8

Charting and Graphing Data to Help Make Decisions

Getting assessment data into a form that is easy to interpret and use is one of the most important things to consider. If the data we collect are not easy to use, we will be less likely to use them, and if we do not use them, why bother collecting them? One of the main benefits of CBM is that the data are displayed in graphs and charts (which are a lot easier to read and interpret than a page full of numbers). Different types of graphs can be used to examine the data in different ways. This chapter demonstrates some types of graphs that are commonly used to display CBM data and some decision rules for using them.

PROCEDURES AND MATERIALS NEEDED TO CHART CBM DATA

The standard graph used with CBM is a typical line graph like the one in Figure 8.1. The vertical axis of the graph (marked as "Words Read Correctly"—the abscissa, for you math-o-philes) indicates the number correct on a CBM probe. The actual metric will be different for different content areas (e.g., WRC is the ORF metric for Reading CBM). The increments should be sized so that student growth can be accurately observed. Increments that are too large may understate the student's growth, and increments that are too small may overstate it. The horizontal axis (marked as "# of weeks"—the ordinate) is used to indicate the number of weeks the student will be monitored, allowing for data to be entered one to two times per week.

Because the chart has both a time axis (number of weeks) and a skill axis (WRC), it allows us to record changes in student learning over time. Learning (or a lack of it) is what we begin to see as we collect a series of data points. This is significant because it means that by charting CBM results we get two kinds of data: data on student level of

RESOURCES AND FURTHER READING

Clarke, B., & Shinn, M. (2004). A preliminary investigation into the identification and development of early mathematics curriculum-based measurement. *School Psychology Review, 33,* 234–248.

Foegen, A. (2000). Technical adequacy for general outcome measures for middle school mathematics. *Diagnostique, 25,* 175–203.

Foegen, A., & Deno, S. L. (2001). Identifying growth indicators for low-achieving students in middle school mathematics. *The Journal of Special Education, 35,* 4–16.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., Phillips, N. B., & Bentz, J. (1994). Classwide curriculum-based measurement: Helping general educators meet the challenge of student diversity. *Exceptional Children, 60,* 518–537.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., & Stecker, P. M. (1990). The role of skills analysis in curriculum-based measurement in math. *School Psychology Review, 19,* 6–22.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., Thompson, A., Roberts, P. H., Kubek, P., et al. (1994). Technical features of a mathematics concepts and applications curriculum-based measurement system. *Diagnostique, 19*(4), 23–49.

Thurber, R. S., Shinn, M. R., & Smolkowski, K. (2002). What is measured in mathematics tests? Construct validity of curriculum-based mathematics measures. *School Psychology Review, 31,* 498–513.

VanDerHeyden, A. M., & Burns, M. K. (2005). Using curriculum-based assessment and curriculum-based measurement to guide elementary mathematics instruction: Effect on individual and group accountability scores. *Assessment for Effective Intervention, 30,* 15–31.

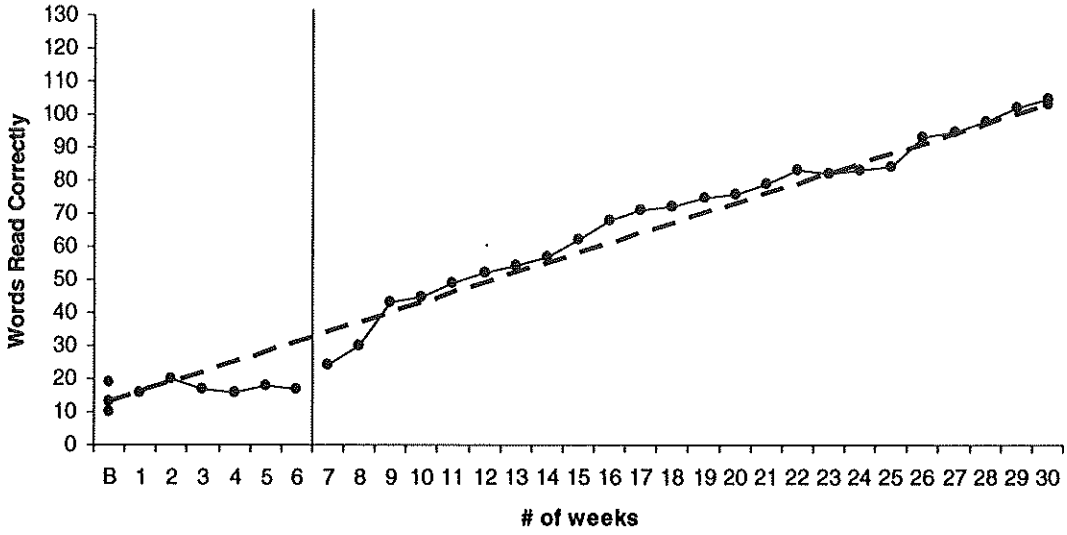

FIGURE 8.1. A typical CBM line graph.

performance, and data on student rate of progress. Performance scores tell us how well a student can do that task. Progress scores tell us how quickly she is learning how to perform it.

For each content area, the same graph should be used for each student. Figure 8.2 illustrates why. The two graphs in Figure 8.2 use the same student data. Because the vertical axis of the graph on the right only goes from 0 to 30, the student appears to be making good progress (i.e., the trend of his progress is quite steep). When we examine his progress on the graph with the vertical axis that goes from 0 to 130, it doesn't look so good. In actuality, his progress is below his peers', and the decision should be that he is *not* making adequate progress.

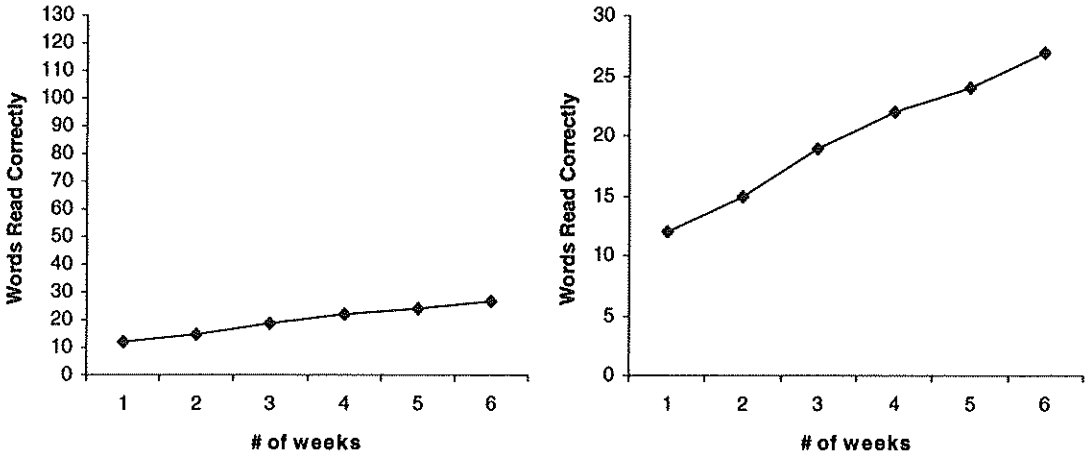

FIGURE 8.2. Student data plotted on graphs with different vertical axes.

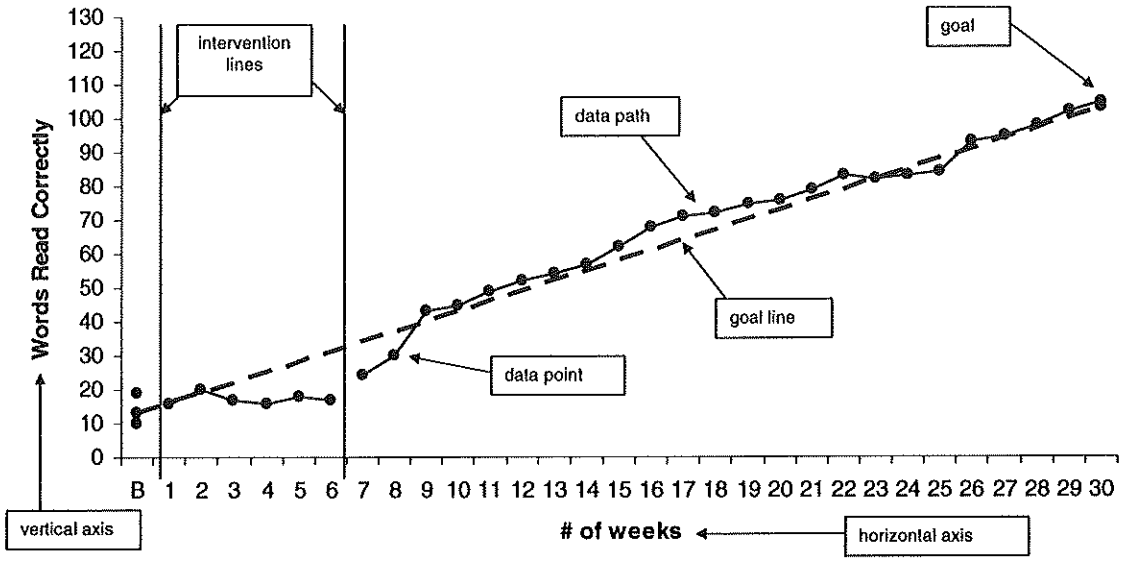

FIGURE 8.3. Sample CBM graph with each part labeled.

Figure 8.3 is an example of a CBM graph with each part of the graph labeled. The first thing we enter on the graph is the student's baseline data (the first column on the left side of the graph—marked with a B). This lets us know where the student is starting with his performance. To find the student's baseline, we administer three separate passages, lists, story starters, or sheets. Plot all three on the first vertical line. The one in the middle is the baseline score (if two scores are the same, that score is the baseline). Figure 8.3 shows that the three scores the student earned are 10, 13, and 19. His baseline score is therefore 13—the point we will start from.

HOW TO SET AND GRAPH GOALS

Now that we have plotted the student's baseline data, we need to set a goal. There are three methods to setting goals: end-of-year benchmarks, norms (national or local), and intraindividual framework. Which method to use depends on the availability of information (Are there national norms?), the student's performance level (typically performing or at risk), and the comparison you want to make (to a performance criterion or a representative peer group).

End-of-Year Benchmarks

The use of performance standards (i.e., benchmarks) is one method of determining goals. Table 3.4 in Chapter 3 shows benchmarks for grades 1 through 6 for ORF CBM. At the end of the year, we want every student to be performing at or above the benchmark. For

example, for a student in third grade, we would set our end-of-year goal at 110 WRC. This is the lowest score we would accept that would indicate a student is *not* at risk for future academic failure. Even if the students were not performing at an acceptable level at the beginning of the year (when we screened/benchmarked the class), as long as they make progress that will take them to mastery by the end of the year, we can feel confident that they will be performing proficiently and will not be at risk for difficulty in reading.

Norms

Another way to set goals is to use some type of normative comparison group. There has been some work identifying national norms for CBM in most content areas. When they are available, national norms are good to use. If they are not, it is possible to develop local norms by administering the measures to every student in a school or district (or a random sample of 100 per grade level) three times per year. These scores are used to calculate local norms and should be updated every 3–5 years. This is a time-consuming practice, so we recommend using national norms whenever possible.

As mentioned in Chapter 2, it may make sense to randomly sample a small group of students and compare their scores to the norms that have already been validated. If they are similar, there is nothing to gain by generating local norms. Also, if school norms are lower than national ones, teachers would not want to use the local ones because they might give a false impression of student proficiency.

Norms come in two forms: levels of performance and rates of progress. Because CBM has been used for more than 25 years, there have been some efforts to collect large samples of scores that are representative of the U.S. school population. Others have collected large sets of data based on who is using their CBM product. These may not be truly representative, but the results seem to be quite similar. To set goals using this type of norm, you use the same process as with end-of-year benchmarks. The difference is that these are based on typical performance of same-grade peers rather than a criterion for proficiency that predicts performance on outcome measures (which is what benchmarks do). One finds the grade level the student is in, identifies the level of performance for the 50th percentile in the spring, and uses that as the end-of-year goal. The content chapters contain tables of these national sets of norms for Reading CBM (Tables 3.5 and 3.6), Early Reading CBM (Table 4.3), Spelling CBM (Table 5.2), Writing CBM (Table 6.1), and Math CBM (Table 7.3).

The other type of norm is rate of growth or progress. In addition to identifying the level of performance for national groups, some researchers have identified the typical rate of growth for large samples of students. This has been calculated as an average weekly gain. Using this weekly growth rate, you can simply multiply the rate by the number of weeks left until the aim date (i.e., the date by which you expect the student to reach the goal) for your student and add that number to his baseline score. Tables 3.2, 3.3, 5.1, and 7.1 contain the rate of growth norms for Reading (both ORF and Maze), Spelling, and Math CBM respectively. For example, assume we are working with a student in second grade whose baseline ORF score is 28 WRC. We have 20 weeks left in the school

year. Setting an "ambitious" goal (see Box 8.1) using an increase of 2 WRC per week would indicate a goal of 20 × 2 = 40 + 28 = 68. Our goal is 68 WRC at the end of 20 weeks. This would be enough to have the student performing in the mastery range—exactly where we want him to be.

We need to note a few things about progress norms. First, progress norms reflect the quality of instruction—more intense instruction should lead to greater growth. One thing we don't know about national progress norms is how good or intense the instruction was that the students were receiving. Second, the students who are farthest behind need to have the steepest slopes (i.e., the greatest rates of progress) in order to catch up to the expected level of performance. This means they need the most intense and effective interventions.

Intraindividual Framework

Setting goals using the intraindividual framework uses the student's current level of performance and rate of progress to set end-of-the-year goals for his performance. After collecting at least eight data points, subtract the lowest score from the highest. For example, if we were progress monitoring a second-grade student using ORF passages, his first eight scores might be 12, 16, 15, 19, 16, 21, 26, and 24. We find the difference: 26 – 12 = 14. Divide this difference by the number of weeks (i.e., the number of data points we have collected, eight): 14 ÷ 8 = 1.75. This baseline rate of growth is multiplied by 1.5 in order to set a weekly progress goal: 1.75 × 1.5 = 2.625. This number is then multiplied by the number of weeks left until the end of the year (or the end of the planned intervention: 2.625 × 16 weeks = 42. This number is then added to the median score of the first eight data points we used to calculate the baseline growth rate (it is 17.5—halfway between 16 and 19): 42 + 17.5 = 59.5. This is our end-of-year performance goal for this student: 59.5 (using 60 WRC as the goal ensures he scored above the goal).

While this method can be used, we caution that it may underestimate a student's rate of learning and may never catch him up if he started out behind. (Because he wasn't performing as well as he needed to is why we were concerned in the first place, right?) If the

BOX 8.1. Should I Use Ambitious or Realistic Goals?

The terms *ambitious* and *realistic* can be a little misleading. The term *realistic* is used to label the typical growth rate for the sample used. *Ambitious* is used to label the typical growth rate for the sample used plus 1 standard deviation (i.e., if you expressed each student's slope as a single number, typical growth is at the 50th percentile and ambitious growth is at the 84th). These values are not meant to be maximum possibilities. It isn't unrealistic to expect greater rates of growth from a student—especially if he is starting well below the typical performance. In that case, the student *must* make extraordinary growth in order to catch up to his peers. That's ambitious, but sometimes it is realistic to be ambitious.

instruction is good and the student responds positively to it, using benchmarks or norms may provide better goals since they represent scores that are predictive of future academic success (i.e., benchmarks) or an indication of how other students in that grade level perform (i.e., norms). In our opinion, the only time you would want to use a student's past performance as a goal for future performance is when his past performance is average or above average.

Graphing Goals

Now that we have set the goal for our student, we need to graph that goal on his chart. Whichever method we used to set the goal, we should have a specific target to work toward and a number of weeks we expect it will take to get there. These are the only two numbers we need to graph the student's goal. We also need to make sure that the paper we are using has enough room horizontally for all the weeks of data we will be collecting and enough room vertically to record the student's performance all the way to the goal.

Look at Figure 8.3 again. We had already plotted our student's baseline data and found his baseline score to be 13. Say we have decided to use the norm approach and set an ambitious growth rate of 3 WRC per week. Since we are planning to monitor the progress of the student's performance for the entire school year, we have 30 weeks left. So 30 weeks times 3 WRC per week is 90 WRC. In 30 weeks, we expect the student to *increase* his WRC by 90. This means we add it to his baseline score (13). At week 30 on our chart, we draw an X or a target at 103 (90 + 13). We then connect the baseline score and the goal. This is the student's goal line (also sometimes referred to as an *aimline*).

Each week, as we administer at least one passage or probe to the student, we enter his score on the graph and connect it to the previous point. These are data points and the data path. This allows each student to have his database, which is used to evaluate the effectiveness of the instruction he is receiving.

HOW OFTEN SHOULD DATA BE COLLECTED?

How frequently to collect data and graph them depends on three things. First, it depends on our purpose—is it to screen/benchmark or progress monitor? If we are assessing and graphing to screen/benchmark all students' progress, we typically use CBM measures three or four times per year. This is the "checking vital signs" exercise designed to pick up potential problems but not to yield much information about how to correct those problems when they are found. This sort of testing doesn't need to be done often. If we are monitoring progress to guide instruction, we need frequent feedback, so more frequent measurement is needed.

Second, how frequently we collect and graph data depends on the importance of the task. High-importance tasks need frequent monitoring. If there are particular skills that are of great importance, we should monitor them more directly and frequently than we would monitor skills of lesser consequence (this is basically why we watch young chil-

dren more closely when they are playing near a street than when they are playing in a fenced backyard). Reading and language are good examples of skill areas in which we can't afford to let students fall behind without noticing. Reading Roman numerals might not meet the same criterion.

Third, frequency of collecting and graphing data depends on the significance of a problem. As the student's difficulties increase and the need for effective instruction becomes more urgent, the need for more frequent monitoring is increased. The magnitude of a student's difficulty is illustrated by the size of the difference between his actual level of performance and the expected level of performance as well as his rate of progress. A student who is far behind but making rapid progress may actually be seen as having less of a problem than another student who is only moderately behind expectations but making little or no progress.

What this means is that while there are no hard and fast rules for the frequency of progress monitoring, it should be increased when the content is important and the student is at risk for future academic problems. Most people recommend screening/benchmarking three or four times per year on CBM measures. Progress monitoring should be done one to two times per week for the students having the greatest difficulty and every other week to once per month for students who are not having as much difficulty. For students who are performing and progressing well, the screening/benchmarking measures may be enough to monitor their progress.

DECISION RULES TO HELP EDUCATORS USE THE DATA TO INFORM INSTRUCTION

Notice that in Figure 8.3 there are also vertical lines that seem to separate sections of the data. These are called *intervention lines*. Where an intervention line falls, the data points on either side are not connected by a data path. This is to help us remember that something changed at that point and to group the data points more easily. Each intervention line shows us the point at which a decision about the student's progress was made.

There are two methods of making decisions about whether the student's response to instruction is appropriate or not (i.e., if the student's progress is adequate for him to meet his goal within the expected time period). The first is data point analysis and the second is trend line analysis. With either method, the goal line is used as a reference point.

To use data point analysis, the data points on the graph for each week are examined. After collecting an initial six to eight data points, any time four *consecutive* scores fall below the goal line, a decision needs to be made. This decision is usually some sort of change in instruction—even something as simple as "Maybe I could meet with him earlier in the day." Lowering the goal is not considered an appropriate option. Whenever the student achieves four *consecutive* data points above the goal line, the goal is raised (see Fuchs et al., 1989). Using the data in this way allows the teacher to determine if the student is making appropriate progress or if a change in instruction is warranted. If data are not collected frequently, several weeks could go by before these rules could be applied.

The second method, trend line analysis, represents the student's *observed* rate of progress, which can be compared to the *expected* rate of progress as indicated by the goal line. The five steps below describe the Tukey method of trend line analysis.

1. Collect at least seven or eight CBM scores.
2. Divide them as evenly as possible into three groups. For example, if we collected eight data points, we might divide them into the first three, the next two, and the last three.
3. Find the median (middle) score for the first group and the last group and mark them with an X.
4. Draw a line between the two X's.
5. Compare this trend line to the goal line.

Figure 8.4 shows what this process might look like. After 8 weeks of monitoring our student's progress once per week, we have enough data points to draw a trend line. First, we group the first three data points together, the next two, and the last three. Next, we draw an X at the median point of both the first and last three data points. Notice that the X is at the midpoint both vertically (the middle score) and horizontally (the middle time point). The X shouldn't be drawn exactly *on* the middle score unless it occurred at the middle time point for that group. Last, connect the two X's and compare the trend line to the goal line.

If the trend line and goal line are similar, the student is making adequate progress. If the trend line indicates that the student will not be able to reach his goal in the time frame graphed, then instructional changes should be considered. This should be done every seven to eight data points to ensure the student is staying on track. If the trend line is consistently above the goal line, we should consider increasing the goal.

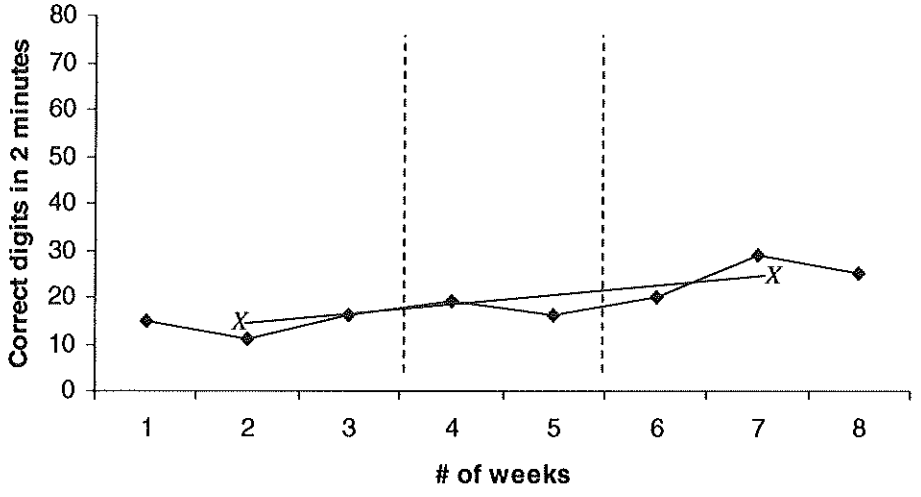

FIGURE 8.4. Example of the Tukey method of drawing a trend line.

CONSIDERATIONS FOR GRAPHING AND CHARTING THE DATA IN THE CONTENT AREAS

The procedures for graphing are the same no matter what content area you are monitoring the student's progress in. The different expected levels of performance and rates of growth for different content areas as well as different grades can be seen in the following tables:

- Chapter 3: Reading—Tables 3.2–3.6
- Chapter 4: Early Reading—Tables 4.2 and 4.3
- Chapter 5: Spelling—Tables 5.1 and 5.2
- Chapter 6: Writing—Table 6.1
- Chapter 7: Math—Tables 7.1–7.3

It is possible to use different scales on graphs for different content areas; however, if you are trying to make comparisons across areas, this may make it confusing. For example, the graphs in Figure 8.2 could be for different content areas. Using these two graphs, you could easily make different conclusions about the student's progress in the different areas, but if you have the student's goal line plotted on each (and you should), you will have a reference point. As such, it may not be a big deal to use different vertical axes for different content areas. We recommend using the same vertical axis for all students in the same content area so that you can make accurate comparisons among students (if you are so inclined) or among grades for the same student.

THE USE OF CBM IN RESPONSE TO INTERVENTION

You've probably heard of the term *response to intervention*, or RTI; at the very least, you should have read our brief reference to it in Chapter 1. There are different approaches to RTI, but all include the use of data to make decisions about the effectiveness of instruction with students.

RTI uses a tiered approach to instruction. Tier I is the general instruction provided to all students. Tier II adds supplemental instruction for those students who are not making adequate progress with only the Tier I instruction. Tier III encompasses the most intensive instruction for those students having the greatest difficulties. The same CBM measures are used with all students across the various tiers of instruction; the only thing that really changes is the frequency of assessment. The students who need the most intensive interventions (Tier III), also need to have their progress monitored most frequently (in addition to screening/benchmarking)—one to two times per week. Students receiving supplemental instruction (i.e., Tier II) would need to have their progress monitored less frequently—every other week or once per month. The students making adequate progress with the general instruction (Tier I) are monitored even less frequently—once per month or only using the screening/benchmarking assessments of three to four times per year. These data are used to make instructional decisions.

When making decisions, one of the most important parts is to determine an appropriate standard to compare student performance to. Once you have identified the appropriate comparison, you have a basis for making judgments. We have already explained how standards for level of performance and rate of progress can be set for use with CBM. There are norms for performance and progress, and there are criteria (i.e., benchmarks) that can also be used. These same standards can be used to make two types of decisions within an RTI approach.

The first type of decision is about the effectiveness of the instructional program that a student is receiving. If the student's level of performance or rate of progress is below the standard being used, then the instruction is not as effective as we want it to be. The decision we need to make is about how to alter the instruction the student is receiving in order to increase his level of performance or rate of progress. CBM (or any assessment tool) does not give you information specific enough to determine which instructional approach to use or how to alter the current one—this is the time for teachers, as professionals, to use their professional judgment. No matter how well developed, an assessment tool does not have the same amount of information about the student as a teacher does. There are some structured approaches to decision making (see the Resources and Further Reading section of this chapter for some), but they do not tell you what to do—they only provide guidelines for decision making.

The second type of decision made within RTI is about eligibility for remedial programs such as special education. Most often, this is mentioned in reference to eligibility for the category of Learning Disability (LD), but the decision can also be made for a general determination of eligible/not eligible. This is often referred to as a noncategorical approach to special education since one does not have to determine which disability category a student might belong to before providing services.

The most common method to this approach of eligibility determination is called the *dual discrepancy method*. Because CBM provides you with performance data (the level a student is performing at) and progress data (his rate of growth), you can compare both of these types of data to standards (such as the ones discussed previously in this chapter).

Since this isn't a book on RTI, we really can't go into too much detail. Suffice it to say that CBM is a core component of RTI. If you are interested in learning more about RTI, check out some of the resources listed in the Resources and Further Reading section of this chapter.

COMPUTERIZED GRAPHING AND DATA MANAGEMENT SYSTEMS

There are many different alternatives for computerized graphing and data management programs. Some are designed to be used specifically with the company's products, and others have the flexibility to incorporate other measures as the user wants. All the programs listed below allow the user to enter and graph data. Some are web-based and some are stand-alone programs (meaning you can install them on a single computer or sometimes a local network). Some programs will also allow for data management and storage over time, which enables cross-year analysis and interpretation. Some will even collect

and score the data. Cost for the programs varies. For some it depends on the level of license that is purchased (e.g., individual, schoolwide). For others it depends on which services are purchased. There are three general types of computerized systems: material-specific programs, material-flexible programs, and general spreadsheet and data management programs. It is important to select one that is right for your specific needs. Each program is described in terms of the following criteria:

- *Type*: Is the program web-based (meaning that the data are stored on a remote server and are accessed through the Internet) or stand-alone (meaning that the program is installed on a specific computer and must be accessed through that computer)?
- *Data*: Does the program allow for cross-year data management and analysis, or is it only available for within-year use?
- *Fee*: Is there a fee associated with the program or its use? Is it a one-time fee or an ongoing fee for usage?
- *Auto*: Does the program allow for computerized administration and scoring, or is it solely for data management and interpretation?
- *Skills*: Which skills discussed in this book can be addressed using this program?
- *Note*: This provides additional information about the program (if applicable).

Material-Specific Programs

DIBELS Data System (dibels.uoregon.edu)

- *Type*: web-based
- *Data*: cross-year
- *Fee*: ongoing usage fee
- *Auto*: data management and storage
- *Skills*: Reading (ORF only), Early Reading (DIBELS only)
- *Note*: Materials are also available in Spanish.

DIBELS Monitoring Device (DiMonD; e-mail to: cdorman1@cfl.rr.com)

- *Type*: stand-alone
- *Data*: cross-year
- *Fee*: none
- *Auto*: data management and storage
- *Skills*: Reading (ORF only), Early Reading (DIBELS only)

Edcheckup (www.edcheckup.com)

- *Type*: web-based
- *Data*: cross-year
- *Fee*: ongoing usage fee

- *Auto*: computerized scoring (ORF only), data management, and storage
- *Skills*: Reading (ORF, Maze), Early Reading (LSF, WIF), Writing

Yearly Progress Pro (YPP; CTB/McGraw-Hill: *www.ctb.com)*

- *Type*: web-based
- *Data*: cross-year
- *Fee*: ongoing usage fee
- *Auto*: computerized administration, scoring, data management, and storage
- *Skills*: Reading (Maze), Math (Computation, Concepts and Applications)
- *Note*: Math materials do not use the traditional CBM procedures or require a production response.

Material-Flexible Programs

AIMSweb (Pearson; Harcourt Assessment: *www.aimsweb.com)*

- *Type*: web-based
- *Data*: cross-year
- *Fee*: ongoing usage fee
- *Auto*: data management and storage
- *Skills*: Reading, Early Reading (DIBELS, LSF), Spelling, Writing, Math (Early Numeracy, Computation)
- *Note*: Early Reading materials are also available in Spanish. Most skills are linked to AIMSweb-specific materials, but DIBELS measures can also be included.

Intervention Central (Chart Dog: *www.interventioncentral.org)*

- *Type*: web-based
- *Data*: single year
- *Fee*: none
- *Auto*: data management and storage
- *Skills*: Reading, Early Reading (DIBELS, LSF, WIF), Spelling, Writing, Math (Early Numeracy, Computation, Concepts and Applications)
- *Note*: For progress monitoring only. Can be customized to include any CBM measure.

Spreadsheet and Data Management Programs

Excel

- *Type*: stand-alone
- *Data*: cross-year
- *Fee*: one-time fee (comes bundled with Microsoft Office)
- *Auto*: data management and storage
- *Note*: There are some graphs that Excel cannot create; however, data are easily exported into other software that can. Requires more time (due to creating the system from scratch), but is more flexible to meet local needs.

FileMaker Pro

- *Type*: stand-alone (although there is a web-based version)
- *Data*: cross-year
- *Fee*: one-time fee
- *Auto*: data management and storage
- *Note*: Requires more time (due to creating system from scratch), but is more flexible to meet local needs. Not as readily available as Excel (which could create accessibility issues).

FREQUENTLY ASKED QUESTIONS ABOUT CHARTING AND GRAPHING CBM DATA

1. ***Does the use of CBM lead to changes in students' curriculum?*** CBM doesn't lead to changes in curriculum because that is set by state standards or the student's IEP. It does lead to more frequent changes in instruction, and those changes have been shown to lead to increased student performance. Remember, CBM is not a curriculum or an intervention, but it does provide data on how students are responding to a curriculum or intervention.

2. ***Does the median score reliably predict the student's baseline?*** Generally, the median score is considered the baseline. It's not quite the same as in behavior assessment or single-case research, though; it's more like the starting point or a pretreatment score. We can't wait to find a stable baseline over time because we're not measuring skills that should be stable. If a student wasn't improving her performance for 3 or more weeks, we shouldn't be waiting around to try an intervention. We should be panicking.

3. ***If a student reaches his goal early, should I continue to monitor his progress to see if he exceeds the goal?*** Absolutely! You should set a more ambitious goal if the student gets four consecutive scores above his goal line. If the student's goal was to meet a benchmark or catch up to his peers, you could start to monitor his progress less frequently so that you can focus your time on another student having difficulty.

4. ***Why is it important to have intervention lines?*** Intervention lines are put onto the graph in order for you to be able to separate different interventions or phases of the student's instruction more easily. They let you quickly and clearly tell when something different occurred and judge what effect it might have had on the student's rate of progress.

5. ***While progress monitoring a student, how many times do you allow his performance to fall below the goal line before reassessing his instructional level?*** When a student's performance falls below the goal line for four consecutive data points, you should consider making an instructional change rather than assuming his instructional level is different. His level of performance is probably fairly stable. It is his rate of progress that is not as good as it should be.

6. ***Would it be appropriate to show the student his chart even if his performance is falling below the goal line?*** Yes. Students like to see what kind of progress they're making—it can be very motivating when they're doing well and when they're not doing as well as we'd like. Rather than telling the student that he isn't doing well or is failing, the chart can be used to start a discussion about changing instruction (how the discussion goes depends on the student and his grade level). It might start off something like, "You're right. Your progress isn't as good as we want it to be. Maybe we should try something different with how I teach you reading."

7. ***When is it appropriate to raise a student's goal?*** After collecting a minimum of six to eight data points, a student's goal should be raised when he has four consecutive data points above the goal line.

RESOURCES AND FURTHER READING

Conte, K. L., & Hintze, J. M. (2000). The effects of performance feedback and goal setting on oral reading fluency within curriculum-based measurement. *Diagnostique, 25*(2), 85–98.

Deno, S. L. (1987). Curriculum-based measurement, program development, graphing performance and increasing efficiency. *Teaching Exceptional Children, 20*(1), 41–47.

Howell, K. W., Hosp, J. L., Hosp, M. K., & Macconell, K. (in press). *Curriculum-based evaluation: Linking assessment and instruction*. New York: Sage.

Jimerson, S., Burns, M., & VanDerHeyden, A. (2007). *The handbook of Response to Intervention: The science and practice of assessment and intervention*. New York: Springer.

Marston, D. B., Diment, K., Allen, D., & Allen, L. (1992). Monitoring pupil progress in reading. *Preventing School Failure, 36*(2), 21–25.

National Association of School Psychologists (2006). *Assessment alternatives under IDEA 2004* (CD Rom Toolkit). Bethesda, MD: Author.

Salvia, J., Ysseldyke, J., & Bolt, S. (2007). *Assessment* (10th edition). Boston: Houghton-Mifflin. (Particularly see Chapter 30, "Assessing Response to Intervention")

9

Planning to Use CBM—and Keeping It Going

Our best intentions will not go far without a solid plan for carrying them out. It is worth putting in the time and effort up front to ensure successful implementing of CBM. Getting it going is only half of it, though; planning how to keep it going is the other half and just as important. In this chapter, we outline ways to help plan for using CBM before, during, and after initial implementation. We also offer helpful hints on how to get and keep CBM going.

DEVELOPING A PLAN FOR USING CBM

So you have decided to implement CBM. Congratulations! With a well-developed plan you will soon see how CBM will allow you to help all students achieve greater success in school. This is possible because CBM provides a database for each student which allows you to evaluate the effectiveness of the instruction they are receiving. Whether you are looking at implementing CBM at the classroom, grade, schoolwide, or district level, the factors that need to be considered will be similar.

We have broken the task of planning to use CBM into 10 steps. In Appendix B we provide a checklist to get you started. Below are points to consider to ensure you are making informed decisions as you complete the checklist.