Using Curriculum-Based Measurement to Improve Achievement

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A data-driven method provides the most reliable indicator of student progress in basic academic areas.

Response to intervention (RTI) is on the radar screen of most principals these days—finding out what it is, how it can improve teaching and learning, and what needs to be done to implement it effectively. One critical component of RTI that will require particular attention from principals is student progress monitoring, which is required in every tier of RTI. The most commonly used and well-researched method of monitoring progress is curriculum-based measurement (CBM).

Nearly 30 years of empirical evidence tells us that CBM provides a valid and reliable indicator of student progress in basic academic areas, especially reading, math, and writing, and that it can have a positive impact on student achievement (Foegen, Jiban, & Deno, 2007; McMaster & Espin, 2007). Yet CBM was not commonly used by teachers, particularly in general education classrooms (Hosp & Hosp, 2003; Ardoin et al., 2004), until the advent of RTI.

Research has shown that the data gathered from CBM can be used in numerous educational decisions, such as screening, eligibility for special education, and re-integration. More recently, researchers have been examining the effectiveness of CBM in other areas as well, such as predicting performance on high-stakes tests and measuring growth in content areas (Deno, 2003). Mellard and Johnson (2008) discuss the use of CBM from an RTI perspective:

> *Within an RTI model, the types of decisions that a system of progress monitoring can inform include whether a student is making adequate progress in the general classroom, whether a student requires a more intensive level of intervention, and whether a student has responded successfully to an intervention and, therefore, can be returned to the general classroom.*

What Is CBM?

"CBM is a scientifically validated form of student progress monitoring that incorporates standard methods for test development, administration, scoring, and data utilization" (Stecker & Lembke, 2005). It was developed so that teachers would have measurement and evaluation procedures that they could "use routinely to make decisions about whether and when to modify a student's instructional program" (Deno, 1985).

In contrast to standardized achievement tests, which do not provide immediate feedback, CBM tests are given frequently to track student progress toward annual goals, monitor the effectiveness of interventions, and make instructional changes as needed throughout the year. As Wright (n.d.) points out, "much of the power of CBM … seems to lie in its ability to predict in a short time whether an intervention is working or needs to be altered." In an RTI context, CBM can help identify students in need of interventions, decide which level of intervention is

most appropriate, and determine if an intervention is successful (Mellard & Johnson, 2008).

Unlike classroom assessments that test mastery of a single skill, each CBM test samples the year-long curriculum and, therefore, measures small student gains toward long-term goals (Stecker, Fuchs, & Fuchs, 2005; Deno, Fuchs, Marston, & Shin, 2001). For example, a third-grade teacher typically tests students on their mastery of multiplication immediately after completing that unit. However, the math CBM would include problems that test each skill that students are expected to master by the end of third grade (e.g., addition, subtraction, multiplication, and division problems). In this way, CBM provides educators with an overall indicator of student competence and progress in the curriculum.

In addition to being an assessment tool that allows educators to frequently measure student progress in the year-long curriculum, there are some additional benefits of CBM:

- It can provide documentation of student progress for accountability

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purposes, including adequate yearly progress and individualized education programs;
- It can facilitate communication about student progress with parents and other professionals;
- It may result in fewer special education referrals;
- It allows teachers to compare students against other students in the classroom, rather than against national norms; and
- It allows schools and districts to develop local norms that can then guide teachers when interpreting data (National Center on Student Progress Monitoring, n.d.; Holland-Coviello, n.d.).

How Does CBM Work?

One of the key aspects of CBM is that the "mechanics"—how the test is administered, the directions given to students, the procedures for scoring—are standardized (Deno & Fuchs, 1987). Standardization is important because it ensures that the data are valid and reliable indicators of a student's proficiency, allows for individual and group data to be compared across time, and facilitates the development of local norms (Deno, 2003; Wright, n.d.).

CBM probes, or tests, are easy and quick to administer, and are generally given once or twice per week. Each test is different but of equivalent difficulty. "Because CBM converts student academic behaviors into numbers (e.g., number of words read correctly per minute), teachers can easily chart the resulting data over time" (Wright, n.d.) and see when instructional changes need to be made. For example, the oral reading fluency probe has students read aloud from a passage for one minute as the teacher follows along, marking words that are read incorrectly. The number of words read correctly is recorded and graphed. It takes approximately five minutes to administer, score, and graph the result.

On a CBM graph, baseline data indicate a student's initial level of proficiency and a goal line is drawn to connect the baseline data to the desired year-end proficiency level. Following each CBM test, the teacher plots the student's score on the graph to determine whether the student is scoring above or below the goal line, and uses a predetermined rule to decide if instruction needs to be modified. Using the four-point rule, for example, the teacher looks at the four most recent of the first six data points. If all four are above the goal line, the teacher raises the goal; if all four fall below the goal line, an instructional change may need to be implemented (Stecker, Fuchs, & Fuchs, 1999).

Researchers have proposed several decision rules, in addition to the four-point rule, that educators can use to determine if a teaching change is needed. It is critical that one rule is chosen and then applied consistently across time and among all students being monitored.

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Teacher Support and Training

Studies have shown that teachers who use CBM to monitor progress, adjust instruction, and determine the effectiveness of interventions have higher rates of student achievement and learning than those who do not use CBM (Bowman, 2003; Mellard & Johnson, 2008; Hosp & Hosp, 2003). As a principal, what factors do you need to consider and address to help prepare and support teachers in the use of CBM?

One research review that examined the effect of CBM on the achievement of students with learning disabilities concluded the following:

- Progress monitoring alone will not have a significant impact on student achievement. Teachers must modify their instruction based on what the data indicate.
- The use of data-based decision rules is important and they should be

used by teachers to make necessary instructional changes.

- Computer applications that collect, store, manage, and analyze data make using CBM more efficient and contribute to teacher satisfaction.
- Ongoing teacher support, including a system that provides teachers with instructional recommendations, may be needed (Stecker, Fuchs, & Fuchs, 2005).

While CBM is designed to be time-efficient for teachers, it is important to note that time is cited as the biggest barrier to its implementation. Teachers need time for training and practice in all aspects of CBM, such as how to administer the various probes, how to set annual performance goals, and how to analyze graphs.

Actually using the data to make instructional changes may be one of the most difficult steps for teachers. Wesson (1991) suggests that as districts train teachers to use CBM, they should encourage them to meet regularly with one another, rather than with outside experts, to discuss what they are finding.

A "seamless and flexible system of progress monitoring" (Wallace, Espin, McMaster, Deno, & Foegen, 2007) remains a goal of researchers. In the meantime, three decades of study have produced a significant research base of reliable and valid CBM measures that schools can use to monitor student progress and support RTI implementation. P

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References

Ardoin, S. P., Witt, J. C., Suldo, S. M., Connell, J. E., Koenig, J. L., Resetar, J. L., et al. (2004). Examining the incremental benefits of administering a maze and three versus one curriculum-based measurement reading probes when conducting universal screening. *School Psychology Review, 33*(2), 218-233.

Bowman, L. J. (2003). *Secondary educators promoting student success: Curriculum-based measurement.* Retrieved February 7, 2008, from http://coe.ksu.edu/esl/lasestrellas/presentations/Lisa_CBM.ppt

Deno, S. L. (1985). Curriculum-based measurement: The emerging alternative. *Exceptional Children, 52*(3), 219-232.

Deno, S. L. (2003). Developments in curriculum-based measurement. *The Journal of Special Education, 37*(3), 184-192.

Deno, S. L., & Fuchs, L. S. (1987). Developing curriculum-based measurement systems for data-based special education problem solving. *Focus on Exceptional Children, 19*(8), 1-16.

Deno, S. L., Fuchs, L. S., Marston, D., & Shin, J. (2001). Using curriculum-based measurement to establish growth standards for students with learning disabilities. *School Psychology Review, 30*(4), 507-524.

Foegen, A., Jiban, C., & Deno, S. (2007). Progress monitoring measures in mathematics. *The Journal of Special Education, 41*(2), 121-139.

Holland-Coviello, R. (n.d.). *Using curriculum-based measurement (CBM) for student progress monitoring.* Retrieved August 26, 2008, from www.studentprogress.org/player/playershell.swf

Hosp, M. K., & Hosp, J. L. (2003). Curriculum-based measurement for reading, spelling, and math: How to do it and why. *Preventing School Failure, 48*(1), 10-17.

McMaster, K., & Espin, C. (2007). Technical features of curriculum-based measurement in writing: A literature review. *The Journal of Special Education, 41*(2), 68-84.

Mellard, D. F., & Johnson, E. (2008). *RTI: A practitioner's guide to implementing response to intervention.* Thousand Oaks, CA: Corwin Press and Alexandria, VA: National Association of Elementary School Principals.

National Center on Student Progress Monitoring. (n.d.). *Common questions for progress monitoring.* Retrieved August 26, 2008, from www.studentprogress.org/progresmon.asp#2

Stecker, P. M., Fuchs, L. S., & Fuchs, D. (1999). *Using curriculum-based measurement for assessing reading progress and for making instruction decisions.* Retrieved February 25, 2008, from www.onlineacademy.org/modules/a300/lesson/lesson_3/xpages/a300c3_40200.html

Stecker, P. M., Fuchs, L. S., & Fuchs, D. (2005). Using curriculum-based measurement to improve student achievement: Review of research. *Psychology in the Schools, 42*(8), 795-819.

Stecker, P. M., & Lembke, E. S. (2005). *Advanced applications of CBM in reading: Instructional decision-making strategies manual.* Washington, DC: National Center on Student Progress Monitoring.

Wallace, T., Espin, C. A., McMaster, K., Deno, S. L., & Foegen, A. (2007). CBM progress monitoring within a standards-based system. *The Journal of Special Education, 41*(2), 66-67.

Wesson, C. L. (1991). Curriculum-based measurement and two models of follow-up consultation. *Exceptional Children, 57*(3), 246-256.

Wright, J. (n.d.). *Curriculum-based measurement: A manual for teachers.* Retrieved February 5, 2008, from www.jimwrightonline.com/pdfdocs/cbaManual.pdf

WEB RESOURCES

On the National Center on Student Progress Monitoring Web site, educators can download articles, presentations, and webinars that address a range of CBM topics, such as improving instruction with CBM and using progress monitoring to develop individualized education programs. The site also has a section for families, which includes resources that can be used with parents to explain progress monitoring.
www.studentprogress.org

This site offers step-by-step manuals and guides on how to use CBM, including how to administer the various probes and graph the results. It also includes forms for recording data and scoring sheets that can be downloaded.
www.interventioncentral.org/htmdocs/interventions/cbmwarehouse.php

The Research Institute on Progress Monitoring Web site includes an in-depth training manual for implementing reading CBM and procedures for scoring writing samples.
www.progressmonitoring.net