Using Progress-Monitoring Data to Improve Instructional Decision Making

Pamela M. Stecker, Erica S. Lembke, and Anne Foegen

ABSTRACT: In this article, the authors describe the use of curriculum-based measurement as a research-validated practice for monitoring student academic achievement and ultimately for improving students' educational outcomes. The authors describe oral-reading fluency and maze fluency as assessment tools for monitoring student progress, evaluating instructional effectiveness, and aiding teachers with instructional planning. They provide a brief hypothetical case study of 1 elementary-aged student with a learning disability in reading to illustrate the use of progress-monitoring practices for enhancing instructional decision making and promoting academic achievement.

KEYWORDS: *curriculum-based measurement, evidence-based practices, formative assessment, progress monitoring, reading*

RECENT REFORMS IN EDUCATION have emphasized the importance of setting high standards for all learners and increasing the level of accountability expected of education professionals in meeting these high standards for student achievement. In the area of reading, both (a) the expectations set forth in the No Child Left Behind Act (NCLB; 2001) and (b) the investment that the federal government made in addressing reading practices evidence priorities that have been established to improve the reading performance of all students, regardless of their ethnic background, language, or disability status. Setting high standards is the first step in a process that must also include teachers' use of curricular materials and instructional strategies that lead to increased achievement levels in reading. In this article, we propose that a critical component necessary for bringing these goals to fruition is a technically sound assessment system that assists teachers in determining whether the instruction that they are providing is effective.

Educational Accountability and Importance of Progress Monitoring

Assessment is a vital element in any educational system. States use assessment data to evaluate the effectiveness of their educational systems, school districts use assessment data to monitor the success of their instructional programs, and classroom teachers use assessment data to determine students' strengths and weaknesses in particular areas of the curriculum. However, if teachers must produce high levels of achievement among all students, they also need assessment tools that will guide their instructional decision making. With student progress monitoring, data alert teachers when particular students are not progressing at acceptable rates. For example, as schools establish practices within a responsiveness-to-intervention (RTI) model, teachers use progress-monitoring data to target students who are not performing satisfactorily and to track their academic growth during various research-based instructional interventions (e.g., L. S. Fuchs & Fuchs, 2007). In addition to schools' use of RTI to eliminate lack of scientifically based instruction as a potential cause for children's persistent academic difficulties and to determine the presence of specific learning disabilities, many schools are moving toward large-scale implementation of RTI practices with periodic screening of all students in general education and more frequent progress monitoring for targeted learners. Moreover, as schools increase access to the general education curriculum and expect students with disabilities to perform

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satisfactorily in general education settings, progress monitoring becomes increasingly important as an assessment method that all teachers use readily. Because of this extensive role for progress monitoring in today's schools, it is necessary that progress-monitoring tools (a) be sensitive to student change, (b) be educationally meaningful, and (c) do not monopolize instructional time.

One well-established form of progress monitoring that meets these three conditions is *curriculum-based measurement* (CBM; Deno, 1985). Initially developed at the University of Minnesota by Stan Deno and colleagues, CBM uses brief assessments that serve as indicators of overall proficiency in an academic area, such as reading. A large amount of research evidence supports the technical adequacy of CBM in reading (Baker & Good, 1995; Deno, 1985; Deno, Mirkin, & Chiang, 1982; L. S. Fuchs & Deno, 1994; L. S. Fuchs, Fuchs, & Maxwell, 1988; Shinn, Knutson, Collins, Good, & Tilly, 1992). Another benefit of CBM is that it is less susceptible to possible bias associated with gender, race or ethnicity, or disability status than some other types of assessment, because the measures rely on direct assessment of student performance. Moreover, research demonstrates that when teachers use CBM information to monitor student progress and make instructional changes in response to student data, students achieve significantly more than do students whose teachers use their own assessment practices (for a review, see Stecker, Fuchs, & Fuchs, 2005).

To illustrate the use of progress-monitoring data for helping teachers evaluate student growth, in this article we describe a hypothetical case study of an elementary-aged student with a learning disability in reading. We also show how teachers can use the data generated by progress-monitoring procedures to evaluate their instructional effectiveness for particular students. The following description will set the stage for how educators can use CBM procedures to monitor student progress in the context of special education practice, in both special and general education settings. However, we also note that general education classroom teachers can apply similar principles and procedures to monitor the reading progress of any student with or without disabilities.

Hypothetical Case Study

Ellie is a 9-year-old student with a learning disability in reading. She attends a fourth-grade class for language-arts instruction. However, she also attends a special education resource class every day for 50 min of intensive instruction. Although Ellie is bright and learns easily from oral discussion, the demands for independent reading placed on fourth-grade students create great difficulties for her. She has a particularly difficult time understanding informational text such as science and social studies materials. Both Ellie's special education teacher, Mr. Albright, and her classroom teacher, Ms. Ables, recognize that Ellie needs substantial support in accessing the general curriculum and in improving her reading achievement. They also know that they need to use effective assessment practices to monitor Ellie's growth carefully and evaluate the success of her reading instruction.

In this article, we describe how CBM fits within the scope of typical assessment practices in schools. Then we describe a blueprint for implementing CBM. Subsequently, we return to Ellie's case to apply the procedures outlined in the CBM blueprint, including how Ellie's teachers made instructional decisions on the basis of progress-monitoring data. Last, we summarize progress-monitoring practices teachers should follow with fidelity and practices teachers should avoid.

Past and Present Assessment Practices

Traditionally, standardized, norm-referenced achievement tests have provided schools with scores that summarize the overall success of their educational programs. In addition, many classroom teachers rely heavily on assessments that they have created themselves or that curriculum developers have produced to evaluate student performance. More recently, standards-based reform efforts have prompted many schools to administer benchmark assessments at several points during the year to determine whether students are on track toward meeting their district's or state's expectations as demonstrated by student performance on high-stakes, year-end tests. Although each of these assessment approaches has merit, each also encompasses several limitations. For example, most standardized, norm-referenced achievement tests possess adequate technical characteristics and illustrate a student's relative standing with respect to peers, but the tests typically are time consuming, often fail to reflect content actually taught, and consequently may provide little information that is relevant to instructional planning (Jenkins, Deno, & Mirkin, 1979). In contrast, teacher-made tests and curriculum-embedded tools often evaluate the instructional content that was most recently taught, but assessments typically are limited to a small domain of the content area. As a result, a student's performance on these assessments provides the teacher with information about that student's mastery of particular content and skills but fails to provide an indication of the student's overall proficiency in the academic area or of how this level of proficiency is changing over time. In addition, these types of informal measures rarely have documented levels of technical adequacy, so teachers cannot necessarily assume that the scores resulting from these assessments are reliable and valid.

With benchmark assessments, educators have generally categorized student performance as no-risk or at-risk status as a result of comparing the performance to a predetermined

cut score. For example, the Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2003) illustrates one type of benchmark system that has been used frequently in recent history as a part of an effort to document elementary-aged students' relative risk for reading difficulties within a school-wide-assessment approach. Typically, educators have assessed all students three or four times per year, and teachers have compared student scores to benchmarks provided to categorize students' relative risk and make decisions about the need for instructional intervention. Although teachers using DIBELS may more frequently assess students whose scores place them at risk of not meeting the next benchmark, many benchmark assessment systems rely on teachers to make instructional decisions on the basis of student scores that were produced at one moment and to wait for the next benchmark period to evaluate the overall success of their instructional interventions.

One problem with typical benchmark assessments that are given infrequently across the year is that the rate of student progress is difficult to capture between benchmark periods. For example, a student may be targeted as needing intervention because his or her score fell below the cut. However, the benchmark test may not reveal that this student is growing at a rate similar to classroom peers but is just starting at a lower performance level. Consequently, this student's instructional needs are different from those of the student whose score also is low but whose performance changes little over time. Likewise, a high-performing student may be able to meet or even exceed a benchmark score but may not exhibit continued academic growth. A teacher may mistakenly assume that this student is achieving satisfactorily simply because the student attained the established benchmark. Consequently, information about only a level of score is limited without corresponding data about rates of student improvement.

CBM as a research-validated form of progress monitoring appears to be becoming more popular as an assessment practice, even in general education, and information is being shared in a format that is easy to understand for practitioners, during both preservice and inservice teacher education (e.g., Foegen, Espin, Allinder, & Markell, 2001; Hosp & Hosp, 2003; Scott & Weishaar, 2003). CBM offers to teachers several advantages that distinguish it from typical assessment practices. CBM measures are brief, and the brevity allows teachers to assess their students efficiently on a regular basis. CBM scores represent global proficiency in the academic area rather than performance on a limited subset of the content or domain. This characteristic allows teachers to determine whether students are making progress toward a long-term goal rather than determining mastery of a small portion of the curriculum. It is important that these brief, global measures are reliable, in that alternate forms produce consistent scores; and CBM measures are valid, with student scores serving as indicators of overall proficiency in academic subjects (e.g., Christ & Vining, 2006; Deno, 1992, 2003; L. S. Fuchs, Fuchs, Hamlett, & Stecker, 1990; L. S. Fuchs, Fuchs, Hosp, & Jenkins, 2001; Gansle, Noell, VanDerHeyden, Naquin, & Slider, 2002; Gansle, VanDerHeyden, Noell, Resetar, & Williams, 2006). Moreover, CBM reading scores are sensitive to student growth, and they correlate well with and predict student performance on state-mandated, high-stakes assessments (Good, Simmons, & Kame'enui, 2001; McGlinchey & Hixson, 2004; Schulte, Villwock, Whichard, & Stallings, 2001; Stage & Jacobsen, 2001). McGlinchey and Hixson found a significant positive and predictive relation between CBM oral-reading fluency and scores on their state's high-stakes reading assessment for a sample of 1,362 fourth graders over an 8-year period. Such information enables teachers to intervene early with students whose progress is inadequate in an effort to enhance their academic growth, which in turn is likely to result in better scores on high-stakes achievement tests. When measures have sound technical features, teachers can be more confident in justifying their use for decision making. Because CBM measures are comparable (i.e., similar in difficulty level) and administration procedures remain constant, another advantage of using CBM is that scores can be graphed and compared directly to determine a student's rate of improvement in the academic area. Consequently, teachers use CBM data to inform their ongoing instructional decision making, determining at what points instructional changes might be necessary (Gable, Arllen, Evans, & Whinnery, 1997; Hagan-Burke & Jefferson, 2002).

Researchers continue to develop new CBM measures and to investigate additional applications of progress-monitoring procedures. For example, the Research Institute on Progress Monitoring (http://www.progressmonitoring.org) posts new information regarding CBM research on its Web site. Recent extensions of the use of progress-monitoring systems include uses of CBM data (a) with English language learners (Ramirez & Shapiro, 2006) and (b) for screening and progress-monitoring purposes within an RTI framework (D. Fuchs & Fuchs, 2005; Griffiths, VanDerHeyden, Parson, & Burns, 2006).

Given the critical importance of progress monitoring, in the next sections we describe a progress-monitoring blueprint for implementing CBM. In addition, we illustrate how teachers may use CBM data for instructional decision-making purposes.

Blueprint for Progress Monitoring

In this section, we describe an outline for progress-monitoring implementation in reading. However, teachers should note that similar procedures are applicable to other academic areas. First we provide general information about

progress-monitoring procedures. Then we present a blueprint for progress monitoring and describe five critical steps in its implementation: select measurement materials, evaluate technical features, administer and score measures, use data for goal setting, and judge instructional effectiveness.

The purpose of progress monitoring is to represent student growth in the curriculum across the year, perhaps under varying instructional conditions. Consequently, educators assess student performance frequently. Because instructional time that educators devote to assessment should be minimal, these frequent progress-monitoring measures should be fast and easy to administer. Teachers should administer measures at least monthly to consider these assessments as providing progress-monitoring information. However, for students who are low achieving or who have disabilities, measurement once or twice weekly is preferable for instructional decision making. After scores are graphed, teachers study information to determine whether students are progressing at a desired rate across the year. Thus, progress monitoring includes the evaluation of the level of performance and the rate of student improvement. When implementing progress monitoring, teachers have several choices to make regarding specific tools and procedures for instructional decision making. Regardless of choice, teachers should use research to help guide decision making as much as possible.

Step 1: Select Appropriate Measurement Materials

A distinct feature of progress-monitoring methods is that educators evaluate student performance on material that represents or is closely associated with either the skills or general outcome that students should achieve by the end of the year. Consequently, when developing or selecting materials for progress monitoring, teachers should be sure that the measures represent overall student proficiency in the curriculum. For example, proficient reading and comprehension of grade-level text is a commonly desired outcome. *Oral-reading fluency*, or the number of words read correctly in 1 min, serves as a robust indicator of overall reading achievement. The fluency increases as students age and correlates highly with standardized measures of reading comprehension during the elementary years (Deno, 1985, 1992). Educators can monitor progress with oral-reading fluency in grade- or instructional-level text even when students read relatively slowly on passages early in the year. Because alternate forms of the measures remain constant in terms of level of difficulty and represent the year-end goal material, students may not perform well on progress-monitoring measures at the beginning of the year. Teachers need to explain to students that these measures test what students should be able to do by the end of the year, not what they know at the current time. Assessing students on material that reflects the year-end goal is a critical feature of progress-monitoring methods. Thus, repeated testing over time on equivalent alternate forms illustrates whether the student is gradually improving in overall reading proficiency across the year.

Another measure frequently used to represent overall reading achievement is the maze task (L. S. Fuchs & Fuchs, 1992; L. S. Fuchs, Fuchs, Hamlett, & Ferguson, 1992; Shin, Deno, & Espin, 2000). *Maze fluency* functions similarly to oral-reading fluency but measures proficiency of silent reading in goal-level material. In a maze passage, every *n*th word is replaced with a blank that contains three word choices. The student selects the correct word for the blank that makes sense in the passage. Educators often use a maze with upper elementary students who are fluent with oral reading or with middle and high school students (Espin, Wallace, Lembke, & Campbell, 2004; Jenkins & Jewell, 1993). They can also use a maze with informational text. At the other end of the grade-level spectrum, prior to students' fluent reading of connected text, educators may use several measures to monitor progress in early literacy skills, such as letter-sound fluency, nonsense word fluency, and word-identification fluency.

Step 2: Evaluate Technical Features

Because assessments need to be reliable and valid, progress-monitoring tools must be reliable and valid for instructional decision making. Measures must be sensitive to student change. Increased scores should indicate that the student is actually improving as a reader. Likewise, scores that remain static or begin to decrease should indicate that the student's reading skills have changed little over time or that the student has started to regress, respectively. As with any measure for progress monitoring, teachers should select tools that have yielded scientific evidence for their effective use. The National Center on Student Progress Monitoring (http://www.studentprogress.org) is a federally sponsored technical assistance and dissemination center that posts informational articles, conference presentations, and training materials to aid professionals in their implementation of progress monitoring. The Center's technical review committee annually evaluates progress-monitoring tools that have been submitted for review by publishers and posts this information on its Web site. The committee compares publishers' evidence against established standards for progress-monitoring measures, including reliability, validity, sensitivity to student improvement, adequacy of alternate forms, and effectiveness in improving student learning or teacher planning. Teachers may access this information easily to make informed decisions when selecting tools that are scientifically based.

Step 3: Administer and Score Measures

Because one of the primary functions of progress monitoring is to evaluate the rate of student growth by comparing scores

across time, educators must follow standardized procedures for test administration and scoring. Accordingly, a change in a student's scores should reflect growth (or deterioration) in the student's achievement and should not change because a teacher modifies the administration procedures or allows the student a different amount of time in which to work on the assessment.

During oral-reading fluency measurement, the teacher listens to a student read aloud in goal-level material for 1 min. The teacher evaluates verbatim reading of the text and marks any errors the student makes, such as mispronunciations, substitutions, omissions, and transpositions. Because the measure is timed, the teacher allows the student only 3 s to figure out an unknown word before the teacher supplies it for the student and marks it as incorrect. Self-corrections made within 3 s are scored as correct. The teacher counts the number of words read aloud correctly in the passage and plots this score on the student's progress-monitoring graph. If the student is low achieving, the teacher may assess oral-reading fluency once or twice weekly by using alternate passages and may chart the student's scores.

With maze fluency, the teacher provides goal-level passages for the student to read silently for 2.5 min. The student marks the correct word for each blank, and the teacher counts the number of correct choices that the student made prior to a ceiling of three incorrect selections in a row. Educators use this ceiling rule in scoring to minimize student guessing.

Step 4: Use Data for Goal Setting

For students with disabilities, educators can translate progress-monitoring information into educationally meaningful statements on the individualized education program (IEP; Etscheidt, 2006; Yell & Stecker, 2003). After several scores have been collected on goal-level material, the teacher may use the median (i.e., middle score) as the average level for the student's current performance information. For example, when educators use oral-reading fluency for progress monitoring, an IEP statement reflecting current level of performance may be written as "Given randomly selected passages at the 2nd-grade level, Juan currently reads 30 correct words in 1 min."

Once the current level of performance has been established, the teacher may use published information regarding year-end benchmarks (i.e., typical scores that represent a likely nonrisk status in reading proficiency at that grade level) or normative growth rates (i.e., typical and ambitious weekly rates of improvement for students by grade level) to determine the long-term goal or how much growth the student should make by the annual goal (for suggested year-end benchmarks and weekly growth rates included in their PowerPoint presentation, see Stecker, Saenz, & Lemons, 2007). For example, an ambitious weekly rate of improvement for second graders is growth of 2 words per week in oral-reading fluency (L. S. Fuchs, Fuchs, Hamlett, Walz, & Germann, 1993).

Juan's IEP goal is written for 36 instructional weeks in the future. An ambitious weekly rate of 2 is multiplied by 36 weeks to produce an overall projected improvement of 72 words that he reads correctly in 1 min by the time of the annual goal. Added to his current level of performance of 30, growth of 72 words would yield an annual goal of 102 correct words per minute. Consequently, Juan's annual IEP goal in reading may be written as "Given randomly selected passages at the second-grade level, Juan will read at least 102 correct words in 1 min."

Step 5: Judge Instructional Effectiveness

In addition to using progress-monitoring information for describing both the current level of performance and the long-term goal, educators can connect a goal line from baseline performance (i.e., current level of performance) to the annual goal to depict the rate of progress (e.g., growth of 2 words each week for Juan) the student needs to reach the annual goal. The teacher continues to administer progress-monitoring measures and to plot scores on the student's graph. Periodically, progress-monitoring scores are compared with the goal line to determine whether the student is progressing satisfactorily. When the trend of the student's scores is less steep than the projected goal line, the teacher determines that the current instructional program is not effective in bringing about the desired rate of progress and that an instructional change must be implemented. Conversely, if the trend of a student's scores is steeper than the projected goal line, the teacher assumes that the student will likely exceed the established goal and that the teacher underestimated how much the student actually could achieve. Consequently, the teacher raises the goal to match the faster rate of progress that the student is demonstrating.

In this way, progress-monitoring data not only describe the student's overall rate of improvement over time, but they prompt the teacher to analyze the effectiveness of the student's instructional program. Enabling the teacher to use the data to make changes in instruction is one of the most important functions of progress monitoring. When students perform less satisfactorily than anticipated, the teacher should consider aspects of the overall program that he or she could alter to boost student achievement. Typical programmatic features that are alterable include (a) instructional procedures, (b) time allowed for various instructional procedures, (c) size of instructional group, (d) instructional materials, and (e) any motivational strategies that teachers use during instruction. As the teacher changes features of instruction, he or she continues to collect progress-monitoring data. The graphed data for this new phase of instruction will demonstrate whether the teacher's modifications produced the desired effect.

Some decision-making frameworks suggest that educators should not evaluate instructional effectiveness until the program has been in place for at least 3–4 weeks. Either (a) the trend of overall student progress may be compared with the goal line or (b) several of the most recent data points may be evaluated in terms of their relative position to the goal line. For example, if at least several weeks of instruction have occurred and progress-monitoring data have been collected at least twice weekly, the teacher may examine the most recent four scores to determine whether they all fall above or below the goal line (L. S. Fuchs, Hamlett, & Fuchs, 1997). Points above the goal line indicate the need to raise the goal, and points below the goal line indicate the need for another program change. In this way, teachers use progress-monitoring data formatively to build more effective instructional programs for particular students over time.

In the next section, we apply the progress-monitoring blueprint to Ellie's scenario that we presented earlier. We explain how Ellie's teachers use each step for monitoring her overall reading progress and enhancing their own instructional decision making. In addition, we describe necessary resources and time commitment for implementing progress monitoring in this fashion.

Case Study Application of the Progress-Monitoring Blueprint

Step 1: Select Appropriate Measurement Materials

Because Ellie was reading substantially fewer words correctly per minute than typical fourth graders, both Mr. Albright and Ms. Ables decided that oral-reading fluency was the appropriate measure to use for progress monitoring. Although Ellie is a relatively slow reader, her teachers decided that fourth-grade level passages should be recommended for inclusion in her IEP so Ellie's progress toward proficiency in the general education curriculum can be monitored.

Step 2: Evaluate Technical Features

Ellie's teachers were satisfied with the research that they had read regarding the technical merits of oral-reading fluency as a progress-monitoring tool (Deno, 1985) and had examined the Technical Review Committee's evaluation of oral-reading fluency within the context of specific progress-monitoring tools from the National Center on Student Progress Monitoring Web site. They recognized that as Ellie becomes a better reader, her progress-monitoring scores should grow over time. They understood that oral-reading fluency should be sensitive to change in Ellie's performance, and they planned to use the data that they obtained to evaluate whether Ellie is achieving satisfactorily across the year. In addition, Ms. Ables decided to check Ellie's performance periodically on maze fluency because Ms. Ables administers this measure to her entire class every month.

Step 3: Administer and Score Measures

Because Mr. Albright and Ms. Ables use the same procedures for giving and scoring the tests, they decided that they would each administer one oral-reading fluency measure to Ellie each week. In this way, they both had the opportunity to hear Ellie read aloud and to note common strengths and weaknesses that she exhibits. Both scores were plotted each week on Ellie's graph.

Step 4: Use Data for Goal Setting

For 1 week, Mr. Albright and Ms. Ables each administered two oral-reading passages to Ellie to determine her baseline performance in fourth-grade text. Ellie's oral-reading fluency scores were 82, 89, 85, and 87 correct words per minute. Using the median score of 86, Ms. Ables wrote the following statement about Ellie's current level of performance: "Given passages selected randomly at the fourth-grade level, Ellie currently reads 86 correct words in 1 min." Using a rate of growth of 0.9 correct words per minute per week (an ambitious growth rate for fourth-grade students), Mr. Albright multiplied 0.9 by the 36 weeks left until Ellie's annual goal date. Consequently, he added 34 words to Ellie's baseline score of 86 to yield a long-term goal of 120 words and recommended this goal at Ellie's IEP team meeting.

Step 5: Judge Instructional Effectiveness

Figure 1 shows Ellie's progress-monitoring graph. The goal line was drawn from the median level of baseline scores (i.e., 86) to the projected annual goal of 120 correct words. If Ellie meets her annual goal, she should improve at about a rate of 0.9 additional correct words each week. Both Mr. Albright and Ms. Ables emphasized comprehension skills during instruction, focusing on discerning differences in text structure between narrative and informational materials. Mr. Albright addressed specific learning strategies for summarization. This instructional program is indicated by the first vertical line on Ellie's graph during Week 2. Although Ellie seemed to be learning some new skills with these methods, when they examined Ellie's graph 4 weeks later, Mr. Albright and Ms. Ables determined that their instruction did not have the desired effect on Ellie's overall performance.

On the basis of their observations of Ellie's relatively slow reading and difficulties with multisyllabic word identification, Mr. Albright decided to shorten the length of time for which he would focus on learning strategies and to add time for work on advanced decoding skills, such as morphemic analysis. He also implemented a repeated-readings strategy four times per week to increase Ellie's reading rate. This instructional modification is indicated by the second vertical line on Ellie's graph. Ellie's graph shows that only 2 weeks of this new intervention have been implemented thus far. Although this instructional phase

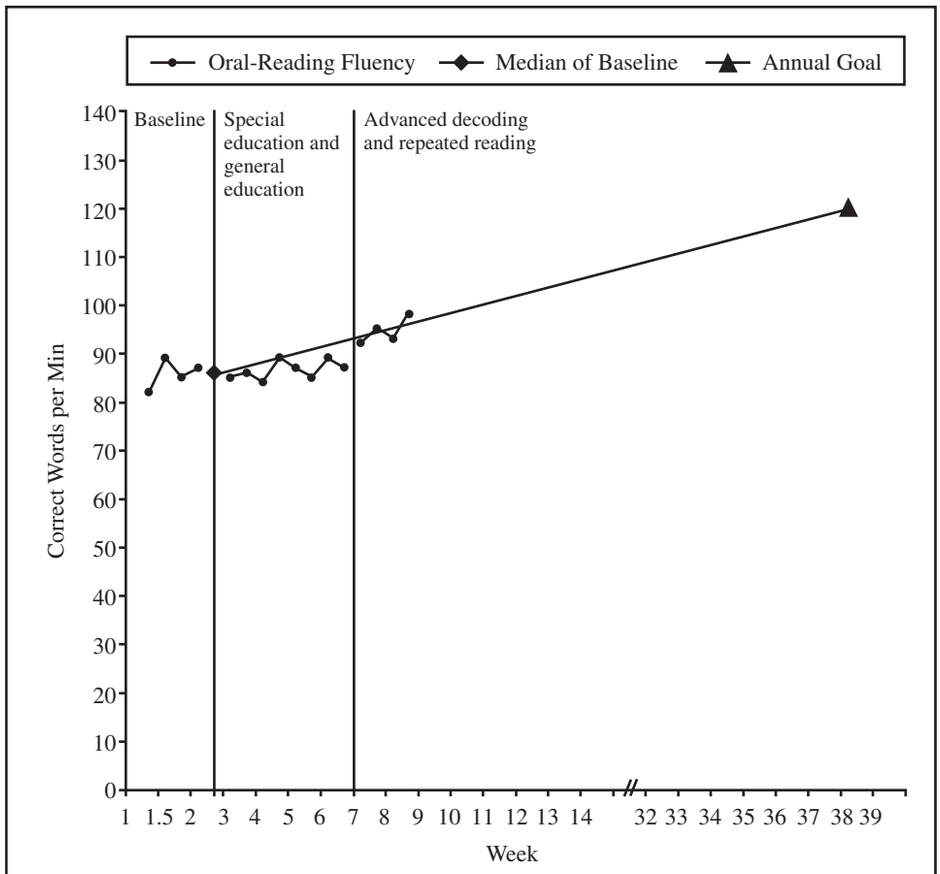

FIGURE 1. Ellie's progress-monitoring graph.

has not been implemented for long enough to evaluate its overall effect, Ellie's scores do appear to have improved during the first part of this intervention. Mr. Albright and Ms. Ables continued to provide this intervention and collect oral-reading fluency data to assess the effectiveness of their instructional modifications across 1 month. Using data in this ongoing fashion, Mr. Albright and Ms. Ables strove to develop a stronger program over time that better meets Ellie's individual needs.

Resources Ellie's Teachers Need to Implement Progress Monitoring

To better understand how progress monitoring can be implemented feasibly, we reconsider Ellie's scenario to illustrate how her teachers accessed resources, allocated time, and established priorities for assessment practices within general and special education settings.

For Ellie's teachers, the most time-consuming elements involved the initial acquisition of new skills related to progress monitoring (i.e., describing the rationale and research base, administering and scoring assessments, using data for instructional decision making) and the preparation or attainment of measures for progress monitoring. However, once Ellie's teachers accomplished these tasks, actual implementation of progress monitoring required relatively little time in exchange for the important information it yielded.

First, Mr. Albright and Ms. Ables participated in a teacher in service activity that focused on progress monitoring, read several articles that described the research base for progress monitoring, and completed two online instructional modules on progress monitoring. At the beginning of the school year, they met once during their planning time to discuss three students, including Ellie, for whom they would be sharing instructional responsibility. Mr. Albright copied alternate forms of the maze passages and of passages to be used for oral-reading fluency for Ms. Ables and himself. He planned to test each student whom he shared with Ms. Ables once weekly (i.e., 1-min oral-reading fluency or 2.5-min maze fluency), with Ms. Ables also testing these students once weekly. Both scores would be graphed each week. Ms. Ables tested only these three students with disabilities in her class on a weekly basis. However, she used maze measures with the entire class on a monthly basis, which required 2.5 min of

testing time with everyone reading silently and marking their answers. Although this assessment procedure involved little class time, tests needed to be scored. Ms. Ables prepared answer keys at the beginning of the year and taught several students and a parent volunteer how to score the maze measures. She also obtained approximately 30 alternate forms of passages for oral reading that could be used when necessary for very low-achieving students in her class who required more frequent progress monitoring. For any student (in addition to her three students with disabilities) who performed very poorly on the maze measure, she also would test oral-reading fluency once weekly. She also charted their progress to see whether her instruction seemed to work for these low-achieving students or if their lack of progress indicated the need for more intensive intervention. As a result, Ms. Ables spent 5–12 min weekly testing selected students' oral-reading fluency, which she did regularly when her class was engaged in independent seat activities. Once per week during planning, she used the Web-based system with which her district had a contract and entered students' scores. The progress-monitoring system graphed the data and provided recommendations regarding student performance. She continued to meet on a monthly basis with Mr. Albright to review student data and plan instructional modifications when necessary.

Mr. Albright made decisions about the use of maze or oral-reading fluency for each student in his caseload on the basis of initial student performance and in conjunction with the IEP team. He set up a regular schedule for assessing his students and made sure he had independent or group-work activities planned at the same time. Because he monitored all of his students weekly, he had short periods of testing every day to get to each of his students throughout the week without sacrificing his instructional time. Every week, he used a portion of his planning time to enter data at the computer and to evaluate student progress. He also developed a schedule to meet monthly with each of the classroom teachers who shared responsibility in instruction for his students. Depending on the number of students whom they both shared, he planned 15–30 min at the computer with each of these teachers. Although not every teacher shared a student with Mr. Albright, all teachers at this elementary school engaged in progress-monitoring activities. The instructional lead teacher at the school was knowledgeable about progress monitoring and supported her faculty's efforts. She led faculty meetings four times per year in which issues related to progress monitoring, use of the Web-based system, and instructional interventions were discussed.

The school where Mr. Albright and Ms. Ables worked provided training and set expectations regarding teachers' use of progress monitoring. We think individual teachers will be more successful implementing progress monitoring when their school administration supports such efforts and when their colleagues are engaged in similar tasks. However, for progress-monitoring data to be used effectively, each educator involved in the process must adhere to procedures with fidelity. To implement our progress-monitoring blueprint successfully, we recommend assessment practices that should be emphasized and warn against potential assessment pitfalls that educators should avoid. Table 1 describes our recommendations for practice. Also,

TABLE 1. What to Anticipate and Avoid When Implementing Curriculum-Based Measurement

Anticipate	Avoid
Being consistent about the materials that are used and administration directions, timing, and scoring. Ensuring fidelity with procedures is crucial for using progress-monitoring data effectively.	Using norms, growth rates, or cut scores from one set of published progress-monitoring materials with other published materials without first examining the methods involved for deriving the scores. Typically, norms and publishers' recommendations are established with students' performance on particular materials using specific procedures and may not automatically be transferred to a different set of progress-monitoring materials.
Using student data for instructional decision making. Collecting data serves a purpose; however, using that data to inform instructional decision making is the most important feature of progress-monitoring practices.	Assuming that the progress-monitoring probes will provide adequate information about specific skill strengths and weaknesses for particular students. Although some progress-monitoring systems may provide skill-mastery feedback aggregated over time for the teacher, progress-monitoring graphs are most important for informing teachers about their overall instructional effectiveness. In other words, progress-monitoring data tell teachers about the effectiveness of their instruction for particular students, but they do not necessarily indicate how or what to teach.

the Appendix provides a list of resources, including books and Web sites that teachers may find helpful as they try to implement progress-monitoring procedures for evaluating student academic growth and determining the success of various instructional programs.

Conclusion

The high expectations for student achievement that NCLB (2001) established represent an important—but sometimes daunting—challenge for teachers. The assessment strategies and instructional methods of the past have not proven to be sufficient for meeting the critical goal of raising student achievement levels. Teachers cannot afford to lose instructional time on practices that are ineffective (Rock, Thead, & Gable, 2006), so they must embrace research-supported practices as they strive to help all of their students achieve acceptable levels of proficiency. Progress monitoring, particularly CBM, is a research-validated assessment method that provides data critical for evaluating academic performance across the entire spectrum of student achievement. These data provide teachers with direct evidence to determine whether their students are benefiting from the instructional program. Teachers who use progress-monitoring procedures with students such as Ellie may better enable low-performing students to meet provisions of adequate yearly progress. However, teachers who implement systematic progress monitoring in general classrooms likely will reap benefits not only for students with identified needs but also for their other students, regardless of their achievement levels.

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APPENDIX
Resources for Progress Monitoring Including Curriculum-Based Measurement

Books and tutorials	National centers
Hosp, M. K., Hosp, J. L., & Howell, K. W. (2007). *The ABCs of CBM: A practical guide to curriculum-based measurement.* New York: Guilford.	National Center on Student Progress Monitoring (http://www.studentprogress.org) provides technical assistance on scientifically based progress monitoring for Grades K–5 and contains training materials, including Webinars, and houses a Web library. The Center's Technical Review Committee evaluates specific progress monitoring materials submitted to them by publishers, and reviews are updated and posted on the Web site.
Shinn, M. R. (Ed.). (1989). *Curriculum-based measurement: Assessing special children.* New York: Guilford.	Research Institute on Progress Monitoring (http://www.progressmonitoring.org) conducts research and disseminates findings on student progress monitoring across grade levels and maintains a searchable database of article citations and abstracts of published research and technical reports.
Shinn, M. R. (Ed.). (1998). *Advanced applications of curriculum-based measurement.* New York: Guilford.	The IRIS Center for Training Enhancements (http://iris.peabody.vanderbilt.edu) provides instructional modules and other training resources for preparation of school personnel in a variety of areas. Online, interactive modules are included for progress monitoring and responsiveness to intervention.
Busch, T. W., & Lembke, E. S. (2005). *Progress monitoring in reading using the CBM maze procedure.* Web-based tutorial published by the Division for Learning Disabilities (DLD): http://www.teachingLD.org. Available to DLD members.	National Research Center on Learning Disabilities (http://www.nrcld.org) conducts research on the identification of specific learning disabilities, disseminates findings, and makes recommendations, including information related to responsiveness to intervention. The center provides technical assistance to national, state, and local constituencies. The Web site provides a variety of resources, including papers, PowerPoints, and resource kits.
Lembke, E. S., & Busch, T. W. (2004). *Curriculum-based measurement in reading: Oral fluency.* Web-based tutorial published by the Division for Learning Disabilities (DLD): http://www.teachingLD.org. Available to DLD members.	Center on Instruction (http://www.centeroninstruction.org) collects scientifically based information on instructional practices related to reading, math, science, special education, and English-language learning. The use of progress-monitoring practices is included in the resources intended for use by regional comprehensive centers and is available to the public. The center is one of five content centers funded by the U. S. Department of Education.