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Pre-service Teachers' Interpretation of CBM Progress Monitoring Data

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Teachers must be proficient at using data to evaluate the effects of instructional strategies and interventions, and must be able to make, describe, justify, and validate their data-based instructional decisions to parents, students, and educational colleagues. An important related skill is the ability to accurately read and interpret progress-monitoring graphs. This study examined preservice special education teachers' graph reading and interpretation skills at two points in time. Participants used a think-aloud procedure to interpret a curriculum-based measurement (CBM) progress monitoring graph, and results were compared to those of CBM experts. Overall, preservice teachers tended to say fewer words than graph experts did. Furthermore, their descriptions of CBM graphs were less sequentially coherent, specific, and reflective. Little change was observed at time 2. Implications for improving teacher preparation in this skill area are discussed.

LEARNING DISABILITIES
RESEARCH & PRACTICE

The processes of thought, judgment, and decision making are integral to teaching in general, and are particularly important for special educators who are charged with making decisions about individual students (IDEA, 2004; NCLB, 2001). These teachers are responsible for mastering a complex set of knowledge and skills, and the degree to which they do so has important consequences for individuals with disabilities (see review by Stecker, Fuchs, & Fuchs, 2005). Special educators are expected to be proficient at using data to evaluate the effects of instructional strategies and interventions. They should be able to identify problems—the "unacceptable discrepancies between what is expected and what is observed" (Christ, 2008, p. 159)—and then proceed to make sound instructional decisions and take appropriate action so that students make progress at desired rates and meet a variety of defined academic benchmarks in areas such as reading, math, and writing.

Connected to, and essential for, meeting these expectations is the need for teachers to develop graph reading and interpretation skills. Teacher preparation standards at the national (NCATE, 2010) and state levels, as well as professional organizations such as the Council for Exceptional Children (CEC), assert that the ability to graph, interpret, and use progress monitoring data to make instructional decisions are all essential skills for teachers to develop in order to meet professional qualifications and to perform essential tasks. Specifically, the CEC Initial Special Education Learning Disabilities Specialty Set of standards includes (1) an assessment preparation standard wherein a teacher is expected to be able to "Evaluate instruction and monitor progress of individuals with exceptionalities," and (2) an instructional and planning preparation standard wherein a teacher is expected to be able to "Modify instructional practices in response to ongoing assessment data" (Council for Exceptional Children, 2016a, p. 55).

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Curriculum-Based Measurement

Curriculum-based measurement (CBM) is a research-validated progress monitoring system that is flexible enough to be used across multiple learning areas including reading (Ardoin, Christ, Morena, Cormier, & Klingbeil, 2013), math (Lee & Lembke, 2016), and writing (Ritchey et al., 2016). CBM was conceptualized around the premise that repeated measurement data can be used to evaluate and improve instruction. The system uses short outcome measure probes (usually 1–2 minutes) to quantify student performance on a discrete skill. These measurement data are then plotted on a line graph. When the probes are psychometrically sound, possessing strong validity and reliability, teachers can quickly and accurately gauge a student's ability level on the measured skill. By examining the results of multiple CBM probes that are "*different but equivalent"* (Deno, 2003, p. 185, italics added) and implemented over time, the teacher can also determine the student's rate of progress toward a designated goal. Multiple psychometrically sound sets of probes are currently available for use. Some well-known examples include the Formative Assessment System for Teachers (FAST; Christ, Ardoin, & Eckert, 2014), AIMSweb (Pearson Education, 2013), and the Dynamic Indicators of Basic Early Literacy Skills (DIBELS, Good & Kaminski, 2002; see also DIBELS Next; Powell-Smith, Good, & Atkins, 2010). Many probe sets are also part of a larger data system for logging and graphing scores. The results of multiple studies demonstrate that student achievement improves if teachers use CBM data to make instructional decisions (Stecker et al., 2005).

Since its development in the mid 1980s (see Deno, 1985), researchers have continued to refine the CBM system and expand its uses. Today CBM is used not only to evaluate and improve instruction, but also to predict performance on important criteria such as high stakes tests (Ditkowsky & Koonce, 2010; Silberglitt, Burns, Madyun, & Lail, 2006), develop grade-level norms for peer performance (Christ, Silberglitt, Yeo, & Cormier, 2010), evaluate the effectiveness of prereferral interventions (Parker, Vannest, Davis, & Clemens, 2012), and screen students for academic risk (Deno, 2003; Kilgus, Methe, Maggin, & Tomasula, 2014). Even observations of student behavior during the administration of the probe can provide important information regarding student characteristics related to the skill being measured. For instance, while observing a student during a 1-minute oral reading fluency probe, the teacher may observe that the student omits words, skips lines, or reverses letters. This information, although less quantitative in nature, may help inform instructional decisions. Unfortunately, teachers appear to have some difficulty using CBM for instructional decision making with a high level of proficiency (Stecker et al., 2005).

Graph Reading and Interpretation

A critical skill involved in using CBM effectively is reading and interpreting progress data as displayed on the graphs. Graph comprehension theory and research has identified three major processes individuals engage in when reading and interpreting graphs: (1) pattern-recognition processes, (2) interpretive processes, and (3) integrative processes (Carpenter & Shah, 1998). Specifically, an individual such as a special education teacher first encodes the visual information (i.e., patterns) and then translates it in terms of the qualities or quantities that are being represented. For instance, a series of connected points may be recognized as a line graph. If each point is higher than the preceding point, the teacher may translate this as an upward slope, signifying an increase of some sort. Finally, the information is integrated, relating the translation to the referent, as inferred from the visual information (e.g., title, labels, etc.). To continue our example, if the *y*-axis is labeled *words read correctly per minute*, the teacher may integrate that information with the data points and infer that this particular student is increasing steadily on the measured skill (Carpenter & Shah, 1998). Further, if he or she also knows that the last three data points are below the expected grade-level performance for this student, the degree to which the student is on track to achieve grade-level competency (e.g., *if* and *when*) may also be inferred.

Given the complex and demanding cognitive processes involved when interpreting graphical displays of data, and the importance of using CBM to make instructional decisions, it is essential that special education teachers learn CBM progress monitoring graph interpretation skills early in their training. However, there is currently no standardized convention for evaluating preservice teachers' skill in this area. The research on CBM training during teacher preparation is limited. An early study examined the effects on student achievement of training preservice teachers in the use of CBM to monitor reading progress and make data-based decisions during student teaching. Results indicated that participants were able to accurately use CBM with guidance from the researchers, and that procedures had a positive effect on elementary students' reading achievement (Jones & Krouse, 1988). Another study found that watching video presentations on the technical adequacy and utility of CBM positively influenced preservice teachers' beliefs about the procedure, although they questioned the validity of the measure as a valid indicator of reading comprehension (Foegen, Espin, Allinder, & Markell, 2001). Unknown is the amount and quality of CBM training preservice teachers receive. In one study, participants reported having received little to no training in their teacher preparation programs (Begeny & Martens, 2006). A recent study examined the effects of using a content acquisition podcast (CAP) to disseminate knowledge about CBM to preservice teachers. Results were compared to a contrast group who received the same content via a practitioner-friendly text and found that participants who learned using the CAP scored significantly higher on knowledge and application measures. Participants in the CAP group also reported higher levels of motivation during instruction than participants in the text-only group (Kennedy et al., 2016). The data from the literature cited above indicate that preservice special education teachers can develop positive beliefs about CBM and learn to use it effectively, yet the data are limited, and specific methods for studying and supporting preservice teachers' learning and use of CBM have not been sufficiently examined.

Taken together, there is a need for research to increase our understanding of how special education teachers develop their ability to read and interpret CBM graphs, including leveraging those data in the process of analyzing student progress and making instructional decisions that positively impact learning. In service of this goal, the purpose of this study was to examine the development of graph interpretation skills in special education preservice teachers. Specifically, we wondered how preservice teachers' CBM graph interpretation skills compared to those of CBM experts.

We conducted the present study to examine the following research questions: (1) How do preservice special education teachers' CBM progress monitoring graph interpretation skills compare to those of experts; and (2) How do preservice special education teachers' CBM progress monitoring graph interpretation skills change over time?

METHODS

Participants

Participants for this study included three scholars, judged to be experts in CBM, and 36 preservice special education teachers. The three CBM experts were involved in the original development of CBM. In addition, they each had more than 100 published papers on CBM, and had over 50 teaching and training experiences on the topic of CBM at the time of the study.

The preservice teachers were recruited from two different universities in the Midwest at the end of a learning disabilities methods course they took in their final semester prior to student teaching. Participants ($n = 22$) from University 1 were enrolled in a weekend and evening initial teacher licensure program for undergraduate and graduate students. Of the 22 participants, seven were undergraduate students and 15 were graduate students. Participants from University 2 ($n = 14$) were enrolled in a postbaccalaureate/master's program. Both university preparation programs had met state and national accreditation standards. Of the 36 participants, 29 were female and 7 were male. All were pursuing their teaching license in learning disabilities. In addition, 16 were pursuing a license in emotional and behavioral disorders, and two were pursuing a license in Developmental Cognitive Disabilities. Seven of the participants held a license in a general education area (e.g., elementary education, social studies), and 12 had experience working as a paraprofessional in a special education classroom.

Think-Aloud Procedures

Our study used a think-aloud procedure to evaluate CBM graph reading and interpretation skills. A think-aloud procedure has some advantages over a multiple-choice task to measure graph-reading and interpretation ability. First, multiple-choice assessments may not encourage participants to think through their answers carefully before submitting a response; in a think aloud, the participants articulate their response rather than merely selecting responses from a menu of possible answers. Second, multiple-choice assessments do not allow the participants to explain their thinking or rationalize their selection; in contrast, the think aloud offers participants the chance to explain their thinking and provide a rationale for their answers (Berg & Smith, 1994). In addition to the benefits described above, the think-aloud procedure employed in this study has been used in previous CBM graph interpretation research (Espin, Wayman, Deno, McMaster, & de Rooij, this issue).

We created two CBM reading progress-monitoring graphs of hypothetical students, one in third grade and one in fifth grade, who were receiving intervention in reading. The graphs displayed the number of words read correctly and incorrectly in 1 minute on grade-level passages administered once a week over the course of 36 weeks. The graphs included baseline data, peer comparison data, a goal line, five phase changes indicating five interventions, and trend lines within each phase. The graphs are presented in Figures 1 and 2.

A researcher presented the graphs, one at a time, to each participant, and asked the participant to describe the graph. The order in which the graphs were presented was counterbalanced across participants. Upon presenting the graphs, the researcher provided the following directions:

> *We want you to look at this Curriculum-Based Measurement progress-monitoring graph for a student who is receiving intensive reading instruction. Describe the graph. Think out loud as you look at the graph and tell me what you are seeing and thinking. Tell me what you are looking at and why you are looking at it.*

If the participant paused for more than 5 seconds during the think aloud, the researcher asked, "Is there anything else you want to say about this graph?" If the participant said, "No," or paused for another 5 seconds, the researcher moved on.

The experts completed the think alouds one time. The preservice teachers completed the think alouds twice, once at the beginning and once at the end of their student teaching experience in the area of learning disabilities. Preservice teachers at both universities completed student teaching assignments that required them to administer, score, graph, and use CBM progress monitoring data to make instructional decisions for individual students. A seminar instructor supported these assignments by providing training on CBM, feedback on CBM procedures, and repeated opportunities for preservice teachers to present and discuss progress monitoring data during the student teaching seminar.

Coding Procedures

Think alouds were coded to examine completeness, coherence, specificity, reflectivity, and accuracy using the following variables: (1) total number of words, (2) number of essential CBM progress monitoring graph interpretation components, (3) percent of sequentially coherent statements, (4) percent of specific statements, (5) percent of reflective statements, and (6) percent of accurate statements.

Description of Codes

A total of 12 codes were used in the coding and analysis of the think-aloud data, all derived from previous research (Espin et al., this issue). The essential CBM progress monitoring graph interpretation component codes included (1) framing the data; (2) describing baseline data; (3) describing goal setting; (4–8) describing data in each intervention

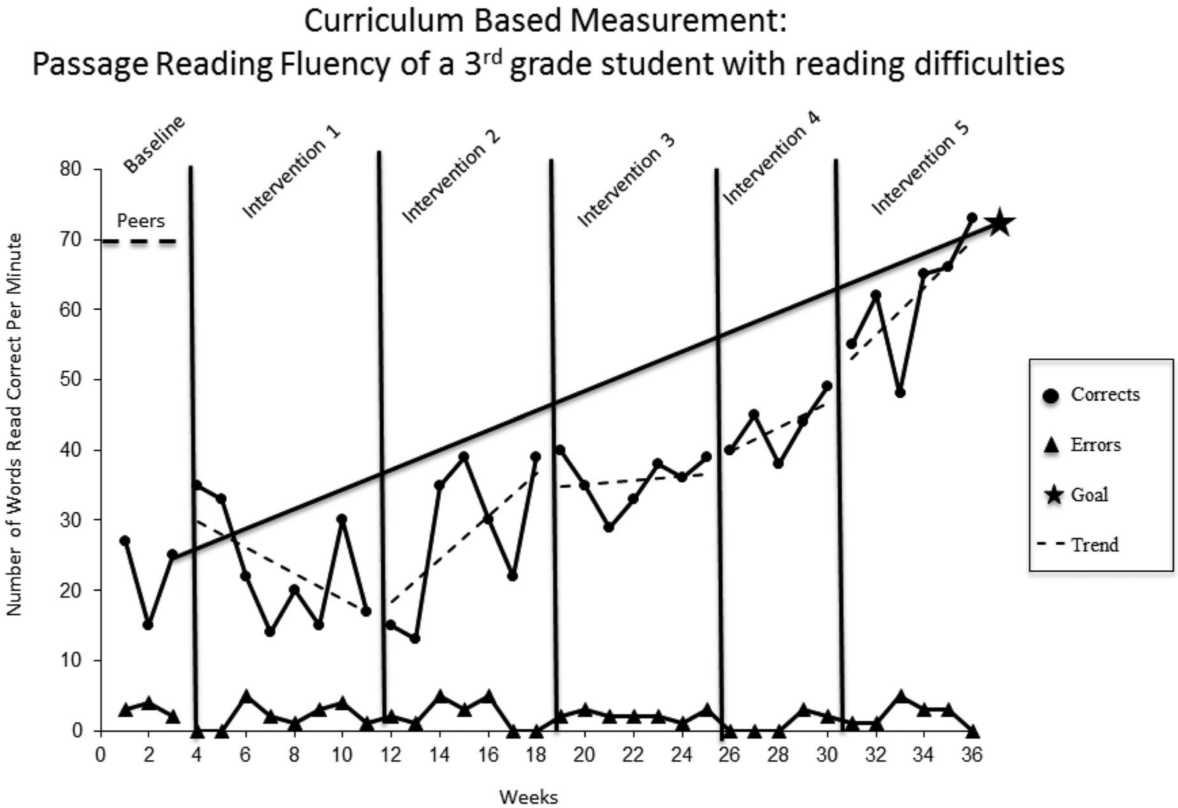

FIGURE 1 CBM progress monitoring graph 1 used for think aloud.

phase, from phase 1 through phase 5; and (9) evaluating goal achievement. In addition, general progress, reflective statement, and inaccurate codes were used.

Coding Process

The think alouds were audio-recorded and transcribed verbatim. The first author then parsed each think aloud into individual idea units, a unit of text expressing one idea. The first author trained three additional coders in the following procedure. First, the total number of words expressed was calculated using the word count tool in Microsoft Word. Second, the essential CBM progress monitoring graph interpretation component, general progress, and reflective statement codes was applied. Third, each unit was coded as accurate or inaccurate, and those that were inaccurate were coded as such. During the training process, two think alouds were coded together, and then one was coded independently until interrater agreement, which was calculated by dividing the number of agreements by the number of agreements plus disagreements, was established at a level of at least 80 percent. The think alouds were coded individually, and 20 percent of the protocols were coded by the first author and another coder to assess interrater agreement. Average agreement was 86.34 percent (range 72.5–100 percent). Disagreements between coders were discussed until an agreement was reached.

After the think alouds were coded, the following data were calculated for each protocol. The total number of words expressed was calculated using the word count tool in Microsoft Word. The number of essential CBM progress monitoring graph interpretation components that were expressed at least once was counted. The percent of sequentially coherent statements expressed in each protocol was determined by calculating the number of essential CBM progress monitoring graph interpretation components expressed *that followed an ideal sequence* by the *total* number of essential CBM progress monitoring graph interpretation components expressed. We used the ideal sequence established in earlier research by Espin et al. (this issue): (1) framing the data; (2) describing baseline data; (3) describing goal setting; (4)–(8) describing data in each intervention phase (in our study, intervention phases (1)–(5); and (9) evaluating goal achievement. General progress and reflective statements were not included in the sequential coherence calculations. The percentage of specific statements was determined by dividing the number of general progress statements by the total number of statements and multiplied by 100, which resulted in the percentage of nonspecific statements. This percentage was then subtracted from 100 to determine the percentage of specific statements expressed. The percentage of reflective statements was determined by dividing the number of reflective statements by the total number of statements and multiplying by 100.The percentage of accurate statements was determined by dividing the number

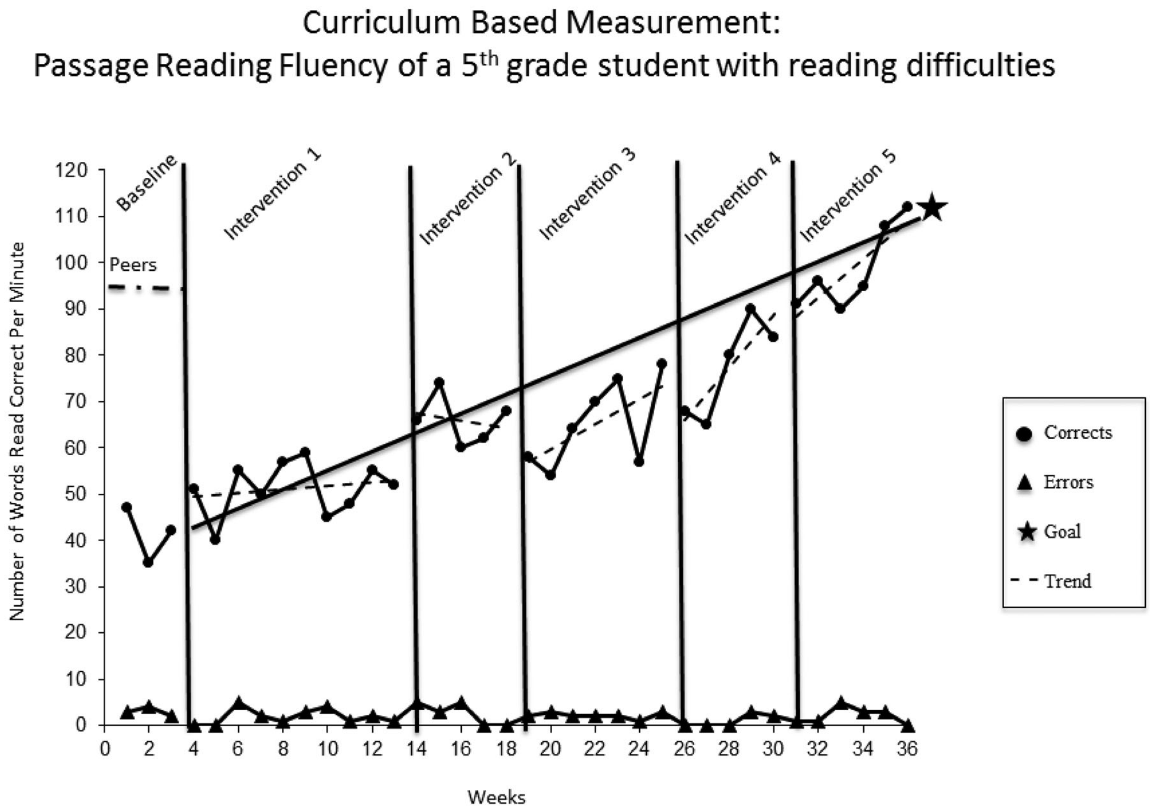

FIGURE 2 CBM progress monitoring graph 2 used for think aloud.

of inaccurate statements by the total number of statements and multiplying by 100, which resulted in the percentage of inaccurate statements. This percentage was then subtracted from 100 to determine the percentage of accurate statements expressed.

RESULTS

Research Question 1: Comparison of Preservice Teachers and Experts

To examine the first research question, "How do preservice special education teachers' CBM progress monitoring graph interpretation skills compare to those of experts?," we calculated descriptive statistics for number of words, number of graph interpretation components, sequential coherence, and percentage of reflective and accurate statements across both groups, and at both time points for the preservice teachers. These data are displayed in Table 1. A sample expert and preservice teacher at time 2 think aloud can be found in the Appendix.

Overall, the data show a pattern of the experts expressing higher levels of number and percentages of all variables than the preservice teachers. The experts said more words than did the preservice teachers. The mean number of words expressed by the experts was approximately 450 words more than that of the preservice teachers at both points in time. The experts described all or most of the essential CBM progress monitoring graph interpretation components (an average of 8.5 out of 9 components). In the example in the Appendix, the expert described all of the essential components. The preservice teachers described, on average, less than half of the components at both points in time. In the example in the Appendix, the preservice teacher described three out of the nine components—Goal Setting, Phase 5, and Goal Attainment. The experts described the essential components in a more sequential manner than did the preservice teachers, with a mean of 85 percent versus approximately 50 percent of the experts' and preservice teachers' statements following an ideal sequence, respectively. The experts' think alouds were more specific than those of the preservice teachers at both points in time. On average, 85 percent of the experts' statements were specific, whereas an average of approximately 60 percent of the preservice teachers' statements were specific. The experts were more reflective than the preservice teachers, with an average of 32 percent of their statements being reflective in nature, compared to an average of less than 15 percent of the preservice teachers' statements at both points in time. The experts made only accurate statements, whereas, on average, 89 and 85 percent of the preservice teachers' statements were accurate at time 1 and time 2, respectively. The sample expert and preservice teacher think alouds in the Appendix illustrate the differences in

TABLE 1
Descriptive Statistics by Group and Time

Variable	*Experts (N = 3) M (SD)*	*Preservice Teachers Time 1 (N = 36) M (SD)*	*Preservice Teachers Time 2 (N = 36) M (SD)*
Number of words	556.17 (138.36)	103.92 (44.16)	106.5 (45.23)
Number of CBM graph interpretation components (out of nine)	8.5 (0.52)	3.38 (2.22)	3.06 (2.01)
Percentage of sequential coherence statements	85 (18.04)	53.42 (37.31)	54.46 (38.83)
Percentage of specific statements	85.33 (16.85)	64.31 (32.63)	61.33 (31.06)
Percentage of reflective statements	32.33 (3.2)	9.22 (10.95)	13.53 (14.1)
Percentage of accurate statements	100	89.06 (15.54)	85.92 (16.03)

sequential coherence, specificity, and reflectivity that were observed between the groups.

Research Question 2: Examination of Preservice Teachers over Time

To answer the second research question, "How do preservice special education teachers' CBM progress monitoring graph interpretation skills change over time?," we examined the descriptive statistics found in Table 1, and used independent paired sample *t*-tests to compare each variable at the two points in time (just prior to and just after completing student teaching). Overall, the data show relatively little change over time. The mean number of words expressed was increased by an average of 2.58 words. The mean number of graph interpretation components described was decreased by 0.32 components. The mean percentage of sequential coherence and reflective statements was increased by 1.04 and 4.31, respectively. The mean percentage of specific and accurate statements was decreased by 2.98 and 3.14, respectively. Independent paired sample *t*-tests showed that two of the five changes were significant: (1) the number of graph interpretation components in the direction opposite of what was expected ($p = 0.04$), and (2) the percentage of reflective statements ($p = 0.01$).

DISCUSSION

The purpose of the present study was to compare preservice special education teachers' CBM progress monitoring graph interpretation skills to those of experts, and to examine the development of preservice teachers' skills over time. A think aloud procedure in which participants were asked to describe CBM progress monitoring graphs was employed to gather information about the CBM graph interpretation skills of experts at one point in time, and of preservice teachers at two points in time (just prior to student teaching, and at the conclusion of student teaching). The think alouds were coded for completeness by calculating the total number of words, and the number of essential CBM progress monitoring graph interpretation components expressed. They were coded for coherence by calculating the percentage of the essential components that were expressed following an ideal sequence. In addition, the protocols were coded for specificity, reflectivity, and accuracy. Overall, the results show large discrepancies between the experts' and preservice teachers' CBM graph interpretation skills, and minimal change in that of the preservice teachers over time. The two areas in which significant change was observed in the preservice teachers' skills over time were in a decrease in the number of essential graph interpretation components expressed, and in an increase in reflectivity.

Contributions to the Literature

The results of this study make the following contributions to the literature. First, the think-aloud data generated by the experts validated the coding system we used in our study, which was developed in previous research (Espin et al., this issue). These expert data document the manner in which three pioneers of CBM, individuals who were deeply involved in its original development, describe and interpret progress monitoring graphs. We assert that their descriptions epitomize the skill, comprising a "gold standard" of complete, coherent, specific, and reflective CBM graph interpretation that can form the foundation of a shared language and standardized procedures for interpreting and discussing graphs. Such an expert model is useful to guide practice and future research; special education professionals can also use the model to guide the development of procedures for effectively communicating progress monitoring graph data with teachers, colleagues, parents, and students themselves.

A second contribution to the literature is that the findings expand what is known about preservice teachers' development of CBM progress monitoring graph interpretation, adding to the limited number of studies that have examined various aspects of this topic (Begeny & Martens, 2006; Foegen et al., 2001; Jones & Krouse, 1988; Kennedy et al., 2016). Although preservice teachers have reported that they received little to no CBM training in their preparation courses (Begeny & Martens, 2006), previous research verifies that they *can* (1) develop positive beliefs about the utility and validity of CBM (Foegen et al., 2001), (2) acquire CBM content knowledge via traditional text-based methods or CAP technology (Kennedy et al., 2016), and (3) effectively interpret progress monitoring graphs and use the data to make instructional decisions with researcher support (Jones & Krouse, 1998). The present study expands on what is known by providing greater specifics about aspects of CBM progress monitoring graph interpretation that preservice teachers developed during their student teaching experiences. Specifically, the think-aloud data provide a picture of preservice teachers' skills just prior to and immediately following their student teaching experience in learning disabilities. Results indicated that there was a lack of change overall, with the exception of a statistically significant decrease in the number of graph interpretation components and a significant increase in the percentage of reflective statements. These results showing little change over time are not entirely surprising, given that the cognitive processes associated with CBM progress monitoring graph interpretation are complex, and that the skill may be difficult to develop (Carpenter & Shah, 1998). This suggests that teacher preparation programs may need to incorporate more opportunities to practice the skill, and to provide more extensive coaching in this area during the student teaching experience.

The present study also contributes to what we know about the level of CBM progress monitoring graph interpretation ability with which new teachers enter the field. At the second point in time, the preservice teachers had completed their student teaching and could be considered beginning teachers, who had received CBM training in their preparation programs. The discrepancies between their think alouds and those of the experts are concerning, given the large gap observed in most variables. This presents a problem for the following reasons: (1) Having an incomplete and insufficient understanding of CBM progress monitoring data would likely prohibit accurate and sustained use of data in practice; (2) given the observed skills of preservice teachers, their communication regarding students' progress data with colleagues, students, and parents would likely be incomplete and difficult to understand. These deficits have important implications for student outcomes because they suggest that newer teachers may be ill-equipped to independently make data-based decisions to positively impact student achievement. They may also be unable to provide parents and other IEP team members with sufficient, clearly explicated information to enable meaningful participation in decisions regarding their students' educational programming.

Implications for Future Research

Taken together, the results of the present study have implications for future research. An examination of the conditions under which preservice teachers' CBM progress monitoring graph interpretation skills become proficient is needed. Connected to this, researchers might examine how systematic and explicit instruction, practice, and coaching contribute to increased growth and greater fluency in these skills. Future research could also examine the CBM progress monitoring graph interpretation skills of other practitioners who use data to make decisions, such as school psychologists, administrators, paraprofessionals, and interventionists. Additionally, the development of CBM progress monitoring graph interpretation skill might be examined in other areas such as writing, math, and behavior.

Researchers should also work to develop terminology and procedures for CBM progress monitoring graph interpretation, including how to discuss the data, and procedures and tools for evaluating skills in this area. In service of these objectives, it is important to conduct additional study of the coding system that has been developed, and that we used here. Although the expert data provided validation for the system, we acknowledge that further refinement may be warranted, and that the small sample of three CBM graph experts is a limitation. We also acknowledge that it is unrealistic to expect preservice teachers' CBM graph interpretation skills to be as strong as those of gold standard experts. Further research is needed to establish performance standards for teachers throughout their career, beginning at the preservice level. Nevertheless, an examination of the educational research literature on graph interpretation and visual analysis did not yield *any* conventions for how teachers should describe graphical data in a way that can be understood by listeners, nor methods for evaluating such data beyond the coding system developed by Espin et al. (this issue) and used in this study. The paucity of information on the subject indicates that this area is open to development, and we assert that such conventions and tools are necessary for adequately preparing teachers for their work, and may serve to elevate the special education profession. The descriptions of progress monitoring graphs we have documented from CBM experts are thus a first step in this direction, and reflect conventions that are used anecdotally among the educational research community.

Limitations

The contributions of the present study should also be viewed in light of limitations. Our preservice teacher participants were also drawn from a convenience sample composed of university students from a single region in the United States whose results were compared to those of our CBM experts, without a control group of preservice teachers as a counterfactual. Additional research using a more representative sample and a different research design may yield other results and add to the information we obtained. Another limitation is that although we have information about the CBM training the preservice teachers received in their university seminar, we have little information about the support they may have received in their student teaching placements. It is possible that some student teachers had more opportunities to practice using CBM with their mentor teachers and other school personnel.

Conclusion

In conclusion, the results of the present study provide an illustration of expert and preservice special education teachers' CBM progress monitoring graph interpretation skills. The data show large gaps between the two groups in the degree to which CBM graphs were interpreted with completeness, sequential coherence, specificity, reflectivity, and accuracy. Limited change was observed in the preservice teachers' skills over time. Follow-up research is needed to determine how best to improve these critical teaching skills in order to elevate the profession, promote effective communication about students' academic progress with stakeholders, and ultimately, increase special education teachers' use of CBM progress monitoring data to make sound instructional decisions that maximize student growth.

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Appendix

Sample Think Aloud for Expert and Preservice Teacher

Expert Statement	*Code*
So the student is a fifth-grade student with reading difficulties and the graph is set up with the vertical axes labeled with words read correct per minute	Framing
Although, again, it should include incorrect because the graph also shows incorrect scores.	Reflective Statement
The horizontal access shows weeks from 0 to 36. The graph contains data across those 36 weeks.	Framing
It shows a hatched line indicating peer performance during baseline of about 95 words correct, and it shows that the student's median score is just over 40 words correct given three measurements. Looking at that gives me a perspective on how different the student's performance is from peers.	Baseline
I will comment that the error scores are low, one or two errors, and that remains true across the 36 weeks, and so I would not comment further about those.	General Progress
The aimline or goalline has been established for that student beginning at about 40 words correct, the median for baseline, and ending somewhere near 110 words correct at week 36.	Goal Setting
After the three baseline measurement scores, a vertical line is drawn to indicate that intervention one has occurred which is labeled at the top and a series of 10 scores across those weeks have been obtained for the student, and in that set of 10 scores, there is a hatched line to indicate slope or trend during that period of time. Where the student begins slightly above the beginning of that goal line or aim line across that period of time, the student's performance is flat, not too variable but flat. At the end of those weeks, the student ends below the goal line.	Phase 1
An intervention occurs at week 14, intervention 2. There is an immediate shift upward, and the student's performance from the last data points from intervention 1.	Phase 2
It is always interesting to look at whether or not there is something that produces a shift at the point of intervention.	Reflective Statement
Now, five data points are collected, and a slope is drawn in,	Phase 2
which is probably not very reliable given the few number of data points there are. My understanding is that we probably need closer to 9 or 10 data points to get a reliable slope.	Reflective Statement
Nevertheless, the student's performance, while it jumped up above the goal line in intervention 2, it sort of tapered off. However, the level of performance in intervention 2 looks to be pretty consistently higher than the level of performance during intervention 1.	Phase 2
So, how to account for that is unclear in that the intervention did not seem to have a positive effect on trend, it did have a positive effect on level, apparently.	Reflective Statement
Intervention 3 occurred at week 19, and then at week 19, we have seven data points collected once a week. This time, even though the shift at the point of intervention appears to be downward, the trend appears to be upward.	Phase 3
That can be somewhat misleading, in that the performance was depressed at the beginning.	Reflective Statement
The student really winds up at approximately the same level during intervention 3 that the student was during intervention 2 even though the slope was steeper.	Phase 3
Another line is drawn in to show that another intervention occurred. In intervention four, the student starts about where that student was. The trendline seems to indicate across those five measurements that the performance is positive. If I take intervention 3 and intervention 4 slopes together, they look pretty consistent to me. You could draw one trend line across the two, I think it would be reasonable that the student's rate of growth was approximately across interventions 3 and 4.	Phase 4
Another intervention occurred at week 31, and six more data points were collected. The student's performance continues to trend upward	Phase 5
To the extent that ultimately, the student achieves the goal not only to the final level of performance but to traject the level based on the trend. Again, the overall impact of the intensive reading instruction program at least achieved the goal that was established.	Goal Attainment
To the extent that goal was appropriate, which seemed like a positive intervention for that fifth grade student.	Reflective Statement

Preservice Teacher Statement	Code
I' am seeing where the goal line is.	Goal Setting
I can see that through each intervention, there was some success. Sometimes, things were not working. After a couple of attempts, they moved to a new intervention.	General Progress
It does look like (overall) there is a progression in the number of words read correctly per minute toward the goal line. It also looks like the errors stay low.	General Progress
Whatever the fifth intervention was, the student made good gains,	Phase 5
and met their goal.	Goal Attainment
There seems to be inconsistency in why they changed the intervention. It seems there was often a positive reaction from the student, and then they switched.	Reflective Statement

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