Embedded Shared Reading to Increase Literacy in an Inclusive English/Language Arts Class: Preliminary Efficacy and Ecological Validity

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Abstract: Learning in general education contexts enhances access to general curriculum content for students with disabilities. However, few intervention studies focused on general education content have been conducted in general education settings. The current study provides preliminary evidence of the effectiveness of a literacy intervention using evidence-based practices (i.e., shared reading, embedded instruction, time delay) implemented in the context of a ninth-grade general education English/language arts class. A multiple baselines across conditions design was used to examine the effectiveness of the intervention, and field notes were collected to examine the factors that facilitated and inhibited the integration of the intervention into the general education class routines. Implications are discussed in relationship to future research focusing on interventions to improve access to the general curriculum in general education contexts, as well as for teachers providing such instruction.

The general curriculum, by definition, is “the same curriculum as for non-disabled students” (IDEA, Individuals with Disabilities Education Act, 2004). Federal laws such as IDEA (2004) and No Child Left Behind (2002) mandate that all students, including students with disabilities, have access to evidence-based instructional strategies in the least restrictive educational settings. Literacy, defined as the natural use of language in everyday contexts (Gee, 2001), is particularly important to address within less restrictive settings such as general education classes, because peers provide natural opportunities to use language. Unfortunately, a majority of students with significant disabilities continue to be served in self-contained classrooms, and fail to realize the benefits of learning the general curriculum in age-appropriate, general education contexts (Kurth & Kozleski, 2014; Ryndak et al., 2014).

Instruction in self-contained classes is characterized by limited access to general curriculum content, lack of structure and schedule, and a lack of well-conceived approaches to deal with behavior challenges (Causton-Theoharis, Theoharis, Orsati, & Cosier, 2011). In a study of literacy experiences of students with significant disabilities in self-contained classes, findings indicated that the instruction more closely resembled an ad-hoc set of activities rather than a cohesive curriculum with a scope and sequence (Ruppar, 2013). Research suggests that general education settings have a positive impact on students with disabilities’ use of literacy skills, independent living, social and emotional skills, community living, leisure activities, and employment in comparison to students who remain in self-contained classes (Ryndak, Ward, Alper, Montgomery, & Stroch, 2010). In general education classes, students with significant disabilities have greater opportunities to engage with goal-oriented, specific curriculum content, age appropriate materials, and general education content (Matzen, Ryndak, & Nakao, 2010). Access to general education content is associated
with increased instructional time and less problem behavior for students with disabilities when compared with other types of curricular content (Lee, Wehmeyer, Soukup, & Palmer, 2010). Wehmeyer, Lattin, Lapp-Rincker, and Agran (2005) found that students with intellectual disability were more likely to work on tasks related to a standard and have adaptations to access the general curriculum in inclusive settings, whereas students were working on tasks that were not linked to a standard and below grade level in self-contained settings.

Even though general education contexts are more likely to yield positive student academic and behavioral outcomes, instruction in general education classrooms for students with significant disabilities is not easy due to students’ extensive needs. Curriculum modifications are necessary to help students benefit from general education content. Lee et al. (2010) found that curriculum modifications were a significant predictor of increased student engagement and decreased undesired behavior. With modifications to curriculum, students with significant disabilities can access meaningful literacy instruction in general education classes. However, limited research has been conducted on the effectiveness of specific modifications and instructional strategies in literacy instruction for students with significant disabilities.

Despite the evidence that students with significant disabilities benefit from learning in general education contexts with curricular modifications, intervention research focused on the access to the general curriculum for students with significant disabilities has rarely been implemented within those settings. Hudson and Browder (2014) found only 17 articles focused on access to general education content in general education contexts between 1975 and 2012; among those articles, the authors concluded that embedded instruction with constant time delay is an evidence-based practice for teaching students with significant disabilities in general education classes. This literature is limited in its scope, however, especially in relationship to literacy. Only seven of the identified studies targeted literacy skills, and four of the literacy studies focused only on sight word identification. The limited applied research on literacy in general education contexts translates to limited information for teachers about how general education content can be taught to students with significant disabilities in general education contexts.

**Embedded Instruction**

Embedded instruction is one strategy that can be used to provide targeted instruction for students with significant disabilities in general education classes (McDonnell, 1998), and has been identified as an evidence-based practice for providing access to general education content in general education contexts (Hudson & Browder, 2014). In embedded instruction, teachers use systematic instruction within the ongoing routines of the general education setting. Trials are distributed across activities that typically occur in natural performance settings. Studies have shown that embedded instruction is effective to teach both academic and developmental skills to students with significant disabilities in general education settings. For example, McDonnell, Johnson, Polychronis, and Riesen (2002) used embedded instruction to teach four students with developmental disabilities to read or define words provided on vocabulary lists of three high school general education content. In another study, Johnson, McDonnell, Holzwarth, and Hunter (2004) implemented embedded instruction in an inclusive elementary classroom for three students with developmental disabilities. Together, these findings illustrate that embedded instruction can be successful in promoting acquisition and maintenance of academic and developmental skills of students with significant disabilities in general education classes. While these findings are promising, one limitation of the embedded instruction research is that instruction was typically provided during breaks and transitions between classroom activities. Limited empirical evidence is available for strategies that can be used during class instructional time, which would allow students with significant disabilities to access general education content at the same time as their peers and promote greater membership and participation in general education classes.
Shared Reading

Shared reading, a strategy to improve literacy, has a growing base of evidence supporting its use to improve the comprehension and engagement skills of students with significant disabilities. In shared reading, proficient readers such as teachers and peers read aloud and provide support for students with significant disabilities to engage with text (Hudson & Test, 2011). Text is adapted and augmented using a variety of strategies, such as embedded definitions of new or unfamiliar words, key words paired with picture symbols, summarized text, enlarged title of the book and the name of the author, laminated pages to make the books sturdy, repeated lines, tactile representations of nouns embedded throughout the story, and enhanced the sensory distinctiveness of the stimuli (e.g., soft cloth, textured surfaces, distinct smell like an orange) (Browder, Trela, & Jimenez, 2007; Mims, Browder, Baker, Lee, & Spooner, 2009; Spooner, Rivera, Browder, Baker, & Salas, 2009). The instructional procedures are guided by a task analysis for the student and teacher, and the use of systematic instructional procedures such as the system of least prompts (Browder et al., 2007; Mims et al., 2009; Spooner et al., 2009). Books have been adapted from the general education curriculum (Browder et al., 2007) or popular picture books (Mims et al., 2009; Spooner et al., 2009). Two studies of shared reading have been conducted in elementary general education classes, both using peer tutors to provide instruction. These studies demonstrate the effectiveness of the procedures within general education classes at the elementary level (Hudson & Browder, 2014; Hudson, Browder, & Jimenez, 2014). To date, shared reading has not been implemented in general education high school settings.

The purpose of this study was to examine the effectiveness and ecological validity of an embedded shared reading intervention in a high school general English/language arts (ELA) class for a student with multiple disabilities. Specifically, we investigated the effectiveness of shared reading instruction on the student’s (a) literacy engagement, (b) vocabulary, and (c) listening comprehension skills. We also report features of the instructional context of the class to begin to establish guidance for how a shared reading intervention might be integrated into general education class routines. The research questions that guided this study were:

1) What is the effect of a shared reading intervention embedded in an inclusive high school ELA class on the literacy engagement, vocabulary, and listening comprehension of a student with multiple disabilities?

2) What contextual factors support or inhibit the success of the shared reading intervention in an inclusive high school ELA class?

The current study builds on the established evidence base for the use of shared reading with elementary and middle school students (e.g., Browder et al., 2007; Browder, Lee, & Mims, 2011; Mims et al., 2009; Mims, Hudson, & Browder, 2012; Mims, Lee, Browder, Zakas, & Flynn, 2012; Spooner, Knight, Browder, & Smith, 2011), as well as the established evidence-based practices of embedded instruction and constant time delay in general education contexts. We extend the application of these strategies for use in an inclusive high school class.

Method

Participant

The participant in this study was Caitlyn, a 16-year-old student enrolled in a general education ninth grade ELA class. Caitlyn qualified for special education under the categories of Other Health Impairment and Speech/Language Impairment; she also had bilateral hearing loss. Caitlyn wore hearing aids in both ears and used a personal FM assistive listening device, which she wore around her neck and gave to communication partners. Her expressive communication consisted of signs and gestures, many of which were idiosyncratic or modified due to fine motor challenges. She received academic modifications and support services (i.e., speech and language, physical therapy, occupational therapy) to maximize participation in school and meet her educational goals. While formal literacy assessment data were not available, Caitlyn was consid-
ered to be a beginning reader. She was able to recognize single words after multiple exposures. According to her teachers, Caitlyn was able to answer “what” questions with 80% accuracy and was working on expanding her academic vocabulary.

Prior to the study, Caitlyn participated in her ELA class with support from a special education teacher, who co-taught the class with a general education ELA teacher. She had been given a binder by her case manager (another special education teacher who was not an instructor in her ELA class) in which she practiced writing one Dolch sight word each week. At the end of the week, she was asked to write the word from memory given the prompt, “What was the word this week?” This material was not related to the ELA curriculum available to her classmates.

Classroom and Curriculum Context

The present study emerged from a collaborative relationship between the first author and the special education staff at Caitlyn’s high school. The special education teachers and administrators at the school initiated the relationship in order to improve literacy programming for the students with significant disabilities. Caitlyn was enrolled in the ELA class at her parents’ request; other students with similar disabilities at the high school were enrolled in a special education course called Foundations of Reading, which did not include students without disabilities and did not follow the general curriculum.

Twenty-nine students were enrolled in the ELA class; eight had Individualized Education Programs (IEPs). The class was co-taught by two teachers, a general education English teacher and a special education teacher. As is typical in high school ELA classes, the students in the class read literature in a variety of genres over the course of the school year. A typical class session included multiple opportunities and means for students to engage with text. Partner reading, large-group reading, audio books, videos, writing, sharing, and individual reading and work time were incorporated into the class structure, and students were provided with flexible means to express their knowledge (e.g., oral presentation, writing, use of technology). Lessons consisted of journal writing, reading the text out loud or in small groups, class discussions about the text, completing accompanying study guides, and creating projects related to the major themes and concepts of the text. Students with IEPs used modified versions of the text, guided notes, movie clips, and question prompts to use during discussions.

The general and special education teachers rotated among students and presented to the whole group individually and cooperatively. The teachers loosely structured discussions in order to foster a sense of independence and community within the classroom, with a focus on validating students’ opinions. Outside of class time, the two teachers co-planned lessons, with the ELA teacher taking responsibility for the content and the special education teacher taking responsibility for the curricular adaptations and modifications. As the teachers’ relationship grew, each learned from the other and they began to contribute more equally to the content, instruction, and student support planning.

The scope and sequence of the ELA curriculum was focused on reading, writing, speaking, and listening skills and emphasized seven enduring understandings: critical thinking, community, empowerment, social justice, responsibility, appreciation of literature, and fostering a love of reading. Across the year, students read a variety of literature including a graphic novel, dramatic literature including Shakespeare, historical fiction, non-fiction, short stories, and poetry. Discussion skills were emphasized through small and large-group discussions which required students to take multiple perspectives, make logical inferences, and create intellectual connections between their own lives and communities to literature and to other content areas. Speaking skills were addressed through public speaking. Students addressed writing standards through an expository writing assignment, journaling, and partner writing.

All sessions were conducted during the ELA class. The interventionists were the special education teacher and a student teacher in her last semester of a Master’s program in special education. The special education teacher had an established relationship with Caitlyn and worked closely with her during the ELA class. The interventionists met with the research
team to determine the steps to be included in the shared reading task analysis. The intervention procedures were also discussed with the ELA teacher and the student’s case manager.

Materials

At the time of the intervention, the class was studying *The Odyssey*. Thus, the teachers and research team worked collaboratively to adapt *The Odyssey* so that it was accessible for Caitlyn. The team followed a process for adapting the text for complexity while maintaining the genre and author’s tone (see Apitz, Roessler, Ruppar, & Pickett, manuscript submitted for publication). The adapted book included a title page with a picture of the actual book, accompanied by an enlarged title and author’s name. The book was broken down into chapters based on Odysseus’ many journeys. Each journey was numbered and titled and included a list of characters associated with that journey. The pages at the beginning of the book showed pictures of the key characters and each of the three targeted vocabulary words (i.e., trip, brave, hero) along with a line drawing of the American Sign Language sign for each word. Each page of the text featured photographs captured from a movie version of the book along with the adapted version of the text. There were approximately two to three sentences of text per page. The three targeted vocabulary words were integrated throughout the text and bolded. Comprehension questions appeared at the end of the book.

Content Validity

The ELA teacher reviewed the adapted version of *The Odyssey* to ensure that the key events and themes of the novel that would be emphasized in class were covered. The ELA teacher approved the text and provided no recommendations for improvement.

Independent Variable

A task analysis was created to target engagement, vocabulary, and comprehension of the modified version of *The Odyssey* (see Table 1). The task analysis consisted of 12 different steps, with four steps targeting engagement, vocabulary, and listening comprehension skills respectively. For each step of the task analysis, the teacher provided a cue, which served as the discriminative stimulus (e.g., “Point to the title”). If the student did not respond after a four to seven second response interval, the teacher delivered the controlling

<table>
<thead>
<tr>
<th>Step</th>
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<tbody>
<tr>
<td>2. Point to title</td>
<td>“Point to the title.”</td>
</tr>
<tr>
<td>3. Point to author’s name</td>
<td>“Point to the author.”</td>
</tr>
<tr>
<td>4. Open book</td>
<td>“Let’s read.”</td>
</tr>
<tr>
<td>5. Sign <em>trip</em></td>
<td>This word is <em>trip</em>. Sign trip.</td>
</tr>
<tr>
<td>6. Sign <em>brave</em></td>
<td>This word is <em>brave</em>. Sign brave.</td>
</tr>
<tr>
<td>7. Sign <em>hero</em></td>
<td>This word is <em>hero</em>. Sign hero.</td>
</tr>
<tr>
<td>8. Identify “hero” in print</td>
<td>“What word is this? You sign.”</td>
</tr>
<tr>
<td>9. Answer <em>who</em> question</td>
<td>Asks question when provided in text, and provides 3 choices. “Who ___________?”</td>
</tr>
<tr>
<td>10. Answer <em>what</em> question</td>
<td>Asks question when provided in text, and provides 3 choices. “What ___________?”</td>
</tr>
<tr>
<td>11. Answer <em>how</em> question</td>
<td>Asks question when provided in text, and provides 3 choices. “How ___________?”</td>
</tr>
<tr>
<td>12. Complete sequencing task</td>
<td>Provides three different pictures. “Which one first?” “Which one next?” “Which one last?”</td>
</tr>
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prompt, which varied for each step. At times, the student was distracted or could not hear the teacher’s cue due to her hearing loss; the interventionist was permitted to repeat the cue after gaining the student’s attention by tapping her on the shoulder or providing a prompt to look at the book.

**Dependent Variable and Data Collection**

The dependent variable was Caitlyn’s unprompted correct responses to the teacher’s cues while reading the adapted version of *The Odyssey*. A correct response was defined as an independent response to the teacher’s cue (i.e., discriminative stimulus) within the response interval; incorrect responses were recorded if Caitlyn made no response during the response interval and required the controlling prompt. Throughout the session, the interventionist recorded correct and incorrect responses for each targeted step of the task analysis. Thus, when Caitlyn met criterion for the vocabulary responses, the interventionist began providing the controlling prompt after the response interval for the engagement responses and continued to cue the vocabulary responses. Similarly, when comprehension was introduced the interventionist continued to implement the entire task analysis, including cues for the vocabulary and engagement responses.

**Experimental Design**

The current study is a systematic replication (Gast & Ledford, 2014) of a study by Spooner et al. (2009), which was an examination of culturally relevant shared reading conducted in a special education classroom. Following the procedures of Spooner et al. (2009), a multiple probe across conditions design was used based on a task analysis. The three conditions represented three different sets of literacy skills: Vocabulary, engagement, and comprehension. A systematic replication “demonstrates that the finding ... can be observed under conditions different from those prevailing in the original experiment” (Sidman, 1960, quoted in Gast & Ledford, 2014, p. 115). In the current study, we borrow Spooner et al.’s (2009) design and apply it in a high school general education context, referencing the contextually appropriate general education content (i.e., *The Odyssey*).

**Ecological Validity**

To examine the ecological validity of the shared reading intervention in a ninth grade general education ELA class, the interventionists recorded field notes about the activities of the class each day. Specifically, the interventionists were asked to record any information pertinent to the success of the intervention or challenges related to implementing the intervention, a general overview of the class activities, and general notes regarding Caitlyn’s participation.

**Procedure**

**Baseline.** In baseline, the student and the teacher read the modified text and the teacher provided a cue for each step in the task analysis, but no controlling prompt was given to teach the student the correct response. The interventionist did not model signs for the key vocabulary words.

**Training.** The first author trained the interventionists (i.e., special education teacher and student teacher) to implement the procedures, which were typical systematic instructional procedures that they used in their work as teachers. The first author coached the teachers to ensure correct use the procedures prior to the intervention. During the coaching, the first author modeled the instructional procedures and gave feedback to the interventionists as they practiced using the procedures in simulations.

The sessions were conducted during natural opportunities in the ELA class, usually when the students were directed to work independently. No instruction occurred outside of the ELA class. To begin the intervention, the interventionist delivered the first cue (i.e., “take out your book”) and completed the task analysis quietly with the student at her desk. Each session lasted approximately 20 minutes total; sometimes, breaks were needed to accommodate Caitlyn’s attention span or a change in class activity.

**Intervention.** The 12 skills in the task analysis addressed vocabulary, engagement, and comprehension. The task analysis was con-
TABLE 2.
Social Validity Items and Means

<table>
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<tr>
<th>Questionnaire</th>
<th>Item</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>Prior to the intervention</td>
<td>I think that learning these three new vocabulary words is an important goal for this student.</td>
<td>4.14</td>
</tr>
<tr>
<td></td>
<td>I think that answering listening comprehension questions is an important goal for this student.</td>
<td>4.57</td>
</tr>
<tr>
<td></td>
<td>I think that increasing engagement is an important goal for this student.</td>
<td>4.71</td>
</tr>
<tr>
<td></td>
<td>I think that the shared reading strategy will help this student learn new vocabulary words.</td>
<td>4.43</td>
</tr>
<tr>
<td></td>
<td>I think that the shared reading strategy will help this student answer who, what, and how questions.</td>
<td>4.29</td>
</tr>
<tr>
<td></td>
<td>I think that the shared reading strategy will help the student increase her engagement in reading.</td>
<td>4.43</td>
</tr>
<tr>
<td></td>
<td>I think that adapting grade-level text is an appropriate way to include this student in the grade-level curriculum.</td>
<td>4.86</td>
</tr>
<tr>
<td>After the intervention</td>
<td>Now that the study is over, I think that learning these new vocabulary words (i.e., hero, brave, trip) was an important goal for this student/my child.</td>
<td>4.43</td>
</tr>
<tr>
<td></td>
<td>Now that the study is over, I think that answering <strong>who</strong>, <strong>what</strong>, and <strong>how</strong> comprehension questions was an important goal for this student/my child.</td>
<td>4.29</td>
</tr>
<tr>
<td></td>
<td>I think that the shared reading strategy helped my student/child learn new vocabulary words and answer comprehension questions.</td>
<td>4.43</td>
</tr>
<tr>
<td></td>
<td>I would support the use of shared reading for this student in the future.</td>
<td>4.43</td>
</tr>
<tr>
<td></td>
<td>I have observed the student demonstrating improved listening comprehension skills in other environments after participating in the shared reading intervention.</td>
<td>3.86</td>
</tr>
<tr>
<td></td>
<td>I have observed the student using the vocabulary words in other environments after participating in the shared reading.</td>
<td>3.57</td>
</tr>
<tr>
<td></td>
<td>Overall, this intervention met my expectations.</td>
<td>4.14</td>
</tr>
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</table>
at 100%. In the second intervention condition, inter-observer agreement was calculated at 97.2% (range 91.6% to 100%).

The same observer simultaneously conducted procedural fidelity checks. A correct was marked if the interventionist delivered the appropriate cue and adhered to the constant time delay procedures. An error was marked if the interventionist provided an incorrect cue or provided additional prompts. Procedural fidelity was calculated by dividing the total number of steps by the total number of correct steps and multiplying the quotient by 100. Procedural fidelity was calculated at 93.7% for all steps across all phases of the study. In the baseline phase, procedural fidelity was calculated at 87.5% (range 66.7% to 100%). In the first, second, and third intervention phases, procedural fidelity was calculated at 100%.

Social Validity

A web-based questionnaire was sent to seven consumers of the intervention (i.e., special education case manager, general education teacher, parents, administrators, other special education teachers and paraprofessionals with whom the student worked). The questionnaire was sent twice during the study: before the intervention and at the conclusion of the study. Social validity questions related to the goals, procedures, and outcomes of the intervention and were rated on a 5-point Likert-like scale. See Table 2 for social validity questionnaire items and means.

Results

Experimental Results

Figure 1 presents the number of correct responses during baseline and intervention conditions across the three sets of behaviors. Across the five sessions of baseline, Caitlyn demonstrated zero vocabulary steps independently; a median of 1 engagement steps independently ($M = .28$); and a median of .5 comprehension steps independently ($M = .16$). For the vocabulary steps, Caitlyn remained at zero correct responses for the first five sessions before the level of correct responses increased, with a median of 3 vocabulary steps correct after the effect was observed ($M = 2.9$). The initial low level of correct responses can be attributed to her need for repeated exposure to the cue and need for multiple teaching sessions (i.e., with the controlling prompt) before demonstrating the target behaviors. For the engagement tasks, the trend was slower and more variable; these steps (e.g., point to the author) might not have been as motivating for her to complete ($Mdn = 2; M = 2.31$). The comprehension steps reflected a similar slow trend and high variability ($Mdn = 3; M = 2.83$).

Ecological Validity

The field notes revealed that the timing of the intervention within the classroom routines was different each day. Throughout the study, the interventionists worked within the class schedule and activities to find opportunities to provide the intervention. At times, the intervention overlapped with another, more engaging class activity such as a video. For example, the interventionists noted that “[Caitlyn’s] attention needed to be redirected often” (Field note, 4/7/15) when such activities were occurring. As the study progressed, the interventionists shifted their approach; rather than requiring or redirecting Caitlyn to pay attention the book instead of the video, they used videos in class as opportunities for Caitlyn to take breaks from the shared reading activity. Field notes revealed that independent work time and quizzes or other testing were the most common times that the intervention occurred as the study progressed. Thus, the interventionists became more adept at integrating the intervention into class activities over the course of the study, so that (a) the student would not become distracted; and (b) the student would not miss important class content.

Throughout the unit, Caitlyn had opportunities to experience *The Odyssey* in formats other than the adapted text. In addition to the aforementioned film clips, Caitlyn’s peers sometimes read with her during independent reading time. Her peers took an interest in learning the signs for the key vocabulary words, so Caitlyn had multiple exposures to natural communication partners signing the key vocabulary words beyond the intervention and within the classroom environment. These activities seemed to benefit the peers as well as Caitlyn. *The Odyssey* is difficult
for many ninth-graders to read and understand; after reading with Caitlyn one day a student exclaimed, “Oh that’s what happened!” Caitlyn also read a graphic novel of *The Odyssey* during independent reading times, and heard audio versions of the text through classroom activities as well. Caitlyn therefore had exposure to the content of *The Odyssey* in a variety of ways throughout the unit.

**Discussion**

The current study provides preliminary evidence that shared reading, combined with
embedded instruction and constant time delay, can be effective for improving literacy skills among students with significant disabilities in general education classes. These three evidence-based strategies (i.e., shared reading, embedded instruction, and time delay) were combined to create a treatment package. The effects of this package were systematically examined with one student with multiple disabilities in a ninth-grade general education ELA class. Results of the study suggest that the shared reading intervention has potential for integration into high school general education ELA classes using embedded instruction and time delay.

Several key contextual factors might have contributed to Caitlyn’s success with acquiring the targeted literacy skills. First, the teaching style of the two teachers in the ELA class was highly dynamic, incorporating the flexibility and multiple modalities that are central to a universal design for learning (UDL) approach. Caitlyn had opportunities to use the vocabulary with peers and experienced the content of the book in video, audio, and interactive spoken formats. Caitlyn had a special education teacher and student teacher to implement the intervention; in addition, many peers were interested in the procedures and enjoyed reading along with Caitlyn at non-intervention times. Integrating the intervention into the classroom routine proved difficult at times, and Caitlyn’s slow progress led her to fall behind the rest of the class by the end of the study. Thus, the intervention has potential for increasing students’ membership in the literate community of the classroom as well as enhancing literacy engagement, vocabulary, and listening comprehension skills, but challenges were faced in relation to the timing of the intervention within class activities.

The data trend and variability were inconsistent across the three intervention conditions. Comprehension, in particular, was marked by slow and variable progress. By the time Caitlyn reached the comprehension condition, her classmates had moved on to a different book. Caitlyn might have noticed that her activity was no longer reflective of the class’ activities, and might have felt less motivated and more distracted during this phase of the study. Fatigue or boredom could also explain her slow progress during this phase. Moreover, the story of *The Odyssey* is not linear and the events were difficult for most students in the class to follow. These factors might explain her slow progress toward the comprehension goal.

This study adds to the evidence base supporting the use of shared reading, embedded instruction, and time delay to advance vocabulary, engagement, and listening comprehension skills among students with significant disabilities (Hudson & Browder, 2014; Hudson & Test, 2011). As no previous studies have been conducted in high school general education settings, it was important to explore the ecological validity of the intervention in this context given that students are more likely to have access to general education content in general education settings, especially in relationship to literacy (Wehmeyer et al., 2003; Ruppar, Fisher, Olson, & Orlando, manuscript submitted for publication). Moreover, this study was the first to specifically explore the ecological validity of shared reading in a general education class. Ecological validity is defined as the extent to which an effect has been demonstrated to occur under conditions that are typical (Crano, Brewer, & Lac, 2015). Insofar as “typical” settings are age-appropriate general education classrooms with same-age peers, the results of this study suggest that the causal relation between the shared reading intervention and improved literacy outcomes can be observed in natural general education classroom contexts.

**Limitations and Implications for Research**

The limitations of this study suggest needs for future research in this area. The primary limitation of the present study was the limited number of participants. Nationally, few students with significant disabilities are included in general education classes, and the number of students included in high school classes is even smaller than in younger grades (Kurth & Mastergeorge, 2010; Kurth et al., 2014). The lack of potential participants who are already included in general education classes makes identifying sufficient participants difficult. Thus, few academic interventions for students with significant disabilities have been tested in general education settings, leading to a paucity validated practices for use in general ed-
ucation settings. This cycle perpetuates the low rates of inclusion in general education classes for students with significant disabilities because teachers have few research-based resources to draw on for interventions in inclusive settings.

An additional limitation of this and other shared reading studies is a lack of attention to generalization of literacy or language skills to other natural contexts. While many other shared reading studies have examined and observed generalization effects across materials, no study has examined generalization across environments. Grade-aligned academic skills are important to address because they ensure students with significant disabilities are held to high standards and are able to participate meaningfully in age-appropriate activities. However, literacy skills should also be chosen to address high-priority communication goals, as one of the primary benefits of teaching literacy is that it relates to the everyday use of language. A generalization component was not incorporated into the current study because we could only recruit one participant who was enrolled in a general education class, and time constraints limited us to one adapted text. To enhance generalization, skills should be selected using an ecological approach to ensure that sufficient opportunities for skill application are available in multiple, everyday, personally relevant environments (Hunt, McDonnell, & Crockett, 2012; Trela & Jimenez, 2013). Future research should examine ways to incorporate more natural uses of language into the shared reading intervention. Similarly, we did not collect maintenance data because the school year ended. Future studies should include a maintenance component.

To support the learning of students with significant disabilities in general education classes, additional studies should be conducted which focus on the efficacy of academic interventions for this population in general education settings. Teachers consistently report that they lack knowledge about evidence-based academic interventions that can be integrated into general education classrooms (Agran, Alper, & Wehmeyer, 2002; Ruppar, Dymond, & Gaffney, 2011). Future research should maintain a focus on validating interventions that support skill acquisition, increase participation, and enhance membership in school communities among students with significant disabilities (Billingsley, Gallucci, Peck, Schwartz, & Staub, 1996). Building on the findings of this study, research should be designed in ways that respond directly to the classroom context.

Finally, the evidence suggests that a more comprehensive planning process might be needed for shared reading to be successfully integrated into high school general education ELA classes. The teachers involved in the current study were highly motivated to implement the intervention; nevertheless, they faced logistical issues that other teachers and educational teams might be seen as barriers. A research-based planning process is needed that clearly identifies how the target student will participate in class activities, be supported by teachers and peers, and increase literacy skills, so that barriers to implementation are minimized. Further, the field notes collected were brief. Future research should report rich qualitative data, including field notes, interviews, and document review, and data should be analyzed using formal methods to further examine the facilitators and barriers to implementing shared reading in general education contexts.

**Conclusion**

While federal legislation has required evidence-based practices for students with disabilities for nearly 15 years, and instruction in the least restrictive environment has been required for nearly 40 years, the process of combining these two legal mandates in practice has been difficult for many teachers. One contributing factor has been the lack of ecologically valid research to guide teachers in general education contexts. The current study provides preliminary evidence that shared reading, combined with embedded instruction and constant time delay, can be an effective strategy for supporting involvement and progress in the general curriculum for students with significant disabilities. However, much more needs to be done. Research has consistently supported that students with significant disabilities can learn academic skills. To continue to promote lifelong inclusion and meaningful educational experiences for
students with significant disabilities, intervention research focused on general education content must simultaneously focus on practical applications of evidence-based practices within general education contexts.

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