Early grade curriculum-based reading measures for students with intellectual disability

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Abstract
The purpose of this study was to extend previous research on the use of curriculum-based measurement (CBM) for students with intellectual disability by having 19 special education teachers monitor weekly reading progress of 38 students with intellectual disability for approximately 15 weeks and examining whether students exhibited gains on the progress monitoring measures. In addition to the weekly CBM, teachers reported the type and duration of daily reading instruction. Data were analyzed to explore relationships between CBM performance and reading instruction. Our results indicate that teachers are capable of administering and scoring CBM on a weekly basis and that CBM does capture reading growth for some students with intellectual disability. Correlations between CBM performance and a teacher report of skills taught during reading instruction indicate that teachers may be differentiating instruction based on students’ reading ability. Directions for future research as well as limitations of the study are discussed.

Keywords
curriculum-based measurement (CBM), intellectual disability, reading

Learning to read is an important life skill that is essential for academic advancement and community engagement (Erickson, 2005). Children develop precursory skills for learning to read (i.e. oral language and listening comprehension) during early childhood. Formal education, beginning with preschool or kindergarten, builds upon these foundations by teaching students to understand the system by which spoken sounds are represented in printed form. Historically, students with intellectual disability have struggled to acquire reading skills—some never learning to read (Chall

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et al., 1991). That being said, it is unclear how much a lack of appropriate literacy instruction has contributed to the poor reading outcomes of students with intellectual disability. Intellectual disability, synonymous with the classification title of moderate learning difficulties used in the United Kingdom, is defined by limitations in intellectual functioning (e.g. intelligence quotient scores 2 SDs or more below the mean) and adaptive behavior (IDEA, 2004).

The finite amount of research conducted on teaching children with intellectual disability to read further complicates our understanding of what may be possible (Finnegan, 2012; Roach and Elliott, 2006). Although the field has substantially increased both the depth and breadth of knowledge regarding effective ways to teach a majority of children how to read during the last 30 years (see National Reading Panel, 2002; Snow et al., 1998), our understanding of how to best address the needs of children with intellectual disability is still relatively limited. There are two primary reasons for this. First, there has been a societal assumption that individuals with intellectual disability are incapable of learning to read and would be better served learning functional skills (e.g. vocational and grooming) (Dolch and Bloomster, 1937). Second, the research used to establish evidence-based reading instruction predominately has excluded participants with intellectual disability (Conners et al., 2001).

When the National Reading Panel published its report in 2000, few studies had explored phonics-based reading instruction for children with intellectual disability (Katims, 2000). In 2004, Joseph and Seery conducted a systematic review and were able to identify only seven studies in which researchers examined the use of phonetic analysis strategies and/or phonics instruction with students with intellectual disability. No study examined the effectiveness of direct, explicit phonics instruction; however, findings demonstrated that students with intellectual disability have the potential to benefit from this type of instruction.

More recently, researchers have explored the efficacy of comprehensive phonics-based reading interventions for students with intellectual disability (Allor et al., 2010a, 2010b). For example, Allor et al. (2010b) targeted concepts of print, phonological and phonemic awareness, oral language, letter knowledge, word recognition, vocabulary, fluency, and comprehension. A sample consisting of 59 students with intellectual disability was randomly assigned (treatment, n = 34; control, n = 25), with the treatment group receiving 40–50 min of daily intervention for the duration of the study. Authors reported statistically significant progress for the treatment group across an array of standardized measures (e.g. phonemic awareness, oral language and vocabulary, phonemic decoding, word identification, and reading comprehension) compared to the students in the control group. The effect sizes ranged from 0.04 for passage comprehension (lowest) to 0.66 for phonemic awareness. Based on the results, the authors concluded that phonics instruction appears to be promising for many students with intellectual disability, although there is variation in response to intervention (RTI), and many students need a substantial amount of intervention (e.g. three academic years) to make meaningful gains. Additional research is needed to provide guidance for teachers so they can appropriately individualize reading interventions for their students with intellectual disability.

Curriculum-based measurement

Curriculum-based measurement (CBM) is one tool that may be useful for teachers to use as they tailor reading interventions for their students with intellectual disability. Deno and colleagues (Deno, 1985) developed CBM to provide classroom teachers “a simple way to routinely monitor student achievement in the curriculum (p. 221). CBM has been demonstrated to be technically
adequate, efficient, and feasible to integrate into teachers’ practice. Additionally, researchers have demonstrated that teachers who use CBM data to evaluate and adapt their instruction are more effective compared to teachers who do not (Capizzi and Fuchs, 2005).

Although CBM was initially designed to test a special education intervention model (i.e. data-based program modification) (Deno and Mirkin, 1977), the scope of its use is now much broader. CBM is now used to predict performance on important criteria (including high-stakes assessments), to enhance teacher planning, and to develop local norms (Deno, 2003). Furthermore, with increased implementation of RTI models, particularly in elementary schools, CBM is most often used as a screening measure to identify academically at-risk students and to monitor progress of students who are identified as needing increasingly intense academic interventions (Fuchs, 2004). However, similar to the empirical support for evidence-based reading intervention, few studies exploring the use of CBM have focused on students with intellectual disability.

Tindal et al. (2003) used a modified CBM to measure math and reading for 362 kindergarten through high school students who were exempt from general state assessments. The untimed measures provided data to help monitor student progress as well as supplement large-scale assessment. Results indicated the modified measures had potential to help inform teachers by providing reliable student reading data. Wallace et al. (2008) designed and examined the technical characteristics of general outcome measures (GOMs) in reading for students with intellectual disability aligned to the alternate assessment. More specifically, the authors examined the reliability, validity, and sensitivity to growth of the GOMs for students with intellectual disability. Results indicated high reliability and moderate to high concurrent validity. The authors concluded that using GOMs might be an effective way of measuring the performance and growth of reading for students with cognitive disabilities.

Lemons et al. (2013) examined the relationship between early grade CBM performance on a statewide alternate assessment for 7440 students with intellectual disability. Prior to the study, the authors had concerns about determining the appropriate CBM and corresponding grade level for students who were performing well below their current grade level. The authors addressed this concern in a novel way by establishing predetermined benchmark scores at each grade level (i.e. scores at the 50th percentile of the norm sample for the measures used). Students began the assessment with the lowest grade level measure. They were assessed on higher grade level measures only if their performance was at or above the benchmark score of the lower grade level measures. The authors indicated that this leveled system of early reading CBM might increase teacher’s abilities to monitor progress of students with intellectual disability.

Using a leveled version of CBM with students with intellectual disability has potential to provide classroom teachers with quick, accurate data that can be used in the development of students’ educational goals. Additionally, it could serve as an ongoing progress-monitoring tool that would allow teachers to modify instruction for students with poor response.

**Purpose**

The primary goals of this study were to extend the work of Lemons et al. (2013) by training special education teachers of students with intellectual disability to implement the leveled system of CBM in their classrooms. The research questions that guided this study were:

1. Can special education teachers monitor progress of students with intellectual disability using a leveled system of early grade reading CBM with sufficient reliability?
2. Does progress monitoring capture growth for students with intellectual disability?
3. What reading skills do teachers report teaching to students with intellectual disability?
4. Are there relationships between CBM performance and reading instruction?

**Methods**

**Participants**

The sample included 19 special education teachers (16 females) and 38 students with intellectual disability (15 females). Students ranged in age from 9 to 15 years ($M = 12.24$, $SD = 1.65$). All but one student received reading instruction provided one-on-one or in small group in a self-contained special education classroom. Participants were located at 19 schools (18 public and 1 charter; 8 elementary and 11 middle school) located in a northern state. Schools included a distribution of urban ($n = 2$), suburban ($n = 10$), and rural ($n = 7$) locales.

**Measures**

*Curriculum-based measurement.* Teachers conducted weekly assessments of their students using a system of early grade reading CBM (easyCBM) (Alonzo and Tindal, 2010). Measures included word reading (grades K–3) and passage reading (grades 1–5) fluency. Alternate forms reliabilities are between 0.87 and 0.97 and test–retest reliabilities are between 0.91 and 0.97 (Alonzo and Tindal, 2010). Following standard administration procedures, students read for 60 s. Teachers counted skipped and incorrectly read words as errors and provided the correct word as a prompt for hesitations of 3 s. Teachers recorded the total number of words attempted and the total number of errors. A standard score adjustment (i.e. total words/actual seconds $\times 60$) was applied if a student completed a measure in less than 60 s.

Following procedures used by Lemons et al. (2013), teachers monitored progress for word and passage reading at each student’s instructional level on time per week for between 11 and 15 weeks. Teachers determined instructional level by comparing student performance on each measure to a benchmark score that corresponded to the 50th percentile in easyCBM normative data (easyCBM, 2010). To select the measures on which students would be progress monitored, all students read words from the lower level grade level form for each measure (i.e. kindergarten word reading fluency and 1st grade passage reading fluency). If a student’s score was at or above the benchmark for that measure (i.e. 50th percentile), the teacher administered the next higher grade level measure. This procedure was repeated until the student either did not achieve the 50th percentile benchmark or the student had been placed in the highest level of the measure used in this study (i.e. 3rd grade word reading and 5th grade text reading). In subsequent progress monitoring, teachers used the same grade level measures until a student’s score exceeded the 50th percentile score on a measure. At this point, the teacher would begin monitoring progress on the next higher grade level form (e.g. if a child obtained benchmark on the kindergarten word reading measure, the teacher would begin progress monitoring using the 1st grade word reading measure).

*MyiLOGS.* Teachers reported on the daily reading instruction they provided to participating students via MyiLOGS (www.myilog.com; Kurz et al., 2009; see Kurz, 2011 for additional information). The online teacher tool is designed to assist with planning and delivery of instruction at both the class and student levels. For the purposes of this study, we used a limited set of the tools available.
features. Namely, we focused on having teachers report the content of reading instruction delivered to participating students and to indicate the number of minutes spent per day on this instruction. We used the instructional categories (i.e. dimensions A and B) from the Instructional Content Emphasis–Revised instrument (ICE-R) (Edmonds and Briggs, 2003) as the key reading skills on which teachers would report. Teachers also were able to add custom skills (e.g. individualized education plan (IEP) goals) to report on reading instruction if the ICE-R dimensions did not cover instructed content.

MyiLOGS is formatted to look like a monthly calendar with content standards present in a column to the left of the calendar grid. Teachers use the tool by clicking on a content item (e.g. “fluency–partner reading”) and dragging it to the correct calendar date. The system then prompts the teacher to assign the number of minutes he/she spent instructing that skill during the specific date. Teachers may also report on time not available for instruction (e.g. announcements) and student absences. Teachers were asked to report on instruction for all minutes of their typical reading instruction for the participating students for the duration of the study. Teachers were provided the option to use other features of MyiLOGS (e.g. cognitive process dimensions) at their discretion, and these data were not included in this analysis.

The first author conducted one observation (n = 19) of each teacher’s reading instruction provided to participating students. Descriptive notes detailing the reading skills being taught (e.g. comprehension, fluency etc.) were recorded. The duration of the reading lessons ranged between 15 and 80 min (M = 37.8, SD = 16.8). Notes generated from each teacher observation were compared with the respective teacher’s MyiLOGS entry for the corresponding day. The overall purpose of teacher observations was to ensure that teachers demonstrated the ability to use the MyiLOGS tool satisfactorily.

Survey. At the conclusion of the study, all teachers completed an online survey. The survey was collected anonymously and consisted of 21 multiple-choice and/or short-answer questions. The first set of questions related to basic demographic information (e.g. grade level taught and years of teaching experience). The second set of questions asked participants about their current knowledge and use of technology within the classroom. The third section of questions primarily focused on the administration of CBM and data entry into MyiLOGS. Participants were asked what they liked most and least about administering CBM and using MyiLOGS. The goal of the survey was to gain a greater understanding of the teacher participants’ experience throughout the study.

Procedures

Institutional review board approval was obtained and administrators of the state’s alternate assessments on alternate achievement standards e-mailed a recruitment flyer to a random sample of teachers who were likely to teach eligible students. To be eligible for the study, students were required to (a) be identified as a student with intellectual disability as their primary disability category, (b) be in a grade between four and eight, and (c) be a native speaker of English. Teachers were asked to review the flyer, contact the first author with questions, and then distribute the flyer to the parents of any eligible students. Parents were asked to contact the first author with questions. Informed consent forms were collected from teachers and parents once both had agreed to participate. No teacher had more than two participating students.

Teachers were trained on study procedures at one of two training sessions conducted by the authors in the middle of the academic year. Training lasted for 6 h and provided hands-on training
for all elements of the study. Teachers learned the purpose of the study, how to administer and score CBM (including how to digitally record their assessment with a project provided tablet), how to complete MyiLOGS, and how to submit data and videos to the first author. All participants demonstrated competency on study elements by modeling the tasks for one of the authors and scoring in an acceptable range on a fidelity of implementation checklist.

After training, teachers began administering weekly CBM to their participating students as described in ‘Measures’ section. Teachers sent CBM data and digital recordings to the first author via a secure Internet server. Teachers also reported on their reading instruction via MyiLOGS daily. The first author monitored performance of teachers weekly and double scored all CBM from video. Teachers were provided corrective feedback for any administration or scoring errors on CBM and were prompted to complete MyiLOGS and turn in digital recordings and CBM data if needed.

Results

The primary purpose of this study was to extend the research focusing on the use of CBM with students with intellectual disability by examining CBM use in the classroom on a weekly basis. To meet this aim, teachers were first trained on CBM and instructed to assess their students and record each session once a week. Next, data were analyzed to see whether CBM captured student reading growth over a limited amount of time (i.e. 11 to 15 weeks). Third, teachers were provided the online self-reporting tool (i.e. MyiLOGS) to document daily reading instruction. Last, possible relationships between the amount and type of reading instruction being provided and CBM scores were examined.

Can special education teachers monitor progress of students with intellectual disability using a leveled system of early grade reading CBM with sufficient reliability?

All participating teachers were able to successfully administer CBM measures of word and passage reading fluency to the participating students with intellectual disability. Teachers collected weekly CBM scores for an average of 13.2 weeks (11–15) and were able to successfully submit scores and video recordings of assessment sessions. We evaluated interobserver agreement (IOA) by scoring 100% of the submitted assessment scores (n = 956) from video. IOA was calculated as the total number of correctly scored items divided by the total number of administered items. We obtained an IOA of 99.3%, with 89.7% of assessments receiving a perfect score. Of the 99 assessments with a scoring discrepancy, only 7 were discrepant more than one point. These data support the conclusion that teachers surpassed the sufficient benchmark regarding the ability to accurately and reliably administer CBM to their students.

Does progress monitoring capture growth for students with intellectual disability?

To answer this question, we conducted two analyses. Prior to running the analyses, derived scores were created to allow data for all students (who were assessed at different levels of early grade CBM and some who were assessed at more than one level) to be included in a common analysis. We hypothesized that a word correct on a higher grade measure was worth a greater point value than a word from a lower grade passage. Thus, for word fluency, a student’s total words correct score was generated by multiplying the raw score by an increment of 1 for each grade level beyond the lowest level of the measure (i.e. K word reading).
For example, we multiplied a student’s raw score on a first grade word list by 2 (e.g., 5 words correct = 5 × 2 = 10 total words correct); we multiplied a second grade word list raw score by 3 (e.g., 5 words correct = 5 × 3 = 15 total words correct). A similar procedure was used to generate total passage correct for passage reading fluency. Thus, we generated the scores on the derived variables by multiplying the raw score on word reading fluency by 1, 2, 3, and 4 for K, first, second, and third grade, respectively, and passage reading fluency by 1, 2, 3, 4, and 5 for first, second, third, fourth, and fifth grades.

Next, we conducted a mixed-effects multiple level regression analysis for the derived variables (total words correct and total passage correct). The analyses allowed us to estimate the average intercept and weekly slope for the sample controlling for nesting of time within student. The following commands were used:

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\text{xtmixed Total_Words_Correct Week || Student_ID_Number:, mle var}
\]

\[
\text{xtmixed Total_Passage_Correct Week || Student_ID_Number:, mle var}
\]

using Stata for Macintosh version 12.1 (StataCorp, 2011). Results are displayed in Table 1. On average, students were making an increase of 1.8 points (p < 0.001) per week on total words correct and 1.78 points (p < 0.001) per week on total passage correct. However, the models indicated that there was statistically significant variance in intercept and slope within the sample.

To further examine individual responsiveness, we ran a simple regression of week onto the derived variables (total words correct and total passage correct) for each student. These analyses allowed us to examine how many students had a slope that was positive and reliably different than zero. Our intent with this examination was to determine how many participants demonstrated a minimal level of response (i.e., a detectable increase in score) over the 15 weeks of our study.

As can be seen in Figure 1, five students were deemed responsive on total words correct; 10 on total passage correct (see Figure 2). Students who were placed into a higher grade level measure based on performance are indicated with a diamond. A total of nine students moved up a grade level on the word reading measure and four students moved up on the passage reading measure. Five students on the word correct measure are responders but only two of the five students changed levels. The passage correct measure has double the number of responders (n = 10) and 3 of the 10 responders moved up a grade level. Conversely, 4 of the 33 nonresponders moved up a grade level on the word correct measure and only 1 of the 28 nonresponders on the passage reading measure moved up a grade level.

### Table 1. Total words correct and total passage correct.

<table>
<thead>
<tr>
<th></th>
<th>Early reading skills</th>
<th>Late reading skills</th>
<th>Total word correct slope</th>
<th>Total word correct intercept</th>
<th>Total passage correct slope</th>
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<tr>
<td>Early reading skill</td>
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<tr>
<td>Late reading skills</td>
<td>−0.78</td>
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<td>Total word correct slope</td>
<td>−0.06</td>
<td>0.07</td>
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<tr>
<td>Total word correct intercept</td>
<td>−0.53(^a)</td>
<td>0.43</td>
<td>0.23</td>
<td></td>
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<td></td>
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<tr>
<td>Total passage correct slope</td>
<td>−0.11</td>
<td>0.12</td>
<td>−0.13</td>
<td>0.29</td>
<td></td>
<td></td>
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<tr>
<td>Total passage correct intercept</td>
<td>−0.47</td>
<td>0.50(^a)</td>
<td>0.25</td>
<td>0.70</td>
<td>0.07</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)Statistically significant.
What reading skills do teachers report teaching to students with intellectual disability?

Teachers were required to document daily reading instruction and the corresponding number of minutes for each student participant using a self-report measure (i.e. MyiLOGS). Reading skills were listed in 10 broad categories of reading skills (see Table 2) taken from the ICE-R. Under each broad category, a list of corresponding subcategories were provided to serve as further guidance for teachers to assist them in correctly identifying the reading skills taught daily. For example, if a teacher read a short story to the class and asked students to identify the main ideas, the primary category would be comprehension and the subcategory would be reading comprehension monitoring.

Using Stata, descriptive statistics were generated on the list of ICE-R broad reading categories to determine the skills used most by teachers (see Table 2). Three of the 10 broad reading skills (writing/language arts, text reading, and comprehension) were taught by all of the reporting teachers in the study. Text reading was the skill taught the longest on average by the teachers ($M = 20.22$, $SD = 9.4$) with a range of 2.53–38.34 min. Comprehension had the second longest reported minutes ($M = 19.03$, $SD = 9.8$). Minutes ranged from 3.1 min a week to 48.07 min a week. Concepts of print ($M = 0.40$, $SD = 0.86$) was the reading skill reported to be taught the least with alphabet knowledge ($M = 0.83$, $SD = 1.48$) being taught slightly more. In addition to the broad reading categories, a custom skill ($M = 3.5$, $SD = 5.9$) category was added to the self-report menu. The customized skill option applied to IEP reading goals different from the existing broad reading categories. Overall, the average teacher-reported reading instruction averaged 52 min a day. However, the range of average minutes varied greatly with a minimum of 16 min and a maximum of 107 min.
Are there relationships between CBM performance and reading instruction?

Correlations were estimated to see whether relationships between CBM performance and teacher-reported reading instruction were evident. There was a statistically significant negative relationship between performance on the word reading fluency CBM (i.e. total words correct intercept)
and early reading skills \( (r = -0.53; \text{see Table 1}) \). This indicates that teachers spent less time on early or foundational reading skills for students with higher word correct scores. Another statistically significant relationship was found between performance on the passage reading fluency CBM (i.e. total passage correct intercept; \( r = 0.50 \)) and late reading skills—an indication that teachers spent more time on late reading skills for students with higher passage scores. Overall, the results indicate that teachers may be designing reading instruction based on student reading ability but the limited sample size should be noted.

**Survey results**

The online survey containing 21 questions had a 100% response rate from the teacher participants. The first grouping of questions involved basic demographic inquiries and depth of reading knowledge possessed by the teacher participants. All teachers had at least 4 years of special education teaching experience with 47.1\% \( (n = 8) \) reporting to have had between 4 and 9 years experience. Five teachers (29.4\%) had between 10 and 20 years experience and 23.5\% \( (n = 4) \) had over 21 years of special education teaching experience. The percentage of teachers reporting to have taken at least three or more postsecondary reading instruction courses is 70\% \( (n = 12) \). Only one teacher reported not taking any postsecondary reading courses. Nine teachers reported receiving greater than 10 h of professional development (PD) focusing on reading instruction within their schools. Four teachers reported receiving between 6 and 10 h of PD reading instruction and 6 reported receiving between 1 and 5 h of PD.

The second group of questions was related to various aspects of technology use within the classroom. The integration of technology into classroom instruction consisted of personal computers (77.8\%), whiteboards (55.6\%), and various augmentative devices (61\%). Half of the teachers reported being proficient or expert regarding technology use and the other half reported being average or novice. The final group of questions revealed various teacher opinions about CBM and MyiLOGS. Half of the teachers responded that they plan on continuing to use CBM with their students and 100\% agreed that they were properly trained on how to use and administer both CBM and MyiLOGS. However, teachers experienced difficulty with technological issues such as sending videos and entering MyiLOGS data.

**Discussion**

An increasing number of researchers have conducted studies with a focus on reading interventions for students with intellectual disability over the last several years. However, few have examined the relationship between daily reading instruction content provided by classroom teachers and early grade measures of reading growth. The purpose of this study was to extend the research of Lemons and colleagues (2013) by training 19 special education teachers of students with intellectual disability to implement a leveled system of early grade reading CBM and to report the duration and type of reading instruction each provided daily. Our aims were to evaluate student response on reading CBM over the duration of the study and examine relationships between CBM performance and teacher-reported reading instruction. To meet these goals, teachers administered two types of early reading CBM (i.e. grade K–3 word reading fluency and grade 1–5 passage reading fluency) to 38 students with intellectual disability attending schools across one northern state. We conducted data analyses to assess accuracy and reliability of CBM administration and examined relationships between reading instruction and CBM. Additionally, we conducted fidelity observations to verify daily reading instruction data entered by teachers into MyiLOGS.
**Curriculum-based measurement**

Although several researchers (Lemons et al., 2013; Tindal et al., 2003; Wallace et al., 2008) have explored variations of CBM and its use with this population of students, none have examined the use of a leveled system of early grade reading CBM used by teachers of students with intellectual disability. We believe this line of inquiry to be valuable because teachers of students with intellectual disability are now expected to increase the academic skills of their students due to the expansion of accountability systems (i.e. No Child Left Behind Act of 2002). Also teachers who progress monitor through data collection are better decision makers than teachers who do not (Fuchs and Fuchs, 1986; Fuchs et al., 1989) and teachers who use CBM tend to be more responsive to students’ individual learning needs and set appropriate academic goals (Fuchs et al., 2007). Thus the overwhelming ability of our teachers to correctly and reliably administer CBM over 15 weeks is encouraging.

Student response to CBM was modest with 13 students moving up a grade level on either the word reading or passage reading measures. We believe there are two explanations for the relatively small number of responders. First, similar to the findings reported by Lemons and colleagues (2013), we too wondered whether different measures would have been appropriate for some of our participants. For instance, several students remained on their initial CBM grade level for the duration of the study. However, if they had access to appropriate lower level CBM (e.g. letter sound fluency or letter identification) more participants might have demonstrated reading growth.

Second, a study of longer duration may have provided students with the additional time necessary to demonstrate progress. For example, Allor and colleagues (2010b) reported student reading progress but only after 3 years of intensive instruction. This may explain why after 13–15 weeks less than half of the students in our study demonstrated a positive slope. In other words, student exposure to intervention may not have been sufficient to capture student learning.

**Relationships**

Our analysis of the CBM scores revealed correlations between reading progress and teacher-reported reading instruction. Although data indicate teachers identified specific student reading deficits and provided reading instruction accordingly, there is evidence that some of our teachers could benefit from additional support and training. For example, a portion of the teachers acknowledged not ever engaging in ongoing progress monitoring prior to the study and simply relied on a “trial and error” method to identify students’ reading deficits. Additional research is needed to determine whether teachers are able to sustain the use of CBM and to examine the types and levels of support necessary to ensure appropriate use.

**Observations**

The opportunity to observe our teachers provided valuable insight regarding the content and delivery of daily reading instruction. Teachers demonstrated innovative ways of engaging students in learning. Some teachers used technology (i.e. whiteboards and tablets) to enhance reading assignments whereas others incorporated games and other hands-on activities to supplement various reading skills. The integration of technology into reading lessons by a number of our teachers is encouraging because technology can help alleviate barriers that prevent students with disabilities from participating in activities alongside peers without disabilities (National Association for the Education of Young Children, 2012). The level of commitment and professionalism
demonstrated by each teacher was evident during our observation but we also noted concerns about certain facets of lessons and classrooms.

The absence of designated reading curricula across classrooms was concerning. A majority of teachers relied on reading content pulled from multiple sources to supplement daily instruction (e.g. multigrade level workbooks, worksheets, and software). This may be understandable due to the variation of reading ability in the sample. The fact that few teachers used an evidence-based, systematic reading curriculum highlights the need for additional guidance on how to adapt extant programs for learners with intellectual disabilities.

Although we were able to document some relationship between student performance on CBM and the type of instruction teachers reported providing, our observations did indicate that some teachers appeared to have a limited understanding of effective reading practices. A few teachers inaccurately categorized their reading activities (e.g. reporting an activity focused on decoding as a comprehension activity) on their self-report. Additionally, it is interesting that teachers reported focusing on comprehension and language arts so frequently for a group of learners whose reading performance was at an early elementary level. This may reflect a limited understanding of reading development and effective instructional practices for students who are still learning to make connections between letters and sounds. Limited knowledge of effective reading instruction may be related to teacher preparation. Teachers of students with intellectual disability typically have experienced teacher preparation programs that are broad in scope and unable to provide in-depth training on specific content areas (Brownell et al., 2009).

**Limitations**

A few limitations in our study are worth noting. First, the brief duration of data collection may have limited our ability to document statistically significant slopes on our measures. Second, we conducted only one fidelity observation for the teacher self-report of reading instruction observation due to limited personnel resources and the disperse locales of the respective schools. Additional observations would have enhanced our understanding of teachers’ abilities to accurately report on their instruction and would have provided additional information regarding teachers’ knowledge of evidence-based reading practices.

**Implications for future research**

Based on our results, we believe there are two directions for future research. First, future research should focus on how teachers use CBM data to inform or modify their daily reading instruction. In our study, teachers were trained to administer a progress monitoring tool but were not taught how to analyze and use the CBM data to guide reading instruction. Second, future research should explore teachers’ ability to accurately self-report on their reading instruction. Related to this, additional work is needed to document the level of knowledge of evidence-based reading instruction held by teachers of students with intellectual disabilities and to explore effective methods of PD to ensure that teachers are able to provide high-quality reading instruction to this population of learners.

**Implication for practice**

Although our findings are based on a small number of students whose progress was monitored over a brief duration of time, we believe our findings have demonstrated that teachers of students with intellectual disability can accurately administer early grade CBM to monitor progress. Teachers...
may consider using CBMs focused on early reading skills (e.g. letter sound fluency and phonological awareness) for students who are not yet reading words or text. Our findings also indicate that teachers of students with intellectual disability may need to pursue additional PD opportunities to enhance their understanding of effective reading instruction. With additional training, teachers are more likely to help students obtain successful reading outcomes (Borko et al., 2010; Cohen and Hill, 2001; Desimone, 2009). Due to the complex needs of students with intellectual disability, practitioners may want to consider arranging ongoing, collaborative PD seminars instead of traditional, single-day workshops. Ongoing PD would allow for a deeper understanding of how to make adaptations and individualize instruction for nonresponsive students.

Conclusion

Researchers continue to explore effective practices to enhance reading outcomes for students with intellectual disability. Phonics-based approaches to instruction and teachers’ use of CBM to monitor progress appear to hold promise for at least some students with intellectual disability. As our expectations continue to increase for this group of learners and as they are being education alongside nondisabled peers in general education settings (McLeskey et al., 2012), it is imperative that additional work be conducted to provide practitioners with effective interventions and a better understanding of the how to assist students with intellectual disability in becoming proficient readers.

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