

Monitoring Progress of Students Who Are Deaf or Hard of Hearing

Susan Rose, Ph.D.

Special Education Programs

Department of Educational Psychology

University of Minnesota

Correspondence:

Susan Rose
College of Education and Human Development
University of Minnesota
56 East River Road
Minneapolis, MN 55455

Abstract

Monitoring Progress of Students Who Are Deaf or Hard of Hearing

Federal and state legislation has placed a renewed emphasis on accountability and academic outcomes among students who are deaf or hard of hearing. While much attention is given to norm-referenced standardized testing accommodations, there is a need for functional formative assessments for the purpose of monitoring students' academic progress. This paper addresses some of the evaluative perspective of students' academic performance within the field of deaf education and the critical need for progress monitoring. A brief review is included of studies conducted using Curriculum-Based Measurement (CBM) with students who are deaf and hard of hearing.

Monitoring Progress of Students Who Are Deaf or Hard of Hearing

Susan Rose
University of Minnesota

Several landmark educational reforms have occurred over the past 25 years with significant impact on how, where, what, and who provides educational programming for children and youth who are deaf or hard of hearing. With the onset of the P.L.94-142: Education for All Handicapped Children's Act of 1975, and the Individuals with Disabilities Education Act (IDEA) of 1997, education of children with hearing loss has been externally revolutionized by agencies and agents seeking more options and opportunities for children with special needs. The reauthorization of IDEA in 2004 and the No Child Left Behind Act of 2001 have placed renewed emphasis on academic standards, assessment, and accountability. This quarter century of change has significantly altered the manner, place, materials, and credentials of those who are responsible for the education of infants, children, and youth who are deaf.

Historically, monitoring the academic performance of children with hearing loss was conducted internally to determine conditions within the field of deaf education. Examples include two federally commissioned panels charged, in part, with evaluating the practices and outcomes of programs providing specialized education services to individuals who are deaf or hard of hearing. The Babbidge Committee Report (1965) provided an early account of practices, resources, and academic levels in schools and programs for deaf individuals. This report served as the basis for the development and improvement of professional training programs, curricula, and materials focused on deaf education. The Commission on Education of the Deaf (COED) is a more recent example in the ongoing quest to improve the educational outcomes for persons with hearing loss. In its 1988 report, *Toward Equality: Education of the Deaf*, the COED identified the need to ensure appropriate and individualized instruction that addressed educational, social, and communication requirements for infants, children and youth with hearing loss. The report cited the fact that in the past 25 years, only minimal improvements have been noted in the academic progress of deaf children, particularly in the areas of reading and writing (Bowe, 1991). The COED's recommendations included the need for increased

research in assessment and instructional practices and inferred that significant academic progress is more likely to occur in settings where the curriculum and instruction are communicatively accessible, uniquely designed, and delivered by individuals who have highly specialized skills to address the needs of children with hearing loss (Moores, 2001).

The COED's reports have impacted the training of qualified teachers, speech and language pathologists, counselors, school psychologists, and educational interpreters. The recommendations have brought greater thoughtfulness to the enforcement of the "least restrictive environment" practices for children with hearing loss. Rather than excluding children who are deaf or hard of hearing from access to specialized schools and programs, the COED report may have prevented wholesale closing of publicly funded schools designed exclusively for deaf and hard of hearing children. Today, approximately 30% of children who are deaf or hard of hearing are educated in special schools. Among the 70% of students attending general education programs, approximately 30% receive instruction primarily in self-contained classrooms while the remaining 40% are placed in classrooms designed for hearing students (Gallaudet Research Institute, 2005; Moores, 2006).

IDEA (1997) legislated the inclusion of children with disabilities into the general education curriculum and evaluation, testing, and assessment processes. With the reauthorization of IDEA by President Bush and the initiation of NCLB, there is renewed emphasis for: (a) inclusion of deaf and hard of hearing students and programs in accountability practices; (b) a focus on "closing the achievement gap" between deaf, hard of hearing, and hearing students; and (c) a mandate for research-based educational practices and progress monitoring. The need to demonstrate the effect of highly specialized instructional programming has placed a sense of urgency on the field of deaf education. Scientific evidence demonstrating the academic progress of children with hearing loss is a mandate, not an option.

Gallaudet University's Research Institute (GRI) provides the most extensive and comprehensive model for the summative monitoring of progress across populations of deaf and hard of hearing students. GRI maintains a national demographic and academic achievement database of students that dates back to the 1960s. A national survey of

achievement standards was conducted approximately every 7 years using the Stanford Achievement Test (SAT) (see Gallaudet Research Institute, 2005). The data obtained from testing at the community and state school levels and annual demographic reports provide a national normative standard for deaf and hard of hearing students suggesting a continuum of levels of academic achievement. This highly valued database is frequently used by teachers, parents, and programs as the annual yearly progress (AYP) “measuring stick” for comparison of an individual child’s academic achievement with deaf and hard of hearing peers.

Summative evaluations, demographic studies, and national research efforts have been and continue to be beneficial in defining the “academic conditions” of education for deaf and hard of hearing children (Allen, 1986; Holt, 1994; Strassman, 1997; Mitchell, (2004). Efforts to change conditions have primarily targeted areas such as audiology, (e.g., auditory training, digital hearing aids), medicine (e.g., cochlear implants), technology (e.g., real-time captioning, Web-based video), and communication (e.g., Bi-Bi, Cued Speech) interventions with little evidence of closing the gap or significantly impacting the academic growth among children and youth who are deaf. Educational conditions have received minimal attention. Luckner, Sebald, Cooney, Young, and Muir (2005) conducted a meta-analysis of literacy research with children who are deaf or hard of hearing. The authors noted the scarcity of technically adequate and verifiable research to the extent that conducting a meta-analysis was challenging. More importantly, the authors noted that “commonly used approaches in the field of deaf education have been established by tradition and anecdotal reports” (p. 2).

The academic achievement gap between students who hear and those who are deaf or hard of hearing is a frequently reported fact (Meadow-Orleans, 2001; Moores, 2003; Marschark, 2006). The median reading comprehension score as measured by the SAT-9 for 17- and 18-year-old deaf and hard of hearing students is approximately equivalent to that of fourth-grade hearing students (Gallaudet Research Institute, 2005). This level is only slightly higher than reading achievement scores reported a quarter of a century ago. Professionals in the field of deaf education have linked this “failure” or lack of academic growth to the paucity of research and ineffectiveness of instructional strategies used with children who are deaf or hard of hearing (Paul, 1996; Strassman,

1997; Marschark, Lang, & Albertini, 2002; Marschark, 2006). Knowing “what works” for the advancement of academic progress too often is left to the philosophical commitments of programs, administrators, parents, and teachers seeking the “one-size-fits-all” solution. Research focused on instructional strategies, curricula, teachers, and program characteristics is nearly nonexistent (Meadow-Orleans, 2001).

The ability to determine effective instructional strategies for individual children is not yet available. What is needed is a means by which a parent, teacher, or student can monitor academic progress and establish valid, reliable, and achievable goals for learning. Once we are able to measure academic growth reliably, we can begin to identify which educational interventions are working for each child within selected settings, curricula, and materials.

Academic Monitoring Practices

While mandated large-scale, “high-stakes” testing has received considerable attention, the majority of program and accountability measures used to determine the progress of deaf and hard of hearing students provide limited functional or technically valid information. Standard monitoring practices include the use of commercially or agency-developed achievement tests administered in the fall and spring of the academic year. The differences between the two scores are used as AYP measures. Unfortunately, a number of problems are inherent in this process. The first and most evident problem is that end-of-year scores fail to inform the teacher, child, and parents of the child’s progress as the teaching and learning processes are occurring.

A second challenge is the use of achievement tests designed primarily for hearing students. The success of an individual student, a group of students, or a program is often described through performance scores on standardized tests that assign specific age- and grade-level criteria to an academic area (e.g., math, reading). These measures use normative data from primarily hearing populations and assume that a specific set of skills or facts should be acquired within a fixed time period relative to the grade level and the student’s age (Stiggins, 2005). Using these standards, it is difficult to determine the academic growth of a student who participates in curricula or academic strands that are out of grade level and therefore beyond the boundaries of the predetermined grade and age levels being tested. It is not uncommon for teachers in this situation to regard the

results of standardized achievement testing as meaningless since the test content frequently fails to align with instructional or curriculum content and cannot be interpreted as intended.

A third concern is the use of accommodations during the testing process. The National Center on Educational Outcomes (NCEO) has conducted an extensive review of student participation in state and local assessments for students with disabilities (Clapper, Morse, Lazarus, Thompson, & Thurlow, 2005). Generally accepted test accommodations for students with hearing loss include sign language, cued speech and oral interpreters, visual cues, repeated directions, amplification equipment, noise buffers, extended time, and individual administration. While state and local policies specify that accommodations must maintain the validity of the test and the resulting scores, Sireci, Scarpati, and Li (2005) reported inconsistent evidence regarding the use of additional time and little information regarding the use of sign language interpreters in maintaining the technical qualities of the test.

A fourth challenge in monitoring the academic progress of children who are deaf or hard of hearing is the dearth of technically valid and reliable measures that are embedded in the instructional process. Teachers, parents, and students rely primarily on assessments drawn directly from the curriculum including teacher-made and text-based tests, observations, running records, checklists, and rubrics to determine students' academic progress (Moores, 2001; Marschark, Lang, & Albertini, 2002; Luckner & Bowen, 2005). While these assessments are useful at the time of instruction, the outcomes of such measures frequently fade as the teacher and the student move to the next skill, the next chapter, or the next day (Fuchs, Fuchs, & Deno, 1982).

Teachers face the formidable task of not knowing until the year's end "what works," that is, if the academic placement was appropriate, if the curriculum matched the needs of the child, if the instructional strategies used were effective, or if the information was accessible to the child. While teachers and parents have "hunches," effective teaching and learning practices mandate the use of informative, functional, and technically adequate measures of student growth (Berliner, 1984). If we are to increase academic performance among children who are deaf or hard of hearing, we must renew

our attention to effective instructional practices where measurement of student growth informs instruction and the decision-making process.

It may be valuable to consider a typical scenario, as is the case of Grace. Identified at 2 months of age as having a significant hearing loss following a virus and high fever, Grace was immediately enrolled in a parent-infant program, received home- and school-based interventions, and flourished. Her kindergarten readiness evaluation indicated she excelled in comparison to her hearing peers. Her academic performance was in the upper half of her class through most of the first grade. In second grade, she was “just about average,” as reported by her general education teacher. By the end of third grade, her parents were extremely disappointed by her poor performance on the statewide reading tests. The teacher reported, “I really didn’t notice that Grace was having problems reading. It may be that her speech is not as clear as the hearing children. It may just take time for her to ‘catch up.’” Fourth grade continued to be a nongrowth period for Grace while teachers and parents waited for her to catch up.

Timely, valid, and reliable measures of Grace’s academic performance may have prevented the delay in recognizing the need for change. The teacher and parents needed a gauge or an indicator that Grace was not growing academically and at the same rate as her hearing classmates. What is missing is technically robust data that can be used to identify the need for *early intervention*, to assist students such as Grace in the process of learning to read. What is essential is a formative and systematic process for monitoring students’ progress.

Progress Monitoring

Progress monitoring is defined as a scientifically based process that can be used to “assess students’ academic performance and evaluate the effectiveness of instruction” (National Center on Student Progress Monitoring, para. 1). Progress monitoring may be used to measure an individual student’s academic growth, a class of students, or a program’s general rate of growth within specific academic areas. Information obtained through progress monitoring data can be interpreted to determine the effectiveness of instructional strategies, accomplishments of instructional goals, appropriateness of placement, and curricula (National Education Association, 2005).

While the development of valid and reliable progress monitoring measures has been ongoing since the late 1970s (Deno, 1985), research has typically not included children with hearing loss. Bradley-Johnson and Evans (1991) identified the need for more robust academic monitoring tools as critical to improving the educational outcomes for children who are deaf or hard of hearing. They proposed the use of curriculum-based assessments such as Curriculum-Based Measurement (CBM) as a potential alternative to standardized achievement tests. Objective and reliable measures of student growth depend on standardization of administration, scoring, and interpretation of results. Given the extensive heterogeneity among students with hearing loss and variability in programs, placements, and instructional models, the development of progress monitoring measures has received little attention within the field. However, the renewed call for accountability and need to determine the effectiveness of interventions, including educational, environmental, medical, and audiological strategies, mandates the development of ways and means to determine “what works.”

Progress monitoring tools that have been used with students who are deaf or hard of hearing and reported to be helpful in determining student growth include tools such as portfolios (Reed, 1997), rubrics (Schirmer, Bailey, & Fitzgerald, 1999), mastery monitoring measures (White, 2002), criterion reference checklists (Luetke-Stahlman, 1987), and selected curriculum-based assessments (Gickling & Thompson, 1985; Burns, MacQuarrie, & Campbell, 1999). These assessment procedures have been used in research or intervention programs and occasionally as an application to progress monitoring practices. For example, French (1988) reported using a frequent and systematic process of story retelling as an assessment of students’ reading progress as well as an instructional intervention to increase story comprehension abilities. Nover, Andrews, and Everhart (2001) provided training in the use of curriculum-based assessment tools as measures of short-term progress including reading checklists, story signing, story retelling, and dialogue journals as part of the U.S. Department of Education’s Star Schools Project in bilingual methodology and language assessment.

Curriculum-based assessment progress monitoring strategies are useful to teachers of children with hearing loss. However, many of these types of progress monitoring programs use a “parts-to-whole” approach; that is, proficiency or mastery of subskills

(e.g., decoding) are measured independently from the targeted goal (e.g., reading fluency). The teacher is subsequently required to function as the engineer, integrating exceptionally complex processes and learned components into a functional system of fluency in basic academic areas such as reading, writing, or math. Many of the curriculum-based assessments provide student outcomes that are “fractionated” into a variety of subskills (Deno, 1992) that are not only cumbersome to manage and integrate but also difficult to monitor as the child progresses through the curriculum. Useful progress monitoring assessments need to maintain an unambiguous path toward the goals of instruction. Progress monitoring tools must clearly communicate the student’s academic growth within a formative context. In particular, if progress monitoring systems are to be used in educational settings, they need to be teacher and student friendly, functional, economical, informative, valid, and reliable. Assessment of student progress is critical to the advancement of the field of deaf education. Identifying processes or methods that frequently and reliably provide formative information related to what is being taught throughout the academic year and can easily communicate growth, is a mandate for the improvement of educational outcomes of children who are deaf or hard of hearing.

Curriculum-Based Measurement (CBM)

CBM is the only progress monitoring process, thus far, that is scientifically based and technically robust. It is a standardized process that measures and monitors a student’s progress within the school’s curriculum, specifically in the basic skill areas of reading, writing, spelling, and mathematics. Initially, CBM was developed for use with children identified for special education services, particularly students who were identified as learning disabled or “high-risk” students. The design and development of CBM maintained the goal of providing teachers and parents with an efficient and economical tool to: (a) continuously and frequently assess student performance using a standard measure, (b) provide information regarding the rate of academic progress, and (c) provide teachers with data regarding the effectiveness of instruction (Deno, 1985). Additional research on the development and applications of CBM can be found through the Research Institute on Progress Monitoring and National Center on Student Progress Monitoring.

The advantages of CBM are significant and varied. The process is curriculum-based; that is, the materials used to assess performance can be drawn from the reading passages or spelling program used in the classroom, school, or district. Commercially prepared passages are also available that allow comparisons in students' rate of growth across programs and curricula. Monitoring student progress using the CBM process is efficient. The assessment probes can easily be administered as part of the instructional routines in the classroom. The majority of the measurement tools require an average of 3 minutes to administer and record. Another advantage is that the results of CBM measures are individually referenced; that is, a student's performance is compared to his or her own performance over time. The teacher, parents, and student can easily review graphically displayed performance data (Deno, 1992). The data gained from frequent, direct, and continuous monitoring of student progress can provide teachers a means of determining if and when instructional changes are needed and subsequently whether implemented changes are effective. CBM also has been used to effectively determine a student's progress within the local curriculum, to establish class or program norms, to determine individualized education plan (IEP) goals (Stecker, 2005), and to predict success on "high-stakes" statewide tests (Deno, 2003). Today, research and applications of CBM extend from preschool through postsecondary education (Espin & Foegen, 1996; Miller, Hooper, & Rose, 2005).

While a plethora of research has demonstrated the benefits of CBM as a highly desirable process, it is also important to recognize that CBM as a progress monitoring tool requires attention and time for acquisition. Teachers often express concern regarding the range of skills sampled through CBM measures (e.g., oral reading fluency, Maze silent reading fluency) and the relationship of the scores to general academic growth (reading comprehension). Providing teachers with information and training in progress monitoring applications can be beneficial in understanding CBM as an indicator of academic "wellness" as well as assisting them in making progress monitoring part of the instructional process (Deno, 2003).

CBM does not provide diagnostic information; that is, it does not inform the teacher regarding what needs to be changed (Deno, 1985, 2003). Rather, it is an indicator of students' general progress as they move toward identified instructional goals.

In-service training, instructional exchange pods, and teacher mentor/advisory groups can provide teachers with opportunities to share student data and collaboratively develop innovative instructional approaches based on that data (Marston, Diment, Allen, & Allen, 1992).

Research With Students Who are Deaf or Hard of Hearing

The technical adequacy of CBM reading and writing measures for students who are deaf or hard of hearing has been investigated by a small number of researchers. Allinder and Eccarius (1999) examined the reliability and validity of oral reading fluency procedures with 36 students who were deaf or hard of hearing, ranging from 6 to 13 years of age. All of the students included in the study received instruction through Signed English. Students were individually administered the Test of Early Reading—Deaf and Hard of Hearing (TERA-DHH), oral reading passages, and story retell passages selected from the Comprehensive Reading Assessment Battery (CRAB). Each student was given a passage and instructed to read the passage using Signed English, and then retell the story using Signed English. All of the students' responses were video recorded and reviewed by trained scorers. The scores represented the "number of words" read correctly and the number of idea units retold through signing. Results indicated that the correlations between the scores obtained on the TERA-DHH and the signed reading passages were too low to consider signed reading as a technically valid measure of reading achievement.

As an alternative to oral reading fluency, Shin and colleagues (2000) conducted a series of studies using a modified Cloze procedure. The Maze procedure measures reading fluency using a passage from the student's reading curriculum or commercially prepared passages. Every seventh word is deleted within the passage and replaced with three word choices (see figure 1). The students are given practice items and directions to read the passage within a specified time period (1, 2, or 3 minutes), circling the correct word. The scores include the number of correct responses, the number of incorrect responses, and correct minus incorrect responses.

The snow was falling and the air was crisp. He put on his (**tress**/**boots**/**houses**) and walked to school. He wondered (**what** /**lucky**/**flakes**) would happen if he decided to (**skip** /**fell**/ **raining**) school today and make it his (**many**/ **snow**/ **very**) own special holiday.

Figure 1. Maze Reading Sample

Devenow (2003) investigated the technical adequacy of the Maze procedure as a tool to measure silent reading fluency. Her study included 55 students who were deaf or hard of hearing, ranging from 9 to 18 years of age. Students were given 2- and 4-minute passages, and an unlimited time to read each passage and select the correct responses. She reported statistically significant correlations between the SAT-9 Reading Comprehension scaled scores and the 2- and 4-minute Maze passages. The untimed Maze procedures were not significant.

The characteristics of written expression progress monitoring measures have also received some attention in the field of deaf education. Isaacson (1987, 1996) provided a number of alternatives suggesting that CBM may be a promising approach. Chen (2002) studied the technical characteristics of CBM procedures and written expression with 51 deaf and hard of hearing children ranging from 7 to 12 years of age. The Test of Written Language (TOWL), teacher ratings, and experts' holistic ratings were used as criterion measures to determine the construct validity and alternative form reliability, time variables, and sensitivity to growth. Chen reported that words spelled correctly and total words written appear to be valid and reliable indicators of students' writing proficiency when using 3-minute writing samples in response to picture stimuli. Her studies also indicted that the CBM scoring procedure "Correct Word Sequence" (Espin, Shin, Deno, Shkare, Robinson, & Benner, 2002) may be a more sensitive tool when compared to number of words written or type-token-ratio measures to determine growth in written expression with students who are deaf or hard of hearing.

Several teachers, schools, and programs for deaf and hard of hearing students are using prereading, reading, math, and written expression CBM measures, and similar types of progress monitoring tools (e.g., Dynamic Indicators of Basic Early Literacy Skills (DIBELS)), adapting materials and procedures to meet their specific needs. A few teachers of deaf and hard of hearing children have adapted oral reading procedures

reported by Deno and colleagues (1982) and others (Fuchs, Butterworth, & Fuchs, 1989; Jenkins & Jewell, 1993), using reading passages common to the classroom curricula and a combination of signs and spoken English (Meredith & Walgren, 1998; Foutch & Meredith, 2005). While the process may be not be scientifically based or technically sound, the teachers reported that the use of weekly progress monitoring measures was a critical part of their instruction and provided information regarding academic growth and AYP of their students, data-based documentation for program placement, determination of time and support services needed, as well as program accountability.

Revisiting the case of Grace, weekly 1-minute CBM Maze silent reading scores provided the teacher and parents with information regarding Grace's progress relative to identified goals. Using information generated from CBM data, the classroom teacher and the teacher of the deaf reviewed Grace's silent reading scores over an 8-week period in relationship to reading goals set for the class. Working in concert, the teachers recommended changes that focused on increasing direct instructional time in reading with a specific emphasis on developing language concepts and related vocabulary. The parents and teachers decided to continue monitoring Grace's progress over the next 8 weeks using Maze silent reading scores to determine if implemented instructional changes positively impacted rate of growth (see figure 2).

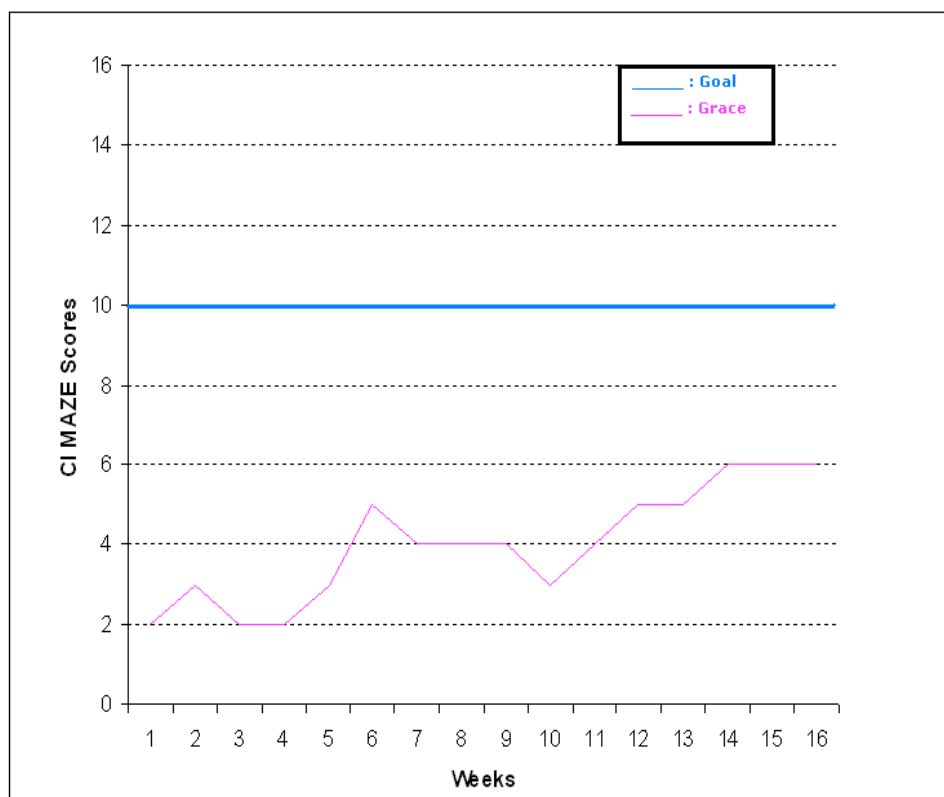


Figure 2: Grace's Maze scores (Correct—Incorrect responses) plotted over 16 weeks. Instructional change occurred during week 8. Instructional goal for the third-grade class is a score of 10.

Discussion

While we still need to develop a better understanding of how deaf and hard of hearing children learn, we are cognizant of the fact that no single approach or strategy will provide the solution. We need to move away from standardized tests to assessments that will inform teachers, parents, and students through individually referenced performance measures. While there is little research to guide us, only when we have valid and reliable progress monitoring measures will we be able to identify instructional strategies and audiological, medical, and communication interventions that are effective or ineffective for a child.

The challenges in the application of progress monitoring tools with deaf and hard of hearing children are many. Perhaps the most significant challenge is the variability within the population and the educational systems including communication systems and

curricula. The second challenge is the lack of attention given to research and development efforts in the application of progress monitoring measures for use with children who are deaf or hard of hearing. Considerable time and talent have been dedicated to providing alternative or adaptive strategies in the administration of norm-referenced standardized achievement tests. While these are necessary and valued in the field of deaf education, increased attention must be given to providing teachers with technically sound tools germane to students with hearing loss that can be used as an integral component within the instructional process. A third challenge is the recognition that monitoring each student's progress is mandatory. Increasing the academic progress for each student with a hearing loss requires setting goals for academic achievement and finding the ways and means to achieve those goals.

Specialized teachers and programs serving children with hearing loss are mandated to provide evidence beyond standardized test scores, observations, and opinions regarding students' academic performances. Accountability in the field of education for children with hearing loss is dependent on the use of valid and reliable data. CBM may provide the field of deaf education with the process and tools to demonstrate that what we are doing is working.

References

- Allen, T. E. (1986). *Understanding the scores: Hearing-impaired students and the Stanford Achievement Test* (7th ed.). Washington, DC: Gallaudet Research Institution.
- Allinder, R. M., & Eccarius, M. A. (1999). Exploring the technical adequacy of curriculum-based measurement in reading for children who use manually coded English. *Exceptional Children*, 65, 271–283.
- Babbidge Committee Report. (1965). *Education of the deaf in the United States, Report of the advisory committee on the education of the deaf*. Washington, DC: U.S. Government Printing Office.
- Berliner, D. C. (1984). *Effective classroom teaching: Conditions for developing exemplary schools*. Paper presented at the Association for College Educators for the Hearing Impaired, Tucson, Arizona.
- Bowe, F. (1991). *Approaching equality: Education of the deaf*. Silver Spring, MD: T. J. Publishers.
- Bradley-Johnson, S., & Evans, L. D. (1991). *Psychoeducational assessment of hearing-impaired students: Infancy through high school*. Austin, TX: Pro-Ed.
- Burns, M. K., MacQuarrie, L. L., & Campbell, D. T. (1999). The difference between Curriculum-Based Assessment and Curriculum Based Measurement: A focus on purpose and result. *Communique*, 27(6), 18–19.
- Chen, Y. (2002). Assessment of reading and writing samples of deaf and hard of hearing students by Curriculum-Based Measurements. Unpublished doctoral dissertation, University of Minnesota, Minneapolis.
- Clapper, A. T., Morse, A. B., Lazarus, S. S., Thompson, S. J., & Thurlow, M. L. (2005). *2003 State policies on assessment participation and accommodations for students with disabilities*. (Synthesis Report 56). Minneapolis, MN: University of Minnesota, National Center on educational Outcomes.

- Commission on Education of the Deaf. (1988). *Toward equality: Education of the deaf*. Washington, DC: U.S. Government Printing Office.
- Deno, S. L. (1985). Curriculum-based measurement: The emerging alternative. *Exceptional Children*, 52, 535–542.
- Deno, S. L. (1992). The nature and development of curriculum-based measurement. *Preventing School Failure*, 36(2), 5–10.
- Deno, S. L. (2003). Developments in curriculum-based measurement. *The Journal of Special Education*, 37(3), 184–192.
- Deno, S. L., Mirkin, P., & Chiang, B. (1982). Identifying valid measures of reading. *Exceptional Children*, 49, 36–45.
- Devenow, P. (2003). A study of the CBM MAZE Procedure as a measure of reading with deaf and hard of hearing students. Unpublished doctoral dissertation, University of Minnesota.
- Espin, C. A., & Foegen, A. (1996). Validity of general outcome measures for predicting secondary students' performance on content-area tasks. *Exceptional Children*, 62, 497–514.
- Espin, C. A., Shin, J., Deno, S. L., Shkare, S., Robinson, S., & Benner, B. (2002). Identifying indicators of written expression proficiency for middle school students. *The Journal of Special Education*, 34, 140–153.
- Foutch, M., & Meredith, S. (2005, April). Curriculum based measurement in reading for deaf and hard of hearing students. Paper presented at the Minnesota State Conference for Teachers of the Deaf, Faribault, MN. Minnesota Department of Education, Minnesota Resource Center for the Deaf and Hard of Hearing
- French, M. M. (1988). "Story retelling" for assessment and instruction. *Perspectives for Teachers of the Hearing Impaired*, 7(2), 20–23.
- Fuchs, L. S., Butterworth, J. R., & Fuchs, D. (1989). Effects of ongoing curriculum-based measurement on student awareness of goals and progress. *Education and Treatment of Children*, 12, 21–32.

- Fuchs, L. S., Fuchs, D., & Deno, S. (1982). Reliability and validity of Curriculum-Based Informal Reading Inventories. *Reading Research Quarterly*, 18(1), 6–26.
- Gallaudet Research Institute. (2005). *Regional and National Summary Report of Data from 2003–2004 Annual Survey of Deaf and Hard of Hearing Children and Youth*. Washington, DC: GRI: Gallaudet University.
<http://gri.gallaudet.edu/Demographics/>
- Gickling, E., & Thompson, V. (1985). A personal view of curriculum-based assessment. *Exceptional Children*, 52, 205–218.
- Holt, J. (1994). Classroom attributes and achievement test scores for deaf and hard of hearing students. *American Annals of the Deaf*, 139(4), 430–437.
- Isaacson, S. L. (1987). Effective measures in written language. *Focus on Exceptional Children*, 19(6), 1–12.
- Isaacson, S. L. (1996). Simple ways to assess deaf or heard of hearing students' writing skills. *Volta Review*, 98(1), 183–200.
- Jenkins, J., & Jewell. (1993). Examining the validity of two measures for formative teaching: Reading aloud and MAZE. *Exceptional Children*, 59, 421–432.
- Luckner, J. L., & Bowen, S. (2005). *Join Together: A Nationwide On-Line Community of Practice and Professional Development Dedicated to Instructional Effectiveness and Academic Excellence within Deaf/ Hard of Hearing Education: Objective 2.4 Assessment*. Retrieved November 10, 2005, from <http://www.deafed.net>
- Luckner, J. L., Sebald, A. M., Cooney, J., Young, J., III, & Muir, S. G. (2005). *A review of evidence-based literacy research with students who are deaf or hard of hearing*. Technical report from the National Center on Low-Incidence Disabilities. Greeley: University of Northern Colorado.
- Luetke-Stahlman, B. (1987). A method for assessing language development of students who use signed-and-spoken English. *Perspectives for Teachers of the Hearing Impaired*, 6, 11–14.

- Marschark, M. (2006). Intellectual functioning of deaf adults and children: Answers and questions. *European Journal of Cognitive Psychology*, 18(1), 70–89.
- Marschark, M., Lang, H. G., & Albertini, J. A. (2002). *Educating deaf students: From research to practice*. New York: Oxford Press.
- Marston, D., Diment, K., Allen, D., & Allen, L. (1992). Monitoring pupil progress in reading. *Preventing School Failure*, 36(2), 21–25.
- Meadow-Orleans, K. P. (2001) Research and deaf education: Moving ahead while glancing back. *Journal of Deaf Studies and Deaf Education*, 6(2), 143–147.
- Meredith, S., & Walgren, M. (1998). *Performance assessment and intervention The problem solving model for deaf and hard of hearing students*. (Technical Report, 2nd rev.). Minneapolis, MN: Ann Sullivan Communication Center for the Deaf and Hard of Hearing, Minneapolis Public Schools.
- Miller, C., Hooper, S., & Rose, S. (2005). Avenue ASL: Developing an environment for assessing American Sign Language learner performance. *Advanced Technology for Learning*, 2(3), 140–147.
- Mitchell, R. E. (2004). National profile of deaf and hard of hearing students in special education from weighted survey results. *American Annals of the Deaf*, 149(4), 336–349.
- Moore, D. F. (2001). *Educating the deaf: Psychology, principles, and practices* (5th ed.). Boston: Houghton-Mifflin Co.
- Moore, D.F. (2002). The law of unexpected consequences. *American Annals of the Deaf*, 147(2), 84–87.
- Moore, D. F. (2003). Short term memory, morphology, and reading (editorial). *American Annals of the Deaf*, 148(1), 3–4.
- Moore, D. F. (2006). Comment on “w(h)ither the deaf community?” *Sign Language Studies*, 6(2), 2002–2009.
- National Center on Student Progress Monitoring. Retrieved May 22, 2007, from www.studentprogress.org

- National Education Association. (2005). *NEA helps develop assessment of student academic growth*. Retrieved December 15, 2005, from <http://www.nea.org/accountability/progressmonitor.html>
- Nover, S. M., Andrews, J. F., & Everhart, V. S. (2001). *Critical pedagogy in deaf education: Teachers reflections on implementing AS/English bilingual methodology and language assessments for deaf learners*. USDLC Star School Project Report No. 4.
- Paul, P. (1996) Reading vocabulary knowledge and deafness. *Journal of Deaf Studies and Deaf Education*, 1, 3–15.
- Reed, C. M. (1997). Grammar and student portfolios: Self-evaluation and pride in learning. *Perspectives in Education and Deafness*, 16(2), 2–4.
- Schirmer, B. R., Bailey, J., & Fitzgerald, S. (1999). Using a writing assessment rubric for writing development of children who are deaf. *Exceptional Children*, 65(3), 383–397.
- Shin, J., Deno, S. L., & Espin, C. (2000). Technical adequacy of the Maze task for curriculum-based measurement of reading growth. *Journal of Special Education*, 34, 164–172.
- Sireci, S., Scarpatti, S., & Li, S., (2005). Test accommodations for students with disabilities: An analysis of the interaction hypothesis. *Review of Educational Research*, 74(4), 457–490.
- Stiggins, R. (2005). From formative assessment to assessment FOR learning: A path to success in standards-based schools. *Phi Delta Kappan*, 87(4), 324–328.
- Strassman, B. K. (1997). Metacognition and reading in children who are deaf: A review of research. *Journal of Deaf Studies and Deaf Education*, 3, 140–149.
- White, A. H. (2002). Assessing semantic-syntactic features of verbs from thirteen verb subsets. *American Annals of the Deaf*, 147(1), 65–77.

For additional information on this or other topics, please contact The National Center on Student Progress Monitoring at studentprogress@air.org.

The National Center on Student Progress Monitoring is a cooperative agreement (H326W30003) funded by the U.S. Department of Education, Office of Special Education Programs, awarded to the American Institutes for Research

1000 Thomas Jefferson St. NW, Washington, DC 20007

Ph: 202-403-5000 TTY: 877-334-3499 Fax: 202-403-6844

e-mail: studentprogress@air.org website: www.studentprogress.org



This report was produced under U.S. Department of Education Grant #H325W30003 with the American Institutes for Research. Jane Hauser served as the project officer. The views expressed herein do not necessarily represent the positions or policies of the Department of Education. No official endorsement by the U.S. Department of Education of any product, commodity, service or enterprise mentioned in this publication is intended or should be inferred.



AMERICAN INSTITUTES FOR RESEARCH®