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Pre-Service Reading Teachers' Use of Curriculum-Based Measurement Data

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Abstract

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Pre-Service Reading Teachers' Use of
Curriculum-Based Measurement Data

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Abstract

Curriculum-Based Measurement (CBM) represents an advancement in classroom assessment technology in that it can be used to repeatedly measure students' progress over time. The usefulness of CBM progress monitoring to reading clinicians in the UNI Reading Clinic was investigated. Following seven weeks of progress monitoring, three clinicians and their tutees who had school psychology graduate students assigned to do CBM progress monitoring and three who did not responded to interview questions. Results indicated that reading clinicians in the progress monitoring condition did not make use of CBM data when answering interview questions about tutees' reading progress. Possible reasons for lack of data utilization and suggestions for further research are discussed.

Pre-service Reading Teachers' Use of
Curriculum-Based Measurement Data

Introduction

Curriculum-based measurement (CBM) uses direct observation and recording of students' performance. CBM was devised to provide "measurement and evaluation procedures that teachers could use routinely to make decisions about whether and when to modify a student's instructional program" (Deno, 1985, p. 221). CBM represents a first time technological advancement in the assessment of students' progress in a curriculum because it is efficient and you can do repeated measurement. Teachers wait long periods of time to tell whether students are making progress, and their progress is based on quarter, semester, or end-of-year data. CBM allows teachers to make regular checks to see if students are progressing.

In addition to monitoring student progress, CBM has an additional advantage of curricular relevance (e.g., students are assessed on material drawn from the curriculum of their school). CBM also may be used to pinpoint students' skill deficits, thus contributing to instructional planning and decision-making (Howell, Fox, & Morehead, 1993). CBM lends itself to analysis of skill deficits when administrators know how to mark error patterns. Deno, Fuchs, and Mirkin

(1984) showed that students whose performance was monitored systematically seemed to know more about their own goals and their progress toward those goals. CBM methods are practical and flexible and focus educators on issues that are educationally relevant.

Deno (1992) suggested three reasons for teachers to begin using CBM procedures. First, teachers lack clarity and focus about essential student outcomes. There is little agreement by teachers today on key indicators of student growth (Deno, 1992). Often teachers and students are uncertain about what the key indicators of progress in basic skills are and how to appraise them. CBM provides instrumentation for teachers to use as feedback on the success of their instructional programs (Deno, 1992). Second, there is a need for vital signs of student growth. Teachers need to begin using CBM procedures as vital signs of student growth.

Last, there are problems with achievement tests. Due to this lack of clarity and focus on educational outcomes and the need for indicators of student growth, government agencies have called for the development of uniform tests (Deno, 1992). However, if the new achievement tests are structured as the old, the intentions of the call for national achievement tests will not be met.

Marston (1989) stated that the current structure of achievement tests are problematic for two general reasons. First, there is great concern at the measurement-psychometric level. Second, these tests have not proven useful at the social policy level.

Of primary concern for all assessment procedures is technical adequacy. Salvia and Ysseldyke (1982) listed a number of frequently used tests that were not technically adequate in relation to validity, reliability, and quality of the normative data. Another problem with traditional tests is content validity. Marston (1989) stated that achievement tests often fail to sample adequately the curriculum the student is taught.

At the social policy level, Marston (1989) stated some legal and practical issues of concern. One concern was the cost of assessment; the assessment process is both costly and time-consuming. Marston (1989) stated that often times the cost of determining special education eligibility exceeds the cost of educating the child. CBM is an alternate form of assessment that is both cost and time efficient.

CBM originally was developed for use in monitoring the progress of students receiving instruction in special education classrooms (Marston, 1988). Accordingly, various

professionals in special education are trained in the use of CBM. On the other hand, regular educators may know little or nothing about CBM as an assessment technique. With the rise of the inclusion movement, more and more students with special education instructional needs may remain in regular classrooms (Harris & Graham, 1996). The implications of this are far reaching and greatly affect data gathering and utilization.

For example, some regular educators have changed from skills-based to literature-based instruction (e.g., whole language and constructivists' approaches). Their views on measuring progress may also have changed. In comparison, special education teachers have focused more on explicit skill instruction. CBM is geared to special education beliefs; therefore, CBM data may be utilized and valued more by special education teachers. In summary, teachers' theoretical positions may affect CBM data utilization.

Teachers' use of CBM data has implications for students and their awareness of goals in that the value placed on CBM by teachers may affect students' awareness of their progress. Awareness of progress by students may also be affected by who is administering the reading probes. Lastly, the amount of progress a student is making and the

graphing procedure of that progress may also affect a student's awareness of progress.

In order to examine the usefulness of CBM data to pre-service teachers in a university-based reading clinic, a comparison of the various CBA models and CBM procedures will be discussed. This will be followed by the history of the development of CBM and the rationale for its use. Next, the psychometric properties of CBM will be detailed. A review of the empirical studies that have been conducted on progress monitoring, instructional modification, and goal-setting will also be included. Lastly, caveats and barriers to implementing CBM will be discussed.

Literature Review

Comparison of Models

Curriculum-based assessment (CBA) is any form of measurement that uses "direct observation and recording of a student's performance in the local curriculum as a basis for gathering information to make instructional decisions" (Deno, 1987, p.41). Shinn, Rosenfield, and Knutson (1989) listed the following four different models of CBA that are presently found in the professional literature: curriculum-based assessment for instructional design (CBA-ID), criterion-referenced-curriculum-based assessment (CR-CBA), curriculum-based evaluation (CBE), and curriculum-based

measurement (CBM). Each of the models is curriculum-based; however, they differ from each other in important ways (Shinn et al., 1989).

CBM. In radical contrast to the other CBA models which were developed to focus on content and curricular level, CBM assesses the effects of instructional planning decisions (Shinn et al.). CBM is not "front-end loaded". More testing is conducted after instructional interventions begin than preceding instruction (Shinn et al., 1989). Shinn et al. also stated that CBM is unique because it is tied to local norms. Normative student performance in the curriculum can be quantified, due to the use of short-duration tests.

CBM employs fluency measures in reading, spelling, mathematics, and written expression (Marston & Magnusson, 1988). Fluency measures are a combination of both speed and accuracy, which is translated into the number of correct responses per time unit (i.e., one minute, three minute) (Shinn et al., 1989).

CBM places emphasis on using measurement material from the long-term goal domain for progress monitoring (Shinn et al., 1989). This is of benefit to special education programs and assessing the progress in reaching students' IEP objectives (Shinn et al.).

CBA-ID. The major premise of CBA-ID is to ease the delivery of instruction by ensuring that students are placed properly in the instructional materials (Shinn et al., 1989). According to this model, learning conditions should provide some level of challenge for students; however, they should also involve some entry-level skills to ensure the student experiences some success. Typical procedure involves students responding in production-type formats (i.e., writing answers to matching problems, reading aloud). The CBA-ID test format is usually of short-duration to maximize time available for instruction. Gickling (1988) states that initial assessments may take 20-30 minutes. However, daily probes used to monitor instructional match take only a few minutes. Shinn et al. state that the main purpose of CBA-ID is to control the level of instruction so students are able to master the classroom curriculum.

The technical adequacy of CBA-ID should be evaluated within the behavioral assessment paradigm; thus, scoring accuracy and content validity with individual students becomes the primary domain (Shinn et al., 1989). Additionally, some evidence of the construct validity of the instructional-match concept has been provided (Shinn et al.).

CR-CBA. CR-CBA purports to provide teachers with information for instructional planning, specifically, the content of instruction (Shinn et al., 1989). Marston (1989) states that CR-CBA models are teacher-constructed criterion-referenced tests. That is, each instructional objective is translated into an achievement test that represents that domain.

CR-CBA is formally defined as "the practice of obtaining direct and frequent measures of a student's performance on a series of sequentially arranged objectives from the curriculum used in the classroom" (Blackenship & Lilly, 1981, p. 81). The CR-CBA model draws upon production-type responses for testing purposes, and examples of selection-type responses are given (Shinn et al., 1989). Response types include such behaviors as writing the time shown on a clock and responding orally to a set of science questions. Selection responses involve circling groups of words that contain a specified letter or are in the correct alphabetical order (Idol & Paolucci-Whitcomb, 1986). Test length fluctuates depending on the test content and the response-type required (i.e., selection vs. production-type responses).

CR-CBA does assess student progress; however, this is done on a short-term basis. Instructional objectives are

set and progress is determined by whether or not a student has met the established criterion, and little attention is given to long-term monitoring. The criterion-referenced measures proposed by this model are lacking in reliability and validity, with the exception of content validity (Shinn et al., 1989).

CBE. The focus of CBE is to provide information regarding the content of instruction (Shinn et al, 1989). CBE is based on testing what you teach and teaching what you test (Howell & Morehead, 1987). Howell and Morehead (1987) state that increased student learning results when evaluation and instruction are in alignment with curriculum.

The primary purpose of CBE places great emphasis on student errors. Shinn et al. (1989) state that "CBE can be conceptualized as a task-analytical model of evaluation. In this model, curricular tasks consist of component subskills that students must learn to perform a task successfully" (p. 309).

Howell and Morehead (1987) describe a four-step process for evaluation regardless of content area: (a) fact finding (survey-level assessment), (b) developing assumed causes (hypothesizing), (c) testing/observation (specific-level assessment), and (d) decision-making (interpretation). The CBE model mostly uses production-type responses to assess

student performance (Shinn et al., 1989). Responses include writing responses to math facts or writing samples used to analyze syntax (Shinn et al.). Selection-type responses involve circling the most appropriate word in a reading maze or pointing to a letter that makes a sound (Shinn et al.).

Test formats are typically short-duration (i.e., one minute), but may extend up to 30 minutes depending upon the task demand required by the instructional objective. The technical adequacy for CBE procedures is lacking, with the exception of content validity. Reliability and validity vary because they are dependent upon the specific measure used (i.e., published criterion-referenced and norm-referenced tests) (Shinn et al., 1989).

Summary. Although each CBA model employs material from students' curricula for assessment purposes, each has its own utility. For example, in relation to assessment and decision-making, CBM is the only model that focuses on student progress monitoring, whereas the other three models focus on instructional planning. In addition, not all models provide evidence of utility for making other decisions. Two of the models, CR-CBA and CBE, have shown no evidence of utility in making other decisions. However, CBA-ID can be useful for indirect monitoring of student progress via academic learning time, and CBM can be useful

in screening, eligibility, and program evaluation through long-term progress monitoring (Shinn et al., 1989).

CBM Procedures

CBM procedures begin with the administration of three one-minute reading probes at grade level in screening materials from the student's curriculum. If the median is at instructional level according to a normed placement table, that is the level used to guide decisions in monitoring student progress. However, if the median is not at instructional level, the administrator must test backward or forward one level (by administering three probes and finding the median) until instructional level is reached.

After the student is placed at the appropriate level of instruction, it is recommended that the student's progress be monitored two to three times per week. Marston (1989) stated that repeated measurement allows pupil performance to be viewed across several days at any stage in the process of decision-making, as compared to decision-making based on only one assessment. This allows the opportunity to continually view progress under standardized conditions. Each progress monitoring session consists of a one-minute reading probe from the student's curriculum. A probe can be defined as a reading passage that is approximately 250 words in length and is taken from a student's curriculum. It must

not be taken from a poem or play. The student's progress is graphed and is compared to an aimline. If the performance trends of the student are less steep than the aimline and fall below the expected rate of progress, a modification in instruction is recommended. If the current instructional approach is not effective, CBM is not prescriptive as to what instructional variables must be changed. Instructional modifications may consist of changes in one of the following: motivational technique, actual instruction, or curriculum.

History

CBM has various historical roots. For example, Data-Based Program Modification (DBPM) involved procedures that generated curriculum-based data on student performance (Deno & Mirkin, 1977). DBPM monitors student progress in treatments by employing repeated administration of specific tests (Howell, Fox, & Morehead, 1993). DBPM decisions are made by applying the teach-test, teach-test cycle. However, DBPM is time-consuming. This is partially due to researchers and publishers failure to popularize the tools needed to use it. Therefore, teachers must develop their own tools (Howell et al, 1993). Unsuccessful efforts of using the DBPM approach led to the need for a standardized set of reliable and valid procedures. Work began anew with

the Minnesota Institute for Research on Learning Disabilities (Deno, 1992).

The conceptual roots of CBM are also found in the observational and analytical methodology of applied behavior analysis (Lovitt, 1967) and in the methods and techniques of Precision Teaching (Lindsley, 1971). Another important conceptual source for CBM is psychometrics. The technical adequacy of CBM is one of the attributes that distinguishes CBM from other behavioral assessments. The combination of psychometric methods and observational methodology have overcome the shortcomings of the DBPM methods.

Rationale

In the late 1980's researchers were questioning the effectiveness of special education and were arguing for inclusion. It was argued that special education services were not producing significant academic gains. Marston (1988) argued that the tests used to assess these gains were not sensitive enough; therefore, the research conclusions were premature. Marston (1988) proposed using CBM progress monitoring over time to identify whether educational interventions were working. His findings indicated that special education was a significant educational intervention. It was found that reading growth of students with mild learning disabilities receiving CBM-based

instruction was greater for those students placed in resource programs than for those placed in regular education. Hence, time-series analyses using CBM data supported CBM as a useful evaluation tool.

CBM monitoring systems are supported by at least three arguments. The first is legal and is related to the individual education program (IEP) mandate of PL 94-142. This legislation intended to encourage development of systematic data bases to document student progress toward goal attainment (Fuchs, 1989). Hence, Federal law supports CBM.

Another rationale for CBM monitoring is logical. CBM involves inductive, versus deductive, reasoning. CBM generates a data base and from this the effectiveness of instructional hypotheses for a given individual can be empirically tested and revised (Fuchs, 1989).

A third rationale for monitoring is empirical. The advantages of CBM are supported by research. A recent meta-analysis estimated the effect magnitude of ongoing monitoring to be .70 (Fuchs & Fuchs, 1986). Research findings in regard to progress monitoring, instructional modifications, and goal setting and awareness will be discussed in detail following a brief review of the psychometric properties of CBM.

Psychometrics

The quality of technical adequacy is a primary concern for any set of assessment procedures (Marston, 1989). The establishment of CBM fluency measures was based on an extensive program of technical adequacy research (Shinn et al., 1989).

Reliability. Numerous reliability studies on CBM have demonstrated that CBM methodology is reliable. Marston (1989) stated that three methods were used for determining reliability for CBM reading measures: test-retest estimates, parallel form estimates, and interrater reliability. A summary of five studies (Marston, 1989) in the content area of reading reported 14 reliability coefficients ranging from .82 to .99.

Validity. Validity studies (Marston, 1989) have demonstrated adequate correlation coefficients in the content areas of reading, spelling, written expression, and mathematics. Oral reading fluency, counting the number of correctly read words in one minute from a passage from the curriculum, is a valid measure of a student's general reading achievement (i.e., decoding and comprehension) (Deno, Mirkin, & Chiang, 1982). The correlation coefficients between oral reading fluency measures and

published reading measures ranged from .73 to .91, with most coefficients in the .80's (Shinn et al., 1989).

Studies investigating the ability of CBM to predict future school achievement have been scarce. Marston, Tindal, and Deno (cited in Shinn, 1989) demonstrated that CBM reading scores predicted LD classifications as well as traditional measures of aptitude-achievement discrepancy.

Usefulness of CBM

Progress Monitoring. In addition to technical adequacy, a salient characteristic of CBM is its focus on direct and repeated measurement of student performance. Literature on teacher effectiveness consistently finds that systematic monitoring is associated with greater achievement gains (Brophy & Good, 1986; Rosenshine & Stevens, 1986). Deno, Fuchs, and Mirkin (1984) found that teachers who used CBM to monitor were more realistic and responsive to student progress.

Although systematic monitoring of student progress has been found to increase student achievement, concerns have been raised regarding testing time requirements. Trained adults and trained fourth- and fifth-graders were compared in their accuracy of curriculum-based reading assessments of second and third graders (Bentz, Shinn, & Gleason, 1990). Results indicated that students could be trained as reliable

data collectors. McCurdy and Shapiro (1992) conducted a study comparing teacher-, peer-, and self-monitoring with curriculum-based measurement in reading among students with learning disabilities. This study also found that students in the peer-monitoring condition could collect reliable data on the number of words read correctly, as well as students in the self-monitoring condition. Self-monitors were trained individually or in small groups and training procedures included: (a) administering the oral reading probe, (b) scoring the oral reading probe, and (c) graphing their own performance. Self-monitors were also provided with a checklist to guide them through the steps of the monitoring process if necessary (McCurdy & Shapiro, 1992).

Instructional modification. CBM was devised to provide "measurement and evaluation procedures that teachers could use routinely to make decisions about whether and when to modify a student's instructional program" (Deno, 1985, p. 221). "CBM is based on the assumption that effective instruction can be determined only by evaluating the effects of teaching plans" (Fuchs & Fuchs, 1989, p. 302). Therefore, with the implementation of CBM, more time is spent assessing whether the teaching plan is effective once the process has begun. If the current instructional

approach is not effective, CBM is not prescriptive as to what instructional variables must be changed.

Setting and awareness of goals. Studies have focused on students' and teachers' awareness and perceptions of goals. Deno, Fuchs, and Mirkin (1984) found that students whose performance was systematically monitored with CBM appeared to know more about their goals and their progress toward them. Teachers who used CBM monitoring were more: (a) realistic about student progress, (b) knowledgeable concerning student progress, and (c) responsive to student progress.

Fuchs, Fuchs, and Stecker (1989) conducted a study to test the effects of CBM on teachers' instructional planning and decision making. Participants of the study were 30 (13 resource, 17 self-contained) special education teachers with classes ranging from grades two through nine. Students in the study ranged from mildly to moderately handicapped (including some learning disabled). Results from their study showed that teachers who employed CBM to monitor reading growth used more specific and complete reading goals. Also, teachers were more realistic and less optimistic about goal attainment.

Not only has CBM been found to make students more aware of their goals, it has also been found to help increase

student involvement in the learning process and make students feel more responsible for their learning. In a study conducted by Davis, Fuchs, Fuchs, and Whinnery (1995), 33 special education teachers selected two mild to moderately handicapped students in grades two through eight to participate. Students were assigned randomly to the CBM group or the control group. After 17 weeks, the students were administered an individual questionnaire. "Results suggested that students enjoyed their participation in CBM, and the CBM systematic measurement of growth and consistent feedback may help increase student involvement in the learning process and make students feel more responsible for their own learning" (Davis et al., 1995, p. 19).

Caveats of CBM

CBM research demonstrated its effectiveness and portrayed the positive effects of CBM. However, little research was found on the caveats of CBM. For example, no research was found which involved schools that do not have a standard curriculum or "reading series" per se (i.e., reading programs implementing whole language or expeditionary learning) where local-curriculum norms would be difficult to obtain. Also, research was lacking on the use of CBM at the secondary level. Only one study was found

which investigated the use of CBM and mathematics at the high school level (Gickling, Shane, & Croskery, 1989).

Yell, Deno, and Marston (1992) discussed the barriers to implementing CBM. The greatest barriers included data utilization, logistical concerns, and difficulties introducing change into systems. However, research examined the use of technology to surmount difficulties in incorporating curriculum-based measurement (Fuchs & Fuchs, 1989).

Fuchs and Fuchs (1989) drew three conclusions in regard to the use of computer applications of CBM. First, it was concluded that automatic collection of data facilitated the efficiency of CBM, however not solely by computerized data-management. Second, software freed up time spent collecting, scoring, and analyzing students' assessment; hence, it may be necessary to develop strategies for maintaining teacher involvement in CBM databases. Third, enhancement of student achievement occurred when computers provided supplementary skills analysis (Fuchs & Fuchs, 1989).

An additional limitation may be in regard to instructional modification. CBM results indicate whether an instructional change is needed, but no specific instructional recommendations are offered. Yell, Deno, and

Marston (1992) found that teachers did not make changes in student programs when progress wasn't being made. It was speculated that teachers may not have known what to do because they seemed to lack alternative instructional strategies. Previous studies involved experienced teachers. Pre-service teachers may be less likely to utilize CBM data because they are not given specific, alternate instructional strategies. They may have difficulty formulating alternatives due to their lack of experience.

This study was conducted with pre-service teachers and focused on instructional modifications, as well as progress monitoring, and goal setting and awareness of goals. Reading clinicians and tutees using CBM were compared to clinicians and tutees not using CBM. It was expected that tutees using CBM would be more aware of their progress and goals (Deno, Fuchs, & Mirkin, 1984). It was also expected that reading clinicians would use the data to monitor and report student progress and make instructional modifications when necessary.

Method

Subjects

Six female reading clinicians from the University of Northern Iowa (UNI) Reading Clinic and their six tutees participated in the study. Each clinician worked with a

school-aged student who was referred for one-on-one tutoring. Clinicians met with respective tutees three times per week.

The reading clinicians were undergraduates who had completed 12 to 15 credit hours of reading including: (a) Children's Literature, (b) Reading and Language Arts I - Emergent Literacy, (c) Reading and Language Arts II - Reading and Writing Connection, (d) Diagnostic Teaching of Reading and Language Arts, (e) some course in Reading and Language Arts across the curriculum, and were currently enrolled in (f) Remedial Reading.

The CBM progress monitors were three female school psychology students who had completed CBM training during the semester. Three of the six tutees were assigned progress monitors who administered CBM reading probes twice a week. Tutees were selected randomly from among those reading above the primer instructional level. All tutees whose progress was monitored were male. The three clinicians and their tutees not assigned a progress monitor were selected by the Director of the Reading Clinic; she did not use a random sampling procedure. Two of the non-CBM monitored tutees were male and one was a high-school aged female.

Instrument

The reading clinicians and tutees participated in a 30-minute and 15-minute semi-structured interview, respectively (see Appendix A). Validity was increased by providing the reading clinicians with a definition of CBM procedures and benefits of CBM (see Appendix B). This was given to them the first week of progress monitoring, and was done to ensure reading clinicians had the same background information regarding CBM. The interview was semi-structured in order to increase reliability. The reading clinicians were allowed to give input on results (i.e., read the final report and give comments), and all clinicians declined. The interviews were also audio-taped to allow for transcription of the interview, and increased reliability of the ratings.

Procedure

The philosophy of the reading clinic was that "assessment is an ongoing, multi-faceted, complex process that actively involves both the teacher and the learner" (Tidwell, 1995, p. 1). The clinic was student-based. Reading and writing were set up as fun learning activities to provide meaningful and purposeful events.

At the beginning of the Fall 1995 semester, the reading clinicians determined the instructional grade level of their

tutees by administering the Qualitative Reading Inventory (QRI). The QRI is a technically adequate informal assessment tool in which data have been psychometrically established and normed. Clinicians also kept weekly running records, which assessed the words tutees read correctly and incorrectly in a given amount of text. Assessment results were used to formulate goals and determine lesson plans.

The CBM progress monitors also determined instructional grade levels by administering three one-minute reading probes at grade level in screening materials. If the median was at instructional level according to a normed placement table, that was the level used to guide decisions in monitoring tutee progress. However, if the median was not at instructional level, the progress monitor tested backward or forward one level (by administering three probes and finding the median) until instructional level was reached. Screening probes came from the Standard Reading Passages (1987). Use of these reading passages is acceptable practice if passages from the tutees' curricula are not available (Shinn, 1989).

As stated above, the median scores were used to determine instructional grade placement according to the placement criteria by Mirkin et al. (1981). Screening for Tutees A and B was done at Level C (grades 3-4), and medians

fell within the instructional level. Initial screening for Tutee C began at Level B (grades 2-3), continued with Level C (grades 3-4), and then ended with Level D(grades 5-6). Tutee C's median score at Level B and Level C were both in the mastery level. At Level D, Tutee C's median score was at the instructional level. See Table 1 for a comparison of the grade equivalents for each tutee using CBM and the QRI.

After the initial assessments, the students were tutored by the reading clinicians for a one-hour period, three times a week. Twice a week the school psychology students measured the tutees' reading progress by administering a one-minute reading probe either at the beginning or end of the one-hour tutoring session. The decision to monitor at a certain time during the session was made by the reading clinician. The information was graphed and shared with both the tutee and the reading clinician after each probe was administered. The graphs included a baseline and an aimline. A gain of two words per week was used to calculate the aimline, the ambitious rate of progress recommended by Shinn (1989).

After four weeks of instruction, an instructional modification was recommended if the performance trends were less steep than the aimline and fell below the expected rate of progress. No instructional modification was recommended

if progress was parallel to, or at a steeper slope than, the goal line. Clinicians had a formal group meeting once a week with their supervisors to review, plan instruction, reflect, and get feedback. They also had informal meetings with their supervisors on a weekly, as needed, basis.

CBM progress monitoring graphs for the three participating tutees are in Figure 1. A vertical line is drawn in after four weeks of instruction to show the point at which an instructional recommendation was given.

Tutee A was a sixth grade boy and was placed at the third grade instructional level by both the clinician and the progress monitor. After four weeks of instruction, Tutee A was progressing and no instructional modification was recommended.

Tutee B was a fifth grade boy and was placed at the third grade instructional level by both his clinician and the progress monitor. At the end of the first four weeks of instruction, the diagnostic prescriptive lessons appeared appropriate for him, and it was recommended that Tutee B continue with the same instruction.

Tutee C was a third grade boy. His reading clinician placed him at the second grade instructional level and his progress monitor placed him at the fifth grade instructional level. After four weeks of instruction, it was recommended

to his clinician that instruction was not effective (i.e., as weeks progressed his words read per minute declined). It was hypothesized by the progress monitor that the tutee was not motivated. The fact that the tutee's words read correct per minute was not increasing, even though he was reading above his aimline, was the basis for this hypothesis.

Therefore, it was recommended that a motivational intervention be added to instruction. The results of the tutees' progress for the three weeks following the recommendations are included on the graphs in Figure 1.

At the end of seven weeks of instruction, the six clinicians and six tutees were interviewed. Comparisons were then made between those using and not using CBM.

Results

Clinicians Using CBM

All three clinicians had set three goals derived from the results of their QRI testing. Two of the three tutees also set their own goals. Goals stated by the clinicians included: (a) increase comprehension of narrative text, (b) improve ability to write narrative pieces, (c) improve word recognition strategies, and (d) improve writing structure and form. Goals set by the tutees were to: (a) improve writing structure and (b) increase fluency. Clinician A stated that the goals did not change over time. Clinician B

stated that comprehension was not an original goal, and evolved from the initial goal of word recognition.

Clinician C reworded some of her goals, and did not provide a reason for the rewording.

When interviewed and asked the level of growth clinicians expected to see, they all stated they had not set a certain "level". When asked if the tutees had shown the growth they expected, they all stated yes. Clinician C stated she had really seen a boost in her tutee's self-confidence in the past four weeks, and his reading had really improved because of it. The clinicians were asked how they measured growth. It was stated that growth was measured by running records and observation of the tutee reading. When asked what they attributed their tutees' progress to, they stated one-on-one instruction, practice, and the strategies they were teaching them (i.e., chunking and SWAT [Strategic Word Attack Technique]).

The clinicians all stated they were provided with the proper amount of information regarding CBM and were "comfortable" or "very comfortable" with the progress monitor's participation in tutoring sessions. When asked if they would like to work with a CBM progress monitor again, clinician A stated she would. Clinician A also stated that after the progress monitor left she would have her tutee

retell the story, and he was able to remember a lot even when he read fast. Clinician A recommended that the child be allowed to read the whole story. Clinician B stated she would like to work with a CBM progress monitor again, and Clinician C said it would depend on the student she was tutoring.

The clinicians stated that they believed tutees' performances on reading probes impacted lessons for the day. If the tutee performed well, above their goal line, then the tutee was in a "better mood" for the rest of the session. However, if they did not get above their goal line, then they were discouraged and sometimes the clinician had to try harder to motivate them.

All three clinicians perceived that graphing the tutees' progress with them helped make tutees more aware of their goals. Clinicians A and B said that CBM placed them at the same grade level as the QRI at the beginning of the semester. Clinician A stated that at first she was shocked how well her tutee was reading for the progress monitor, but not for her. She stated he was reading quite a bit higher than what he read on the QRI tests, and she did not know why that would be. However, the tutor stated that after the first couple of weeks the tutee began reading faster for her and matched his performance with her to that of the progress

monitor. Clinician B stated that her tutee's performance with the progress monitor matched hers from the beginning. Clinician C stated that the initial grade placement for her tutee did not match the progress monitor's, and she was not sure that the QRI results were "totally accurate" because the tutee was resistive to coming to the clinic and uninvolved with the sessions. Also, at times she wondered why her tutee would read so well for the progress monitor, but not for her. She stated the tutee would read more slowly and carefully for the progress monitor.

Clinicians A and B stated that they followed the progress monitors' recommendations to continue with the current method of instruction. Clinician C stated that after four weeks, an instructional modification was recommended. The clinician was told that the progress monitor did not think the tutee was motivated because tutoring materials might be too easy. The basis for this hypothesis was two-fold. As mentioned earlier, the QRI testing placed the tutee at second grade instructional level and CBM placed him at fifth grade instructional level. Also, the clinician reported that the tutee was resistive and uninvolved with the tutoring sessions. Therefore, use of a mood-o-meter was recommended. A poster was placed in the room with different facial expressions on it. At the

beginning and end of each session, the tutee and clinician discussed their moods. Clinician C stated this was "very external, but it worked".

Clinicians Not Using CBM

The clinicians not using CBM also had three goals, derived from the QRI testing. They kept the same three goals throughout the semester. Goals included: (a) work on story structure and retelling, (b) improve writing form, (c) improve comprehension of narrative text, and (d) improve word recognition strategies. Tutees' goals were to (a) get better at decoding words and (b) improve study skills.

None of the clinicians stated a "level" of growth they expected from the tutees, just that overall they "expected" growth. Clinician D stated that she wanted to make sure that when her tutee read a story he knew there was a pattern. Clinician D also stated that her tutee did show growth and she knew that from working with him every week. She stated she could see growth in his retelling and word recognition, especially action words. Clinician E stated that she didn't really have much time to work with her tutee, and she hoped he would get farther than he did. She also stated she didn't actually know how much he had grown, but she could tell by his writing and reading that he improved. Clinician F stated that she saw a lot of growth

and that her tutee changed from hating to read to liking it. She said she knew her tutee had improved because now the tutee gave her more details and specifics when retelling stories and also her strategies were more in depth. Clinicians attributed tutees' successes to the strategies they taught them (i.e., story mapping and SWAT) and to providing the tutees with structure.

Tutees Using CBM

When asked what their goals were at the reading clinic, Tutee A and C first stated that they did not know. Tutee B first stated that his goal was to read more smoothly and clearly and better. Then, when asked if they were progressing towards those goals, they all said they were doing better whether they could state their goals or not. When asked how they knew they were doing better, they said because they were reading better now or because someone told them they were reading better. They stated they were doing better because of practice and because of the strategies they learned.

When asked how many words per minute they could read, Tutees B and C said they didn't know. Tutee A stated he could read 93 words per minute. When asked if they knew why the progress monitor came to see them, they stated it was to see how good their reading could go up, to measure their

reading level, and to help them read. They all were able to explain what they did with the progress monitor. They all knew that they graphed the number of words they got right, and they all made reference to the goal line referring to it as the goal line, the average line, and a thing. They all stated that if they were above it they did good, and if they were below it that they didn't reach their goal. Tutee A stated that he was usually above it. Tutee B stated that he was always right on the line or above it and that his highest one was 101 words per minute. Tutee C stated that last time he went off the paper because he was so good, and that he only went under the line twice. The tutees were correct in stating the highest number of words they read per minute, and also the number of times they were above or below their goal line.

Tutees Not Using CBM

Tutees D and E stated that they didn't know what their goals were. They thought they progressed and they knew this because they could read better or more. They stated that they thought they were doing better because of practice, but did not list strategies. Tutee F, the high-school aged subject, stated that she had two goals: to increase study strategies and reading comprehension. She felt she was progressing toward those goals and she could tell because

she was doing better on her tests at school. The reason she thought she was doing better was because she learned new ways to study.

Discussion

Although the sample was limited, the results are useful in directing future research efforts. When clinicians were asked what level of growth they expected to see from their tutees in the first four weeks of instruction, they stated no particular level was expected. However, when asked if the tutee made the progress they expected, they all stated yes. It was curious that they had no expectations for amount of progress on the first question, yet they were definite their client had met the expected progress. These positions appear to be contradictory and suggest one of two things. First, teachers may not be precise in their goal setting; and therefore, accept any indications of progress as adequate without having measurement precision. Second, there may be a "halo effect" as a result of the one-on-one instruction. In other words, the teacher may feel that no matter what instruction or intervention they used, it was helpful. To overcome this apparent contradiction in responses, the question might be reworded to say "At the end of the semester, how would you know that your client progressed at a rate that you would expect them to?". This

contradiction supports two of Deno's (1992) reasons for teachers to begin using CBM procedures: (a) lack of clarity and focus about student outcomes, and (b) a need for vital signs of student growth.

It appeared that clinicians did not find the CBM data to be useful. When asked how they knew their tutees progressed, none mentioned CBM data. Even though they observed CBM data being graphed twice a week, they solely referred to their own techniques. One reason for this may be that the clinicians were not actually doing the progress monitoring and did not feel ownership of the measurement data. A second reason may be due to the fact that the philosophy of the reading clinic is based on a whole-language approach and none of the reading clinicians had set goals in relation to fluency, which is what CBM measures. Had the reading clinicians understood the correlation between fluency and comprehension (Shinn, 1989), it may have been more likely to be perceived as an objective indicator of progress. Lastly, the clinicians may not have found the CBM data to be useful because they were not trained in CBM; therefore, they did not fully understand its usefulness or advantages.

Although clinicians did not find the CBM data to be useful, benefits from the CBM progress monitoring can be

seen. First, Tutees A and B both made ambitious growth at the Clinic. Such growth only occurs with quality instruction. If clinicians understood progress monitoring data and its implications, they would have been proud of how successful their "learning to teach" reading experience was. Secondly, Tutee C's data were more difficult to interpret, but Clinician C potentially could develop an appreciation for the importance of motivational interventions in reading progress. Tutee C made very ambitious growth during Instruction B phase in the fifth grade materials when QRI results placed him at a second grade instructional level. All three clinicians had available to them quantitative data, indicating great gains, and could have been very pleased with their teaching. Based on their interview responses, they appeared to have few or no vital signs of student growth.

Previous studies have shown that CBM made students more aware of their goals (Deno, Fuchs, & Mirkin, 1984; Fuchs, Butterworth, & Fuchs, 1989). Tutees did not relate progress monitoring to the goals they had at the clinic. This may have been due to one of two things. First, it may have been because the tutees set goals with the clinicians, and the progress monitoring was done with school psychology graduate students. Second, the tutees may not have related their

goals to the CBM progress monitoring because the clinicians did not. Although tutees did not relate CBM progress monitoring to their goals, they were aware of their progress. They knew if they were above or below their goal line, how often they were below, and the greatest number of words they read. Therefore, the tutees who had progress monitors may have been more aware of their growth in reading fluency than those who did not have a progress monitor.

Clinicians indicated that tutees' performance with the progress monitors affected the remainder of the tutoring session. Clinicians were concerned that they had to put more effort into encouraging tutees to try following testing sessions that resulted in lower scores. This may not be a negative influence if one considers the reactive effects of self-monitoring, for example. It is recommended that the timing of progress monitoring be selected to best meet the needs of teachers and students.

This study was conducted in a University Clinic in which two programs were participating: (a) the "Reading Program" and (b) the "School Psychology" program. For this reason, the progress monitoring was probably seen as "separate" from the work conducted in the clinic. A follow-up study is recommended in which CBM is introduced as an integral part of the "Remedial Reading" course. The

clinicians could administer the reading probes themselves, and then they may see a more direct link to their instruction. Also, a more direct link would be made between the tutees' progress and their goals.

From this study, implications can be made for public schools using CBM in which adults other than the reading teacher administer probes. The teacher should understand and participate in the process. There should be open communication between the progress monitor and teacher. Goal setting should include all parties involved (i.e., student, progress monitor, and teacher). By doing this the full benefits of CBM may be reaped by allowing everyone to see the direct link between CBM and the teacher's instructional decisions.

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Appendix A

Clinician Interview Questions

1. What was your primary goal for your tutee this semester?
How did you arrive at that goal?
2. Did you change the goal at any point? If so, why?
3. What level of growth did you expect from your tutee in first four weeks of instruction?
4. Has your tutee shown the growth that you expected?
5. How do you know that they have shown growth? How did you measure growth?
6. To what do you attribute the student's progress or lack of progress to?

*******STOP HERE IF CLINICIAN HAS NOT HAD A PROGRESS MONITOR**

7. What was your comfort zone with having a progress monitor working with your tutee and entering your classroom. Rate on a scale from 1-5.

1-very comfortable 3-comfortable 5-very uncomfortable

8. Do you feel you were provided with the proper amount of information explaining CBM to reach an understanding of the procedures and its function?
9. Does your tutee's performance on his/her progress monitoring have an impact on your tutoring?
10. Do you perceive the tutee's performance as having an impact on his/her attitude or performance during the lesson or on following lessons?
11. Do you perceive that graphing the student's progress with him/her helped in making them more aware of their progress and goals?
12. Do you think that the progress reports matched what you have been observing?
13. What recommendation were you given in regard to instruction after four weeks?
14. Did you follow the recommendation?
15. If you were tutoring again next semester, would you like to have a progress monitor?

Tutee Interview Questions

1. What are your goals at the reading clinic?
2. What progress are you making towards those goals?
3. How do you know you are making progress?
4. Why do you think you are/are not making progress?
5. How many words per minute can you read?
6. Why does (progress monitor) come to see you?
7. What do you do when she comes?
8. Can you explain the graph to me?

Appendix B

CURRICULUM-BASED MEASUREMENT
(CBM)

I. Definition:

A. Curriculum-based measurement uses direct observation and recording of student's performance. We will focus on student's reading fluency and record the number of words read correctly in a one-minute interval. (See procedures below). We will not be using authentic CBM (using probes from the reading clinic curriculum), we will use standardized reading probes for our progress monitoring. CBM was devised to provide "measurement and evaluation procedures that teachers could use routinely to make decisions about whether and when to modify a student's instructional program" (Deno, 1985, p. 221).

B. Rationale

1. legal: PL 94-142 requires special educators to specify long-term goals, short-term objectives, and "appropriate criteria and evaluation procedures"
2. logical: CBM generates a data base with which the effectiveness of instructional hypotheses concerning effective practice for a given individual can be tested empirically and revised as necessary.
3. empirical: Recent meta-analysis estimated the effect magnitude of ongoing monitoring to be .70 (e.g., the use of ongoing monitoring systems can be expected to raise the typical achievement score from 100.0 to 110.5, or from the 50th to the 76th percentile).

II. Additional Benefits:

- A. Deno, Fuchs, and Mirkin (1984) demonstrated that CBM monitoring produces better student outcomes when indexed by probe-like measures and also on more global achievement tests of decoding and reading comprehension.
- B. Fuchs and Fuchs (1987) found that teachers who employed CBM monitoring in math, spelling, and reading could effect greater academic growth than control teachers.
- C. Deno, Fuchs, and Mirkin (1984) found that students whose performance was monitored systematically with CBM appeared to know more about their own goals and their progress toward those goals.
- D. Eubanks and Leving (1983) and Hoffman and Rutherford (1984) found that CBM was associated strongly with effective general education practice.
- E. Gersten, Carnine, and White (1984), Goodman (1985), Peterson, Albert, Foxworth, Cox and Tilly (1985), and Rieth, Polsgrove, and Semmel (1981) found that CBM was associated strongly with effective special education practice.
- F. Deno, Fuchs, and Mirkin (1984) found that a group of New York City teachers who used CBM monitoring in reading were more: (a) realistic about student progress, (b) knowledgeable concerning student progress, and (c) responsive to student progress.
- G. Fuchs, Fuchs, and Stecker (in press) indicated that teachers who employed CBM to monitor their students' reading growth (a) used more specific, acceptable achievement goals; (b) were more realistic and less optimistic about goal attainment; (c) cited more objective and frequent data sources for determining the adequacy of student progress and for deciding whether program modifications were necessary; and (d) modified student programs more frequently.

- H. Deno, Fuchs, and Mirkin (1984) suggested that instructional programs provided by teachers using CBM monitoring may be superior to programs developed by teachers employing conventional special education practice in terms of instructional variables.

III. Procedures:

- A. Graduate students will meet with tutee the first week to determine the appropriate instructional level.
- B. Every week thereafter until the end of the semester the graduate student will meet with the tutee twice a week to routinely measure student progress on curricular material representing goal-level difficulty (Administer one 1-minute reading probe).
- C. The Graduate student will graph this information to share with the tutee so they may see their progress.
- D. Data-evaluation rules are goal-oriented. The graphs will contain an aimline (the expected rate of progress): The tutee's baseline data will be connected with the goal date and performance criterion. When the tutee performance trends are less steep than the aimline and fall below the expected rate of progress, the objective would be to introduce programmatic modifications.
- E. The information obtained will be shared with the tutor so they may see the rate at which the tutee is progressing. **This information will also be available so the tutor has the option of modifying instructional programs when measurement indicates that student progress is inadequate.**

*** Please feel free to ask questions!

Table 1

Grade Equivalent Comparison in Reading Fluency

<u>Tutee</u>	<u>CBM</u>	<u>QRI</u>
A	3	3
B	3	3
C	5	2

Note. CBM = Curriculum-based Measurement;

QRI = Qualitative Reading Inventory.

Figure Caption

Figure 1. Tutee progress monitoring graphs. Graphs include baseline, aimline, and words read per minute. The baseline was determined using the median score of three probes and is the first data point plotted.

WORDS PER MINUTE

