual needs of students with LD but to also systematically measure the effectiveness of UDL. Because effective practices are supported by research and are shown to result in meaningful outcome gains for students, they provide a foundation for further research, replication, and adaptation. By examining how UDL can be used in conjunction with effective practices, researchers can consider some key questions in the field of UDL research such as (a) the nature of a UDL-based intervention, (b) the ways in which UDL guidelines can be applied to curriculum and instruction, and (c) whether the use of UDL along with an effective practice results in intended outcomes for students. By examining how UDL can be applied to instructional practices that already have a research base supporting their efficacy, as described in this article, researchers can define how UDL guidelines can be effectively used along with practices that may result in improved academic and/or behavioral outcomes for students.

Challenges for Building a UDL Research Base

In the past decade, many articles have been published about the value of UDL. Researchers have described the

usefulness of UDL as a framework for supporting inclusion and for increasing access for diverse students with and without disabilities. Systematic reviews of research conducted on UDL (Crevecoeur, Sorenson, Mayorga, & Gonzalez, 2014; Rao et al., 2014; K. D. Roberts, Park, Brown, & Cook, 2011) indicate that researchers have studied the application of UDL to curriculum and instruction to make a determination about whether UDL is effective. Some researchers have examined specific technology-based applications that have UDL-based supports, some have designed intervention packages that are based on various UDL guidelines and others made connections between UDL guidelines and classroom practices (Rao et al., 2014). Whereas all these studies contribute to a base of information on the use of UDL, two fundamental challenges exist in relation to the establishment of a well-developed research base.

First, researchers describe their use of UDL in widely varying ways (Rao et al., 2014). Some researchers provide specific details about the guidelines addressed by their interventions, including making connections on the lesson components (e.g., goals, methods, materials, or assessments) to which UDL was applied. Others state that they used UDL more broadly, without specifying how exactly their interventions make use of UDL. Some studies provide information on specific participants for whom UDL-based instruction was effective while other studies do not. Second, because UDL can be applied in various permutations and combinations and to different components of instruction, each study examines very specific and unique phenomena. Although studies indicate that the supports provided by the UDL-based strategies lead to positive outcomes, the unique nature of each intervention and the numerous ways that UDL guidelines are applied to practices make it difficult to draw conclusions regarding the external validity of UDL.

Clearly defining intervention components and participants are two indicators of methodologically sound research (see CEC, 2014). The current base of intervention research on UDL poses a challenge for systematic replication because researchers have reported on their use of UDL with varying levels of descriptive information. This poses a challenge for (a) understanding how UDL is applied in classroom settings, (b) determining for whom UDL is effective for, and (c) replicating original research studies to establish UDL's efficacy in improving academic and behavioral outcomes for students.

Replication requires researchers to directly or approximately repeat an experiment to increase confidence about a practice's validity when similar results are found across multiple studies (Travers, Cook, Therrien, & Coyne, 2016). The recent call for increasing replication research in the field of special education (Cook, Collins, Cook, & Cook, 2016; Coyne, Cook, & Therrien, 2016; Lemons et al., 2016; Makel et al., 2016; Therrien, Mathews, Hirsch, & Solis,

2016; Travers et al., 2016) provides further justification for UDL researchers to establish methods for approaching research in a way that allows other researchers to replicate their work. For UDL researchers to conduct systematic replications of previous research, it will be necessary, as Coyne et al. (2016) suggest, for researchers to fully describe and report all aspects of their intervention study to enable other researchers to replicate a study.

Measuring the Impact of UDL on Effective Practices

Although research indicates that there are positive outcomes associated with the use of UDL, the wide variation in how UDL is used and described in the research literature presents a challenge for defining when and how UDL is effective. One way to address the challenges of measurement and to allow replication is to consider how UDL can be applied to effective practices and to be specific about the adaptations made and the students for whom those were undertaken. By applying UDL to existing effective practices, researchers and teachers can be intentional and explicit about how they modify effective practices and what role UDL plays in the adaptation. This allows us to clearly describe the practice and how UDL was applied to its components and also to denote the specific UDL guideline(s) used. This clear delineation of practices along with their UDL enhancements and modifications provides a structure to examine how and for whom UDL is effective.

In the two examples presented in the prior section, we illustrate how researchers and teachers can make systematic decisions about how to adapt effective practices. By undertaking an intentional process of (a) considering core components of an effective practice and (b) enumerating which UDL guidelines and specific checkpoints were used to adapt the practice, we can intentionally examine the efficacy of systematically adapted practices. When applying specific UDL guidelines to practices already established by research as effective, researchers are able to add definition and clarity to research examining the application of UDL. That is, researchers can examine the effect of adapted practices and also examine whether outcomes are indeed enhanced when systematically adapted using UDL. This approach to UDL research will allow us as a field to refine our understanding of how UDL works within specific educational contexts.

In the first phase of examining UDL's efficacy when applied to established effective practices, researchers can examine how the intervention works once it is adapted with UDL. We can examine the question "Does it still work?" with the adaptations. Because a base of research already exists about the efficacy of the practice (particularly practices that have been formally classified as EBPs and are

supported by methodologically sound research), it becomes possible to replicate procedures and examine whether the UDL-adapted effective practice results in outcomes that are consistent with prior studies. In addition to quantitative designs that establish efficacy (i.e., single case design, group experimental design, quasi-experimental designs), researchers can use qualitative or mixed methods design to gain an understanding of how and for whom the UDL adaptations worked.

In a second phase, once we establish whether UDL-based adaptations result in desired outcomes, researchers can conduct more rigorous research to determine the efficacy of the adapted practice. That is, using methodologically sound experimental and quasi-experimental designs, researchers can compare the outcomes of effective practices with and without UDL adaptations that will build a base of information on the efficacy of the adapted practices. Mixed methods and qualitative studies can further examine the factors that support efficacy, such as teacher practices and student perceptions.

Conclusion

In the field of education, the evidence base of effective instructional practices for students with LD has been established over decades by peer-reviewed research, supporting the practices' effectiveness in improving educational outcomes for students. Furthermore, some of these practices have been formally classified as EBPs indicating that they are supported by the most methodologically sound peer-reviewed research. These practices may be timeless; however, teachers and students can benefit from updating practices to make use of new tools, methods, and technologies. Teachers can use their professional judgment to update effective practices, taking into consideration the needs of their students with LD and building in options to make instruction relevant and engaging. The efficacy of these adapted practices can be examined for different student populations (e.g., students with disabilities, culturally and linguistically diverse learners, gifted learners) as well as for whole class inclusion.

Using UDL as an instructional design framework for the adaptation of effective practices, including EBPs, educators can consider how to redesign practices, taking into account ways to reduce barriers, update, and enhance effective practices that we know to work. The UDL framework provides a concrete set of guidelines to use during the instructional design process, delineating the various ways in which we can provide flexible pathways to supporting student mastery of learning objectives. As a field, researchers and teachers will benefit from this information on how to apply UDL guidelines, along with examples of ways that effective practices can be adapted that result in increased student achievement. By considering how UDL can increase access in conjunction with existing effective practices and EBPs,

we can build on our knowledge of what works while creating models for ways in which UDL can be applied to educational practices.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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References

- Archer, A. L., Gleason, M. M., & Vachon, V. L. (2003). Decoding and fluency: Foundation skills for struggling older readers. *Learning Disability Quarterly, 26*, 89–101. doi:10.2307/1593592
- Baker, S. K., Chard, D. J., Ketterlin-Geller, L. R., Apichatabutra, C., & Doabler, C. (2009). Teaching writing to at-risk students: The quality of evidence for self-regulated strategy development. *Exceptional Children, 75*, 303–318. doi:10.1177/001440290907500303
- Begeny, J. C., Krouse, H. E., Ross, S. G., & Mitchell, R. C. (2009). Increasing elementary-aged students' reading fluency with small-group interventions: A comparison of repeated reading, listening passage preview, and listening only strategies. *Journal of Behavioral Education, 18*, 211–228. doi:10.1007/s10864-009-9090-9
- Boardman, A. G., Argüelles, M. E., Vaughn, S., Hughes, M. T., & Klingner, J. (2005). Special education teachers' views of research-based practices. *The Journal of Special Education, 39*, 168–180. doi:10.1177/00224669050390030401
- Bruhn, A., McDaniel, S., & Kreigh, C. (2015). Self-monitoring interventions for students with behavior problems: A systematic review of current research. *Behavioral Disorders, 40*, 102–121. Retrieved from <http://www.jstor.org/stable/43740439>
- Bryant, D. P., Bryant, B. R., & Hammill, D. D. (2000). Characteristic behaviors of students with LD who have teacher-identified math weaknesses. *Journal of Learning Disabilities, 33*, 168–177. doi:10.1177/002221940003300205
- CAST. (2011). *Universal design for learning guidelines version 2.0*. Wakefield, MA: Author. Retrieved from <http://www.udl-center.org/aboutudl/udlguidelines>
- Chard, D. J., Ketterlin-Geller, L. R., Baker, S. K., Doabler, C., & Apichatabutra, C. (2009). Repeated reading interventions for students with learning disabilities: Status of the evidence. *Exceptional Children, 75*, 263–281. doi:10.1177/001440290907500301
- Cook, B. G., Collins, L. W., Cook, S. C., & Cook, L. (2016). A replication by any other name: A systematic review of replicative intervention studies. *Remedial and Special Education, 37*, 223–234. doi:10.1177/0741932516637198
- Cook, B. G., & Cook, S. C. (2013). Unraveling evidence-based practices in special education. *The Journal of Special Education, 47*, 71–82. doi:10.1177/0022466911420877
- Cook, B. G., Cook, S. C., & Collins, L. W. (2016). Terminology and evidence based practices for students with EBD: Exploring some devilish details. *Beyond Behavior, 25*, 4–13. doi:10.1177/107429561602500202
- Cook, B. G., Smith, G. J., & Tankersley, M. (2012). Evidence-based practices in education. In K. R. Harris, S. Graham, & T. Urdan (Eds.), *APA educational psychology handbook* (Vol. 1, pp. 495–528). Washington, DC: American Psychological Association.
- Cook, B. G., Tankersley, M., & Harjusola-Webb, S. (2008). Evidence-based special education and professional wisdom: Putting it all together. *Intervention in School and Clinic, 44*, 105–111. doi:10.1177/1053451208321566
- Cook, S. C., Cook, B. G., & Cook, L. (2017). Classifying the evidence base of classwide peer tutoring for students with high-incidence disabilities. *Exceptionality, 25*, 9–25. doi:10.1080/09362835.2016.1196448
- Cook, S. C., Rao, K., & Collins, L. W. (2017). Self-monitoring interventions for students with EBD: Applying UDL to a research-based practice. *Beyond Behavior, 26*, 19–27. doi:10.1177/1074295617694407
- Cortiella, C., & Horowitz, S. H. (2014). *The state of learning disabilities: Facts, trends and emerging issues*. New York, NY: National Center for Learning Disabilities. Retrieved from <https://www.nclld.org/wp-content/uploads/2014/11/2014-State-of-LD.pdf>
- Council for Exceptional Children. (2014). *Council for Exceptional Children standards for evidence-based practices in special education*. Retrieved from <https://www.cec.sped.org/~media/Files/Standards/Evidence%20based%20Practices%20and%20Practice/EBP%20FINAL.pdf>
- Coyne, M. D., Cook, B. G., & Therrien, W. J. (2016). Recommendations for replication research in special education: A framework of systematic, conceptual replication. *Remedial and Special Education, 37*, 244–253. doi:10.1177/0741932516648463
- Crevecoeur, Y. C., Sorenson, S. E., Mayorga, V., & Gonzalez, A. P. (2014). Universal Design for Learning in K-12 educational settings: A review of group comparison and single-subject intervention studies. *The Journal of Special Education Apprenticeship, 3*(2), 1–23.
- Dowhower, S. L. (1987). Effects of repeated reading on second-grade transitional readers' fluency and comprehension. *Reading Research Quarterly, 22*, 389–406. doi:10.2307/747699
- Fixsen, D. L., Naoom, S. F., Blase, K. A., Friedman, R. M., & Wallace, F. (2005). *Implementation research: A synthesis of the literature* (FMHI Publication #231). Tampa, FL: The National Implementation Research Network, Louis de la Parte Florida Mental Health Institute, University of South Florida. Retrieved from <http://fpg.unc.edu/sites/fpg.unc.edu/files/resources/reports-and-policy-briefs/NIRN-MonographFull-01-2005.pdf>
- Gersten, R., Fuchs, L. S., Compton, D., Coyne, M., Greenwood, C., & Innocenti, M. S. (2005). Quality indicators for

- group experimental and quasi-experimental research in special education. *Exceptional Children*, 71, 149–164. doi:10.1177/001440290507100202
- Goddard, Y. L., & Sendi, C. (2008). Effects of self-monitoring on the narrative and expository writing of four fourth-grade students with learning disabilities. *Reading & Writing Quarterly*, 24, 408–433. doi:10.1080/10573560802004514
- Harn, B., Parisi, D., & Stoolmiller, M. (2013). Balancing fidelity with flexibility and fit: What do we really know about fidelity of implementation in schools? *Exceptional Children*, 79, 181–193. doi:10.1177/001440291307900204
- Harris, K. R. (1986). Self-monitoring of attentional behavior versus self-monitoring of productivity: Effects on on-task behavior and academic response rate among learning disabled children. *Journal of Applied Behavior Analysis*, 19, 417–423. doi:10.1901/jaba.1986.19-417
- Harris, K. R., Friedlander, B. D., Saddler, B., Frizzelle, R., & Graham, S. (2005). Self-monitoring of attention versus self-monitoring of academic performance effects among students with ADHD in the general education classroom. *The Journal of Special Education*, 39, 145–157. doi:10.1177/00224669050390030201
- Harris, K. R., Graham, S., Reid, R., McElroy, K., & Hamby, R. S. (1994). Self-monitoring of attention versus self-monitoring of performance: Replication and cross-task comparison studies. *Learning Disability Quarterly*, 17, 121–139. doi:10.2307/1511182
- Herman, P. A. (1985). The effect of repeated readings on reading rate, speech pauses, and word recognition accuracy. *Reading Research Quarterly*, 20, 553–565. Retrieved from <http://www.jstor.org/stable/747942>
- Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children*, 71, 165–179. doi:10.1177/001440290507100203
- Individuals With Disabilities Education Act, 20 U.S.C. 1400 *et seq.* (2004).
- Johnson, L. D., & McMaster, K. L. (2013). Adapting research based practices with fidelity: Flexibility by design. In B. G. Cook, M. Tankersley, & T. J. Landrum (Eds.), *Advances in learning and behavioral disabilities* (Vol. 26, pp. 65–91): Emerald Group. Retrieved from <http://ebookcentral.proquest.com/lib/uhm/detail.action?docID=1215509>
- Leko, M. M. (2015). To adapt or not to adapt: Navigating an implementation conundrum. *Teaching Exceptional Children*, 48, 80–85. doi:10.1177/0040059915605641
- Lemons, C. J., King, S. A., Davidson, K. A., Berryessa, T. L., Gajjar, S. A., & Sacks, L. H. (2016). An inadvertent concurrent replication: Same roadmap, different journey. *Remedial and Special Education*, 37, 213–222. doi:10.1177/0741932516631116
- Maccini, P., Mulcahy, C. A., & Wilson, M. G. (2007). A follow-up of mathematics interventions for secondary students with learning disabilities. *Learning Disabilities Research & Practice*, 22, 58–74.
- Makel, M. C., Plucker, J. A., Freeman, J., Lombardi, A., Simonsen, B., & Coyne, M. (2016). Replication of special education research: Necessary but far too rare. *Remedial and Special Education*, 37, 205–212. doi:10.1177/0741932516646083
- Mastropieri, M. A., & Scruggs, T. E. (2014). *The inclusive classroom: Strategies for effective differentiated instruction*. Upper Saddle River, NJ: Pearson.
- Meyer, A., Rose, D. H., & Gordon, D. (2014). *Universal design for learning: Theory and practice*. Wakefield, MA: CAST. Retrieved from <http://udltheorypractice.cast.org/login>
- National Governors Association Center for Best Practices, Council of Chief State School Officers. (2010). *Common Core State Standards for English Language Arts*. Washington, DC: Author. Retrieved from <http://www.corestandards.org/ELA-Literacy/>
- National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel: Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups*. Washington, DC: National Institute of Child Health and Human Development, National Institutes of Health. Retrieved from <https://www.nichd.nih.gov/publications/pubs/nrp/Documents/report.pdf>
- National Joint Committee on Learning Disabilities. (2008). *Adolescent literacy and older students with learning disabilities*. Retrieved from <http://www.ldonline.org/about/partners/njcd>
- Ok, M. W., Rao, K., Bryant, B. R., & McDougall, D. (2017). UDL in the preK-12 classroom: A systematic review of research. *Exceptionality*, 25, 116–138. doi:10.1080/09362835.2016.1196450
- O'Shea, L. J., Sindelar, P. T., & O'Shea, D. J. (1985). The effects of repeated readings and attentional cues on reading fluency and comprehension. *Journal of Reading Behavior*, 17, 129–142. doi:10.1080/10862968509547535
- Rao, K., Ok, M. W., & Bryant, B. R. (2014). A review of research on universal design educational models. *Remedial and Special Education*, 35, 153–166. doi:10.1177/0741932513518980
- Reid, R. (1996). Research in self-monitoring with students with learning disabilities: The present, the prospects, the pitfalls. *Journal of Learning Disabilities*, 29, 317–331. doi:10.1177/002221949602900311
- Roberts, G., Torgesen, J. K., Boardman, A., & Scammacca, N. (2008). Evidence-based strategies for reading instruction of older students with learning disabilities. *Learning Disabilities Research & Practice*, 23, 63–69. doi:10.1111/j.1540-5826.2008.00264.x
- Roberts, K. D., Park, H. J., Brown, S., & Cook, B. (2011). Universal design for instruction in postsecondary education: A systematic review of empirically based articles. *Journal of Postsecondary Education and Disability*, 24, 5–15.
- Rose, D. H., & Meyer, A. (2002). *Teaching every student in the digital age: Universal design for learning*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Scammacca, N. K., Roberts, G., Vaughn, S., Edmonds, M., Wexler, J., Reutebuch, C. K., & Torgesen, J. K. (2007). *Interventions for adolescent struggling readers: A meta-analysis with implications for practice*. Portsmouth, NH: RMC Research Corporation, Center on Instruction.

- Scammacca, N. K., Roberts, G., Vaughn, S., & Stuebing, K. K. (2015). A meta-analysis of interventions for struggling readers in grades 4–12: 1980–2011. *Journal of Learning Disabilities, 48*, 369–390. doi:10.1177/0022219413504995
- Sheffield, K., & Waller, R. J. (2010). A review of single-case studies utilizing self-monitoring interventions to reduce problem classroom behaviors. *Beyond Behavior, 19*, 7–13.
- Sindelar, P. T., Monda, L. E., & O'Shea, L. J. (1990). Effects of repeated readings on instructional-and mastery-level readers. *The Journal of Educational Research, 83*, 220–226. doi:10.1080/00220671.1990.10885959
- Solis, M., Ciullo, S., Vaughn, S., Pyle, N., Hassaram, B., & Leroux, A. (2012). Reading comprehension interventions for middle school students with learning disabilities: A synthesis of 30 years of research. *Journal of Learning Disabilities, 45*, 327–340. doi:10.1177/0022219411402691
- Therrien, W. J. (2004). Fluency and comprehension gains as a result of repeated reading: A meta-analysis. *Remedial and Special Education, 25*, 252–261. doi:10.1177/07419325040250040801
- Therrien, W. J., & Hughes, C. (2008). Comparison of repeated reading and question generation on students' reading fluency and comprehension. *Learning Disabilities: A Contemporary Journal, 6*, 1–16.
- Therrien, W. J., Mathews, H. M., Hirsch, S. E., & Solis, M. (2016). Progeny review: An alternative approach for examining the replication of intervention studies in special education. *Remedial and Special Education, 37*, 235–243. doi:10.1177/0741932516646081
- Travers, J. C., Cook, B. G., Therrien, W. J., & Coyne, M. D. (2016). Replication research and special education. *Remedial and Special Education, 37*, 195–204. doi:10.1177/0741932516648462
- U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse. (2011). *Procedures and standards handbook* (Version 3.0). Retrieved from <http://ies.ed.gov/ncee/wwc/references/idocviewer/doc.aspx?docid=19&tocid=1>
- U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse. (2014, May). *Students with learning disabilities intervention report: Repeated reading*. Retrieved from https://ies.ed.gov/ncee/wwc/Docs/InterventionReports/wwc_repeatedreading_051314.pdf
- Vaughn, S., & Wanzek, J. (2014). Intensive interventions in reading for students with reading disabilities: Meaningful impacts. *Learning Disabilities Research & Practice, 29*, 46–53. doi:10.1111/ldrp.12031
- Wanzek, J., Vaughn, S., Scammacca, N. K., Metz, K., Murray, C. S., Roberts, G., & Danielson, L. (2013). Extensive reading interventions for students with reading difficulties after grade 3. *Review of Educational Research, 83*, 163–195. doi:10.3102/0034654313477212
- Webber, J., Scheuermann, B., McCall, C., & Coleman, M. (1993). Research on self-monitoring as a behavior management technique in special education classrooms a descriptive review. *Remedial and Special Education, 14*, 38–56. doi:10.1177/074193259301400206
- Webster-Stratton, C., Reinke, W. M., Herman, K. C., & Newcomer, L. L. (2011). The incredible years teacher classroom management training: The methods and principles that support fidelity of training delivery. *School Psychology Review, 40*, 509–529.
- Wexler, J., Vaughn, S., Edmonds, M., & Reutebuch, C. K. (2008). A synthesis of fluency interventions for secondary struggling readers. *Reading and Writing, 21*, 317–347. doi:10.1007/s11145-007-9085-7
- Wexler, J., Vaughn, S., Roberts, G., & Denton, C. A. (2010). The efficacy of repeated reading and wide reading practice for high school students with severe reading disabilities. *Learning Disabilities Research & Practice, 25*, 2–10. doi:10.1111/j.1540-5826.2009.00296.x

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