

# CURRICULUM-BASED MEASUREMENT

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## CURRICULUM-BASED MEASUREMENT (CBM)

**Primary Disciplinary Field(s): Education, School Psychology, Special Education, Psychometrics**

### 1. Core Definition and Distinction

Curriculum-Based Measurement (CBM) refers to a standardized, yet highly individualized, set of procedures used to evaluate student performance in fundamental academic skills, most commonly **reading, writing, mathematics, and spelling**. CBM is distinguished from traditional, large-scale standardized testing in its explicit reliance on the specific material that has been taught or is currently being used in the student's classroom curriculum, rather than comparing students against broad, generalized regional or national norms. The essential function of CBM is to provide educators with frequent, low-stakes data regarding whether students are making adequate progress toward instructional goals, making it an invaluable tool for **progress monitoring** and adjusting instructional strategies in real-time. This methodology is rooted in the belief that effective educational decision-making requires readily accessible data that accurately reflect student mastery of the content they are actively learning, ensuring the assessment is ecologically valid and instructionally relevant.

The core philosophy of CBM centers on a direct and transparent linkage between instruction and assessment. Unlike standardized tests that may cover content presented weeks or months prior, or material that was never explicitly taught, CBM probes are developed directly from the yearly curriculum goals. For instance, a reading CBM probe might involve a one-minute sample of the student reading aloud from a text representing the end-of-year reading level for their grade. This approach ensures that the measurement is a "slim analysis" of actual pupil behavior, contrasting starkly with generalized examinations that aim for broad comparison against external standards. Because the information assessed has been recently and directly posited to them, students generally find CBM tasks less stressful and easier to complete, providing a more accurate snapshot of their current instructional levels.

CBM serves as a critical bridge between formative assessment and instructional intervention. It provides quantitative data, typically expressed as a rate (e.g., words read correctly per minute), which is plotted over time to create a visual representation of student growth or stagnation. This frequent data collection allows educators to establish a baseline performance level and then set ambitious yet achievable goals, known as **aimlines**. If the plotted performance trajectory falls significantly below the aimline, it signals the need for an immediate instructional change. Conversely, if the student's performance exceeds the aimline, the intervention may be intensified or the goals may be raised, ensuring that instruction remains optimally challenging and effective.

## 2. Historical Genesis and Proponents

Curriculum-Based Measurement emerged primarily in the late 1970s and early 1980s, driven by a need for more scientifically sound and instructionally useful methods for monitoring the academic progress of students, particularly those receiving special education services. Prior to CBM, special education decisions often relied upon lengthy, infrequent, and often expensive norm-referenced tests (NRTs) that failed to provide actionable data relevant to daily classroom teaching. The requirement for accountability stemming from landmark legislation, such as the Education for All Handicapped Children Act of 1975 (EHA, now IDEA), necessitated a better way to demonstrate that Individualized Education Programs (IEPs) were effective.

The pioneering work of Dr. Stanley L. Deno and his colleagues at the University of Minnesota is central to the development of CBM. Deno and his team sought to create assessment tools that possessed strong technical adequacy (reliability and validity) while remaining practical and efficient for regular teacher use. They operationalized the concept of academic competence as a rate of response over time, recognizing that fluency and accuracy in basic skills are strong predictors of overall academic success. Their initial research focused heavily on developing standardized procedures for creating probes and charting data in the areas of basic literacy and numeracy, establishing the foundational methodologies that define CBM today.

Key figures such as Lynn S. Fuchs and Douglas Marston further refined and expanded the technical and practical applications of CBM throughout the 1980s and 1990s. Fuchs, in particular, contributed significantly to establishing the validity of CBM measures for both screening and instructional planning, and for integrating CBM into complex decision-making frameworks. Their efforts transformed CBM from a research-based tool into a widely adopted standard practice, demonstrating its utility not just for special education, but for general education as well. This historical evolution solidified CBM's position as a cornerstone of data-based educational decision-making.

## 3. The Psychometric Framework of CBM

Despite its simplicity in administration, CBM is undergirded by rigorous psychometric principles, ensuring that the brief samples of student behavior are reliable indicators of overall academic proficiency. CBM probes are designed to be general outcome measures (GOMs). A GOM is intended to assess the student's mastery of the entire year's curriculum goals simultaneously, even when measuring performance on a single, brief task. For example, a single one-minute reading passage measures not just the ability to read that specific passage, but the overarching skill of reading fluency at that grade level. This predictive power allows educators to extrapolate from the small sample to the student's overall competence in the domain.

The reliability of CBM is extremely high, largely due to its standardized administration and scoring

procedures, which minimize measurement error. Furthermore, CBM boasts high levels of concurrent and predictive validity. Studies consistently show that CBM scores correlate highly with scores on high-stakes, norm-referenced achievement tests, demonstrating concurrent validity. More importantly, CBM scores are excellent predictors of future academic success, including performance on state accountability tests and long-term academic growth, highlighting their predictive validity. This technical strength is what makes CBM data acceptable for making significant educational decisions, such as identifying students who require specialized intervention.

A critical psychometric distinction for CBM is its dual reference system. While the procedures for administration and scoring are **norm-referenced** (standardized across classrooms or districts), the interpretation of the results for progress monitoring is fundamentally **criterion-referenced** at the individual student level. The student's performance is judged against their own established goal or aimline, which is derived from their baseline performance and the instructional goals set within their own curricular context, rather than solely against an external average. This combination provides both technical rigor and instructional relevance, allowing CBM to function effectively both as a screening tool (norm-referenced comparison to peers) and a progress monitoring tool (criterion-referenced comparison to self).

#### 4. Implementation and Procedures

The practical application of CBM is characterized by brevity, frequency, and visual data management. Implementation requires several key steps, beginning with the selection of appropriate measures that align with the core curriculum and the identification of the students whose progress needs close monitoring. The measurement tools themselves are carefully constructed to ensure that they are parallel forms--meaning each probe measures the same construct with equal difficulty, allowing scores from different weeks to be legitimately compared over time.

**Baseline Data Collection:** Typically, three to five CBM probes are administered consecutively to a student to establish a reliable baseline score. This score represents the student's performance level prior to the implementation of a targeted intervention.

**Goal Setting and Aimline Creation:** Based on the baseline data and grade-level expectations, a long-range goal is established. An **aimline** is then drawn on a graph connecting the baseline data point to the goal data point, visually representing the required rate of improvement.

**Frequent Monitoring:** The student is measured weekly or bi-weekly using a different parallel form of the CBM probe (e.g., a new reading passage or math sheet). The measurement process is usually timed and highly standardized, often lasting only 1 to 5 minutes.

**Data Evaluation:** The weekly score is plotted on the graph. The teacher visually inspects the

student's data relative to the aimline. If four to six consecutive data points fall below the aimline, the intervention is deemed ineffective and a change is required. This system provides an objective, data-driven trigger for instructional modification.

The efficiency of CBM is paramount to its success in school settings. Because the probes are short and administration is streamlined, teachers can integrate monitoring into their existing schedule without excessive burden. This administrative ease is coupled with a scoring process that is fast and objective (e.g., counting words correct per minute, digits correct per minute). The focus on observable behaviors and quantifiable rates ensures that interpretation is standardized and less reliant on subjective judgment.

## 5. Integration within the Response to Intervention (RTI) Model

CBM has become an indispensable component of modern educational models, most notably the Response to Intervention (RTI) framework. RTI is a multi-tiered approach to identifying and supporting students with learning and behavioral needs. CBM plays a distinct and critical role at multiple tiers of this framework, providing the necessary data infrastructure for the entire model to function scientifically.

At Tier 1 (Universal Screening), CBM measures are used periodically (e.g., three times per year) to screen all students in a grade level to identify those who are performing below benchmark expectations and are therefore considered at risk for academic failure. This population-level screening ensures early identification and proactive intervention planning. At Tier 2 and Tier 3 (Targeted and Intensive Interventions), CBM transitions from a screening tool to a mandatory **progress monitoring** tool. Students receiving targeted interventions are measured weekly or bi-weekly using CBM probes specific to the skill being remediated.

The core function of CBM within the RTI model is to facilitate instructional fidelity and effectiveness checks. The data collected provides empirical evidence of whether the resources and effort invested in an intervention are yielding the desired student outcome. If a student fails to respond adequately to high-quality, research-based instruction as evidenced by their CBM progress monitoring data, the RTI team can use that information to intensify the intervention (move from Tier 2 to Tier 3) or, in the most severe cases, determine eligibility for special education services, thereby replacing the reliance on the "discrepancy model" of identification that previously dominated the field.

## 6. Pedagogical Significance and Benefits

The significance of CBM extends beyond mere assessment; it profoundly influences instructional quality and accountability. One of the primary benefits is the immediacy and clarity of the performance feedback it provides to both teachers and students. Teachers gain objective insights

into which instructional methods are successful and which students require immediate instructional modification, fostering a data-driven pedagogical environment. This continuous feedback loop prevents minor learning deficits from compounding into major academic crises.

For students, CBM offers a clear, understandable measure of their own progress. When students regularly chart their own scores, they gain ownership over their learning process, leading to increased motivation and self-efficacy. They can physically see their growth over time, reinforcing the idea that effort leads to measurable improvement. This motivational aspect is particularly beneficial for struggling learners who often experience repeated failure in traditional testing environments.

Furthermore, CBM data provides an excellent basis for communicating with parents and administrators. The visual graphs generated by CBM are easily interpreted by non-specialists, making IEP meetings and parent-teacher conferences more objective and collaborative. Instead of relying on anecdotal evidence or subjective grades, discussions can center on measurable rates of growth and specific data points demonstrating the effectiveness, or lack thereof, of the educational program being delivered. This transparency enhances accountability across all stakeholders involved in the student's education.

## 7. Challenges, Limitations, and Future Directions

Despite its widespread acceptance and technical robustness, CBM is not without its limitations and ongoing challenges. One persistent criticism is the potential for **curriculum narrowing**. Because CBM focuses heavily on basic skills and fluency, some critics argue that teachers might inadvertently prioritize teaching only the measurable aspects of the curriculum, such as rote reading or calculation speed, at the expense of higher-order thinking skills, critical analysis, or deep comprehension. While CBM developers have created measures for higher-level skills (e.g., written expression CBM), the most frequently utilized measures remain focused on foundational competencies.

Another practical challenge involves teacher training and fidelity of implementation. For CBM to be effective, teachers must adhere strictly to the standardized administration and scoring protocols. They must also be proficient in analyzing the graphed data and translating performance deficits into specific, high-leverage instructional changes. Lack of adequate professional development can lead to inaccurate data collection or misinterpretation, ultimately undermining the scientific integrity of the progress monitoring system.

Future directions for CBM research include adapting the methodology for use in secondary education settings, where curricular content is more diffuse and specialized than in elementary grades. Researchers are also exploring the integration of CBM with computer-adaptive testing (CAT) technology to increase efficiency and automatically generate individualized probes.

Regardless of these developments, the core principles of frequent, standardized, curriculum-linked measurement established by Deno and his colleagues remain foundational to evidence-based practice in modern education and school psychology.

### Further Reading

[Curriculum-Based Measurement \(Wikipedia\)](#)

[Response to Intervention \(RTI\) Framework](#)

[Stanley L. Deno, Ph.D. Profile \(Pioneer of CBM\)](#)

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