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ELEMENTARY SPECIAL EDUCATION RESOURCE TEACHERS' PRACTICES AND PERCEPTIONS OF CURRICULUM-BASED MEASUREMENT

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DEDICATION

This work is dedicated to my daughters, Sarah Grace and Lily, to my husband, Clayton, and my parents whose love, patience, encouragement and support inspired me to achieve my goal.

ACKNOWLEDGEMENTS

I would like to express my deepest appreciation to my professors during this doctoral program, Dr. Kathleen Marshall, Dr. Mitchell Yell, and Dr. Erik Drasgow, whose vast knowledge and passion for special education and teacher preparation has provided me the knowledge, skills and inspiration to become a professor too. I also want to thank my advisor and dissertation chair, Dr. Kathleen Marshall, for her guidance, support, and expertise without which this dissertation would not be possible. Besides my advisor, I would like to thank the rest of my dissertation committee, Dr. Mitchell Yell, Dr. Anthony Plotner, and Dr. Diane Harwell, for their guidance, encouragement, and time for helping me to complete this task.

ABSTRACT

This study examined elementary special education resource teachers' practices and perceptions of curriculum-based measurement (CBM). A significant body of research since the 1970's has shown that CBM is a reliable and valid predictor of subsequent performance on a variety of outcome measures, and thus useful for a wide range of instructional decisions (Deno, 2003; Busch & Reschley, 2007). Numerous studies have shown that when teachers use CBM, as originally intended, to write data-based IEP goals, monitor the effects of their instructional programs, and adjust their interventions according to data-based decision rules, student achievement improves (Fuchs, Fuchs, Hamlett, 1989b; Jenkins, Graff & Miglioretti, 2009). Additionally, CBM is a valuable assessment tool for meeting the progress monitoring requirements of the IEP, as set forth in the IDEA. Barriers to implementation include, time constraints, lack of confidence and knowledge in using CBM, and doubt in the validity of some of the measures (Yell, et al., 1992; Foegen, 2001). Despite a very solid research base, CBM is not being used as originally intended and is not being used consistently and accurately by special education teachers to monitor student progress to meet the federal mandate (Estcheidt, 2006; Shinn, 2010). To update the literature and bridge the gap between the earlier studies on CBM and current practices and perceptions of elementary special education teachers a survey questionnaire was used to collect data from 84 elementary special education resource teachers from 15 public schools in the southeast. Results revealed that more special education teachers are using CBM than in the past. They are

using CBM to fulfill the federal requirements of the IEP in regards to progress monitoring; however, many special education teachers are not using CBM as originally intended. Time and lack of confidence and knowledge in using some of the components of CBM are still barriers. The results, implications for special education leaders, and recommendations for future research are discussed.

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CHAPTER 1

INTRODUCTION

Recent reforms in education have emphasized the importance of setting high standards for all learners and increasing the level of accountability expected of educators in meeting those high standards for student achievement (Stecker, Lembke, & Foegen, 2008). The expectations set forth in the No Child Left Behind Act (NCLB), the Every Student Succeeds Act (ESSA), and the Individuals with Disabilities Education Act (IDEA) established standards to improve the performance of all students, regardless of their race, ethnic background, language, or disability status.

Students who have been identified as having a disability and receive special education services have an Individualized Education Program (IEP), which is an educational document that must follow the legal requirements laid out in IDEA. The IDEA requires that eight components must be included in student's IEPs. Three of these requirements are (a) a statement of the child's present level of academic achievement and functional performance; (b) a statement of measurable annual goals; and (c) a statement of how the child's progress toward the annual goals will be measured (20 U.S.C § 1414(d) (1) (A)). The progress monitoring provision also requires that the IEP specify how the child's parents will be regularly informed of the child's progress toward the

goals and the extent to which progress is considered sufficient (20 U.S.C. § 1414 (d0 (1)(A) (i) (III).

Progress monitoring is a direct measurement and formative assessment practice that teachers use to assess a student's academic performance on a regular basis (Deno, 1985). Progress monitoring has two primary purposes: (a) to determine whether a child is profiting appropriately from the instructional program, and (b) to build a more effective program for the child who is not benefitting adequately from the instructional program (Fuchs & Fuchs, 2002). Progress monitoring helps IEP teams address any lack of progress toward a student's annual goals and helps IEP teams make decisions concerning the effectiveness of interventions (Peck & Scarpati, 2005).

To be in accordance with the law, the IEP team must select an appropriate progress monitoring approach for each of a student's annual goals. According to Fuchs and Fuchs (1999), the requirements for these acceptable assessment approaches are: (1) the need to have reliability and validity, (2) the capacity to model growth, (3) treatment sensitivity, (4) independence from specific instructional techniques, (5) capacity to inform teachers, and (5) feasibility. One well-established form of progress monitoring that meets these conditions is Curriculum-Based Measurement (CBM: Deno, 1985). CBM uses brief assessments that serve as indicators of overall proficiency in an academic area, such as reading, writing, spelling, and mathematics. A benefit of CBM in regard to accountability is that it is less susceptible to possible bias associated with gender, race, ethnicity, or disability status than some other types of assessment, because the measures rely on direct assessment of student performance (Stecker, Fuchs, & Fuchs, 2005).

Curriculum-Based Measurement

CBM originated at the University of Minnesota's Institute for Research on Learning Disabilities (IRLD) in the mid-to late 1970's, during the time of the original passage and implementation of IDEA, then known as Public Law 94-142. Stan Deno and his colleagues sought to develop a simple and efficient and technically adequate measurement system for assisting special education teachers in tracking student growth in basic skills. The initial purpose for developing CBM was to assist special educators in using progress monitoring data to make meaningful decisions about student progress and to improve the quality of instructional programs for assessing and monitoring students' progress in reading, math, spelling, and writing (Fuchs & Deno, 1991; Shinn & Shinn, 2001). With CBM, a student's academic performance is assessed frequently on standardized tasks representing the yearlong curriculum, and scores on these reliable and valid tests can be displayed on easy-to-understand graphs. Teachers apply data utilization rules to interpret the graphed data and to determine when instructional adjustments are warranted throughout the school year (Deno, 2003). Over the past 35 years, evidence has accumulated to indicate that the students of teachers who use CBM to determine when and how to revise their students' instructional programs show greater achievement than the students of teachers who do not use CBM (Stecker, Fuchs, & Fuchs, 2005).

CBM was initially developed to provide timely instructional feedback to teachers of students with disabilities. However, it has also become an assessment instrument to

evaluate the quality of instruction in reading and math for all students. After the reauthorization of IDEA in 2004, Response to Intervention (RTI)/multi-tiered systems of support (MTSS) became a process often used to identify a student as failing to make acceptable progress in the general curriculum and to indicate a need for intervention of increased intensity including consideration of the possibility of a specific learning disability (Fuchs & Fuchs, 2005).

Within RTI/MTSS models, evidence-based interventions are implemented and CBM data with decision rules are used to determine whether a student's rate of progress is indicative of a student responding to interventions (Jenkins, Hudson, & Lee, 2007). Students are considered for special education eligibility if, after exposure to multiple interventions, they continue to show a lack of adequate progress or response to evidence-based interventions (Ardoin, Christ, Morena, Cormier, & Klingbeil, 2013). RTI/MTSS is a framework that includes (a) universal screening, (b) tiered levels of high-quality interventions, (c) progress monitoring, and (d) data-based instructional decisions (Fuchs & Fuchs, 2005). The RTI /MTSS framework, when implemented with fidelity, can serve the dual purposes of improving all students' academic and behavioral outcomes and identify those students with specific learning disabilities (SLD) (Shinn, 2008). Whether used in special education classes or within the RTI/MTSS model to place students in special education, the requirements for acceptable progress monitoring assessments are the same: the need for simple, quick, objective, reliable, and valid assessment procedures. CBM meets these requirements.

A significant body of research conducted since the 1970's has shown that CBM is a reliable and valid predictor of subsequent performance on a variety of outcome

measures, and thus useful for a wide range of instructional decisions (Deno, 2003; Busch & Reschley, 2007). Also, numerous studies have shown that when teachers use CBM to write data-based goals, monitor the effects of their instructional programs, and adjust their interventions according to data-based decision rules, student achievement improves (Fuchs, Fuchs, Hamlett, 1989b; Jenkins, Graff & Miglioretti, 2009). Additionally, research has demonstrated that when teachers use CBM, their decision-making improves and students become more aware of their own performance (Safer & Fleischman, 2005). The results of almost 40 years of research and development on the reliability, validity, and effective use of CBM have been widely disseminated and applied in public school programs – both in regular and special education with positive results (Adroin, Christ, Morena, Cormier, & Klingbeil, 2013).

In spite of a large body of empirical research attesting to the effectiveness of CBM, a large gap exists between research and practice (Foegen et al, 2001). Some of the reasons for this research to practice gap are: a) extensive time commitments (Yell et al., 1992); b) resistance to change (Swain & Allinder, 1997); c) insufficient mastery of the skills needed to implement CBM (Foegen et al., 2001); and d) lack of face validity (Yell et al., 1992, Foegen et al., 2001) particularly as a measure of reading comprehension (Deno, 2003). Additionally, progress monitoring, using CBM, is essential for evaluating the appropriateness of a student's special education program, yet, historically, there is less compliance with the progress monitoring component of the IEP than any other component (Etscheidt, 2006). Several administrative and judicial decisions have focused on the absence of adequate progress monitoring for students with an IEP (Yell & Stecker, 2003). A review of some of the decisions concerning progress monitoring reveals three

primary areas of concern regarding progress monitoring: 1) the IEP team fails to develop or implement progress monitoring plans; 2) the IEP team uses inappropriate measures to determine student progress; and 3) progress monitoring is not conducted frequently enough to meet the requirements of IDEA or to provide meaningful data to IEP teams (Estcheidt, 2006). What follows is a review of the research on CBM utilization, implementation and acceptability.

Based on a study by Yell, et al, (1992) to identify the most problematic barriers to effective implementation of CBM in special education programs as perceived by administrators and special education teachers, six major barriers were identified in all. According to administrators, the barriers are (1) teachers' data collection practices and lack of making instructional decisions based on the data, (2) logistics (time and lack of adequate resources to properly train staff and monitor teachers' implementation of CBM), (3) initiating change into the educational system. According to the special education teachers, the three major barriers that were rated as the most important to overcome in implementing CBM in the classroom are: (a) time (CBM data collection and data analysis took away from instructional time), (b) lack of training in strategies for managing the CBM process, and (c) face validity of the measurements. Results from this study imply that teachers are concerned about the amount of time CBM takes away from instruction, and they lack confidence in data collection and determining instructional modifications.

In a study on teachers' use of CBM, Swain and Allinder (1997) found that out of 191 special education teachers, only 45% expressed they used CBM, while 55% claimed they did not use CBM. Among the teachers who did not use CBM, lack of time was the most common barrier to implementation. Interestingly, the teachers who use CBM,

expressed that time was not an issue. They also expressed that CBM data provide useful information and are important for IEPs. However, some of the teachers who reported using CBM commented that they did not use CBM as described in the survey, especially in regard to graphing and utilizing information gained through CBM to make changes in students' instructional programs. This study suggests what changes are necessary to encourage the use of these assessments and to make it more feasible for educators, such as ongoing CBM professional development for seasoned teachers or adding CBM training for pre-service teachers to help them implement CBM with fidelity.

Foegen et al. (2001) conducted a study to explore practitioners' beliefs regarding the validity and utility of the CBM Oral Reading Fluency (ORF) measure. Results indicated that, in general, participants expressed stronger belief in the utility of CBM ORF than in its validity, especially as it is related to reading comprehension (effect size .80). They also indicated a stronger belief in the use of CBM to evaluate and modify instruction, than its validity related to reading comprehension with effect sizes ranging between .92 and 1.17. These data suggest that convincing teachers of the validity of CBM is more difficult than convincing them of the utility of the measures. Results of this study are in agreement with the Yell, et. al. (1992) study that showed that perception of validity was a barrier for teacher's implementation of CBM and has implications for professional development programs on CBM and teacher preparation programs.

Wayman, Espin, Deno, McMaster, Mahlke, and Du (2011) conducted a study on special education teachers' understanding and interpretation of CBM data. Teachers were divided into two groups based on their understanding and interpretation of graphed CBM oral reading fluency data. Teachers received the highest ratings for their understanding

and interpretation of goal attainment, function of the goal line, and set up of the graph. Teachers received the lowest ratings for understanding and interpretation of the slope, baseline data, and the meaning of the ORF measure. Higher rated teachers' discussions about the CBM graphs were more accurate, clear, and coherent while lower rated teachers' discussions about the CBM graphs were more inaccurate, disorganized, and unclear. Results also showed that, overall, higher rated teachers exhibit a generally coherent and organized body of knowledge regarding CBM, while lower rated teachers have a general state of confusion about CBM data collection and interpretation. The meaning of the oral reading fluency measure, changing interventions, and using and interpreting slope are areas that appear to be particularly difficult for lowest rated teachers. Results from this study imply that the understanding of CBM progress monitoring data is more complex than it may first appear and is something that may need to be developed through careful training and experience.

Most of the research on special education teacher utilization and acceptability of CBM was conducted during the 1990's, with only a few studies conducted over the past 15 years. Based on the above research, it appears that many teachers use and accept CBM as a progress-monitoring tool; however, there are still many teachers who are not using CBM. Some of the barriers to implementation are: time, acceptability of CBM's validity, and lack of understanding in implementing certain components of CBM, such as graphing and using the data to make instructional decisions. Because IDEA requires that a student's IEP include a progress monitoring provision, it is important that all special education teachers accept, utilize and implement a progress monitoring procedure, such as CBM, regularly and accurately.

Purpose of Study

Despite the accountability requirements of IDEA and a very solid research base for CBM, it is not being used consistently and accurately by special education teachers to monitor student progress and to make data-based decisions to improve instructional programs (Shinn, 2010). It has been well established that implementing CBM is an area of weakness in special education instructional practices and if CBM data are collected, often times instructional modifications are not implemented based on the data (Shinn, 2010). Further, the gap between the federal requirements of scientifically based IEP progress monitoring and what typically occurs in schools remains wide, despite educators' familiarity with CBM (Shapiro, Angello, & Eckert, 2004). Although the literature emphasizes the importance of using CBM data in special education practices in order to meet instructional requirements and obligations of accountability as emphasized in NCLB and IDEA, there have not been any recent studies conducted on special education teachers' acceptability, utilization, and implementation of CBM. Because most of the studies were conducted in the 1990's regarding special education teachers' acceptability and utilization of CBM, there is a significant gap within the literature, as well as between research and current practices. The purpose of my study is to bridge the gap between the earlier studies on CBM and current practices of elementary special education teachers to determine whether or not CBM is being used consistently in their classrooms, how the data is used to make instructional changes or modifications to the students' instructional program, and what changes or modifications are being used to improve instructional delivery and student achievement. Results will be used to describe: a) how teachers report using CBM data to monitor student performance and progress to

plan effective instruction and write IEPs; and b) teachers' perceptions of their CBM practices in terms of experience, knowledge, training, support, and effect on student learning outcomes. Understanding how special education teachers are using CBM for planning effective instruction to meet the individual needs of their students will contribute to an area that has received little attention in recent literature. The implications of this study can help special education leaders determine ways to improve the areas of progress monitoring and data-based decision making using CBM and inform future research efforts to design and implement ongoing supports of CBM for special education teachers. In this study, I conducted a survey of elementary school special education resource teachers, in which I asked them to answer the following research questions:

1. How do elementary special education teachers report using CBM in their practices?
2. What are elementary special education teachers' views on the value of CBM as a progress-monitoring tool?
3. What are elementary special education teachers' perceptions of their ability to implement CBM?
4. What do elementary special education teachers perceive as barriers to implementing CBM?
5. What types of CBM training do elementary special education teachers report they have received? How effective do they view their training?

Definition of Terms

Progress Monitoring – a practice that helps teachers use student performance data to continually evaluate the effectiveness of their teaching and make more informed instructional decisions (Safer & Fleishman, 2005).

Individualized Education Program (IEP) – an individualized and legal document for each public school child who receives special education and related services. The IEP creates an opportunity for teachers, parents, school administrators, related services personnel, and students (when appropriate) to work together to improve educational results for children disabilities. The IEP is the cornerstone of a quality education for each child with a disability (OSERS, 2000).

Curriculum-Based measurement (CBM) – a set of standardized procedures used to assess student performance on long-term goals in reading, spelling, written expression, and math curriculum. CBM is designed to be an objective, ongoing measurement system of student outcomes, which facilitates enhanced instructional planning (Hosp & Hosp, 2003).

General Outcome Measurement – the use of standardized procedures and long-term goals, in which the testing procedures remain constant over a long period of time (typically a year) (Fuchs & Deno, 1991).

Oral Reading Fluency (ORF) – the oral translation of text with speed and accuracy (Fuchs, Fuchs, Hosp, & Jenkins, 2001).

Formative Assessment – the use of observational protocols or diagnostic measures to provide educators with detailed information about a student's progress assimilating and representing knowledge and skills (Wireless Generation White Paper, 2007).

Response to Intervention (RTI): the practice of providing high-quality instruction and intervention matched to student need, monitoring progress frequently to make decisions about changes in instruction or goals and applying response data to important education decisions (Elliott, 2008).

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter provides a review of the literature that explains the evolution of progress monitoring in the educational process. The first section defines progress monitoring and the development of CBM as a form of progress monitoring created for special education teachers to assess their students on a frequent and systematic basis during the course in instruction. The second section provides a history and overview of CBM, including the characteristics of CBM, and a description of the most commonly used CBM reading assessment, Oral Reading Fluency (ORF). Section three explains the application of CBM in schools and highlights the significance of CBM in a MTSS or RTI framework. The next section examines the impressive amount of research on CBM over the past 35 years, supporting its technical adequacy, effects on student achievement, uses and applications, and acceptability and implementation of CBM. The chapter concludes with a final section that describes the purpose of my study.

Progress Monitoring

Progress monitoring is a set of techniques for assessing student performance on a regular basis, the data collected from these assessments helps teachers evaluate the effectiveness of their teaching and make informed instructional decisions (Safer & Fleischman, 2005). Progress monitoring is a broad category of classroom assessment that

can be broken into two categories: mastery measurement (MM) and general outcome measurement (GOM) (Fuchs & Deno, 1991). With MM, teachers test for mastery of a single skill and after mastery is demonstrated, they go on to assess mastery of the next skill in the sequence (Fuchs & Fuchs, 2006). So at different times of the academic year, different skills are assessed. MM is a traditional assessment method most often used in general education classrooms. However, because the nature and difficulty of the tests keep changing with successive mastery of skills, test scores from different times of the year cannot be compared, which makes it impossible to determine whether the student is learning or progressing at a pace that will allow him or her to meet annual learning goals (Safer & Fleischman, 2005). Furthermore, MM has unknown reliability and validity and it fails to provide information about whether students are maintaining the previously mastered skill (Fuchs & Fuchs, 2006).

In contrast, GOM, the second type of progress monitoring, uses standardized procedures and long term goals, in which the testing procedures remain constant over a long period of time. Based on these distinctions, CBM falls under GOM. CBM is a form of classroom assessment conducted on a regular basis in which all skills in the instructional curriculum are assessed by each test (probe) across the year (Fuchs & Fuchs, 2006). It is an approach that measures the academic growth of individual students. The original purpose of CBM was to aid special education teachers in collecting data and evaluating the effectiveness of the instruction they are providing to individual students with disabilities (Deno, 2003). Having individual data for each student allows the teacher to make specific instructional decisions regarding whether or not an educational program is effective for a student or if it should be modified to fit the student's individual needs

(Deno, 1992). Some of these instructional decisions may include determining whether or not to make a program change, the development and placement of students into instructional groups, and identifying specific difficulties the student may be demonstrating (Hosp & Hosp, 2003).

CBM was designed to provide special education teachers an assessment tool that uses data to formatively evaluate their instruction and improve their effectiveness. Since the development of CBM, there have been a plethora of articles written describing how to implement CBM and how to use it to inform instruction (Hosp & Hosp, 2003). Next, I will discuss the history of CBM, give an overview of the characteristics, and address the uses of CBM in schools today.

History and Overview of CBM

In 1975, The Education for All Handicapped Children Act (EAHCA) was enacted. The purpose of the law was to require that states provide a free, appropriate, public education (FAPE) in the least restrictive environment (LRE) to all eligible students with disabilities. The foundation of the FAPE requirement was that all eligible students with disabilities receive special education services provided in agreement with his or her IEP (Yell & Busch, 2013). The law's requirement of specifying annual goals and short-term objectives would prove to be an important landmark on the road to the development of CBM (Jenkins & Fuchs, 2012).

At the University of Minnesota, Stanley Deno and his graduate student, Phyllis Mirkin, began working to design a model to guide special education teachers in planning and delivering educational programs that were amenable with the newly mandated IEP (Jenkins & Fuchs, 2012). Deno observed that traditional assessments, such as mastery

measurement, fell short on measuring student performance, and that better assessment techniques were necessary for making accurate judgments about students' needs and progress (Deno & Gross, 1973).

In the 1970's, the main assessment tools available to educators were standardized, norm-referenced measures that were developed for a different purpose than evaluating ongoing student performance – they were designed to compare an individual's performance to a normative group. These assessment tools, therefore, were not designed to be measurements of progress as they only provided information on a student's relative standing compared to his or her peers (Jenkins & Fuchs, 2012). Deno had an innovative idea: simple indicators of academic performance could be used to capture the overall strength of an individual student at a given point of time, and such data could be used to track the course of development (Jenkins & Fuchs, 2012). Assessment measures had to be easy and time efficient to conduct, so that educators might collect the data without much training, and so the assessment did not compete for valuable instructional time (Jenkins & Fuchs, 2012).

Deno's vision was that educators would use these data as the dependent variable to assess the effects of their instructional practices (Jenkins & Fuchs, 2012). Further, that teachers would evaluate the effects of their instruction on individual students, building stronger academic programs student by student, and that schools and districts would differentiate generally effective from ineffective practices, thereby supplying the basis for data-based education reform (Jenkins & Fuchs, 2012).

An extension of Deno's research on data-based decision making (and progress monitoring), later named CBM, was evident in the book Data-Based Program

Modification: A Manual (Deno & Mirkin, 1977), which had significant impact on special education practices and received national attention (Marston, 2012). Deno and Mirkin (1977) outlined a framework for decision-making and providing services to low performing students based on data. Data Based Program Modification (DBPM) described how to analyze student growth and use the data to examine the effectiveness of instruction (Marston, 2012). Within a DBPM model, the purpose of assessment is not to measure student shortcomings, but rather to measure instructional effectiveness (Germann, 2012).

The purposes of the IEP, outlined in EAHCA, were remarkably similar to Deno and Mirkin's (1977) purposes for developing DBPM. Specifically, an individualized assessment of the student was conducted to determine his or her educational needs. Based on this assessment, a program consisting of measurable goals and special education services was developed to address the student's individual needs. The progress of the student in the special education program was then monitored, and teachers used the data to make important educational decisions regarding the student's individualized program (Yell & Busch, 2013). Eventually, CBM became an assessment methodology that could be used to fulfill the requirements of the IEP based on the requirements of IDEA. CBM could provide information that can be used for the statement of the student's present level of academic achievement, the statement of measurable annual goals, and the statement of how the child's progress toward the annual goals will be measured (Etscheidt, 2006; Yell & Stecker, 2003).

To test teacher use of DBPM empirically, a research and development program was conducted through the University of Minnesota Institute for Research on Learning

Disabilities (IRLD) (Deno, 2003). One result of the IRLD formative evaluation research was the development of a generic set of CBM progress monitoring procedures in reading, spelling, and written expression. These procedures include specification of (1) the core outcomes on which performance should be measured; (2) the stimulus items, the measurement activities, and the scoring performance to produce technically adequate data; and (3) the decision rules used to improve educational programs (Deno, 2003). Ultimately, a set of criteria was specified that was used to establish the technical adequacy of the measures, the treatment validity of the measures, and the logistical feasibility of the measures (Deno & Fuchs, 1987). The following section examines characteristics of CBM that sets it apart from other types of assessments.

Characteristics of CBM: While working on the intervention process of DBPM, Deno and Mirkin (1977) realized they needed an assessment system built on a set of common principles composed of standardized procedures and rules. They developed CBM to fill that need. CBM is characterized by six distinguishing characteristics (Deno, 2003; Hosp, Hosp, & Howell, 2007; Fuchs, 1993):

1. CBM is aligned to the curriculum. With CBM, students are tested on the curriculum they are being taught. The stimulus material the student is given looks the same and the responses the student is expected to make are the same type as in the curriculum (Fuchs, 1993). Further, the assessment of proficiency on skills represents the entire yearlong curriculum (Hosp, Hosp, & Howell, 2007). CBM maintains a constant measurement focus across the entire year with test difficulty remaining constant across the school year.

2. CBM is technically adequate. More than 200 empirical studies provide evidence of CBM's reliability, validity, and treatment utility for assessing the development of competence in basic skills (Fuchs & Fuchs, 2005). The reliability and validity of CBM have been achieved through the use of standardized, observational procedures for repeated sampling on core reading, writing, and mathematics skills (Deno, 2003).

3. CBM is standardized. CBMs are standardized in two ways: a) CBM procedures include standardized instructions for administration, student directions, timing and scoring; and b) standardized tasks are used for each content area measurement (Deno, 2003). Standardization makes possible meaningful comparisons across time and across groups (Shinn, 1995).

4. CBM has decision rules to help inform instruction. Decision rules are put into place to provide those who use the data with information about what it means when students score at different levels of performance or demonstrate different rates of progress on the measure over time (Hosp, Hosp, & Howell, 2007). The teacher uses the decision rules to determine instruction in two ways: a) When the student's actual rate of progress falls below the rate of expected goal attainment for four consecutive scores, a modification needs to be made to instruction; b) When the student's rate of performance is greater than the rate of expected goal attainment for four consecutive scores, the goal needs to be raised (Fuchs, 1993). Using decision rules in this way allows the teacher to determine if the student is making appropriate progress or if a change in instruction is warranted.

5. CBM emphasizes repeated measurement over time. The measurement procedures used in CBM are based on collecting repeated samples of student performance on equivalent forms of the same task over time (Fuchs, 1993). Changes in performance are then interpreted to reflect change in a student's proficiency with that task. This means that CBM data can be used for progress monitoring to illustrate the rate of learning as it is occurring, allowing immediate modifications in a student's educational program as needed, and illustrates the degree to which an instructional intervention is producing the desired outcome (Fuchs, 1993). Therefore, CBM data helps teachers decide what to teach and how to teach (Hosp, Hosp, & Howell, 2007).

6. CBM is efficient. CBM is efficient because individuals can be trained to give the measures in a short period of time and quickly (between 1 and 3 minutes) (Deno, 2003). CBM also communicates efficiently. It produces performance data that allows teachers to draw conclusions directly from what the student actually did on the test. There is no need to convert the raw scores into percentile scores because the CBM scores are the only data that is needed to make decisions (Hosp, Hosp, & Howell, 2007). Additionally, the CBM data can be summarized efficiently by using a variety of techniques such as paper and pencil graphs or web-based data management systems. This efficiency makes the data immediately accessible to any level of the educational system and in an easy-to-understand format for students and parents.

In summary, the original intent of CBM was to develop and validate a technology that was useful to monitor progress in basic skills (reading, writing, and spelling) for students with disabilities. The purpose was to develop a standardized technology that was aligned to the curriculum, technically adequate, efficient, and allowed teachers to use

the data to make judgments of student progress toward annual IEP goals. After 5 years of research by Deno and colleagues, the following measures examined met conventional psychometric standards for reliability and validity and met the 6 characteristics for use in frequent progress monitoring (Shinn, 2010): Reading, oral reading fluency (ORF) was determined by counting the number of words read correctly from a reading passage in 1 minute (Deno, Mirkin, Chiang, & Lowry, 1980), math, counting the number of correct digits in student responses to math computation problems performed in 3 minutes, spelling, counting the number of correct letter sequences from an orally presented list of spelling words in 2 minutes (Deno, Mirkin, Lowry, & Kuehnle, 1980), and in written expression, counting the number of total words written or correct writing sequences written in 3 minutes from an orally presented story starter (Deno, Mirkin & Marston, 1980).

Subsequent research has identified additional CBM assessments. A CBM test for mathematics concepts and applications was later developed by Fuchs & Fuchs (1992), which involved counting the number of correct answers to applied math problems in 5 minutes was find to a reliable and valid method for assessing general math skills (Fuchs, Hamlett, Fuchs, 1998). Additionally, in reading, research was conducted using a 3-5 minute silent reading test called a maze procedure could also serve as a measure of general reading ability (Fuchs & Fuchs, 1992). The CBM Maze procedure requires students to read a passage in which every 7th word has been deleted. When students come to a deleted word, they must select the correct word from multiple-choice items (containing the correct answer and two distractors). The Maze serves as a good indicator of reading comprehension (Fuchs, 1992)

Oral Reading Fluency: Whereas, all of the CBM tests mentioned above are utilized, the most commonly used CBM procedures are to assess students' reading proficiency. For CBM in reading, the most commonly used general outcome measurement is ORF. (Stecker, Fuchs, & Fuchs, 2005). Although researchers at the IRLD studied several measures, the number of correct words (read) per minute (CWPM) in a one-minute oral reading sample of curricular material generated a reliable and valid indicator of overall reading proficiency (Marston, 1989). Additionally, studies repeatedly showed that ORF was also a valid measure of reading comprehension (Deno, Mirkin & Chiang, 1982; Fuchs, Fuchs & Maxwell, 1988). The criterion validity of CBM oral reading scores has also been established for the predictive validity of pre-reading measures and the effectiveness of early literacy interventions (Deno, 2003). According to Good, Simmons, & Kame'enui (2001), evidence shows that CBM oral reading performance at the end of first grade is a significant indication of future reading success. Research in this area has established important linkages with measures of phonological skills in kindergarten and success in state assessments. CBM of reading has been used for a variety of purposes such as screening, progress monitoring, and instructional decision making and has increased in popularity as an alternative to standardized test of reading (Madelaine & Wheldall, 2004).

When Deno and Mirkin developed CBM in the late 1970's, they created a set of procedures that special education teachers could use to plan and monitor instruction. The results of almost 40 years of research and development of CBM have been widely disseminated and applied in public school programs – both in regular and special education. This research has been conducted on the reliability, validity, and effective use

of CBM procedures with all students (Adroin, Christ, Morena, Cormier, & Klingbeil, 2013). What follows are descriptions of additional efforts to use CBM school-wide and to address a variety of educational problems.

Application of CBM in Schools

Originally, CBM procedures were developed for special education teachers and were applied to basic academic areas such as reading, spelling, written expression, and later mathematics. However, more recent work has expanded to the use of CBM in the RTI process. This section will address the application of CBM within the RTI framework in today's schools.

CBM Application in a Response to Intervention/MTSS Framework*:* RTI or MTSS involves a process for evaluating whether students respond successfully to evidence-based instruction (Stecker, Fuchs, & Fuchs, 2008). Considered a multi-tiered and prevention-intervention system, successive levels of instructional support are provided when a student's response to the academic program is measurably poor, particularly compared to his or her peers' responses (Stecker, Fuchs, & Fuchs, 2008). Within RTI/MTSS models, empirically based interventions are implemented and decision rules are used to determine whether a student's rate of progress is indicative of a student responding or not responding to interventions (Jenkins, Hudson, & Lee, 2007). Students are considered for special education eligibility if, after exposure to multiple interventions, they continue to show a lack of adequate progress (response) to targeted evidence-based interventions. The primary data used to determine a student's special education eligibility within an RTI/MTSS model are those indicative of whether; (a) after multiple interventions, the student's level of performance relative to peers is discrepant and (b) the

student's rate of progress when provided with empirically-based interventions is discrepant from what is expected (Fuchs & Fuchs, 2006).

Although robust instruction is paramount to successful implementation of RTI/MTSS, assessment data should drive decision-making (Kashima, Schleich, & Spradlin, 2009). Therefore, CBM comprises one of the most critical features of a successful RTI/MTSS implementation. CBM helps teachers make instructional decisions throughout the levels of the RTI/MTSS system and provides data to validate Specific Learning Disability identification (Stecker, Fuchs, & Fuchs, 2008). CBM has been used within a RTI/MTSS framework to accomplish three purposes. First, CBM measures are used to screen all students regularly to identify achievement difficulties, typically three times a year (Fuchs & Fuchs, 2006). This practice has been referred to as benchmark assessment. Second, students who are identified as below target or at-risk are progress monitored more frequently to assist teachers in determining whether supplemental interventions are successful (Busch & Reschly, 2007). Finally, schools use CBM as a way to evaluate educational programs at different levels (individual, class, grade) to verify whether the core, supplemental, and intensive instructional supports and services are effective (Shapiro & Clemens, 2009).

Following is a sample framework for RTI/MTSS implementation within the context of elementary-level instruction in reading. Within this multi-tiered framework, I will describe how CBM data can be used to provide relevant information regarding data based decision-making.

The first tier, *Primary Prevention*, occurs as general education instruction. Because data used from an RTI/MTSS process for potentially identifying students with

SLD must show lack of adequate response to scientifically validated instruction, Tier 1 must involve implementation of instructional practices that have been tested empirically. Schools must be able to defend that core programs and instructional procedures have been generally effective in promoting student achievement (Stecker, Fuchs, & Fuchs, 2008).

At Tier 1, CBM reading measures are collected on all students in the general education setting. Collecting these data serves two functions. First, it allows examination of whether the instruction provided is adequate for students to progress, as expected, as readers. Second, it allows classes, schools, or districts to collect normative data on all students' level and rates of reading growth (Fuchs & Fuchs, 1998). From these data, students could be identified as being at risk for reading problems by examining their performance and rate of growth. Students who are discrepant from their peers in both current performance and rate of growth would be candidates for more intensive remediation at Tier 2 (Stecker, Fuchs, & Fuchs, 2008).

When students do not respond adequately to otherwise effective Tier 1 instruction, then supplemental support should be provided. At Tier 2, *Secondary Prevention*, small-group, intensive instruction is provided in an attempt to affect both student performance and rate of growth. At this tier, progress monitoring with CBM reading measures is done frequently (typically once or twice a week). Decisions based on effectiveness of the instruction for affecting student performance and growth is accomplished by, examining a student's CBM data and comparing it to his or her classmates. After 10 to 12 weeks, students whose performances improved are returned to Tier 1. Students who do not respond to the intensive, standardized instruction may be

considered for special education placement at Tier 3 (Busch & Reschly, 2007). Thus progress-monitoring data from both Tier 1 and Tier 2 are critical for determining overall student unresponsiveness to instruction and for eliminating the lack of effective instruction as a contributing factor to the student's learning problems (Stecker, Fuchs, & Fuchs, 2008).

When a student has participated in several rounds of preventive assistance, including more targeted assistance with Tier 2, and still progresses poorly academically, he or she should be considered for special education. In many models, special education services are found in Tier 3, *Tertiary Intervention* (Busch & Reschly, 2007). Progress monitoring data collected throughout the multi-tiered system can be used to help document the presence of a learning disability. However, other assessments may be conducted to confirm the presence of a learning disability and to eliminate other potential disabilities as the probable cause for difficulties in learning (Fletcher, 2006). If it is determined that a student does have a learning disability, he or she enters Tier 3 intervention and receives special education instruction (Stecker, Fuchs, & Fuchs, 2008).

At this tier, CBM measures are used to (a) set performance goals, (b) develop appropriate IEP goals, and (c) monitor ongoing student performance in relation to the instruction being provided (Busch & Reschly, 2007). On going revisions, or modifications in the instructional program, may be required during Tier 3 special education intervention, as teachers must use CBM data to judge the adequacy of student improvement (Busch & Reschly, 2007). When students fail to progress as anticipated, then special educators should revise or modify features of their instructional programs, continue to collect data and reevaluate the effects of their instructional changes on

student performance (Stecker, Fuchs, & Fuchs, 2008). Use of CBM data for students at this tier also help teachers meet several of the IEP regulations required by IDEIA. Specifically, the use of CBM measures allows teachers to describe the student's present level of performance and set annual measurable goals. Furthermore, special education teachers are required to inform the parents of a student's progress toward meeting the annual goal as often as parents of students without disabilities receive feedback on their child's performance (Yell & Stecker, 2003). Therefore, the ability to monitor student progress and provide timely feedback to parents is paramount in order for special education teachers to comply with IDEA. Additionally, research confirms significant effects on student achievement when teachers use progress monitoring data to devise instructional programs best suited to the individual needs of students with disabilities (Stecker, Fuchs, & Fuchs, 2005). Presently, RTI/MTSS is implemented in various ways in different states, districts, and even schools within a district. While most have adopted the 3 Tier model, some have implemented 4 Tiers, with special education services provided at Tier 4. The RTI/MTSS systems differ in terms of the number of levels in the process, who delivers the intervention, and whether the process is viewed as precursor to a formal evaluation for special education eligibility or if RTI itself is the eligibility evaluation (Fuchs, Mock, Morgan & Young, 2003). In these models, Tier 3 is another iteration of a specialized, more individualized intervention, whereas Tier 4 represents special education. Regardless of the type of model used, the key feature of a well-designed RTI/MTSS model is the use of CBM for decision-making. Of course, successful learning outcomes are not possible without high-quality instruction implemented with fidelity. To ensure that students are achieving as expected, however,

CBM becomes a critical tool for decision-making purposes at all tiers within the RTI/MTSS framework.

While CBM was initially developed for special education teachers, it has evolved to support general educators to accommodate the increase diversity in their classrooms. CBM data is successfully being used for a wide range of assessment activities within a RTI/MTSS framework including: (a) targeting students in need of additional assistance, (b) judging student responsiveness to interventions, and (c) developing individualized programs for unresponsive students (Fuchs & Fuchs, 2006). In addition to it's use in RTI/MTSS models, CBM is also currently used for decisions regarding special education student's reintegration into general education classrooms (Powell-Smith & Stewart, 1998), predicting success on high stakes test (Deno, 2003), as well as measuring growth in secondary school programs and content areas (Espin & Tindal, 1998), and assessing ELL students (Baker & Good, 1995). The following section will address, in depth, the expansive amount of research conducted on CBM to support its effectiveness and importance in education.

Research on CBM

Over the past 40 years, an impressive body of research has accumulated focusing on CBM. In 1989, Marston reviewed the existing research on CBM. At that time, CBM was viewed primarily as a progress- monitoring tool in basic skills for special education students at the elementary-school level. Since Marston's (1989) review, the research on CBM has expanded considerably. In 2007, Wayman and colleagues from the University of Minnesota conducted a literature synthesis on CBM, centered on research published since Marston's 1989 review. Based on their review, they identified 578 articles,

dissertations, and reports related to CBM. Among the 578 publications, 160 were empirical studies addressing questions of technical adequacy, instructional utility, and the logistics of implementation in reading, writing, spelling, and math. This literature documented how CBM had expanded its initial focus on special education progress monitoring to include universal screening, general education progress monitoring, predicting achievement on high stakes tests, and learning disability classification within a RTI eligibility framework. Over the past four decades, CBM screening and progress-monitoring has become a widely used tool with important benefits.

What follows is a review of research on CBM based on early studies from the Research Institute of Progress Monitoring at the University of Minnesota conducted by Stanley Deno and colleagues to the most recent research found in published journals. My review is organized in 4 sections: Technical Adequacy of CBM, Impact of Teacher Planning and Achievement Effects of CBM, Uses and Applications of CBM, and Acceptability and Implementation of CBM. I begin my review by examining evidence related to the technical adequacy of various measures of CBM with particular emphasis on CBM-ORF, followed with evidence of how CBM can assist teachers with planning better instruction and effecting superior achievement.

Technical Adequacy of CBM: Research on CBM began in the late 1970's and early 1980's at the University of Minnesota Institute for Research on Learning Disabilities. Early research concentrated on finding a valid measure of overall reading proficiency. As already indicated, ORF emerged as the most valid indicator of overall reading performance (Marston, 1989) and has the most empirical research support of any form of CBM (Kranzler, Brownell, & Miller, 1998). A large amount of this research supports the

technical adequacy of CBM in reading (Baker & Good, 1995; Deno, 1985; Deno, Mirkin, & Chiang, 1982; Fuchs, Deno, & Mirkin, 1984).

To be considered technically adequate, CBM needs to be meaningful and useful for decision-making. In other words, the CBM measures must have adequate reliability and validity. If either of these technical characteristics is lacking, educators cannot conclude that changes in the scores on the CBM measures actually reflect changes in student performance. Reliability refers to the relationship between scores on alternate forms of CBM measures and that the scores truly reflect a change in the student's performance. Research on the reliability of the ORF measure has shown that the measure has strong reliability, with correlation coefficients ranging from .82 to .97 (Marston 1989). Examining the validity of CBM measures entails examining the extent to which CBM measures act as indicators of general (reading) proficiency (Fuchs, Fuchs, Hosp & Jenkins, 2001). Essentially to serve as general outcome measures, the CBM reading measures must correlate in expected ways with other measures of reading proficiency. The criterion-related validity of the ORF measure with other reading proficiency measures, such as standardized test scores and teacher ratings of reading performance, has coefficients ranging from .63 to .90 (Marston, 1989). Studies have also shown that CBM measures are appropriate for modeling student growth over time and can differentiate student growth patterns for students with high, average, and low levels of achievement (Shinn, Deno, & Espin, 2000). These results support the utility of CBM reading measures as reliable and valid indicators of student performance and progress. When measures have sound technical features, teachers can be more confident in justifying their use for decision-making. Additional research provides evidence that

CBM is just as valid and reliable as published assessments, such as the following study conducted by Deno, et al. (1982)

Deno, Mirkin, and Chiang (1982) compared 5 different CBM reading probes: Words in Isolation, Words in Context, Oral Reading, Comprehension, and Word Meaning. Measures were examined for their correlation with norm-referenced, standardized measures, including parts of the Stanford Diagnostic Reading Test (Karlsen, Madden, Gardner, 1976) and The Woodcock Reading Mastery Test (Woodcock, 1987). Results of the research provided evidence that the number of words read aloud correctly in 1-minute had the highest correlation with the various standardized reading subtests, providing high reliability and validity coefficients from .73 to .91, with most coefficients above .80. Similarly, internal consistency, test-retest reliability and inter-scorer agreement ranged from .89 to .99, therefore, these quick and easy formative assessments were determined to be just as valid and reliable as the published reading measures.

Another study examined the validity of ORF CBM. Marston and Magnusson (1985) researched the benefits of implementing CBM measures in both general and special education settings. To determine the validity of CBM, student reading performance on ORF measures were compared to several published reading measures including parts of The Stanford Achievement Test, The SRA Achievement Series, and the Ginn720 Reading Series. Results indicated that the validity coefficients ranged from .80 to .90. Teachers also ranked their students' reading achievement level on a scale of one to five. The teacher's judgment of their students' performance was then correlated with performance on both CBM and standardized reading measures. Results of the correlations indicated that CBM ORF had significantly greater correlation coefficients

with teacher judgment that any of the standardized reading measures. Due to the high reliability and validity of CBM, educators within the study were able to use the data derived from CBM to make decisions involving student placement, as well as progress and effectiveness of implemented interventions within their school.

Shinn, Good, Knutson, and Tilly (1992) conducted a study to examine the relationship of CBM ORF to the reading process from a theoretical perspective. To prove that CBM ORF is an effective indicator of reading proficiency, and not just decoding, reading models were tested using confirmatory factor analysis procedures with 114 third- and 124 fifth-grade students. Confirmatory factor analysis was used to examine whether ORF constituted a significant role in a single factor model of reading or whether it should be defined as a decoding construct, a comprehension construct, or a separate construct. Subjects were tested on tasks requiring decoding of phonetically regular words and regular nonsense words, literal comprehension, inferential comprehension, cloze items, written retell, and CBM ORF. For third graders, a one-factor model for reading was validated with all measures contributing significantly. Each of the specific measures tested in the study contributed significantly to the Reading Competence model. Two CBM reading measures where students read aloud from third-grade basal readers correlated the highest with the model ($r = .88$ and $.90$). For fifth graders, a two-factor model was validated paralleling current conceptions of reading measurement. Reading proficiency was best portrayed as being composed of two constructs fitting the common conception of reading: decoding, and comprehension. In the most defensible model, CBM ORF best fit with the construct of decoding. However, even though decoding and comprehension could be differentiated as constructs in the fifth grade, they still were

correlated highly (r = .83). Additionally, the CBM ORF measures correlated as high or higher with Reading Comprehension (r = .74 and .76) as did the Stanford Diagnostic Reading Test (SDRT) measures (r = .73 and .76). This study confirms that CBM ORF fits theoretical models of reading competence and can be validated as a measure of general reading achievement, including comprehension.

CBM reading scores are sensitive to student growth, and they correlate well with and predict student performance on state-mandated, high stakes assessments. McGlinchey and Hixon (2004) found a significant positive and predictive relationship between CBM ORF and scores on their state's high stakes reading assessment for a sample of 1, 362 fourth graders over an 8-year period. Such information enables teachers to intervene early with students whose progress is inadequate in an effort to enhance their academic growth, which in turn is likely to result in better scores on high-stakes achievement tests. Similar findings were found in Florida (Buck & Torgenson, 2003). Colorado (Shaw & Shaw, 2003), Illinois (Sibler, Biwer, & Hesch, 2001), Michigan (McGlinchey & Hixon, 2004), Minnesota (Hintz & Silberglitt, 2005), North Carolina (Barger, 2003), Oregon (Good, Simmons, & Kame'enui, 2001), Washington (Stage & Jacobsen, 2001), and Ohio (VanderMeeres, Lentz, & Stoller, 2005). On average, most studies reported correlations between .60 and .75 range. The data suggests that CBM can be one source of data that could be used to potentially identify those students likely to be successful or fail the statewide assessment measure.

As the above studies demonstrate, CBM research on reading measures supports the technical adequacy of CBM. Research has shown that CBM ORF is a reliable measure for reflecting change in student performance over time; as well as a valid

measure to serve as a general outcome measure of reading proficiency, including comprehension, when compared to other standardized test and teacher ratings of reading performance. Additionally, CBM reading scores are sensitive to student growth, and they can predict student performance on state-mandated, high stakes assessments. Not only was CBM developed to be a reliable and valid measure of overall reading proficiency, another intent of CBM was for teachers to use technically sound data to document student growth and determine the need for modifying instructional programs. The hope was that by responding instructionally to a student's poor patterns of performance, teachers should be able to enhance student achievement (Stecker, Fuchs, & Fuchs, 2005). The following section focuses on studies directed to the effects of CBM on student achievement.

Impact of Teacher Planning and Achievement Effects of CBM: In addition to the research on the technical adequacy of CBM, a well-established, long-standing research program documents how CBM can help teachers plan better instruction and effect superior achievement (Deno, 2005). Teachers who use CBM data to inform their practices develop more specific and realistic goals for their students and modify their instructional approaches more frequently in response to data obtained than do teachers utilizing alternate avenues for monitoring student performance (Fuchs, Fuchs, Hamlett, Phillips, & Bentz, 1994). Investigators have examined the effects of CBM data utilization strategies, as well as CBM's overall contribution to instructional planning and student learning, not only in special education, but also general education.

Fuchs et al., (1984) conducted a study that identified significant achievement effects in reading for students whose teachers' used CBM to monitor progress. Thirty-nine special education teachers were assigned randomly to one of two groups: (a) a

progress monitoring condition called data-based program modification in which teachers measured ORF at least twice weekly, scored and graphed these performances, and used prescriptive CBM decision rules for planning the students' reading programs, or (b) a conventional special education evaluation condition in which teachers used their typical procedure for monitoring student's progress and adjusting programs. Students whose teachers used CBM to develop reading programs achieved better than students whose teachers used conventional monitoring methods on the Passage Reading Test and on the decoding and comprehension subtests of the Stanford Diagnostic Reading Test. Respective effect sizes were 1.18, .94, and .99. The results showed the use of systematic procedures by CBM appear to affect student achievement positively and powerfully.

In addition to providing evidence of systematic procedures of CBM affecting student achievement, studies have also illustrated how teachers may use CBM to help them establish ambitious goals resulting in enhanced student learning and achievement. Fuchs, Fuchs, and Hamlett (1989a) examined the contribution of goal-raising guidelines within CBM decision-making rules. Teachers were assigned randomly to and participated in one of three treatments for 15 weeks in mathematics: no CBM, CBM without a goal-raising rule, and CBM with a goal-raising rule. The goal-raising rule required teachers to increase goals whenever the student's actual rate of growth was greater than the growth anticipated by the teacher. Teachers in the CBM goal-raising condition raised goals more frequently than did teachers in the non-goal-raising conditions. Additionally, concurrent with teachers' goal rising was differential student achievement on pre and post standardized achievement tests, specifically the Math Computation Test (MCT) and Stanford Achievement Tests-Concept of Numbers (CN).

The effect size comparing the pre and post-test change of the two CBM conditions was .52 (MCT) and .32 (CN), showing that using CBM to monitor the appropriateness of instructional goals and adjust goals upward whenever possible enhances teachers' instructional planning and student achievement.

Another way in which CBM can be used to enhance instructional decision-making is to assess the adequacy of student progress and determine if instructional modification is necessary. When the actual growth rate is less than the expected growth rate, the teacher uses a decision-making rule ("change the intervention program" decision rule) and modifies the instructional program to promote stronger learning. Fuchs, et al. (1989b) evaluated the contribution of this CBM decision-making rule with 29 special education teachers who implemented CBM for 15 school weeks with 53 students with mild to moderate disabilities. Teachers in a CBM measurement-only group measured students' reading growth as required, but did not use the assessment information to modify students' reading programs. Teachers in the CBM "change the intervention program" decision rule group measured student performance and used the assessment data to determine when to introduce program modifications to enhance growth rates. Results indicated that although teachers in both groups measured student performance, important differences were associated with the use of the "change the intervention program" decision rule. As indicated on the Stanford Achievement Test (reading comprehension subtest), students in the "change the intervention program" decision rule group achieved better than the CBM measurement-only control group with effect size at .72, whereas the CBM measurement-only group had an effect size of .36. The slopes of the two CBM treatment groups were significantly different favoring the achievement of

the “change the intervention program” group with an effect size of .86. As suggested by these findings, collecting CBM data, in and of itself, exerts only a small effect on student learning. To enhance student outcomes in positive ways, teachers need to use the CBM data appropriately, by utilizing the decision rules, to build effective programs for students with disabilities.

As shown in the above study, the performance indicators, which provide an overall index of the student’s proficiency on the yearlong curriculum, are well suited for summarizing the overall rate of student improvement and for making related evaluation decisions, such as judging the appropriateness of the goal and adequacy of student progress. Yet, the CBM performance indicators displayed on the student’s graphs provide little direction for determining what modifications to the intervention programs should be made when data shows that modifications are needed (Fuchs, 1993). Because during the CBM testing the student is required to perform skills representing the entire yearlong curriculum, student performance on all the curricular content for the year is available for each skill, on any probes or across probes. Information can be aggregated across probes to formulate a detailed description of student’s strengths and weaknesses (diagnostic skill profiles) in the curriculum to aid teachers in determining necessary modifications. Although many practitioners value the information revealed in the data collected using CBM, administration, scoring, graphing, and analyzing to generate a diagnostic skill profile results can be time-consuming tasks (Hall, Vue, & Mengel, 2003).

Several researchers and publishers have taken on this challenge by creating methods that lower the burden for teachers to implement CBM efficiently and effectively by designing CBM software-based data management programs (SDMP). Some CBM

software-based data management programs create individual or group graphs after the student's scores are entered into the program. Other programs also generate a diagnostic skills profile for individual students with suggestions for modifying instruction. In addition to saving valuable time for teachers, another advantage to these computer programs is that data is stored and cumulatively displayed so teachers, students, and parents are able to access and view progress data for individual students over time (Hall, Vue, & Mengel, 2003).

Researchers investigated the contribution of these CBM software-based data management programs in math (Fuchs et al. 1991), reading (Fuchs, Fuchs & Hamlett, 1989c), and spelling (Fuchs, Fuchs, Hamlett & Allinder, 1991a) to help teachers build better programs and affect greater achievement. In each study, teachers were assigned randomly to one of three conditions: no CBM, CBM with SDMP goal raising and change the program decision rules, CBM with SDMP goal raising and change the program decision rules along with CBM diagnostic skill profiles. The control groups implemented normal procedures for monitoring student progress, which did not include any use of CBM. Their monitoring information consisted primarily of inspection of scores on weekly quizzes assessing student proficiency. Within the CBM groups, teachers used CBM to monitor student progress. Teachers used CBM methodology in conjunction with SDMP. Each assessment was created, administered and scored in the same way. The students took their assessments on the computer. When the computer terminated administration of the assessment, the computer's SDMP presented the scores to the student, along with a graph showing student performance over time. The SDMP used an interactive structure to communicate the decision rules of when to raise the goal or when

a modification was necessary. Teachers had to inspect the database independently and enter their own decisions. CBM teachers in the SDMP graphed analysis and in the graphed plus diagnostic skill profile received their graphed feedback. However, CBM teachers in the SDMP graphed plus diagnostic skill profile received additional information. The computer provided teachers with detailed information about the student's' strengths and weaknesses, allowing teachers to target skills for instruction.

In all three studies, teachers in the CBM with SDMP diagnostic skill profile treatment group generated instructional plans that were more varied and more responsive to individual students' learning needs. Further, they affected better student learning as measured on changes between pre and posttest performance on global measures of achievement. Effect sizes associated with the CBM with SDMP diagnostic skill profile groups ranged from .65 to 1.23. It appeared that the skills analysis information contributed critical information in order to promote effective instructional planning. With the addition of the diagnostic skill profile to the graphed feedback, teachers were able to write more acceptable instructional programs; they cited more skills to target during instruction; and they effected superior student achievement. This series of studies demonstrates how CBM with SDMP diagnostic skill profiles of students' strengths and weaknesses in the curriculum supports teachers' effective instructional decision making, build better programs and effect greater achievement.

As the research supporting the effectiveness of CBM on teacher planning and student achievement suggests, when teachers use systematic CBM to track their student's progress in basic skills, they are better able to identify students in need of additional or different forms of instruction, they design stronger instructional programs, and their

students attain greater levels of achievement. Moreover, with timesaving computer programs that generate graphs and diagnostic skill profiles, teachers are able to conduct CBM more efficiently and effectively. Next, I will present research on the uses and applications of CBM within an RTI system, special education eligibility decisions, development and refinement of IEPs, and reintegration into general education following special education services.

Uses and Applications of CBM: CBM was originally designed for individual progress monitoring of special education student's academic performance to enable special education teachers to evaluate the effectiveness of their instructional interventions and make timely modifications to accelerate student achievement (Deno, 2003). Originally, research focused on the technical adequacy of CBM and the achievement effects of students whose teachers' monitored progress, using CBM in Reading, Writing, Spelling and Mathematics. Currently, CBM has evolved to include practices in general education classrooms as a primary data source within RTI models to determine the level of intervention needed by students having academic difficulties and to determine special education eligibility decisions. Data obtained through CBM is also a key component in the development and refinement of IEP's for students receiving special education services and reintegration of special education students into the general education classroom setting. What follows is research on the current practices of CBM in education.

Response to Intervention: Since its inclusion in the 2004 reauthorization of IDEA, RTI/MTSS has become a major force in education reform. Extensive research documents the value and validity of CBM as an effective assessment tool for individual

screening and progress monitoring in the RTI/MTSS model (Fuchs & Fuchs, 2006). Further, a synthesis of RTI/MTSS research supports the claim that RTI/MTSS is an effective method for identifying students at risk of learning difficulties who need specialized interventions and for determining special education eligibility (Coleman, Buysse, & Neitzel, 2006).

The success of RTI/MTSS prevention models centers on accurate determination of which children are at risk for future academic difficulty. Universal screening is a principal means of identifying at-risk students. The screening measure is given to all students and used to identify an initial group of students at-risk for academic difficulties. Typically, risk decisions are made by selecting a critical cut-point along a continuum of scores on a single CBM measure or a group of CBM screening measures. A student scoring below the cut point is considered to be at-risk of developing a reading difficulty (RD), where as a student scoring above the cut-point is not. For early intervention programs to work effectively, screening procedures for determining RD must yield a high percentage of true positives (Jenkins, 2003). The accuracy of a screener to distinguish true positives from true negatives is often characterized in terms of sensitivity and specificity. Sensitivity refers to the degree a measure correctly identifies students as at high risk for academic difficulties. Specificity, on the other hand, refers to how well a measure correctly identifies students at low risk for academic difficulties. Therefore, for early identification to be accurate, screening must yield a high percentage of true positives while limiting false positives. Compton et al. (2006) conducted a study on universal screening to predict a future RD risk. They reported that in fall of first grade, a screening battery comprising of word identification fluency, sound matching, rapid digit

naming, and oral vocabulary, when combined with 5 weeks of word identification fluency progress monitoring, predicted RD on a composite reading measure at the end of second grade with sensitivity and specificity estimates of .90 and .83, respectively.

Later, Compton et al. (2010) reported that the Compton et al. (2006) screening battery predicted future RD risk with precision, but it was too long and inefficient for use as a universal screener with all first grade students. Recognition of this fact prompted the notion of a two stage screening process. In the first stage, a single efficient measure would be administered to all students in hope of eliminating from the risk pool those considered at low risk for developing RD (true negatives). Only those students with scores in the risk range would then be administered a battery of tests in the second stage. The purposes of the Compton et al. (2010) study were to (a) identify measures that when added to a base 1st grade screening battery help eliminate false positives and (b) to investigate gains in efficiency associated with a 2-stage gated screening procedure. They tested 355 students in the fall of 1st grade and assessed for reading difficulty at the end of 2nd grade. The base-screening model included measures of phonemic awareness, rapid naming skill, oral vocabulary, and initial word identification fluency. Short-term word identification fluency progress monitoring (intercept and slope), and dynamic assessment, running records, and ORF were each considered additional screening measures in contrasting models.

Results indicated that the addition of word identification fluency progress monitoring and dynamic assessment, but not running records or ORF, significantly decreased false positives. The 2-stage gated screening process, using phonemic decoding efficiency in the 1st stage, significantly reduced the number of students requiring the full

screening battery. The correlations between the first grade predictor variables and the composite measure of second grade reading were all significant, ranging from .21 to .83. The correlation between dynamic assessment and other measures was negative because lower performance on dynamic assessment indicated less scaffolding was necessary and therefore superior performance. The above studies demonstrate the use of CBM, as a screening measure and a progress-monitoring measure are effective in selecting at-risk first grade readers for early intervention of RD.

In addition to the importance of screening and progress monitoring within a RTI /MTSS model, accurate decision-making by RTI/MTSS teams is a critical component. Shapiro et al. (2012) examined the decision-making process within RTI/MTSS systems of service delivery. The purpose of this study was to examine the tier assignment decisions for three K–5 elementary schools implementing identical RTI/MTSS models for reading. Decisions of grade-level teams were compared against the recommendation made by the *Dynamic Indicators of Basic Early Literacy Skills* (DIBELS) universal screening measure during fall and winter assessments across a 2-year period. The project staff provided ongoing training in data based decision-making throughout the study. Also, for those students who were receiving supplemental intervention within the RTI/MTSS model at Tier 2 or Tier 3, progress-monitoring data were also available by the winter of the year, again providing potential increased confidence in the recommendations provided by the universal screening data. Mean agreement between DIBELS recommendations and team decisions across grades in the fall of Year 1 was 83.3% of decisions (*SD* = 12.8%). In winter, mean agreements between DIBELS recommendations and team decisions were very consistent across grades averaging

84.1% (*SD* = 4.9%). In Year 2, similar patterns of agreement between DIBELS recommendations and teacher decisions across grades were found, with average agreement in fall equaling 79.8% (*SD* = 16.2%) of decisions and with more consistency across grades in winter, where the average percentage of agreement was 86.4% of decisions (*SD* = 6.0%).

Results showed teams had high overall levels of agreement with the DIBELS recommendations, with teams reaching a minimum of 75% in fall and 79% in the winter across grades except kindergarten in the fall of the first year of data collection. The outcomes from this study suggest that teams increased their agreement with the universal screening data over the 2 years, especially at Grades 2 through 5. The fact that all decisions were consistent with the data from the screening measures for these grades in Year 2 was an indicator that grade-level teams really had improved in the accuracy of using data to make their decisions. Although this effect may have been in part the result of the ongoing training and coaching provided by the project staff, it may be presumed that the shift of teachers toward integrating objective, standardized data with their judgments of student performance based on informal, formative daily feedback during instruction demonstrated change in teacher attitudes toward affecting their decisions over time. When teams initially disagreed with the DIBELS recommendations, increased agreement in the use of data based decisions was present over time. This study examined the outcomes of team decisions on student's identified level of risk based on CBM universal screening and compared the decision made by teams with the decision that would have been based solely on the screening data. Findings suggested a fairly high

level of agreement across grades and years between the decisions based on only universal screening data and the decision made by the team.

Special Education Eligibility within RTI/MTSS Framework: CBM has achieved prominence as an essential tool in a RTI/MTSS model with important roles in data based decision-making. When RTI/MTSS is used as part of special education eligibility, CBM is used to determine whether a student's response to an intensive intervention is sufficient, or if the student's response is lacking and may require a special education intervention to reduce the achievement gap (Shinn, 2013). Research has shown that using CBM data as a piece of special education eligibility decisions in RTI/MTSS is a valid and promising alternative to traditional eligibility methods.

Speece and Case (2001) conducted a study on special education eligibility within a RTI/MTSS framework, comparing the traditional approach (the discrepancy between IQ and achievement) with an approach based on CBM with dual discrepancy (DD). The DD approach is one in which a learning disability is conceptualized as non-responsiveness to otherwise effective instruction. It requires that special education services be considered only when a child's performance reveals a dual discrepancy; both the current student level of performance and growth is taken into account. The student not only performs below the level demonstrated by classroom peers but also demonstrates a learning rate substantially below his or her classmates. This study assessed the validity of the dual discrepancy approach with a sample of 694 first and second grade children. The determination of DD status was based on CBM collected across 6 months of a school year. The population was screened on CBM letter sound fluency and reading aloud to identify at-risk students. The at-risk students comprised the lowest 25% of students in

each class. To form the comparison sample, five students representing a range of skills above the 30th percentile on the screening measures were selected from each class. The at-risk and comparison samples were followed throughout the school year and were administered a minimum of 10 CBM reading probes to determine dual discrepancy status (CBM-DD). Other measures of intelligence and reading achievement were used to form the IQ-reading achievement discrepancy (IQ-DS) and low reading achievement (LA) groups. The poor reader groups were formed hierarchically. All students who exhibited a DD were assigned to the CBM-DD group. Then the remaining students who met the classification criteria were assigned to the IQ-DS group for the first set of comparisons and then to the LA group for the second, and parallel, set of comparisons. Using these procedures, 47 students were identified as CBM-DD, 17 as IQ-DS, and 28 as LA. The prevalence of CBM-DD was 8.1% compared to 5.9% for the IQ-DS. The LA group would reflect approximately 25% of the population because a standard score below 90 on a norm-referenced measure was used as the criterion. Based on the data, it appears that the CBM-DD procedures are likely to identify a reasonable number of students as having a learning disability. Thus, a treatment validity framework for identifying learning disabilities, using CBM as a measurement tool, represents a promising alternative to the traditional eligibility method.

Studies have also shown that using CBM within an RTI framework has reduced the number of special education eligibility evaluations as well as improved RTI teams decision-making accuracy. VanDerHeyden et al. (2007) conducted a study to evaluate the use of a systematic research-based RTI model, System to Enhance Educational Performance (STEEP), on the identification and evaluation of students for special

education at 5 schools in the district. STEEP consists of a series of assessment and intervention procedures with specific decision rules to identify children who may benefit from a special education eligibility evaluation. All students are screened using CBM probes, with a small subset identified to participate in interventions. Standard, protocol-based interventions are delivered for a specified number of consecutive sessions and progress-monitoring data is used to determine whether or not the intervention response was adequate or not adequate. Students who show an inadequate response are recommended for a full psycho-educational evaluation. Effect of the RTI/MTSS model on number of evaluations conducted and percentage of evaluated students who qualified for services was evaluated. Based on the data, fewer evaluations were conducted and total number of students that qualified for special education services when STEEP was implemented fell below any data point conducted during baseline. Following only one year of STEEP implementation, SLD diagnosis decreased from 6% to 3.5% of elementary students in the district. This study demonstrates the use of CBM in the STEEP RTI/MTSS model to reduce the number of special education evaluations and improved database decision accuracy in this school district. In addition to CBM being an effective tool within a RTI/MTSS framework to determine student's at risk of learning difficulties who need specialized interventions, CBM has significantly contributed to data-based decision making in determining special education eligibility within the RTI model and reduced the number of special education evaluations.

Development and Refinement of IEPs Using CBM: The revision of IDEA 1997 explicitly stated the need to: (a) assess educational need, (b) write measurable annual IEP goals, monitor progress, and report progress to parents at least as often as progress is

reported about non-disabled students; and (c) make revisions in the IEP to address any unexpected lack of progress. Research has looked at the use of CBM in the development and refinement of IEPs for students receiving special education services.

The quality of special education IEP goals and objectives is an often cited concern of scholars and researchers (Espin, McMaster, Rose, & Wayman., 2012; Shin, 1989; Yell & Stecker, 2003; Yell & Busch, 2012). Without quality goals, evaluation of individual student's outcomes is challenging, and as a result, ineffective interventions will not be identified and modified (Shinn, 1989). Special education legislation has long recognized the need for evaluation of individual program outcomes and mandated that each child with a disability have a statement as to what the special education intervention is designed to accomplish at least on an annual basis. However, nearly four decades after implementation of the original IDEA in 1975, the quality of IEPs has not improved significantly (Bateman, 2011).

Driven by findings from Smith (1990) that found inconsistencies between assessment and annual achievement goals on IEPs as well as observation and qualitative notes that described teachers as passive recipients of assessment data, Codding and colleagues (2005) trained teachers not only to interpret data, but also to translate the data into measurable goals for monitoring student skills. Three special education teachers were trained and provided consultation addressing writing observable and measurable goals for students, identifying instructional reading levels, and calculating annual goals based on expected level of growth. A thirteen-item checklist was completed across the study and addressed items such as the correct use of CBM data to identify student's instructive levels in reading, and the presence of operationally defined behaviors in

reading that included information regarding the learner, target behavior (e.g. reading fluency), conditions under which the student was to perform the behavior, and the criterion for success.

Positive outcomes of the training/consultation model were found. During baseline, stable patterns were observed for Teacher 1 (M = 25%, SD = 7.7), Teacher 2 (M = 31%, SD = 0), and Teacher 3 (M = 29%, SD = 3.4) on the percentage of correctly implemented steps. These steps included using the assessment data and placement criteria for CBM to identify students' levels of frustration, instruction, and mastery, and selecting the appropriate material for students to work on over the course of the IEP. During the intervention phase, which included providing each teacher with modeling, practice, and performance feedback, a level change and an increasing trend in the percentage of correctly implemented steps was demonstrated by Teacher 1 (M = 88%, SD = 16.0); Teacher 2 (M = 94%, SD = 13.9) and Teacher 3 (M = 90%, SD = 14.7). Subsequent to this training, performance of Teachers 1 (M = 98%, SD = 3.6) and 3 (M = 92%, SD = 7.5) was virtually indistinguishable from the intervention phase, where simulated data were used. Teacher 2 (M = 86%, SD = 16.4) experienced a slight decline in her performance when switched to actual student data. Examination of the permanent product data illustrated that Teacher 2 consistently missed three specific steps (i.e. failing to provide the operational definition of reading for the first, second, and third benchmarks of the annual goal) during the first two generalization sessions. Feedback was given and her performance on these steps subsequently improved. It is unclear whether Teacher 2's performance decline is related to the switch from simulated to actual data.

The results of this study demonstrated the efficacy of using an individually administered training package that included modeling, practice, and performance feedback to increase teachers' skills for translating CBM data into technically adequate IEP goals. Based on the data, the additional feedback given to Teacher 2 was especially helpful, which suggests that the combination of individualized feedback and ongoing feedback may provide optimal training strategies for teachers who participate in professional development programs in the form of in-service training models. As the study above shows, training special education teachers to use CBM allows the teacher to collect meaningful data on a student's progress that can be used to develop technically adequate IEPs; thus increasing the likelihood that the requirements of IDEA are being met.

Reintegration: One of the goals of special education is that more students with disabilities be educated in general education classrooms. To accomplish this goal would require students served in special education pullout programs to be reintegrated back into general education classrooms. Embedded within the EAHCA is the concept of the Least Restrictive Environment, which states that to the maximum extent possible, students with disabilities should be educated with students without disabilities and that removal of students with disabilities from the regular educational environment should occur when the nature or severity of the disability is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily.

Shinn et al. (1993) conducted two studies to examine the use of CBM to operationalize satisfactory achievement, a distinguishing feature of the LRE. This feature is then used to identify students receiving special education as potential candidates for

reintegration into general education. In the first study, 329 students (244 in general education lowest reading group (LRG), 85 in special education) from 51 classrooms in Grades 3 through 5 were tested using CBM ORF reading procedures with two passages from the lowest level of the basal reading series used in the general education classrooms. As expected, students in special education read basal readers less well than LRG students read them. However, at the individual level, there were special education students who read within the range of LRG students. Thirty-seven out of 85 special education students (43%) read as well as or better than at least one student in LRGs in their grade. A significant number of special education students displayed reading scores that the discriminant function determined were more consistent with LRG than special education students. Almost half of the special education students' scores (48.2%) were classified as belonging to the LRG.

In the second study, subjects were 190 students (140 general education LRG, 50 special education) from 26 classrooms in Grade 1 through 5. Student reading performance was assessed using passages derived from the school districts reading series. Two passages were chosen from the lowest reading book used in each classroom, in contrast to Study 1, where passages were chosen from the lowest reading book used in each grade. CBM ORF testing procedures identical to those in Study1 were employed. Outcomes similar to Study 1 were observed. Students in special education read the instructional basal readers less well than the general education LRG students. Again, at many grades, there were special education students who read within the range of LRG students. In this study, a special education student had to read within the range of LRG students in their own classroom rather than any classroom at their grade level in their

school. Using this more conservative criterion for defining students as potential candidates, 18 out of 50 special education students (36 %) read as well as or better than at least one student in the LRG in their own classroom. For first graders, nearly all (6/7) read as well or better than at least one student in the LRG while in Grade 2 very few of the students in special education (2/16) read as well as or better than their LRG comparison peers. In grades 3, 4, and 5 the percentage was more consistent. Overall, results suggested that 36-40% of special education students in Grades 1 through 5 met the criterion of satisfactory achievement defined as reading as well as or better than at least one general education student. Results were consistent whether the standards for satisfactory achievement were defined at the grade or specific classroom level. Results from the discriminant function analyses matching students to their instructional group (i.e., general education, special education) by their CBM reading scores consistently classified high proportion (42-48%) of special education students' scores as more consistent with those of students in general education.

These studies suggest that a large number of special education students with IEPs in reading who are instructed outside the general education classroom read as well as or better than their general education low reading group peers. These special education students may meet the LRE conditions described in federal law. Therefore, it is arguable that they could be considered potential candidates for reintegration into general education classrooms. These studies affirm the utility of CBM to determine satisfactory achievement for special education students to be considered for reintegration into the general education classrooms.

As the results of the above studies illustrate, CBM has proven to be a technically adequate measure of students' performance and academic proficiency in reading, writing, spelling, and mathematics, as well as a meaningful and useful measure for instructional decision-making. In addition to it's proven technical adequacy, CBM has demonstrated it's usefulness to help teachers plan better instruction and effect superior achievement for general and special education students. Moreover, CBM has been established as a key component of the RTI framework, special education eligibility decisions, the development and refinement of IEPs for students receiving special education services, as well as a way to identify students who should be considered for reintegration into the general education classroom. Although research has demonstrated the many benefits of CBM in the field of education, there is evidence that shows that teachers are reluctant to implement CBM in their classrooms. What follows is research on teachers' acceptability and implementation of CBM in general and special education classrooms.

Acceptability and Implementation of CBM

The original purpose of the development of CBM was for special education teachers' to use the formative measurement data they collected to evaluate student progress and determine the success of instructional programs (Deno, 1985). Research has demonstrated CBM has many benefits in the field of education. However, evidence exists that teachers do not readily implement all components of the formative evaluation system (Wesson, King, & Deno, 1984) and when they do, they do not always do it correctly (Skiba, Wesson, & Deno, 1982). Wesson, King, and Deno (1984) were the first to examine special education teachers' use of CBM. The purpose of their study was to examine the reasons why 136 teachers did not implement these strategies. Specifically,

the study examined (a) what percentage of special education teachers had heard of CBM (b) what percentage of those teachers used CBM (c) for those teachers who use CBM, what percent of time they allocated to the measurement of student behavior in the classroom, and (d) for those teachers who did not use CBM, what factors inhibited their use of this type of measurement.

Results indicated that the majority (82.1%) of the teachers in the study had heard about CBM. Of the 82.1% of teachers that reported they had knowledge of CBM only 53.6% reported that they used this type of measurement in their classroom, and 46.4% responded that they did not. Of the total number of respondents (N = 136) 43.8% reported using CBM to evaluate student performance. The majority of teachers who reported using CBM indicated that it took up to about 10% of their time. Seventy of the teachers who did not use CBM listed a number of factors that inhibited the use of this type of measurement. The factor most mentioned (45.7%) was the time consuming nature of CBM. The second most frequently recorded response (24.2%) was lack of knowledge of how to use CBM. Only 17.1% of the subjects felt that the measurement was not useful. The remaining reasons inhibiting the use of CBM included lack of materials (4.2%) and use of evaluation techniques (4.2%). While this study was conducted 30 years ago and knowledge and understanding of CBM is much greater now, similar barriers are still expressed by teachers today. Specifically, teachers express concern that CBM is time consuming, that CBM is not useful, and many still lack knowledge of how to use CBM. These concerns hold a common thread throughout the following studies.

To follow up on the Wesson, King, and Deno (1984) study, Yell, Deno, and Marston, (1992) conducted an investigation to identify the most problematic barriers to effective implementation of CBM in special education programs perceived by administrators and teachers. Two studies using the Delphi Probe procedure were used. The studies were conducted with 56 special education administrators and 146 special education teachers. Administrators and teachers included in the study had experience in implementing CBM in their programs, schools and districts.

Three major barriers were rated by the administrators as the most important to overcome when initiating CBM. Eighty-eight percent of the administrators indicated that the way teachers collect and use data is the most problematic barrier in implementing CBM. That is, teachers often didn't react to the data by making instructional changes when the data indicated that they should. According to the administrators, this was due to the teachers charting the data but not realizing when the data indicated that an instructional change was needed, or that teachers lacked a repertoire of instructional strategies to draw upon when the CBM indicated a change was necessary. The second major barrier identified by 44% of the administrators, involved time and lack of adequate human resources to properly train staff and monitor teachers' implementation of CBM. Administrators expressed that they did not have enough time to adequately monitor teachers to make sure that CBM was implemented correctly and that data was used correctly. A third barrier (34%) was the difficulty of initiating change into the educational system. Administrators described the resistance and anxiety many teachers (especially those who had been teaching the longest) had to the introduction of CBM.

Results of the teacher Delphi indicated that the greatest barrier is time concerns (86%) when implementing CBM. Teachers believed that CBM data collection and analysis procedures take away from instructional time. Also, many teachers mentioned that they had not been trained in strategies for managing the CBM process. Face validity of some of the measures was identified as the major barrier by 22% of the teachers. A number of teachers stated questions about the validity of the reading and written expression measures. Eight percent of the teachers reported that the most problematic barrier was getting teachers to accept the change when CBM was introduced. A few of the panelists expressed that many teachers were concerned that the CBM measures would be a means for administrators to evaluate teacher performance. This is consistent with the previous findings by Wesson et al. (1984) that teachers were concerned about the amount of time CBM takes away from instruction, as well as, lack confidence in data collection and determining instructional modifications, and doubting the validity of the measure.

To further investigate the way teachers use CBM, Swain and Allinder (1997) explored the use of CBM for progress monitoring by 191 elementary special education teachers. Of the 191 teachers who completed the survey, 45% (n = 86) of the respondents indicated that they utilized CBM for progress monitoring and 55% (n = 105) reported they did not use CBM. Forty-nine percent of the respondents who used CBM for progress monitoring indicated that reading was the subject area in which CBM was used the most, while 36% of the respondents reported that math was the subject area used the most. Also, teachers who used CBM indicated that time was not an issue. For teachers who used CBM for progress monitoring, 86% reported that reading CBM takes between 5 and 15 minutes a week per child. Eighty-nine percent of the teachers indicated that

math CBM took between 5 and 15 minutes a week per child, and 84% said spelling took between 5 and 15 minutes. Since time has been a big concern to educators in previous studies (Yell et al. 1992), it is interesting to note that teachers who use CBM felt they had enough time to implement the procedure. In contrast, teachers who were not using CBM responded that lack of time would be a barrier to implementing CBM. It appeared that for some teachers, once they began using CBM, the benefits outweighed the concerns about the amount of time it takes to implement CBM. Of the teachers who reported they used CBM, 35% (n = 30) of the respondents indicated they used CBM as part of the pre-referral process, 13% (n = 12) used CBM for identifying students with disabilities, and 46%, (n = 39) used CBM for program evaluation. On a Likert-type scale from 1 (strongly agree) to 5 (Strongly disagree), teachers indicated that it was important to monitor student progress on a weekly basis (M - 4.0, SD = 1.0) and that CBM provides useful information (M = 4.1, SD = 1.0). Teachers also reported that it is helpful to include CBM objectives on a student's IEP (M = 4.0, SD = 1.0)

Teachers' written comments reinforced the quantitative analyses and provided more information about the use and understanding of CBM. The comments of some of the teachers who reported using CBM showed that they do not use CBM as described in the survey. Some teachers made comments such as, "we don't use graph scores" and "I do not graph information, but record for the IEP." Also, of the 46% of teachers who stated that they use the CBM results for evaluating program effectiveness, less than half of them reported utilizing information gained through CBM to make changes in student's instructional programs.

Although CBM can be used in the pre-referral process and for identifying students with disabilities, very few special educators who responded to the survey are using CBM for these purposes. Only, 46% reported that they used the results for evaluating program effectiveness, which indicates that less than half of the teachers are utilizing the data gained through CBM to make changes in student's instructional programs. This indicates that teachers may need help to identify strategies for modifying their instructional interventions. This study examined special education teachers' use of CBM for progress monitoring and provides insight of what changes are necessary to encourage the use of these assessments and to make it more feasible for educators, such as ongoing CBM professional development for seasoned teachers or adding CBM training for pre-service teachers to help them implement CBM with fidelity.

Foegen et al. (2001) conducted a study to explore practitioners' beliefs regarding the validity and utility of the CBM ORF measure. Researchers examined the beliefs of special education pre-service teachers following their viewing of one of two videotaped presentations of CBM ORF. In one presentation, statistical information that supported CBM's validity and utility was provided. In the second presentation, an anecdotal, "first person" account, supporting CBM's validity and utility were provided by a teacher who used CBM in the classroom. Participants were randomly assigned to one of the two videos. Following the videotape, participants responded to a questionnaire addressing their beliefs about CBM's utility and validity. Results indicated that, in general, participants expressed stronger belief in the utility of CBM ORF than in its validity, especially as it is related to reading comprehension (effect size .80). They also indicated a stronger belief in the use of CBM to evaluate and modify instruction than its validity as it

is related to reading to comprehension with effect sizes ranging between .92 and 1.17. Data suggest that convincing teachers of the validity of CBM is more difficult than convincing them of the utility of the measures. In other words, even though participants did not believe that the number of words read in one minute was a valid indicator of students' reading comprehension, they did believe that the measure could provide the teacher with information about the effects of instruction and the need to modify instruction. An explanation is that participants did not see the need for a measure to be valid in order for it to be useful. Specifically, a measure did not necessarily have to be a valid indicator of reading comprehension to provide the teacher with information regarding students' general level of reading proficiency, the effects of instruction, or used to modify instruction when it was not judged to be effective.

Results of this study are also in agreement with the Yell et al. (1992) study that showed that validity was a barrier for teacher's implementation of CBM, and have implications for teaching pre-service teachers about CBM. Since it is presumed that an intervention that is liked better and found to be valid will be used to a greater extent, pre-service teacher programs need to focus on training teachers not only on how to use CBM, but also show why CBM is useful and valid (Witt & Elliott, 1985). Several researchers noted that effectiveness might be related to an intervention's acceptability. For example, Kazdin (1980) stated that if treatments are judged to be effective, they are more likely to be utilized. Even though many special education teachers have acknowledged their acceptance of CBM and its benefits, many do not implement it within their classroom, or if they do, implementation may vary across teachers, which can be problematic.

Quality of CBM implementation has been demonstrated to have an effect on the amount of academic growth teachers foster among their students with mild disabilities. For example, a study by Allinder (1996) showed that students of teachers who implemented CBM with high quality made significantly greater gains in math than did a control group of similar students, whereas students of teachers who did not implement CBM with high quality achieved comparably to students whose teachers did not implement CBM at all. Similar results have been reported with regard to use of CBM in reading (Fuchs, 1988; Wesson, Skiba, Sevcik, King, & Deno, 1984).

Drawing on the model of treatment acceptability proposed by Witt and Elliott (1985), Allinder and Oats (1997) investigated the hypothesis that teachers who find CBM more acceptable will implement it with greater fidelity, and related that to gains in students' math performance. Twenty-one elementary special education teachers implemented Math CBM for four months and completed the CBM Acceptability Scale (CBM-AS; Oats & Allinder, 1995) to assess acceptability of CBM. The CBM Acceptability Scale consists of 20 items on a 6-point Likert-type scale with possible responses from 1 (strongly disagree) to 6 (strongly agree). Questions address educator understanding of CBM components, judgments of effectiveness, time required, and amount of skill required to implement CBM. Based on their responses to the survey, teachers were divided into two groups: high and low acceptability. The two groups of teachers were compared on 5 measures of implementation, and the amount of growth demonstrated by their students' Math CBM. The five variables were (a) the number of CBM tests students took, (b) the ambitiousness of the goal set for the student, (c) the number of times the students goal was raised, (d) the number of times instructional

changes were made, and (d) the timing of changes made. To investigate the hypothesis that teachers who found CBM more acceptable implemented it with greater fidelity, teachers were divided into two groups: One group (n = 12) consisted of teachers whose CBM-AS mean score was 5 or above, the second group (n = 9) were teachers whose mean scores was below 5. To examine the differences between these groups with respect to CBM implementation, a multivariate analysis of variance (MANOVA) was conducted separately for implementation measures and student achievement measures of slope and standard error of estimates (SEE). The MANOVA conducted with the five measures of implementation yielded an overall significant difference, $F(5, 15) = 3.12$, $p < .05$ (Wilks' lambda = .49). Inspection of univariate tests revealed that groups differed significantly on two implementation measures: mean level of ambitiousness, $F(l, 19) = 7.33$, $p < .01$, and mean number of probes, $F(l, 19) = 7.75$, $p < .01$; the difference between the groups on a third implementation variable, number of times students' goals were raised, approached statistical significance, $F(l, 19) = 3.82$, $p = .06$. Examination of means of these variables reveals that high-acceptability teachers scored higher on these measures than low- acceptability teachers. The remaining implementation measures did not yield significant univariate results: number of instructional changes, $F(l, 19) = .28$, *ns,* and timing of instructional changes, $F(l, 19) = .08$, *ns.*

Results of the study also indicated that students of teachers who reported that CBM was highly acceptable and who implemented CBM with greater fidelity had greater slopes, but not standard error of estimates (SEE), than their counterparts. Outcomes of the MANOVA examining slope and SEE from student graphs were not significant, $F(2, 18) = 3.21$, $p < .05$ (Wilks' lambda = .74). However, examination of the univariate tests

revealed that the test for slope was significant, F (l, 19) = 6.20, $p < .05$; the test for SEE was not significant, F (l, 19) = .19, *ns*, suggesting that the degree to which teachers find CBM acceptable and to which they implement it well affects their students' progress in math computation. Results of this study suggest that treatment acceptability affects teacher fidelity in implementing CBM, which, in return, affects higher student achievement.

A central purpose of CBM is teacher use of data to evaluate student progress and determine the success of instructional programs. However, research has demonstrated that teachers have difficulty using CBM data to inform instruction. Although methods have been designed to improve use of CBM data, such as computer software programs, one area of study that has been neglected is teachers' understanding and interpretation of CBM data. Wayman et al. (2011) conducted a study to examine the understanding and interpretation of CBM data for more- and less-experienced teachers. The participants were 14 special education teachers who were more experienced CBM users (N = 10) and less experienced CBM users (N = 4). The more experienced CBM teachers had 5 or more years of experience with CBM and generated 30 to 50 individual student CBM graphs and less experienced teachers had 2 years or less experience with CBM and generated less than 30 individual student CBM graphs.

Teachers understanding of CBM data was assessed using a think-aloud approach. Each teacher was presented with 3 CBM graphs. With the first two graphs, participants were asked to look at the graphs and tell what they were seeing and thinking. For the third graph, teachers were asked a series of questions about different aspects of the CBM graph (e.g., baseline data, intervention phases, goal setting, growth rates, etc.). Data

analysis was conducted in 3 phases. In the first phase, the extent to which experienced teachers differed in their interpretation and understanding of the CBM data was examined by 4 expert raters. The expert raters used the Teacher Interpretation Rating Scale (Wayman et al., 2011) to evaluate the think aloud transcripts. Teachers were divided into low, middle, and high groups based on global ratings given by the expert raters. In the second phase, themes were extracted from the think aloud, using the expert raters' comments to describe differences in understanding and interpretation for teachers in the low, middle and high groups. For the third phase, each think aloud was analyzed into sections and coded to identify areas discussed by lower and higher rated teachers. The overall total score given by the expert raters was used to identify the four highest rated teachers and the four lowest rated teachers. The similarities were examined for both groups of teachers.

According to the results, teachers received the highest ratings for their understanding and interpretation of goal attainment, function of the goal line, and set up of the graph. Teachers received the lowest ratings for understanding and interpretation of the slope, baseline data, and the meaning of the ORF measure. Higher rated teachers' discussions about the CBM graphs were more accurate, clear and coherent while lower rated teachers' discussions about the CBM graphs were more inaccurate, disorganized and unclear. This finding is particularly important because it indicates that teachers may need additional training or guided practice on interpreting and using CBM graphs on an ongoing basis. Results also showed that, overall, higher rated teachers exhibit a generally coherent and organized body of knowledge, while lower rated teachers have a general state of confusion about CBM data collection and interpretation. The meaning of the ORF

measure, changing interventions, and using and interpreting slope are areas that appear to be particularly difficult for lowest rated teachers. Results from this study imply that the understanding of CBM progress monitoring data is more complex than it may first appear, and is something that may need to be developed through careful training and experience.

To further explore teacher use of CBM progress monitoring data, Roehrig et al, (2008) conducted a study to examine how teachers in the Florida Reading First context are more or less effective in trying to use student CBM data to inform their literacy instruction and what they perceive to be barriers to using CBM data to inform literacy instruction. In Florida, schools with Reading First grants receive professional development and must use approved reading programs and assessment plans, as well as, school reading coaches. The teachers at Florida Reading First schools, as part of the assessment plan, also have access to online progress monitoring data reports about their students' reading skills. The Progress Monitoring and Reporting Network (PMRN) identifies students who are not performing as expected based on the performance of other students at the same grade level, identifies the skills they are struggling with, and makes suggestions for student grouping. It does not provide specific instructional guidance to teachers. Reading coaches were intended to help provide specific instructional guidance to teachers, with the coach assisting teachers' professional development and use of student assessment data to inform their literacy instruction. Teachers interacted with assessment data in three ways: (a) monitoring student progress and areas of strengths and weaknesses; (b) adjusting or forming groups for individualized instruction; and (c) identifying appropriate activities for intensity and level of instruction.

Participants were 10 kindergarten and first grade teachers and four reading coaches. Written survey data were collected from the teacher participants. The survey contained both open-ended and Likert-type questions on the use of CBM data. Using these survey data, three sub-scores were calculated for each teacher by taking the mean scores of the items on (a) their attitudes about progress monitoring related issues (comfort using data reports, importance of opportunities such as professional development, etc.), (b) the perceived value or helpfulness of CBM data related activities, and (c) the frequency with which they use progress monitoring for certain activities. Additionally, coaches were asked to rate their teachers' skills as above average, average, or below average in affecting student outcomes, in teacher knowledge, and in using the PMRN and CBM data to inform instruction as eager to use, average, or resistant. Besides the coaches' ratings and teacher survey, teachers participated in professional development program that received some extra materials and training related to implementing instructional strategies based on students' need in the areas of phonological awareness and phonics development. Lastly, teachers participated in semi-structured interviews that had teachers expand as much as possible on their experiences with assessment data. In this study, teachers at different schools were found to report varying levels of success using assessment data to inform instruction.

Findings showed that the crucial element needed for greater success in using data was the reading coach, who helped teachers interpret data and make informed instructional decisions based on data. Some of the frequently named variables which teachers identified as barriers when attempting to use assessment data to inform instruction include: (a) coach availability and quality of support received from the coach;

(b) breakdown between receiving assessment results and what to do with the students; (c) teacher knowledge; and (d) willingness of teachers to examine the effectiveness of their practice using student assessment results. Comments from participants showed that teachers think the process of using data to inform instruction is where they had the most difficulties stating, "I don't know what to do with the test results." Lack of knowledge or training in CBM assessment was another barrier that the teachers corroborated. All the teachers thought they would probably better understand the results and implications for instruction of assessment scores if they were trained in administering or if they were the ones administering the tests. Teachers also described feeling a lack of comfort with the data or data presentation in graphs, indicating they were not very good at reading and analyzing data. Time was also cited by half of the teachers as hindering their ability to individualize instruction the way they would like. One teacher stated, "I believe TIME is a constraint to fully utilizing the data. Teachers are asked to do so much and simply don't have the time needed to delve into the PMRN as much as they'd like. They also don't have time to take part in professional development concerning the PMRN as much as they need".

This study provided an opportunity to examine what happens when coaches and teachers are motivated to try to use assessment data to improve the instruction for children. Providing mentoring or coaching that includes instructional recommendations, in addition to the data, seems necessary for teachers to make changes that positively affect student learning. The importance of mentors or coaches may be an important consideration for pre-service teacher education programs, and district induction programs. Once teachers are in the classroom, providing mentors or coaching to new

teachers in regards to using assessment data may facilitate acceptability as well as proper utilization and implementation of CBM. Although, as we have discussed, CBM is a fundamental part of the RTI/MTSS process, CBM tools are not necessarily emphasized in pre-service teacher education programs, which may make equipping teachers with a comprehensive understanding of these assessment tools challenging. As shown in some of the above studies, some teachers have questioned the acceptability of CBM-ORF, and are concerned whether it is appropriate, fair, and reasonable. Whether teachers find CBM-ORF acceptable for universal screening and progress monitoring within a RTI/MTSS framework has not been researched. In addition, research has not yet captured information on teachers' reasoning for their reported levels of assessment acceptability, which may shed light on potential barriers and facilitators to effective use of assessment data within a RTI framework. Rowe et al. (2014) explored teachers' attitudes about using CBM-ORF for universal screening and progress monitoring using a mixed methods study with three elementary schools (grades1- 6) in a Mid-western state. Schools were selected on the basis of their participation in a statewide project that assists schools in the development of school-wide support systems in reading and behavior. The collection of CBM-ORF data from all students is a requirement for participation in the statewide initiative, which ensured that many participating teachers were familiar with how CBM-ORF data may be used for screening and progress monitoring purposes. Schools that did not participate in the initiative were also selected to participate so that views of teachers with a variety of training and experience with CBM-ORF would be represented.

One hundred sixty-four teachers completed the Acceptability Rating Profile – Revised (ARP-R; Eckert, Hintze, & Shapiro, 1999) survey, and 22 teachers participated in one of four focus groups. Through the survey, teachers reported CBM-ORF to be moderately to highly acceptable for both purposes, although they rated it to be slightly more appropriate for universal screening (M = 60.56, SD = 10.35) than for progress monitoring (M = 57.99, SD = 12.64). The difference in assessment acceptability on the basis of purpose suggests that many teachers in the study did have a basic understanding of the importance of considering purpose when selecting an appropriate assessment tool. They also were aware of the idea that they should be teaching more than just what is perceived to be needed for students to make progress on the selected progress monitoring measure. Teachers expressed concern about the frequent use of CBM-ORF for progress monitoring because they reported that this took away from instructional time. Also, several teachers reported that using CBM-ORF frequently for progress monitoring with struggling students was inappropriate or harmful. Overall, it appears that teachers may be more willing to use CBM-ORF for universal screening than for progress monitoring. Qualitative data were used to identify teacher attitudes toward CBM-ORF. Six themes were identified that related to teachers' acceptability of CBM-ORF: factors influencing accuracy of scores, resources needed, use within teacher evaluations, influence on students, use of data, and limitations of CBM-ORF. Although teachers participating in the focus groups, did report appreciating how CBM-ORF records student growth, requires less time than other tests, and can be used to consult with other teachers and parents about students' progress, they expressed concerns with the accuracy of CBM-ORF, its potentially negative influence on students, the resources needed, the limitations

of the test, and the potential use of CBM-ORF in teacher evaluations. Similar to findings in previous research (Foegen et al. 2001; Yell et al. 1992), this research indicates that teachers are concerned that CBM-ORF may not measure overall reading ability of comprehension.

Another major concern teachers identified under factors influencing accuracy of CBM-ORF was related to the consistency of administration and scoring of the CBM-ORF assessment tool. Their concern is that characteristics of the assessor, student, environment, or passage may influence the accuracy of CBM-ORF scores. Teachers were concerned that their peers may administer CBM-ORF differently and not follow standardized instructions. In addition, there were concerns about the accuracy of CBM-ORF for some students, including English Language Learners (ELL), nonverbal students, or students with mental health/behavioral difficulties.

In the area of resources needed for CBM-ORF, concerns focused on resources including; time, people, space, knowledge, training, and funding, needed to administer CBM-ORF. In the area of data usage, another theme was how teachers use CBM-ORF data for a variety of purposes. Teachers expressed the helpfulness of CBM-ORF for parent communication, teacher collaboration, decision-making, goal setting and measurement, and standard measurement. Another limitation mentioned by teachers, is concern with the scope of what CBM-ORF measures. Teachers expressed a desire to use other assessments, such as running records, or to rely on teacher judgment. Added concern was that CBM-ORF did not match classroom instruction. For example, teachers expressed trepidation that comprehension and vocabulary were not directly measured through CBM-ORF. Some additional concerns by teachers were that progress monitoring

every week with struggling readers would take away from instructional time and overemphasize the importance of speed. Overall, teachers in this study appeared to have relatively positive attitudes toward CBM-ORF and recognize differences in the appropriateness of using CBM for universal screening and progress monitoring.

Although most teachers who responded to the survey reported high levels of acceptability, some teachers expressed negative attitudes toward CBM-ORF. As noted earlier, evidence suggests that teachers often rely on their pre-service training to determine the reading instruction practices in which they engage. Although many teachers in this study were learning about CBM-ORF data through professional development, the extent to which this is aligned with pre-service instruction is unclear. It may be that their early foundation of knowledge o reading assessment and instruction continues to play a large part in the practices in which they engage. Also, studies have suggested that teachers tend to have weak knowledge in the area of measurement compared to other aspects of RTI and may need substantial training on how to use CBM information to inform instruction (Stecker, Fuchs, & Fuchs, 2005). This is important to consider, given that concerns have arisen about how best to use CBM-ORF data for the purposes of progress monitoring. Given these negative attitudes, it would be important for leaders in the school to provide additional consultation and support for the collection and use of CBM data. In doing so, it may be helpful to consider background knowledge, attitudes and perspectives that teachers bring with them and communicate the advantages of CBM measurement practices. Helping teachers understand the importance and benefits of using measures that display technical adequacy, characteristics corresponding

with their intended purpose, may be key to increasing their willingness to implement CBM with integrity.

Purpose of the Present Study

The main research on the development of CBM was completed in the 1980s and the research since the early 1990s has consolidated the knowledge base on CBM, concentrating on generalizing the principles to other groups and on making it easier for teachers to implement. Despite the plethora of research on the benefits of CBM, it is not as widely used, as the empirical backing would suggest it should be. It is important that further research on CBM concentrate on determining why it is not being used, especially for special education teachers, for whom CBM was initially designed for. The purpose for the present study is to conduct further research on elementary special education teachers' perceptions and practices of CBM. Deno's original intent for CBM was to provide special education teachers with an assessment tool to monitor their student's progress in basic skills and evaluate whether their instructional practices are effective or ineffective. If teachers found that their instruction was not effective, they would make modifications to improve student achievement. Further, special education teachers could use the data from CBM to develop and refine IEPs to fulfill the requirements of IDEA. Researchers have analyzed special education teachers' utilization of CBM (Wesson, King, Deno, 1984, Yell et al. 1992, Swain & Allinder, 1997), but most of that research was conducted before the 2000s and focused on the barriers of implementation. It is important to fill the gap of the past 20 years to determine if elementary special education teachers are using CBM in their practices today, and if they are, is it required by their school administration or do they have a choice of what assessment tools they use?

Additionally, for those who are using CBM, for what purposes they are using CBM; screening, progress monitoring, writing IEPs or program evaluation? Also, research is needed to verify which CBM assessments are used in their practices: ORF, Maze, Spelling, Writing, and Math. Prior studies have shown evidence that CBM-ORF is the most widely used CBM assessment (Foegen, 2001); it is important to determine if this is still the case. This research is needed to determine if in this age of accountability are more special education teachers aware of CBM and using CBM for its intended purposes.

Past studies on the acceptability of CBM have indicated that teachers have varying beliefs on the acceptability of CBM in terms of validity and technical adequacy (Yell et al., 1992, Foegen, 2001) especially with CBM-ORF. Updated research is needed on the connection between CBM acceptability and fidelity of implementation, not just for CBM-ORF, but also the other basic skill areas. Research needs to delve into special education teachers' reasons for acceptability or non-acceptability. When Rowe et al. (2014) explored teachers' attitudes about using CBM-ORF for universal screening and progress monitoring within a RTI framework, six themes were identified that related to teachers' acceptability of CBM-ORF: factors influencing accuracy of scores, resources needed, use within teacher evaluations, influence on students, use of data, and limitations of CBM-ORF. To facilitate more in depth research on this topic with special education teachers, it would be beneficial to take into consideration these themes. Further research is also needed in determining special education teachers' acceptability of specific components of CBM, such as, probing, data analysis, and decision-making. Such information could answer the reason of why some teachers do not implement CBM and

why all teachers do not implement CBM equally well; an important consideration given the effect teacher fidelity has on student progress (Allinder, 1995, Wesson et al., 1984).

The Rowe et al. (2014) study suggested that CBM acceptability is related to prior assessment training. Further research is needed to examine special education teacher's insights on this theory. Perhaps the most crucial element to increasing use of CBM involves training. Information on when and where special education teachers received training on CBM, during their teacher preparation program or through professional development with their school, is crucial to understand CBM acceptability and utilization. Most of the barriers may be avoided with training systems that are continuous growth oriented models rather than isolated one time in-services. It is important to examine if special education teachers perceive their CBM training as helpful and gather suggestions for improving training in both teacher preparation programs and school's professional development. Training must be conducted by knowledgeable individuals and cover the benefits of using CBM, data collection methods, graphing, analysis of data, writing IEP goals, monitoring student progress, and evaluating interventions. Researchers (Roehrig, et al., 2008) have suggested that providing mentoring or coaching to teachers using CBM and the combination of individualized feedback, ongoing feedback, and in-services may provide optimal training strategies necessary for teachers to make changes that positively affect student learning. Investigating special education teachers' perceptions, understanding and comfort with these different aspects of CBM training will be helpful in determining what areas of CBM are in need of improved training.

While past research has been conducted on the barriers of CBM, we need to continue to gain understanding of what changes are necessary in order to encourage the

use of CBM assessments. Studies by Wesson et al. (1984), Yell et al. (1992), and Swain & Allinder (1997) found that time, acceptability, and lack of understanding on how to use CBM data were barriers to CBM. Knowledge of what current special education teachers perceive to be barriers that impede the use of CBM can assist in minimizing the effects of these factors. If educational leaders take actions to improve the barriers, it will be more likely that the research on CBM will be successfully translated into practice.

In summary, this study will provide current and further research evidence on special education teachers' perceptions and practices of CBM. This research is important to provide direction for CBM training for special education teachers in the areas of acceptability, implementation, benefits, and improving barriers that impede the use of CBM to improve and enhance special education systems, so the original intent of Deno and requirements of IDEA are fulfilled.

CHAPTER 3

METHODOLOGY

The practices and perceptions of CBM among special education teachers have not been investigated systematically since the 1990's. The purpose of this study is to expand and update the literature by examining elementary special education resource teachers' current practices and perceptions of CBM. Specifically, this study will examine: a) how special education resource teachers report using and implementing CBM; b) special education resource teachers' perceptions of the value of CBM as a progress monitoring tool; and c) how special education resource teachers' report they were trained on CBM. The research questions this study will answer are:

1. How do elementary special education resource teachers report using CBM in their practices?
2. What are elementary special education resource teachers' views on the value of CBM as a progress-monitoring tool?
3. What are elementary special education resource teachers' perceptions of their ability to implement CBM?
4. What do elementary special education resource teachers perceive as barriers to implementing CBM?

5. What types of CBM training do elementary special education resource teachers report they have received? How effective do they view their training?

This chapter provides an overview of how this study was conducted. First, I provide an overview of the methodology for the study. The second section is on the study design and includes a description of the sampling procedures for determining the study setting and participants. The third section includes a description of the instrumentation and procedures for data collection. The fourth section details the specific procedures for analyzing the data in this study. The final section describes the strategies used to ensure reliability and validity of the research.

Methods

A survey questionnaire was used in this study to examine CBM practices of special education resource teachers by measuring teacher reports of their CBM use and perceptions related to these practices. Surveys provide quantitative or numerical descriptions about certain aspects of the study population (Fowler, 2014). In addition to descriptive and behavioral information, surveys solicit the respondent's attitude and opinions about a variety of topics and circumstances (Rea & Parker, 2014).

Study Design

A descriptive research methodology was used for this study. Data collected through the survey will be presented and analyzed using descriptive statistics, including measures of frequency and percentages.

Study participants. The target population for this survey study was special education resource teachers in elementary schools in the state of South Carolina. A

resource teacher is a specialized teacher who works with students who have mild or moderate disabilities by using specific teaching methods to meet students' individual needs. In addition to using specialized teaching methods, resource teachers set individual and realistic goals for each child, and monitor their progress toward meeting those goals. Because purposeful sampling helps researchers gain qualified participants who meet a specific criterion (Patton, 2002), I used this sampling technique to select elementary special education resource teachers in South Carolina. Purposeful sampling was used through multiple stages. Prior to the start of data collection, I obtained approval from the Institutional Review Board (IRB) at the University of South Carolina. In addition, I submitted proposals to obtain approval to conduct research within all school districts according to district policy.

Sampling stage 1. The first stage of sampling included identifying all public school districts in South Carolina. A search on the South Carolina Department of Education website was conducted and 81 school districts were identified. District websites were used to identify a contact from each district in the Accountability department, Exceptional Children/Special Education department, or both. All 81 school districts were emailed a brief overview of the study, requesting information regarding the process for proposing to conduct research within the district. Thirty-three school districts responded and provided either a contact person or requirements for requesting permission to conduct a research study in their district.

Sampling stage 2. In the next sampling stage, I sent the research study proposal, either by email or postal mail (based on individual district requirements), to all school districts that responded to my first email inquiry and were willing to accept my

proposal to determine whether or not to allow their district to participate in the study. Fifteen school districts agreed to participate in my study.

Sampling stage 3. In the final sampling stage, based on the districts that agreed to participate in my study, an email was sent to each contact person from those school districts, requesting names and email addresses of elementary special education resource teachers. From that information, I created a spreadsheet in Microsoft Excel with the total number of 152 elementary special education resource teachers from the school districts, along with their contact information (name, email address).

Instrumentation

I designed a survey questionnaire to investigate elementary special education resource teachers' practices and perceptions of CBM. Survey items were designed to reflect the information gained through the literature review on special education teachers' CBM practices and perceptions in order to answer the five research questions for this study. A chart is provided, as Appendix A, to explain the alignment between survey items and study research questions.

Survey pilot. The initial version of the questionnaire was developed based on the review of the literature. An educational research professor, who has expertise in survey research, reviewed the initial version and provided feedback that resulted in the second version of the survey questionnaire. Next, an advisory panel, including 6 special education practitioners with experience in CBM reviewed this version. Participants of the survey pilot test (Fowler, 2014) were asked to provide feedback on the question items and design of the survey instrument. Feedback was received in the following areas: a) if the link to the survey worked properly; b) if they were able to complete the survey

without any technical difficulties; c) if the instructions for self-administration were clear; d) if clarity of item format, items, and response choices were needed; e) if there were any suggested edits for grammar, spelling, and/or question items and response choices; and (f) the amount of time it took to complete the survey. Revisions to the survey items were made according to the feedback. The survey instrument is provided in Appendix B.

Survey design. An original, web-based survey, consisting of 31 items, was developed for purposes of data collection. Teacher respondents were instructed to respond to close ended and open-ended items related to teachers' practices and perceptions of CBM. The survey instrument was created in SurveyMonkey™ (1999-2015). Using a web-based instrument provides convenience, rapid data collection, ease of follow up, confidentiality and security, and allows respondents ample time to consider response choices (Rea & Parker, 2014). Additionally, a web-based survey can follow complex question skip patterns (Fowler, 2014).

The survey begins with an introduction page, which provided teachers with a brief overview of the study purpose and format. Additionally, the introduction page provided teachers instructions for taking the survey and definitions for CBM and progress monitoring to be used for answering the survey items. As stated before, the survey contains 31items. Logic was used when designing the survey and the number of items may be different based on participants' responses. The first fourteen items gathered information about teachers' use of CBM, including which CBM programs are used (AIMSweb, DIBELS, easyCBM), which CBM assessments are used (Reading, Math, Writing, Spelling), for what purposes CBM assessments are used (screening, progress monitoring, IEP development and refinement, evaluate effects of instruction, and

intervention), how often CBM assessments are used, and how much time is spent implementing and analyzing CBM. The information from this section was used in the analysis of survey questions for Research Question #1.

The next 8 items of the survey asked questions specific to teachers' perceptions of the value and usefulness of CBM. These items gathered information in relation to the value teachers place on CBM as a progress monitoring tool, whether they feel that CBM is an accurate measurement tool in regard to student performance, student's general proficiency in basic skills, and student's rate of growth. The information from these items was used in the analysis of survey responses for Research Question #2.

The following 3 items are related to CBM implementation, specifically, how comfortable teachers feel performing certain CBM tasks (graphing, interpreting data, modifying instruction based on data, writing IEP goals using CBM data), steps teachers follow for implementing CBM for progress monitoring, steps teachers follow for responding to student progress based on CBM data. The information from these items was used in the analysis of survey responses for Research Question #3.

The subsequent item is related to the perceived barriers of CBM implementation. The information from this item was used in the analysis of survey responses for Research Question #4.

The next four items are specific to the CBM training received by participants. These items gathered information in relation to CBM training (teacher preparation program, in-school professional development, mentor/coach) and perceived impact of CBM training, as well as suggestions for improving CBM training programs for teacher

preparation programs and in-service professional development. The information from these items was used in the analysis of survey responses for Research Question #5.

One final survey item provides participants the opportunity to share any additional information related to CBM that may have not been requested, but perceived as important to elementary special education resource teachers regarding CBM. The information gathered from this item was useful in the analysis of survey responses for all of the research questions.

The last portion of the survey includes seven demographic questions to gather information about the respondents' gender, highest degree earned, certification(s), experience teaching, experience using CBM, and school location (urban, suburban, rural). The information from this section was used in the analysis of survey responses as the information gathered in previous items was grouped based on these variables to investigate patterns in the data.

Procedures

Data collection occurred during spring of 2016. All data gathered from participants were collected with permission from the participants and in full compliance with the Institutional Review Board (IRB). Prior to contacting individual teachers, I requested permission from 81 school districts to conduct a descriptive study of elementary special education resource teachers' practices and perceptions of CBM. After receiving permission from 15 school districts, I emailed teachers a cover letter/letter of consent, explaining the purpose of the study and soliciting their participation in the study (see Appendix C). Three school districts chose to send the email to their teachers. A secure link, generated by the SurveyMonkey™ (1999-2015) website during survey

development, was included in the emailed letter for immediate access to the web-based survey. Additionally, teachers were given the closing date of the survey and informed that the survey would take approximately 15 minutes to complete. Teachers indicated their consent to participate by accessing the survey and submitting their responses through the survey link. A reminder email was sent five days after the survey link was initially sent to encourage responses from those who had not completed the survey (Rea & Parker, 2014). Another email was sent seven days later to remind those who had not completed the survey of the closing date. The survey remained open for two weeks, after which the survey was closed and the data analyzed.

Data Analysis

Descriptive statistics was used to analyze the survey responses and to answer each research question in this study. Quantitative analysis of responses was conducted for close-ended items. SurveyMonkey™ (1999-2015) was used to export spreadsheets containing software computed descriptive statistics related to each item and to grouped items related to each research question. Descriptive statistics was reported within the results section as measures of frequency and percentages. Frequency and summary data were reported for open-ended response items.

Research question #1. There are fourteen survey items related to the first research question, describing how elementary special education teachers report using CBM in their practices. These items include seven close-ended items, six close-ended checklist items (i.e. mark all that apply), and one item that used a drop down menu. The following items allowed respondents to write additional comments: 2, 5, 6, 7, 8, 9, 10, 12,

and 13. Descriptive statistics are reported for all 14 survey items, specifically frequencies and percentages, to summarize overall results.

Research question #2. There are eight items related to the second research question, describing elementary special education teachers' views on the value of CBM as a progress-monitoring tool. All questions are close-ended, four (4-point) Likert-type scale items. Descriptive statistics are reported for all eight survey items, specifically, frequencies and percentages, to summarize overall results.

Research question #3. Three survey items are related to the third research question describing elementary special education teachers' perceptions of their ability to implement CBM and what they perceive as barriers to implementation. One item is a close-ended, 4-point Likert-type scale item. Two items are close-ended questions that include a checklist and allow respondents to write an optional comment. Descriptive statistics are reported for all three survey items, specifically frequencies and percentages, to summarize overall results.

Research question #4. There is 1 item related to the fourth research question describing perceived barriers to CBM implementation. It is a close-ended, checklist item and allows respondents to write an optional comment. Descriptive statistics was reported for this survey item, specifically frequency and percentages, to summarize overall results.

Research Question #5. There are 4 items related to the fifth research question describing types of CBM training elementary special education teachers report they have received and their view of the effectiveness of training. Three of these items are close-ended. Of the close-ended items, one is a checklist item, one is a yes/no item, and one item uses a drop down menu. Items 28 and 29 allowed respondents to write an optional

comment. Descriptive statistics are reported for all 4 survey items, specifically frequencies and percentages, to summarize overall results. The remaining item in this section is an open-ended item relating to suggestions for improving CBM training and professional development. Frequency and summary data are reported for participants' suggestions for providing training to support and improve their ability to use CBM and provide effective instruction. The final item of the survey questionnaire is an open-ended item describing additional information on the topic of CBM and can apply to all of the research questions. Summary data was reported to describe additional information practitioners report for CBM.

Reliability and Validity

Total survey design involves considering all aspects of a survey: the quality of the sample, the quality of the questions as measures, the quality of data collection, and the mode of data collection (Fowler, 2014). To address the quality of the sample, responses were collected from a purposeful sample because the study addressed information that can only be obtained from a specialized group of the general population. The sample frame was designed to include special education resource teachers, and some variation is to be expected, by chance alone, between the characteristics of the sample and the target populations (Fowler, 2014). With regard to the quality of the questions as measures, Suskie (1996) reports that reliability and validity are enhanced when the researcher takes the following precautionary steps: 1) each survey item is clear and easily understood, 2) respondents interpret each item in the intended way, 3) the items have a natural relationship to the study's topic and goals, and 3) each item is clear to colleagues knowledgeable about the subject. To avoid possible threats and to test the validity of this

study, a pilot test of the survey questionnaire was conducted to help identify any problems with the design and content of the survey instrument before distributing the survey to participants. With respect to the quality and mode of data collection, the use of a web-based, self-administered/computer assisted survey instrument ensures that responses are recorded directly, which aids in eliminating data entry errors. Moreover, this mode of data collection allows participants to submit responses anonymously, which encourages not only a higher rate of response but also accurate and honest responses (Fowler, 2014).

Summary

The purpose of this chapter was to describe the research methodology of this study, explain the steps for sample selection and setting, describe the procedures used in designing the survey instrument, explain the methods of data collection, and provide an explanation of the statistical procedures used to analyze the data.

CHAPTER 4

RESULTS

The purpose of this study was to examine elementary special education teachers' practices and perceptions of CBM. Survey questionnaire responses entered into Survey Monkey were the basis for my data analysis. In this chapter, I will explain the analysis conducted and present the results for each research question.

Participants

The survey was sent to 152 elementary special education resource teachers, representing fifteen public school districts in South Carolina. Eighty-four (N = 84) completed the survey questionnaire, yielding a response rate of 55%. Two participants gave incomplete data so they were removed from the population. Out of the 84 respondents, the majority was female (96.43%, N = 81). The highest degree earned by most participants was a bachelors degree (N = 36, 42.86%). Most respondents were veteran teachers of 20+ years (N = 22, 26.19%). Interestingly, most of the participants have only been teaching special education resource for 1-3 years (N = 19, 22.62%) and most participants have only had 1-3 years experience using CBM (N = 36, 42.86%). The majority (N = 26, 30.95%) of respondents reported between 21-25 students on their caseload and 23.81% (N = 20) reported they had more than 30 students on their caseload. More than half of the teachers (N = 51, 60.71%) reported their school is located in a rural area. Table 4.1 displays the frequencies and percentages of the demographic section of the survey.

Table 4.1

Demographic Data

Demographic Variable	N	Percentage
Gender		
Male	3	3.57%
Female	81	96.43%
Total	84	
Highest Degree Earned		
Bachelors	36	42.86%
Masters	29	34.52%
Masters +30	17	20.24%
Doctorate	2	2.38%
Total	84	
Total Number of Years Teaching		
1-3	11	13.10%
4-6	7	8.33%
7-10	14	16.67%
11-15	14	16.67%
16-19	16	19.05%
20+	22	26.19%
Total	84	
Total Number of Years Teaching Special Education Resource		
1-3	19	22.62%
4-6	14	16.67%
7-10	15	17.86%
11-15	13	15.48%
16-19	10	11.90%
20+	13	15.48%
Total	84	
Total Number of Years Experience Using CBM		
0	2	2.38%
1-3	36	42.86%
4-6	16	19.05%
7-10	17	20.24%
11-15	8	9.52%
16-19	4	4.76%
20+	1	1.19%
Total	84	
School Location		
Rural	51	60.71%
Suburban	29	34.52%
Urban	4	4.76%
Total	84	
Number of Students on Current Caseload		
1-5	0	0.00%
6-10	4	4.76%
11-15	11	13.10%
16-20	8	9.52%
21-25	26	30.95%
26-30	15	17.86%
More than 30	20	23.81%
Total	84	

Research Question 1

My first research question was, "How do elementary special education resource teachers report using curriculum-based measurement?" I used the results of survey items 1-14 to identify and describe the respondents' reported uses of CBM. I calculated frequencies and percentages for each response given in the survey questionnaire for each item. The majority of respondents reported using CBM in their practice (N = 78, 92.86%). Of the respondents who reported not using CBM (N = 8), all reported using running records (N = 8, 100%) in addition to teacher made tests (N = 4, 50%) and chapter tests (N = 2, 25%). Respondents were given the option to list assessments not included in the item choices. One participant reported using assessment items from the Internet that are more content specific, "For example, if the student has a goal for comparing fractions, then only a progress monitoring sheet for comparing fractions is used as opposed to progress monitoring general fractions."

A little more than half of the respondents reported they were not required to use CBM by their school administration (N = 44, 52.38%), and more than three-fourths (N = 65, 77.38%) of the respondents reported they would use CBM if not required by their school administration. Remarkably, more than a quarter of respondents (N = 22, 26.19%) reported they had to purchase their own CBM materials. Respondents were given the opportunity to provide optional responses not included in the item choices related to who provides CBM material. Eighteen respondents provided comments. Twelve of the respondents reported they use free CBM resources online. For example, one respondent said, "I use easyCBM-free edition." Another said, "For math, I create my own based on

IEP needs." Another commented, "Some my district supplies and other assessments I get on my own."

EasyCBM was reported used by most respondents (N = 44, 52.38%), followed by AIMSweb (N = 35, 41.67%). Respondents were given the opportunity to provide optional responses not included in the item choices related to the types of CBM programs used. Twenty-seven respondents wrote comments. Fourteen of the respondents reported the survey would not let them check more than one item and added that they use "all three of the choices," "AIMSweb and easyCBM," or "I use both AIMS and DIBELS." Other respondents (11) reported choices not included on the survey, including Reading A to Z, Fountas & Pinnell, Dominie, MAP, Vmath, SRA, IReady, Brigance, Newmark Learning, LLI, and the school curriculum. Two respondents wrote they do not use CBM. Respondents' complete comments are listed in Appendix D.

The top four purposes reported for using CBM are, respectively, progress monitoring (N = 79, 94.05%), IEP progress reports (N = 73, 86.90%), IEP goal writing (N = 72, 85.71%), and IEP development (N = 60, 80.95%). Respondents were given the opportunity to provide optional responses not included in the item choices related to the purposes for using CBM. Three respondents provided comments. One respondent reported, "CBM's are used for grades," another respondent reported using CBM "to identify strengths and weaknesses of my students," while another reported using CBM as an "Annual assessment tool for grade level progress in reading and math." Table 4.2 displays the frequencies and percentages of the purposes for using CBM.

Table 4.2

Purposes for Using CBM

Data	Frequency	Percentage
Screening	21	25.00%
Progress Monitoring	79	94.05%
IEP development	68	80.95%
IEP goal writing	72	85.71%
IEP progress reports	73	86.90%
Evaluate effects of intervention	32	38.10%
Evaluate effects of instruction	36	42.86%
I don't use CBM for any purposes	2	2.38%

Oral Reading Fluency (N = 71, 84.52%) and Math Computation (N = 70, 83.33%) were rated the skill areas most frequently assessed using CBM. Following close behind were Reading: Comprehension (N = 58, 69.05%) and Math Concepts and Applications (N = 58, 69.05%). Respondents were given the opportunity to provide optional responses not included in the item choices related to CBM assessments used. Two respondents wrote comments. One respondent reported using, "EasyCBM comprehension and vocabulary," and the other respondent reported using, "AIMSweb TEL/TEN (Tests of Early Literacy and Tests of Early Numeracy)." Table 4.3 displays the frequencies and percentages for which CBM assessments are used.

Table 4.3

CBM Assessments Used

Data	Frequency	Percentage
ORF	71	84.52%
Reading Comprehension	58	69.05%
Math Computation	70	83.33%
Math Concepts and Applications	58	69.05%
Writing	37	44.05%
Spelling	9	10.71%
I don't use any CBM assessments	2	3.57%

Almost half of the respondents reported using CBM for progress monitoring twice a month (N = 37, 44.05%). Respondents were given the opportunity to provide optional responses not included in the item choices related to how often teachers use CBM. Four respondents wrote comments. One respondent reported using CBM, "every two weeks," another respondent reported, "I use CBM at different times throughout the year," and a third respondent reported, "I either use weekly, or every two weeks depends on the student/curriculum." The fourth respondent stated, "Used for a time but the passages were too long for my special education kids." Table 4.4 displays the frequencies and percentages for how often teachers use CBM.

Table 4.4

How Often Teachers Use CBM

Data	Frequency	Percentage
At least once a week	15	17.86%
Twice a month	37	44.05%
Once a month	15	17.86%
Only before IEP progress reports	8	9.52%
Only before annual IEP meetings	4	4.76%
Spelling	1	1.19%
Never	2	3.57%

Between 53% and 62% of respondents reported using CBM in grades one through five. CBM was used much less frequently in kindergarten and sixth grade. Table 4.5 displays the frequencies and percentages for which grade level(s) respondents use CBM for progress monitoring.

Table 4.5

Grade Levels Used For CBM

Data	Frequency	Percentage
Kindergarten	30	35.71%
1st Grade	45	53.57%
2nd Grade	52	61.90%
3rd Grade	49	58.33%
4th Grade	52	61.90%
5th Grade	49	58.33%
6th Grade	18	21.43%

Slightly fewer than half of the respondents reported using a computerized software program to administer CBM (N = 38, 45.24%). However, about the same number of respondents reported they did not use a computerized software program for CBM (N = 36, 42.86%). About a third of the respondents reported using a computer software program to generate graphs (N = 26, 30.95%).

A little more than a third of the respondents (N = 29, 34.52%) reported they graph CBM data consistently after each administration and scoring. Almost a third (N = 24, 28.57%) of the respondents reported they graphed CBM data sometimes prior to an IEP meeting or for IEP progress reports. Interestingly, quite a few respondents (N = 21, 25.00%) reported they never graph CBM data. Respondents were given the opportunity to provide optional responses not included in the item choices related to how often respondents graph CBM data. Three respondents wrote comments. One respondent reported, "It is automatically graphed with AIMSweb." Another respondent reported, "I graph student's reading, but not math." The third respondent reported, "I occasionally graph IEP goals; however, I often graph goals for students that lead to success with the IEP goals. For example, we use a program called Reflex Math to track fact fluency.

Together, the students and I graph and monitor their success with Reflex which leads to success with math computation goals."

Respondents who reported they did not graph CBM consistently after each administration and scoring were asked to indicate reasons they opted not to graph CBM data. Fifty-five (N = 55) respondents answered this item. The most frequently reported reason respondents reported not to graph was because graphing was too time consuming (N = 22, 40%), followed by those who reported they didn't feel it was necessary (N = 14, 25.45%), and those who were unsure how to graph CBM data (N = 9, 16.36%). Respondents were given the opportunity to provide optional responses not included in the item choices related to reasons opting not to graph. Fifteen respondents checked "other." Six respondents stated that they do not graph or they use other tools. For example, one respondent stated, " I don't really need a graph in my IEP process." Another respondent stated, "Too many other obligations." Eight of the respondents reported that they do graph, but not consistently or they may graph for certain CBM assessments, but not others. For example, one respondent commented, "I graph just not all the time. I have data sheets for it I don't always use this in a graph form." One respondent stated that their students graph the data, "My students are older, so they like to look at their scores themselves and see the growth from one assessment to the next. I have some of them graph their own scores. Other students glean more information from the raw numbers than from a graph."

Respondents reported spending the greatest amount of time (more than 15 minutes per week for each student) administering and analyzing Math Computation (N = 22, 26.19%) and Math Concepts and Applications (N = 23, 27.38%). Less than half of

the respondents (N = 34, 40.48%) reported spending 5 minutes per week for each student administering and analyzing ORF and 0 minutes a week administering and analyzing CBM data for each student on the following CBM assessments: Reading Comprehension (N = 24, 28.57%), Writing (N = 38, 45.24%), and Spelling (N = 58, 69.05%). Table 4.6 displays the frequencies and percentages for approximate minutes per week respondents spend administering and analyzing CBM for each student.

Table 4.6

Minutes Per Week Spent on Administering and Analyzing CBM

CBM	0 Minutes	5 Minutes	10 Minutes	15 Minutes	More Than 15 Minutes
ORF	11.90% (10)	40.48% (34)	20.24% (17)	8.33% (7)	19.05% (16)
Reading Comprehension	28.57% (24)	21.43% 18	21.43% (18)	8.33% (7)	20.24% (17)
Writing	45.24% (38)	19.05% (16)	15.48% (13)	9.52% (8)	10.71% (9)
Spelling	69.05% (58)	19.05% (16)	7.14% (6)	0.00% (0)	4.76% (4)
Math Computation	13.10% 11	20.24% (17)	21.43% (18)	19.05% (16)	26.19% (22)
Math Concepts and Applications	22.62% 19	15.48% (13)	22.62% (19)	11.90% (10)	27.38% (23)

Research Question 2

For the second research question, "What are elementary special education teachers' views on the value of CBM as a progress-monitoring tool?" I used the results of survey items 15 – 22 to identify and describe the respondents' views on the value of CBM as a progress-monitoring tool. A Likert-type scale was used for items 15-19 based on a scale ranging from "not at all valuable" to "very valuable." The scale was out of order on the survey questionnaire (somewhat valuable and valuable were switched). I combined those two responses in order to make it a 3-response scale (not at all valuable,

somewhat valuable/valuable, very valuable) for purposes of reporting the results. More than half of the respondents (N = 50, 59.52%) reported they believe their use of progress monitoring with CBM is very valuable for developing and revising IEPs. Additionally half (N = 42, 50%) of the respondents reported their use of progress monitoring with CBM is very valuable for individual student instructional decision-making. Interestingly, a little less than half (N = 38, 45.24%) of the respondents reported that CBM is very valuable for student achievement and a 40.48% reported CBM is very valuable for communicating with parents. Math Computation (N = 38, 45.24%), Oral Reading Fluency (N = 36, 42.86%) and Math Concepts and Applications (N = 34, 40.84%) were identified as the most valuable CBM assessments by almost half of the respondents. Reading Comprehension (N = 28, 33.33%), Writing (N = 24, 28.57%), and Spelling (N =11, 13.10%) were all reported as very accurate by the least number of respondents. Items 20 – 22 involved respondents' perceptions of the accuracy of CBM assessments to measure student performance, student general proficiency, and student rate of growth. A Likert-type scale was also used for items 20-22 based on a scale ranging from "not at all accurate" to "very accurate." The scale was out of order on the survey questionnaire (somewhat accurate and accurate were switched). I combined those two responses in order to make it a 3-response scale (not at all accurate, somewhat accurate/accurate, very accurate) for purposes of reporting the results. The majority of respondents reported that ORF (N = 24, 28.57%), math computation (N = 24, 28.57%), and math concepts and applications (N = 19, 22.62%) as very accurate for measuring student performance. Writing (N = 12, 14.29%), reading comprehension (N = 11, 13.10%) and spelling (N = 6, 7.14%), had the least number of recipients report that they were very accurate. When

gauging accuracy of CBM assessments to measure student general proficiency, most respondents reported that math computation (N = 24, 28.57%%), ORF (N = 20, 28.31%), and math concepts and applications (N = 20, 23.81%) as very accurate and writing (N = 13, 15.48%), reading comprehension (N = 10, 11.90%), and spelling (N = 7, 8.33%) were reported as very accurate by the least number of respondents. A majority of respondents also reported that ORF (N = 24, 28.57%), math computation (N = 21, 25%), and math concepts and applications (N = 21, 25%) as very accurate for measuring student rate of growth and the least number of respondents reported writing (N = 16, 19.05%), reading comprehension (N = 12, 14.29%), spelling (N = 11, 13.10%), as very accurate.

Research Question 3

My third research question, "What are elementary special education resource teachers' perceptions of their ability to implement CBM?" explored teachers' perceptions of their ability to perform CBM tasks, which steps they implement when using CBM, and which steps they implement when responding to CBM data. I used the results of survey items 23-25 to identify teachers' perceptions of their ability to implement CBM. A Likert-type scale was used for item 23 based on a scale ranging from "not at all comfortable" to "very comfortable." The scale was out of order on the survey questionnaire (somewhat comfortable and comfortable were switched). I combined those two responses in order to make it a 3-response scale (not at all comfortable, somewhat comfortable / comfortable, very comfortable) for purposes of reporting the results. In regard to comfort using CBM, about half of the respondents reported feeling very comfortable administering (N = 48, 57.14%), scoring (N = 46, 54.76%) CBM assessments, and writing IEP goals using CBM data (N = 41, 48.81%). Respondents felt

least comfortable ("not at all comfortable") with setting up graphs (N = 18, 21.43%), constructing the goal line (N = 16, 19.05%), and interpreting the function of the goal line (N = 13, 15.48%).

The two steps most respondents reported as part of their CBM practice when performing progress monitoring were administering CBM assessments (N = 76, 90.48%), and using CBM assessments to write IEP goals (N = 75, 89.29%). Using computerized data software to administer and score CBM assessments (N = 27, 32.14%) and monitoring progress using CBM frequently, at least once a week, (N = 26, 30.95%) were the least frequently used steps reported by respondents. Respondents were given the opportunity to provide responses not included in the item choices related to steps of their CBM practice when performing progress monitoring. Two respondents wrote comments. One respondent stated, "I make very few instructional decisions using CBMs as they provide little instructional information. I instead rely on Informal Reading Inventories, which provides miscue analysis. I use rubrics for written expression. MAZE is totally inappropriate and inaccurate in assessing comprehension. It gives false positives and false negatives." The other respondent commented, "I have an overloaded case load of 35 students across grades K-5. At least 40% of my time is spent preparing IEP's and being in meetings. On weekends, I work long hours preparing IEP's. There is simply insufficient time to plan lessons effectively and learn/implement CBM. I wish it were not the case."

The two steps most respondents reported as part of their CBM practice for responding to student performance/progress were modifying instruction by making changes to one feature at a time (N = 67, 79.76%) and continuing current instruction (N = 58, 69.05%). Following instructional recommendations provided by computerized skills

analysis (N = 23, 27.83%) was the step least used for responding to student performance/progress.

Research Question 4

My fourth research question is "What do elementary special education resource teachers perceive as barriers to implementing CBM?" Survey item 26 addressed barriers respondents encounter when using CBM. The two most frequently reported barriers were time (N = 58, 69.05%) and number of students to assess (N = 44, 52.38%). Respondents were given the opportunity to provide optional responses not included in the item choices related to barriers to implementing CBM. Seventeen respondents wrote comments. One respondent stated he or she does not use CBM. Six respondents made comments in reference to the reading passages being too lengthy. For example, one stated, "The Reading comprehension passages for the Easy CBM are much too long, students lose focus easily." Eight respondents reported that CBM measures are not useful or a true representation of a student's ability. For example, one respondent commented, "Reading quickly is not a good measure of reading ability especially for students with slow processing speed, visual tracking problem, visual memory problems (who are slow but active decoders). These assessments provide very little information to inform instruction. I am comfortable with the administration procedures and know how to graph and make instructional decisions using progress-monitoring data. I simply believe there are far better assessments." Two commented on time and classroom management as barriers. One stated, "A huge caseload of 35 students and the amount of time required to keep up with IEP's and meetings is problematic." The other respondent indicated that data management was an issue by stating, "Data Entry on the math measures can be

cumbersome." Table 4.7 displays the frequencies and percentages of barriers respondents encounter with CBM.

Table 4.7

Barriers of CBM

Data	Frequency	Percentage
No barriers with CBM	5	5.95%
Administering CBM assessments	4	4.76%
Time	58	69.05%
Number of students overwhelming	44	52.38%
Lack of training	16	19.05%
Graphing	20	23.81%
Data-based instructional decisions	6	7.14%
Lack of materials	20	23.81%
Not useful	2	2.38%
Not a good measurement of student performance	5	5.95%
Not a good tool for measuring student progress	3	3.57%

Research Question 5

My fifth research question is "What types of CBM training do elementary special education resource teachers report they have received? How effective do they view their training?" I used the results of survey items 27 to 30 to determine the types of training teachers' report having received and whether or not they believe it was effective. Almost half (N= 40, 47.62%) of the respondents reported they have not received training in CBM. The majority of respondents reported receiving training in implementation (N = 34, 40.48%) and administration (N = 34, 40.48%). Respondents reported the least amount of training in data based decisions (N = 16, 19.05%) and modifying instruction (N = 12, 14.29%). More of the respondents reported receiving training from in-school professional development than from any other source (N= 44, 52.38%). Interestingly,

the fewest number of respondents reported receiving training at a college/university teacher preparation program (N = 17, 22.08%). More respondents reported that in-school professional development (N = 43, 54.43%) was more helpful than college/university teacher preparation programs (N = 16, 24.62%) or mentor/coaches (N = 23, 32.39%). Respondents were given the opportunity to provide optional responses not included in the item choices related to where they received training and if it was helpful. Nine respondents wrote comments. Four respondents stated they did not receive training, and two of them commented they taught themselves how to do CBM. Two respondents stated they had formal training. One stated, "Formalized AIMSweb training offered by AIMSweb." Two respondents said they received minimal training. For example, one stated, "I had minimal training in AIMSweb from my district and was expected to implement it without complete training. Website was helpful in filling in the gaps. Don't think teachers are trained thoroughly enough before having to implement procedures adopted by schools or districts."

More than three-fourths (N = 66, 78.57%) of the respondents reported they believe a college/university teacher preparation program should offer a course devoted only to CBM. Respondents were given the opportunity to provide optional responses not included in the item choices. Nine respondents wrote comments. Some examples of comments include the following: "I think it can be used in a course devoted to talking about finding the strengths and weaknesses of your students and how to use this data to make research based curricular decisions about your students education plan. Doesn't need to be in isolation" and "The more exposure to data collection and CBM training prior to graduation and getting a job is super beneficial."

Survey item 30 was an optional, open-ended question asking participants to share their most important suggestion for supporting their ability to use CBM and improving CBM training/professional development. Forty-eight participants shared suggestions. Respondents' comments are listed in Appendix E. Several themes stood out among the comments. Twenty respondents gave suggestions/recommendations specific to CBM training and staff development. For example, one respondent commented, "There needs to be follow up classes after the training." Seven respondents wrote comments in favor of CBM training in college or university teacher preparation programs and for new teachers coming into the district. For example, one teacher stated, "It should be included as part of student teaching so teachers get a chance to implement it with actual students." Five teachers gave suggestions for using CBM. One teacher commented, "Putting data directly in ENRICH once a week saves time and gives me a graph." Four teachers discussed the need for consistency of CBM assessments across their district and among districts. For example, one teacher stated, "More staff development and consistent use of CBM across our district is needed." Four teachers gave specific suggestions for improving CBM assessment instruments. For example, one commented, "Decrease the size of the Reading comprehension passages-they are much longer than those on state testing and too long for the kids to follow and/or look back to find answers." Also, 5 teachers gave positive feedback about CBM. One teacher stated, "CBMs are quick and easily used for all teachers and assistants." Lastly, 3 teachers gave comments of not needing support or wrote comments like "N/A."

Optional Open-ended Question

The final survey item was an optional, open-ended question that asked participants to share any additional information/opinions that they would like to contribute on the topic of CBM that were not covered in the survey. Complete statements for the final open-ended question are listed in Appendix F. Eighteen respondents recorded comments to the open-ended question. Five respondents gave comments such as "none" or "N/A." Other comments included explanations of responses, drawbacks to CBM, suggestions for implementation, and comments specific to the survey questionnaire.

Summary

Survey questionnaire responses from 84 respondents provide the results for each of my research questions. Results show that the majority of SC elementary special education resource teachers report using CBM for progress monitoring and IEP development. Most respondents reported using CBM assessments twice a month, and the most used CBM assessments were ORF and Math Computation. One third of respondents reported graphing CBM data consistently following each assessment. For those who reported they did not graph, the reason for opting not to graph was because it was too time consuming.

Overall, the majority of respondents consider CBM to be very valuable or valuable for developing and revising IEPs and for instructional decision-making. Additionally, respondents reported each CBM assessment (except spelling) to be valuable or very valuable for purposes of progress monitoring. With regard to the accuracy of CBM assessments to measure student performance, student general proficiency, and

student rate of growth, most respondents reported each assessment to be accurate or somewhat accurate.

Respondents reported they were very comfortable administering and scoring assessments but not as comfortable with the steps involving graphing CBM data. The majority of respondents reported administering CBM assessments and using CBM data to set IEP goals as steps that are part of their CBM practices, and when responding to student performance/progress, most respondents reported they modify instruction as part of their CBM practices.

The two barriers to implementing CBM reported by most respondents are time and the number of students makes CBM overwhelming. Almost half of the respondents reported they have not received CBM training. Of those who reported they received training, most reported receiving training in the areas of implementation and administration. Very few reported they received training in data-based decisions and modifying instruction. The majority of respondents received training at in-school professional development and more than half of the respondents reported they believed that colleges or university teacher preparation programs should offer a course devoted only to CBM. The results for each research question provide the basis for my discussions and the education and research implications I present in chapter 5.

CHAPTER 5

DISCUSSION

The purpose of this study was to expand and update the literature by examining elementary special education resource teachers' current practices and perceptions of CBM. Specifically, this study examined: a) how special education resource teachers report using and implementing CBM, including perceived barriers to implementation; b) special education resource teachers' perceptions of the value of CBM as a progress monitoring tool; and c) how special education resource teachers report they were trained on CBM. Earlier research suggests that CBM is not used as originally intended by the developers or used accurately and appropriately to meet the requirements of the IEP as laid-out by IDEA (Shinn, 2010; Yell & Stecker, 2003). Additionally, past research suggests that barriers to CBM implementation are due to time constraints, low acceptability of CBM, and uncertainty of how to implement CBM (Foegen, 2001; Yell et al., 1992). By examining elementary special education resource teachers' practices and perceptions of CBM and their current levels of acceptability, their responses can be used to influence future work in this area. In this chapter, I present discussion of my findings and implications for how these findings may be used to better support special educators use, implementation, and acceptability of CBM. First, I will address teachers' use and implementation practices of CBM, including perceived barriers. Next, I will discuss

acceptability of CBM and last, CBM training. Limitations of the study and suggestions for further research complete the chapter.

Uses and Implementation of CBM

In earlier research, Wesson, King and Deno (1984) found that only 53.6% of special education teachers used CBM, and Swain and Allinder (2011) found that less than half of teachers (45%) used CBM for progress monitoring. In this study, the majority of elementary special education resource teachers (92.86%) reported using CBM in their practices. This is considerably more than previous studies revealed. It is possible that four factors have resulted in more teachers using CBM today than 30 years ago. First, school districts may be requiring special education teachers to use CBM for progress monitoring. Fifty-two percent of respondents reported they were required to use CBM by their school administration. Second, IDEA requires students' progress toward their IEP goals be monitored and reported to parents as often as students in general education classes. Third, since the rollout of RTI as a way to identify students at risk for disabilities utilizes CBM as a means to determine eligibility for special education, more teachers (both special and general education) are required to use CBM. Thus, more teachers are being trained on CBM during professional development training as well as taught about CBM in pre-service teacher training programs. Fourth, the availability of CBM programs is much higher now. There are more commercial CBM programs available for purchase as well as programs that are free on the Internet.

Past studies have shown that ORF is the most used CBM assessment (Swain & Allinder, 1997). My study revealed that ORF is still the most widely used CBM assessment with Math Computation following close behind. These results are not

surprising for several reasons. First, three-fourths or more of the respondents reported ORF and math computation to be very valuable for the purpose of progress monitoring. Second, since reading and math are the most commonly taught subjects in a resource setting, teachers may feel most comfortable using these probes. Third, the ORF and Math Computation probes may be considered easier and quicker to administer and score, allowing teachers more time to spend on instruction. Fourth, teachers may find that it is easier to write IEP goals based on ORF and math computation probes.

Earlier research suggested that teachers were not using CBM accurately and in compliance with the requirements of the IEP (Yell & Stecker, 2003; Etscheidt, 2006). The majority of respondents in this study reported they use CBM mostly for progress monitoring. Moreover, they reported primarily using CBM for IEP progress reports, IEP goal writing, and IEP development. These data imply that special education teachers appear to understand the IDEA requirements of the IEP and are using CBM to meet these requirements. An explanation for this compliance may be that CBM training programs have a strong focus on how to use CBM to meet the mandates of the law.

In my study, less than half of the respondents reported using CBM for the original purposes of using graphed data to evaluate the effects of instruction and interventions and to make instructional data-based decisions to help students meet their IEP goals (Deno, 1985). Only about a third reported consistently graphing data following each assessment, and a fourth reported they never graph CBM data. Special education teachers may not be graphing CBM data because they feel that it is time consuming. Almost half of the teachers reported that it is too time consuming. A second reason for not graphing may be lack of training. Only a quarter of respondents reported receiving training in graphing

and half of the respondents reported feeling somewhat comfortable or not at all comfortable with setting up graphs. Additionally, some respondents reported the reason for not graphing was because they were unsure how to do it, and a quarter reported it is not necessary. Graphing is a critically important part of the effective use of CBM (Deno, 2005). Past research has shown that teachers who graph CBM data and use a goal-raising rule enhance instructional planning and effect greater student achievement (Fuchs, Fuchs, & Hamlet, 1989). Of concern is the lack of training leading to teachers administering CBM but not using the data to make instructional decisions. They may perhaps be interpreting the data incorrectly. Roherig et al. (2008) found that teachers may need additional training or guided practice on interpreting data and using CBM graphs on an ongoing basis. It is critical that CBM training include instruction not only on administration and implementation but also on graphing and data-based decisions. By training teachers on all the components of CBM, school districts and teachers will be able to use CBM as originally intended, meet the requirements of the law, and provide meaningful educational programs for students with disabilities.

Data from this study also indicated that close to half of elementary special education teachers only use CBM twice a month. This, too, may be related to time constraints and lack of training. Research recommends that teachers of students with disabilities use CBM to monitor their students' progress more frequently than twice a month (Hasbrouck & Tindal, 2006). Although it is unlikely that school administrators can add more time to the school day for teachers to administer CBM, they can provide guidance on how to prioritize instruction and develop realistic time management plans. For example, many resource teachers set aside one day a week, such as Fridays, just for

CBM, and when they are assessing an individual student, they have other students working at centers. Time management and an explanation for the purpose of frequent progress monitoring should be included in CBM training programs.

In this study, less than half reported using a computerized software program for CBM, less than a third reported using software programs to generate graphs, and only a fourth reported using software programs to generate individual student skills analysis. In addition to comprehensive training on all CBM components, another way school districts can assist special education teachers with CBM implementation is to purchase computer software programs to aid in graphing and data-based decisions. Not only will CBM computer software programs help teachers to make data-based decisions based on graphs and modify instruction based on the skills analysis profile, it will also help with the concern that CBM is too time consuming. Computer software programs can help teachers save valuable time for instruction by doing a lot of the elbow work for them, especially for those who are not comfortable with graphing, data analysis, and modifying instruction based on data because a lack of proper training. It may be beneficial, therefore, for districts to invest in a computerized software program to help special education teachers implement CBM more efficiently and effectively.

I was surprised that more than a quarter of respondents reported having to purchase their own CBM material. Perhaps if all school districts provided CBM materials for special education teachers, then maybe all teachers would use it. Because monitoring student progress is a requirement of IDEA, special education teachers should be provided with all materials necessary to fulfill this mandate. General education teachers are not required to buy their own assessment materials. That's not to say that all

general education teachers do not purchase their own supplemental materials, as all teachers do, but general education teachers are provided CBM materials to implement RTI, special education teachers should also be provided with their CBM materials.

Acceptability of CBM

Along with time, past research has shown that acceptability of CBM as a progress-monitoring tool is another barrier to implementation (Yell et al., 1992, Wesson et al., 1984). This study provides a more current look at teacher acceptability of CBM. Most respondents reported they consider CBM to be very valuable for developing and revising IEPs and for making instructional decisions. Respondents also reported they would use CBM even if it were not required by their school district. It appears that more teachers consider CBM to be acceptable today than they did 25 years ago. This could be the result of several factors. First, the use of CBM as an important component of RTI and its use by all educators, rather than exclusively special educators, may have convinced teachers of the benefits of CBM. Since it is the cornerstone of the nationwide RTI initiative, CBM may be considered a more valid assessment tool than it was in earlier research studies. Second, with the updated accountability provisions of the IDEA (1997) that mandates the IEP include a statement of how the student's progress toward his or her goals will be measured and documentation of the student's progress be reported to parents throughout the year, special education teachers may see the value of CBM as an excellent tool for developing IEPs and fulfilling this requirement.

Interestingly, about 40% of the respondents reported CBM to be very valuable for communicating with parents. I find it surprising that more teachers did not consider CBM to be very valuable for communicating with parents since it is a necessary requirement of

IDEA and it is a good way to communicate with parents in an easy to understand format (Fuchs et al., 2008). Perhaps when answering this question, respondents were considering the use of graphs for communicating with parents and because many have not been trained on the use of graphs with CBM data, they do not consider it as very valuable. However, a summary of student progress can be easily determined throughout the year and the CBM graph provides an excellent documentation for both accountability and communication purposes (Yell & Stecker, 2003).

Data revealed that most elementary special education resource teachers' perceptions of the accuracy of the CBM ORF and math assessments to measure student performance, general proficiency, and rate of growth to be very accurate and reading comprehension, writing and spelling less accurate. In the study by Yell et al. (1992), 22% identified face validity of some of the measures to be a barrier of CBM. The findings from this study suggest that some teachers may still be reluctant to believe in the validity of CBM measurements. These results are a little surprising since most respondents reported, as stated above that they consider CBM as a progress-monitoring tool to be very valuable. An explanation is that participants do not see the need for a measure to be valid in order for it to be useful, which is similar to the findings of Foegen et al. (2001), who found that a measure did not necessarily have to be a valid indicator of reading comprehension to provide the teacher with information regarding students' general level of reading proficiency.

Additionally, previous research indicated that training can influence an individual's acceptance of an intervention or buy-in to a program (Foegen et al., 2001). Perhaps if more teachers had received training on CBM, they would have reported CBM

to be more accurate. CBM training programs should not only include instruction on how to implement all components of CBM with fidelity but also include informing teachers on the research that demonstrates the technical adequacy of CBM, as well its benefits of effecting superior achievement, which may increase acceptability and belief in the validity of CBM.

Training

As stated earlier, almost half of the respondents reported they had not received CBM training. About half of the respondents reported they received training during an in-school professional development, while less than a quarter received training as part of their college/university teacher preparation program, and less than a third received training from a coach or mentor.

Wayman et al. (2011) suggested that training and professional development should involve learning that is sustained and supported over time and that having a coach or mentor is recommended. It may be beneficial to provide teachers with follow up after professional development training in CBM to assist them with practicing and transferring their learning, as well as helping them understand the impact CBM will have on their students' achievement and their individual teaching practices. According to Roehrig et al. (2008), follow up after training is highly recommended to ensure teachers are implementing CBM correctly and with confidence.

As stated earlier, most respondents reported they received training on administering and implementing of CBM, but only a few reported they received training on graphing, data analysis and data-based decisions. It is important for special education teachers to be instructed not only on how to use CBM as an instrument for developing

IEPs to fulfill the requirements of IDEA but also how on to use CBM data to create graphs and make instructional decisions as originally intended by Deno.

Limitations

There are several limitations to the current study. The total sample for the present study was 84 participants from South Carolina. Due to this small sample size, the results of this research may not be generalizable to the larger population of special education resource teachers across the United States. Additionally, only 15 out of 81 school districts in South Carolina agreed to participate in this study, the results may not be generalizable to the school districts that did not participate. This study focused only on the CBM practices and perceptions of elementary special education resource teachers. Therefore, the results should not be generalized to other grade levels or special education teacher categories. Because a purposeful sample was used and the participants were volunteers, the responses given by them may not reflect the population as a whole. The researcher developed the survey used with this study; therefore, it may not be the most precise measure of elementary special education resource teachers' practices and perceptions of CBM. For example, the Likert-type questions (items 15-23) were not in proper order (i.e., valuable and somewhat valuable should have been switched in order) and may have been confusing for some participants. In addition, survey research can be subjective in nature (Fowler, 2014) and may not be the most accurate measure of teachers' practices and perceptions of CBM.

Implications for Practice

The current findings suggest noteworthy implications relating to special education teachers' practices and perceptions of CBM. Most importantly, these findings suggest

that more elementary special education resource teachers are using CBM today than in the past. This implies a greater acceptability of CBM than thirty years ago. The findings also suggest that special education teachers are using CBM to meet the federal requirements of the IEP. They are using CBM to develop IEPs, write IEP goals, monitor student progress, and report student progress to parents. However, findings suggest that special education teachers are not using CBM as originally intended (Shinn, 2010). Teachers are not very comfortable graphing data and using it to make data-base decisions, and it does not appear they are using CBM to evaluate the effects of their instruction and interventions. Through good professional development opportunities and teacher preparation programs, teachers can become educated on the benefits of CBM and on the use CBM to evaluate the effects of their instruction and interventions. Additionally, they can be educated on the importance of implementing each of the components of CBM, such as graphing and data-base decisions. Specifically, training should include having teachers graph data by hand to give them a better understanding of the different aspects of the graph (i.e., baseline data, function and construction of the goal line, determining rate of growth) and the benefits of using the graph to communicate student progress with parents. Moreover, follow up after training, perhaps with a mentor or coach, would be helpful to ensure teachers are implementing CBM with accuracy and fidelity.

The findings of this study also revealed that time is still the number one barrier to CBM implementation. Special education teachers already feel they have an extraordinary amount of paperwork. Including CBM in their practice on a weekly basis may feel overwhelming to some teachers. Schools may want to consider investing in a CBM

computer software program to help ease the constraints of time for special education teachers. Because more schools are using CBM as part of their RTI process, computer software programs can be used by both general and special education teachers to be more cost effective. A complaint by some of the respondents of this study is that a variety of CBM programs are used throughout school districts. It may be more advantageous if everyone in the district uses the same CBM program. This would help with accuracy and consistency of data as students move from one grade to the next and from one teacher to another.

Recommendations for Future Research

The current study suggests the need for conducting more research on special education teachers' practices and perceptions of CBM. More research needs to be conducted on examining the inhibiting factors of implementing CBM. We know time is a major barrier; research should be conducted on ways to help teachers with time management skills related to CBM and on finding other ways to help teachers with this barrier, such as providing paraprofessionals to assist. In addition, it may be beneficial to conduct further research on the factors that may affect teachers' acceptability of CBM. Some of these factors may include administrative support, more comprehensive professional development, and pre-service teacher program courses covering CBM. Additionally, research on CBM training programs would be helpful in finding ways to support teachers' use of CBM. For example, examining how teacher preparation programs are training preservice teachers, the effects of using coaches and mentors as opposed to a one time training, and training with follow-ups to ensure teachers' ability to implement CBM with accuracy and fidelity. Moreover, since the progress monitoring

requirements of IDEA is for all special education teachers, it may be beneficial to examine all special education teachers, including elementary self-contained teachers' or secondary teachers' practices and perceptions of CBM. Also, I suggest conducting this same study with other elementary special education resource teachers in other states or regions. As stated earlier, teachers in this study suggested that districts choose one CBM program for the entire district and stick with it instead of adopting a different program every couple of years. Not only are teachers concerned about having to learn a new CBM program but also they are concerned that there is not consistency with data if it is coming from different CBM programs. It would be important for research to determine if data from one CBM program are consistent with data from another CBM program, as well as study whether district-wide adoptions result in increased participation by teachers and more thorough training opportunities.

Conclusions

The purpose of this study was to expand and update the literature by examining elementary special education resource teachers' practices and perceptions of CBM. Past studies have shown that few special education teachers were utilizing this assessment tool, and if they were, they may not be implementing it accurately and appropriately to meet federal IEP requirements or as originally intended by its developers. The earlier research indicated the reason for the lack of use was due to two main barriers; time and acceptability of CBM as a valid assessment method. The results of this study show that more special education teachers are using CBM than thirty years ago and perceive it to be valuable for monitoring student progress. Additionally, they are using CBM to meet the federal requirements of the IEP; however, many are not using it as originally intended by

its developers. Whereas, teachers reported feeling comfortable with administering and implementing CBM, they are not as comfortable with graphing the data and using it to make instructional decisions. One reason special education teachers are not as comfortable with implementing certain components of CBM is due to the lack of training. Another reason some special education teachers are not implementing certain components of CBM is lack of time. Time is the still the greatest perceived barrier to CBM implementation for special educators. With the information provided in this study, school administrators and leaders of teacher preparation programs should consider more effective methods to educate and support special education teachers as they learn to use CBM in their practices.

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APPENDIX A – RESEARCH QUESTION/SURVEY ITEM ALIGNMENT

Research Question	Survey Item #(s)	Citation(s)
RQ 1: How do elementary special education teachers report using CBM in their practices?	1 – 14, 31	Deno (2003); Hosp & Hosp (2003); Jenkins & Fuchs (2013); Swain & Allinder (1997); Wesson, King, Deno (1984); Yell & Busch, (2013); Yell et al., (1992); Yell & Stecker (2003)
RQ 2: What are elementary special education teachers' views on the value of CBM as a progress-monitoring tool?	15 - 22, 31	Allinder and Oats (1997); Foegen et al. (2001); Kazdin (1980); Roehrig et al., (2008); Rowe et al. (2014)
RQ 3: What are elementary special education teachers' perceptions of their ability to implement CBM?	23– 25, 31	Allinder and Oats (1997); Codding et al., (2005); Deno (2003); Fuchs (1993); Hall, Vue, & Mengel (2014); Roehrig et al, (2008); Rowe et al. (2014)
RQ 4: What do elementary special education teachers perceive as barriers to implementing CBM?	26, 31	Skiba, Wesson, & Deno (1982); Swain & Allinder (1997); Wayman et al. (2011); Wesson, King, & Deno (1984); Yell et al. (1992)
RQ 5: What types of CBM training do elementary special education teachers report they have received? How effective do they view their training?	27 - 30, 31	Stecker, Fuchs, & Fuchs (2005); Rowe et al. (2014); Witt & Elliott (1985); Yell, Marston, and Deno (1992)

APPENDIX B – SURVEY QUESTIONNAIRE

Curriculum-Based Measurement Practices and Perceptions

Instructions

Thank you for agreeing to participate in my survey on Elementary Special Education Resource Teachers' Practices and Perceptions of Curriculum-Based Measurement. The survey should take approximately 15 minutes, and your responses are completely anonymous and confidential.

If you have any questions about the survey, please email me: brooksm2@email.sc.edu

Please use the following definitions to answer the survey questions:

Progress monitoring – a set of techniques for assessing student performance on a regular basis, that helps teachers use student performance data to evaluate the effectiveness of their instruction and make informed instructional decisions (Safer & Fleischman, 2005)

Curriculum-based measurement (CBM) – CBM is a form of progress monitoring conducted on a regular basis in which all skills in the instructional curriculum are assessed by each test (probe) across the year. It is an approach that measures the academic growth of individual students to document if the student is benefitting from his or her educational program (Fuchs & Fuchs, 2005).

Curriculum-based measurement will be referred to as CBM throughout the question items.

1. Do you use CBM in your classroom? (Check one)
   A. No
   B. Yes

2. If you do not use CBM, what types of assessments do you use to monitor student progress? (Check all that apply)
   A. Running records
   B. Teacher-made tests
   C. Chapter tests from curriculum
   D. Other (please specify)

3. Are you required to use CBM for progress monitoring by your school administration? (Check one)
   A. No
   B. Yes

4. If you were not required to use CBM by your school administration would you use CBM or other types of progress monitoring? (Check one)
   A. Curriculum-based measurement
   B. Other types of progress monitoring

5. Does your school/district supply you with CBM materials? (Check one)
   A. My school/district supplies CBM material
   B. I purchase my own CBM material
   C. Other (please specify)

6. Which CBM program(s) do you use? (Check one)
   A. AIMSweb
   B. DIBELS
   C. EasyCBM
   D. Other (please specify)

7. For what purposes do you use CBM (Check all that apply)
   A. Screening
   B. Progress monitoring
   C. IEP development
   D. IEP goal writing
   E. IEP progress reports
   F. Evaluate effects of intervention
   G. Evaluate effects of your instruction
   H. I do not use CBM for any purposes
   I. Other (please specify)

8. Which CBM assessments do you use? (Check all that apply)
   A. Reading: Oral Reading Fluency
   B. Reading: Comprehension Cloze Procedures (ex. MAZE, DAZE)
   C. Math Computation
   D. Math Concepts and Applications
   E. Writing
   F. Spelling
   G. I do not use any CBM assessments
   H. Other (please specify)

9. How often do you use CBM for progress monitoring? (Check one)
   A. At least once a week
   B. Twice a month
   C. Once a month
   D. Only before IEP progress reports
   E. Only before annual IEP meetings
   F. Never
   G. Other (please specify)

10. Which grade level(s) do you use CBM for progress monitoring (Check all that apply)
   A. Kindergarten
   B. 1st Grade
   C. 2nd Grade
   D. 3rd Grade
   E. 4th Grade
   F. 5th Grade
   G. 6th Grade
   H. Other (please specify)

11. Do you use a computerized software program for CBM? (Check all that apply)
   A. To administer CBM assessments
   B. To generate graphs
   C. To generate individual student's skills analysis
   D. I do not use a computerized software program for CBM

12. How often do you graph student CBM performance/progress? (Check one)
   A. Never
   B. Occasionally, when I remember
   C. Sometimes, prior to an IEP meeting or for IEP progress reports
   D. Consistently, following each assessment and scoring
   E. Other (please specify)

13. If you do not always graph student CBM performance/progress, please indicate the reasons you opt not to graph data from CBM assessments. (Check all that apply)
   A. I don't feel it is necessary to graph student performance/progress
   B. Graphing is too time consuming
   C. Graphed results are too difficult to interpret
   D. I am unsure of how to graph CBM data
   E. Other (please specify)

14. Approximately how many minutes per week do you spend administering and analyzing CBM for each student? If you use CBM less than once a week, provide an average for approximate minutes per week. (Check one for each assessment)

A. Reading: Oral Reading Fluency
B. Reading: Comprehension Cloze Procedures (ex. MAZE, DAZE)
C. Math Computation
D. Math Concepts and Applications
E. Writing
F. Spelling

15. How valuable is your use of progress monitoring with CBM to individual student instructional decision-making? (Check one)

Not at all valuable **Valuable** **Somewhat valuable** **Very valuable**

16. How valuable is your use of progress monitoring with CBM for developing and revising IEPs? (Check one)

Not at all valuable **Valuable** **Somewhat valuable** **Very valuable**

17. How valuable is your use of progress monitoring with CBM on student achievement? (Check one)

Not at all valuable **Valuable** **Somewhat valuable** **Very valuable**

18. How valuable is your use of CBM for communicating with parents? (Check one)

Not at all valuable **Valuable** **Somewhat valuable** **Very valuable**

19. How valuable do you feel the following CBM assessments are for the purpose of progress monitoring? (Check one answer for each assessment)

Not at all valuable **Valuable** **Somewhat valuable** **Very valuable**

A. Reading: Oral Reading Fluency
B. Reading: Comprehension Cloze Procedures (ex. MAZE, DAZE)
C. Math Computation
D. Math Concepts and Applications
E. Writing
F. Spelling

20. Do you consider the following CBM assessments to be an accurate measure of student performance? (Check one answer for each assessment)

Not at all accurate **Accurate** **Somewhat accurate** **Very accurate**

A. Reading: Oral Reading Fluency
B. Reading: Comprehension Cloze Procedures (ex. MAZE, DAZE)
C. Math Computation
D. Math Concepts and Applications
E. Writing
F. Spelling

21. Do you consider the following CBM assessments to be an accurate measure of students' general proficiency? (Check one for each assessment)

Not at all accurate **Accurate** **Somewhat accurate** **Very accurate**

A. Reading: Oral Reading Fluency
B. Reading: Comprehension Cloze Procedures (ex. MAZE, DAZE)
C. Math Computation
D. Math Concepts and Applications
E. Writing
F. Spelling

22. Do you consider the following CBM assessments to be an accurate measure of student's rate of growth? (Check one answer for each assessment)

Not at all accurate **Accurate** **Somewhat accurate** **Very accurate**

A. Reading: Oral Reading Fluency
B. Reading: Comprehension Cloze Procedures (ex. MAZE, DAZE)
C. Math Computation
D. Math Concepts and Applications
E. Writing
F. Spelling

23. How comfortable do you feel performing the following CBM tasks? (Check one for each item)

Not at all comfortable Comfortable Somewhat comfortable Very comfortable

A. Administering assessments
B. Scoring assessments
C. Setting up graphs
D. Interpreting graphs
E. Interpreting baseline data
F. Interpreting the function of the goal line
G. Constructing the goal line
H. Interpreting CBM data to evaluate the effectiveness of instruction
I. Interpreting CBM data to determine when to modify instruction
J. Interpreting CBM data to determine when to raise the goal line
K. Determining what instructional modifications to make when CBM data shows need for a change
L. Writing IEP goals using CBM data
M. Determining whether or not students have attained goals based on CBM data
N. Overall, I feel comfortable implementing CBM with my students

24.Which of the following steps are apart of your CBM practice when monitoring student progress (Check all that apply)

A. Administering CBM assessments
B. Scoring CBM assessments by hand
C. Using computerized data software to administer and score CBM measures
D. Monitoring progress using CBM frequently at least once a week
E. Using CBM data to set IEP goals
F. Using CBM data to target skills for instruction
G. Graphing student performance after each CBM assessment
H. None of the above, I don't use CBM
I. Other (please specify)

25. Which of the following steps are apart of your CBM practice when responding to student performance/progress? (Check all that apply)

A. Continuing current instruction

B. Modifying instruction by making changes to one feature at a time (ex. intervention strategy, duration of instruction, motivational strategies)

C. Following instructional recommendations provided by computerized skills analysis (ex. data software that provides advice for instruction)

D. Increasing goal

E. None of the above, I don't use CBM

F. Other (please specify)

26. What barriers do you encounter with CBM? (Check all that apply)

A. I don't encounter any barriers with CBM

B. Administering CBM assessments

C. Time

D. Number of students to assess makes CBM overwhelming

E. Lack of training

F. Graphing

G. Data-based instructional decisions

H. Lack of materials

I. I don't think CBM is useful

J. I don't think CBM is a good measurement of student performance

K. I don't think CBM is a good tool for measuring student progress

L. Other (please specify)

27. Have you received training with CBM in the following areas? (Check all that apply)

A. I have not received CBM training

B. Implementation

C. Administration

D. Graphing CBM data

E. Data analysis

F. Data-based decisions

G. Modifying instruction based on data

28. Where did you receive CBM training and did you feel it was helpful? (Check one answer for each item regarding where you received training and if it was helpful)

	Received training?	**Was it helpful?**
College/University teacher preparation program	Yes/No	Yes/No
In-school professional development	Yes/No	Yes/No
Mentor/Coach	Yes/No	Yes/No
Other (please specify)		

29. Do you believe that college/university teacher preparation programs should include a course devoted only to CBM training? (Check one)

A. No
B. Yes

30. Please share your most important suggestion for supporting your ability to use CBM and improving CBM training/professional development.

31. Please use the space below to share any additional information/opinions that you would like to contribute on the topic of CBM that was not covered in the survey.

Demographics

32. Gender:

A. Male

B. Female

33. Highest degree earned:

A. Bachelors

B. Masters

C. Masters +30

D. Doctorate

34. Total number of years teaching (include current year):

A. 1-3

B. 4-6

C. 7-10

D. 11-15

E. 16-19

F. 20+

35. Total number of years teaching special education resource (include current year)

A. 1-3

B. 4-6

C. 7-10

D. 11-15

E. 16-19

F. 20+

36. Total number of years experience using CBM (include current year)

A. 0

B. 1-3

C. 4-6

D. 7-10

E. 11-15

F. 16-19

G. 20+

37. School location:

A. Rural

B. Suburban

C. Urban

38. Number of students on current caseload:

A. 1-5

B. 6-10

C. 11-15

D. 16-20

E. 21-25

F. 26-30

G. More than 30

APPENDIX C – TEACHER COVER LETTER/CONSENT

Study Title: Elementary Special Education Resource Teachers' Practices and Perceptions of Curriculum-based measurement

Dear Teachers,

My name is Susan Seymour and I am a Doctoral Student in the Educational Studies Department at the University of South Carolina. I am conducting a survey to investigate Curriculum-based measurement (CBM) practices and perceptions among elementary special education resource teachers. The results of this study will be presented as my dissertation in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Special Education.

I am writing you to ask for your help to participate in my study. Your expertise and knowledge are vital to this study because the information being requested is not available from any other sources.

I am interested in learning more about how you use CBM in your practice. The information you provide for this survey will be used to describe: a) how special education resource teachers report using and implementing CBM, b) special education resource teachers' perceptions of the value of CBM as a progress monitoring tool; and c) special education resource teachers training on CBM.

There are no potential risks associated with participating in this study. By participating, you will have the opportunity to reflect on your CBM practices as well as share your thoughts and ideas. Your contribution can aid schools, districts, and the state department in developing an understanding of special education resource teachers' CBM practices and inform future research and efforts aimed at providing ongoing support for such practices. Your contribution can also assist college/university teacher preparation programs to improve and enhance training programs for new teachers. Information and data resulting from this project will be shared with you and your district upon request, in addition to being shared with other education professionals.

Participation in this project is **confidential** and all survey responses will be recorded **anonymously** through the SurveyMonkey™ database, therefore your identity will not be revealed to anyone, at any time, including the researcher. The 31-item questionnaire includes Likert-type, close-ended, and open-ended items related to CBM. The survey should take approximately 15 minutes to complete. Your district is neither sponsoring nor

conducting this study. You have the right to inspect materials before consenting and to withdraw consent at any time. There is no penalty for not participating, and participants may withdraw from the project at any time without penalty.

I will be happy to answer any questions you have about the study. You may contact me at (803) 743-9000 or by email (brooksm2@email.sc.edu).
Thank you for your consideration. Submitting your responses via the survey link below will be acknowledgement of your consent to participate.
Link: https://www.surveymonkey.com/r/CBMpracticesandperceptions

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APPENDIX D – SURVEY ITEM #6 OPEN-ENDED COMMENTS

1. I do not use
2. I also use the curriculum that I teach with to take fluency readings.
3. I also use EasyCBM, but am unable to check both.
4. Reading A to Z Fountas & Pinnell.
5. The district has AIMSweb but is in the piloting stages so only some schools are allowed to use it.
6. Fountas and Pinnell
7. Dominie
8. We use both AIMS and DIBELS but this survey only lets you check one of the selections
9. I also use DIBELS DAZE but the survey only allowed me to select one option.
10. MAP
11. DIBELS
12. I use both AIMS and DIBELS
13. I use CBM downloaded from the Internet.
14. I have used DIBELS in the past. In my other school district.
15. Vmath, SRA
16. IReady
17. I primarily use AIMSweb; however, occasionally I used EasyCBM.
18. All of the above

19. Both DIBELS and AIMSWeb
20. I also use DIBELS
21. *I also use DIBELS
22. Fluency passages from books or internet Comprehension passages found or created – with comprehension questions each week Sight words lists
23. I was unable to check all that applied, but I use Aimsweb, DIBELS, Brigance and Newmark Learning
24. None
25. LLI
26. I use all three, but it would not let me select more than one.
27. And Easy CBM

APPENDIX E – SURVEY ITEM #30 OPEN-ENDED COMMENTS

1. Suggestions specific to training and staff development. (19 responses)
    a. Communication and having strong leaders to provide the appropriate training.
    b. School district special services departments should provide training to special ed teachers.
    c. How to make good progress monitoring probes. Websites that have pre-made probes.
    d. There needs to be follow-up classes after the training.
    e. Training is needed and some explanations of time management.
    f. More training is needed at the school level for administering as well as interpreting data.
    g. I believe that student teachers should get the training necessary to enable them to monitor and assess their students and develop goals and plans for individual growth.
    h. Hands on experience.
    i. Having adequate materials to use as interventions. Having a variety of assessments and training in how to use the information.
    j. Finding quality CBMs and making sure that they are given correctly.
    k. I would like information on using CBM for writing, spelling, and comprehension (that is useful). My students are unable to finish reading passages from Easy CBM due to the format and the length, and there are not

enough questions given through DIBELS to make accurate educational decisions about comprehension (in my opinion). I would like more information about how to implement these correctly, so there is reliability and validity.

l. Offer more classes or professional development to show what options are out there other than EasyCBM.

m. I believe that it is something teachers must really set aside time for. It's hard to carve out time, unless it is already set aside.

n. TRAINING and TIME. Teachers need thorough training and refresher training sessions. Teachers need allotted time to administer CBM's as well as time to score and interpret the data. IF instructional decisions are made based on CBM data then teachers need time and training to analyze the data.

o. Training on modifying instruction based on progress

p. Hands on implementation with support just a phone call away.

q. Finding quality CBMs and making sure that they are given correctly.

r. I find that easy cbm.com is not user friendly for teachers or students.

s. The CBM instruments for math are hard to find.

2. Suggestions for including training for new teachers and as part of student teaching. (7 responses)

a. It should be included as a part of student teaching so teachers get a change to implement it with actual students.

b. Training incoming teachers on how to use CBMs

c. Teacher or students should have training in college so they will understand how to use CBMs because they may have to depending on the district.

d. I believe that student teachers should get the training necessary to enable them to monitor and assess their students and develop goals and plans for individual growth.

e. Colleges and universities should require courses in CBM. If that has not been done, then school districts should offer professional development for this purpose.

f. I think that we should be trained while in the teacher preparation program, on how to sue various forms of CBM.

g. I think it is important for new teachers to receive training on how to administer and use CBM to inform their instruction. It can feel overwhelming when trying to do it on your own. My district provides a lot of support for administering and using CBM in our classrooms. Specifically our Special Services department.

3. Suggestions for using CBM (5 responses)

a. Be prepared and organized with your materials. It goes much faster if you have everything in one spot and it is organized – the students will know the ropes and what to do on progress monitoring days.

b. CBM should be a part of daily informal assessments used to gauge a student growth and understanding of content. This allows teachers to adapt instruction as needed and effectively ensure student success.

c. I believe that it is something teachers must really set aside time for. It's hard to carve out time, unless it is already set aside.

d. I think CBM training should be sued for all classrooms not just special education settings or RtI progress.

4. Consistent use among district(s). (4 responses)

a. More staff development and consistent use of CBM across our district is needed.

b. I think we change our programs or methods of assessment without adequately preparing those who are expected to implement the assessments. Learn as you go often seems to be the norm.

c. We need consistent CBM measures across our district.

d. Have one standard CBM

5. Suggestions for improving CBM assessments. (4 responses)

a. Decrease the size of the Reading comprehension passages – they are much longer than those on state testing and too long for the kids to follow and/or look back to find answers.

b. Make the passages shorter

c. Please make items more skill specific, not just a broad/general content to assess.

d. Providing curriculum based assessment specifically for students with special needs who require picture response options. It takes a long time to find pictures to represent answer responses on current CBM.

e. Decrease the price of the programs, other than the free stuff.

6. Positive feedback about CBM. (5 responses)
    a. I appreciate EASY CBM. IT was easy to learn how to add students and assign tests.
    b. CBM implementation is a key factor in determining baseline and instructional data, especially for IEP progress reports and IEP goals.
    c. CBM's are quick and easily used for all teachers and assistants.
    d. CBM progress monitoring makes progress monitoring efficient, reliable and doable especially in a Special Education program for multi-tasking special ed teachers.
    e. CBM has allowed me to consistently monitor and track student progress throughout the year. Also it has helped me communicate to parents how their son/daughter are progressing towards the IEP goals.
7. No more support needed and not applicable. (3 responses)
    a. I have already shared in previous answers. Please see above. Thank you.
    b. I do not need any more support. I would like more support in writing IEP using miscues analysis and how brain dysfunctions such as slow processing speed, working memory difficulties, visual tracking issues, language delays, sensori-motor coordination issues affect reading fluency. We seem to completely ignore these issues when we expect students to read easily and with fluency.
    c. Na

APPENDIX F – SURVEY ITEM #31 OPEN-ENDED COMMENTS

1. Not applicable (5 responses)
    a. I do not use CBM; therefore I do not feel my answers are true data
    b. None
    c. No comments
    d. N/A
    e. N/A
2. Explanation for answers (1 response)
    a. The only reason I said "not at all helpful" for some of the CBM is because I only use CBM for math computation and reading words per minute.
    b. Drawbacks to CBM (3 responses)
    c. I think CBM is a very useful tool, however it has its drawbacks as well. Students often feel it is boring and may or may not see the value and therefore may or may not give 100% effort. I see my students rush through just circling answers so they can complete the Maze quickly or dazing off during the timed math/writing assessments hard to help them understand the value sometimes.
    d. CBMs are at best very superficial measure of performance

e. If you have a lot of students, it is hard to chart CBM as often as I would like.

3. Suggestions for CBM (6 responses)

   a. All teachers need to receive training on CBM and how to provide appropriate interventions before the referral process is implemented.

   b. Please add more math items to the computer CBM software, and then I would be able to use t more often.

   c. Teachers training teachers is not optimal. There should be a concerted effort on the part of the school districts to insure that CBM progress monitoring is in place.

   d. Special Education students should be given more time to complete assessments.

   e. Time is definitely an issue but if you set one day a week aside, it can be done. Once you start collecting data, you realize how important it is to have on a daily or weekly basis in order to drive instruction, report to parents, assist with IEPs. It definitely needs to be incorporated into undergraduate degree programs for both general and special education teachers.

   f. I wish there was a good CBM for determining writing data and goals.

4. Related to Survey Questionnaire (2 responses)

   a. It was covered well.

   b. Your options weren't clear were you wanted us to choose not valuable, somewhat valuable, valuable and very valuable. They were in the wrong order.