Curriculum-Based Measurement (CBM)
Overview

Purpose and Use of CBM in a Problem-Solving Framework

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Review of Problem Solving

- The use of student data is critical to successful problem solving and data-based instructional decision making.

- CBM provides a research-based approach to collecting reliable and valid data for these steps.
Purpose of CBM

• CBM was designed to be a set of *simple, efficient, standard* procedures that:
  – Are objective
  – Allow for comparison of students to peers and to grade-level benchmarks
  – Allow for *repeated measurement*
  – Show *student growth*
Purpose of CBM

• CBM was initially designed to show student performance and progress within a curriculum; thus:

  – CBM probes comprise items that represent content to be learned across an annual curriculum.

  – CBM probes are of approximately the same level of difficulty, so that progress within the curriculum can be monitored over time.
Purpose of CBM

• CBM can be thought of as a ‘general outcome measurement’ approach to gauging a child’s overall performance in a given academic domain (Fuchs & Deno, 1991).

• Deno (1985) has compared this general outcome measurement approach to assessing a child’s academic vital signs.
Purpose of CBM

• Much like measuring a child’s temperature, blood pressure, height, and weight, *vital signs*:

  – Tell us if the child is ‘healthy’ or on track in a given academic area OR

  – Tell us that the child is not on track, and needs further diagnosis and intervention.

  – Do NOT necessarily tell us what to do.
CBM Research

• Developed by Stan Deno and colleagues at the University of Minnesota (see Deno, 1985).

• They established the following CBM criteria:

  – CBM must be technically sound:
    ▪ In other words, reliable, valid, and sensitive to growth.

  – CBM must be practical to use in the classroom:
    ▪ In other words, easy to use and understand, brief to administer and score, and repeatable to show growth over short time periods.
CBM Research

• Over 30 years of CBM research has been conducted in
  - Reading
  - Mathematics
  - Spelling
  - Written expression
  - Content areas
How is CBM used within a problem-solving framework?

- Sometimes, a problem is identified based on a teacher’s judgment or intuition.
- Increasingly, a problem is identified based on screening data.
- Some schools and districts have established CBM benchmarks; a problem may be identified if a student is performing below the benchmark.
How is CBM used within a problem-solving framework?

- Once an academic problem has been identified, the problem must be defined.

- Recall that a problem can be defined as “the difference between what is observed and what is expected” (see Interview with Dr. Stan Deno)
Define the Problem

• To determine “what is observed,” a student’s baseline performance in a given academic area is measured.

• To determine “what is expected,” the student’s baseline is compared to some educational standard, which may be based on:
  – the performance of grade-level peers,
  – normative expectations, or
  – criterion-referenced benchmarks.
Define the Problem (cont.)

- “What is observed” and “what is expected” are then graphed in relation to each other.

- Consider the following example.
Case Study: Defining the Problem

• A third-grade teacher noticed that Jamie, a student in her class, is struggling with writing. So, the teacher has identified a possible problem.

• The teacher “defines the problem” by establishing Jamie’s baseline performance, using CBM in Writing (CBM-W), and comparing that to Jamie’s 3rd grade peers.

<table>
<thead>
<tr>
<th></th>
<th>Number of correct word sequences</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jamie</td>
<td>9</td>
<td>3 min</td>
</tr>
<tr>
<td>Other students</td>
<td>18</td>
<td>3 min</td>
</tr>
</tbody>
</table>

• Then, the teacher graphs the discrepancy.
Case Study: Defining the Problem (cont.)

### Correct Word Sequences

- **Expected performance**
- **Observed performance**

**Dates of Probes**
- 29-Oct
- 5-Nov
- 19-Nov
- 3-Dec
- 17-Dec
- 17-Jan
- 27-Jan
- 12-Feb
- 28-Feb

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How is CBM used within a problem-solving framework?

- Once an academic problem has been defined using CBM data, CBM can also be used to explore, apply, and look at the effects of alternative solutions.
Explore, Apply, and Look at Effects of Solutions

• First, the teacher sets a *reasonable* and *ambitious* goal for the student to attain in a given time period (e.g., one academic year):

*By the end of school year, given grade-level text, Jamie will write 35 correct word sequences (CWS) in 3 minutes.*

<table>
<thead>
<tr>
<th></th>
<th>Number of correct word sequences</th>
<th>Time</th>
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</thead>
<tbody>
<tr>
<td>Jamie</td>
<td>35</td>
<td>3 min</td>
</tr>
</tbody>
</table>

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Setting a Goal

Correct Word Sequences

Observed performance

End of year goal

Dates of Probes

29-Oct  5-Nov  19-Nov  3-Dec  17-Dec  17-Jan  27-Jan  12-Feb  28-Feb
For more information about setting the goal, please see the “Goal Setting and Data-Based Instructional Decision Making” module.
Explore, Apply, and Look at Effects of Solutions (cont.)

Then, the special education teacher would plan instruction based on the individual student’s need, using additional information.

The teacher will:

- Explore alternative solutions by testing interventions that s/he hypothesizes would address the individual student’s needs;
- Decide on the appropriate level of intensity;
- Begin implementing instruction; and
- Monitor the student’s progress during each intervention.
Monitoring Progress during Intervention

The teacher is delivering direct instruction to improve Jaime’s writing. At first Jaime makes good progress, but then he has 4 weeks in which he performs below the goal line.
Explore, Apply, and Look at Effects of Solutions

• The Sp. Ed. teacher would collect ongoing progress monitoring data and use decision rules to determine if/when an instructional change is needed:

  – Student is on track → Continue current instruction.

  – Student is not on track → Make a change.

  – Student is exceeding goal → Raise the goal!

Example:

  Jamie’s teacher uses the rule that 3 to 4 data points below the goal line indicates the need for an instructional change.
For more information and to test your decision-making skills, please see the “Goal Setting and Data-Based Instructional Decision Making” module.
Example: Decision Rule

Let’s say the teacher is delivering direct instruction to improve Jaime’s writing. At first he makes good progress, but then he has 4 weeks in which he performs below the goal line.

![Graph showing progress and decision rule](graph.png)
Exploring, Applying, and Looking at Effects of Solutions

So, the teacher makes an instructional change by adding a peer mediated component.
Exploring, Applying, and Looking at Effects of Solutions

If progress is still insufficient, the teacher makes another instructional change.

By using ongoing progress data to make these decisions, the teacher finally identifies an intervention that appears to be effective for this student.

![Graph showing correct word sequences over time with interventions 1, 2, and 3.]
References and Resources

CBM Overviews

CBM Reviews
Special issue of *Journal of Special Education, 41*, Summer 2007

Additional Training Modules
“Introduction to CBM for Progress Monitoring” (National Center on RTI)
“An Introduction to Monitoring Academic Achievement in the Classroom” (Peabody IRIS Center)
Now, see if you can answer the self-test questions.

After you complete the self-test, you will be able to review the results.
The purpose of CBM is to:

- A) Show student progress over time within a given academic area.
- B) Diagnose a student’s academic problems.
- C) Measure a child’s temperature.
- D) Show whether a student has mastered skills taught in during a single instructional unit.

Your answer:

The correct answer is:
A problem is defined when:

- **A)** The teacher senses that the student is struggling in an academic area.

- **B)** The student’s baseline performance looks low.

- **C)** There is a discrepancy between the student’s observed and expected performance.

- **D)** The student doesn’t respond to an intervention.

Your answer:

The correct answer is:
How does a teacher know when to change an intervention?

- A) When 8 weeks have passed.
- B) When the data fall below the goal line for a specified number of sessions.
- C) Never; it is important to carry out an intervention for an entire school year.
- D) When the student meets the goal.

Your answer:

Submit your answer

The correct answer is:
If the student is progressing at a rate that exceeds the goal line

- A) The intervention can be terminated.
- B) The goal should be raised.
- C) The intervention should be changed.
- D) No change is needed.

Your answer: 

The correct answer is: 

Submit your answer
# Self-test results

<p>| | |</p>
<table>
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<th></th>
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</tr>
</thead>
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<tr>
<td><strong>Number of Quiz Attempts</strong></td>
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- Review self-test results
- Continue to the next slide
Summary

- CBM provides a research-based approach to collecting reliable and valid data for problem solving, once the problem has been identified.

- CBM was designed to be a set of *simple, efficient, standard* procedures that provide general outcome indicators of student performance and progress over time.