

The impact of an alphabetic professional development on teachers' knowledge and instruction and the achievement of first graders

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The purpose of this manuscript was compare four first-grade teachers' alphabetic knowledge and instruction, and their 80 first-grade students' achievement. Two experimental teachers received professional development on alphabetic prior to and during the school year. Data sources included a teacher survey, interview, observations, and student achievement data. Findings indicated that ongoing professional development deepened teachers' knowledge of alphabetic, this knowledge impacted their instruction, and students who received alphabetic instruction from knowledgeable teachers have learned the alphabetic principle. Implications are discussed.

Common Core State Standards expect first graders to master basic phonological awareness and phonics skills, also known as alphabets (National Reading Panel, 2000). “These foundational skills are not an end in and of themselves; rather they are necessary and important components of an effective, comprehensive reading program designed to develop proficient readers” (Common Core State Standards English Language Arts, 2010, p. 10).

While mastery of alphabetic principles are expected of first graders, research has shown that teachers are not effectively delivering alphabetic instruction (Cunningham, Perry, Stanovich, & Stanovich, 2004). One prominent reason teachers are not able to successfully teach alphabets is lack of knowledge about this crucial topic (Cheesman, McGuire, Shankweiler, & Coyne, 2009; Moats & Lyon, 1996; McCutchen, Abbott, Green, Beretvas, Cox, Potter, Quiroga, & Gray, 2002; Spear-Swerling & Brucker, 2003, 2004). Teachers may be aware alphabets is important, but they lack the knowledge and skills necessary to teach it in an explicit, systematic way, especially for students who are not mastering the basic skills.

Therefore the purpose of this manuscript was compare four first-grade teachers’ knowledge and instruction, and their 80 first-grade students’ achievement. Two experimental teachers received professional development on alphabets prior to and during the school year.

Literature Review

The conceptual framework for this study is a basic model built on core professional development activities: 1) teachers are given professional development, 2) professional development impacts teachers’ knowledge and skills, 3) teachers use new knowledge to improve the content and pedagogy of instruction, and 4), the teachers’ instructional changes boost student learning (Desimone, 2011). Effective professional development contains several key features (Desimone, 2011; Kretlow & Bartholomew, 2010). First, training should focus on content

knowledge and how students learn that content. Second, teachers should analyze student achievement and be involved in observing and giving feedback to peers. Third, the presented information should be coherent with teacher beliefs and with school and district reforms. Fourth, professional development should be sustained over time with 20 or more hours of contact. Fifth, groups of teachers from the same grade should build an interactive learning community.

Teachers' Alphabetic Knowledge

Competent and qualified teachers make the difference in students' reading success. Teacher knowledge has been shown to be more important than instructional method or socioeconomic status with regards to effective teaching (Mosenthal, Lipson, Torncello, Russ & Mekkelson, 2004). Unfortunately, research shows that both beginning teachers (Cheesman, et al., 2009) and practicing teachers (Bos, Mather, Dickson, Podhajski & Chard, 2001; Moats & Foorman, 2003) who teach children to read are lacking in technical knowledge that is fundamental to teaching foundational skills. For example, Mather, Bos, and Babur (2001) found many teachers were not able to match the terms consonant blend and digraph with definitions, they were confused when the number of letters didn't match phonemes, and they clearly showed a disassociation of sounds from spellings. Bos, et al., (2001) found 53% of preservice and 60% of inservice teachers were unable to answer half of the knowledge questions on their survey. Educators with more than 11 years of experience scored higher than new educators (1-5 years of experience) and special educators had more knowledge than classroom teachers. However, all groups scored less than two-thirds correct. They concluded, "These results suggest that educators who are directly responsible for teaching children how to read have relatively limited knowledge about the structure of the English language" (p. 114).

Moats and Foorman (2003) gave a survey to 50 kindergarten through second grade teachers. They found syllable counting and phoneme matching to be more difficult than expected for these primary teachers. A second survey was given to 41 second and third grade teachers. Findings showed this group of teachers was challenged with syllables, specifically their spelling, correspondence to sounds, and morphology. A third survey was given to third and fourth grade teachers (N=103). These teachers had difficulty identifying a final consonant blend, silent -e concept, and sentence structure. When asked to evaluate a student's written sample and oral reading, approximately 30% of teachers were not cognizant when misspellings represented phonological and orthographical difficulties. While there were strengths, there were also clearly gaps in the teachers' alphabetical knowledge.

Further, there is a mismatch between primary grade teachers' self-perceptions of their competency and their actual phonological and phonics knowledge (Bos, et al., 2001; Cunningham, et al., 2004; Mather, et al., 2001). Seven hundred and twenty-two kindergarten through third grade teachers were given a survey that measured their knowledge of alphabets and their perceptions of their knowledge (Cunningham, et al, 2004). Teachers were separated into high-perception (e.g. expert or proficient knowledge) or low-perception (e.g. minimal knowledge). Interestingly, teachers who thought they had great knowledge of phonological awareness actually achieved lower scores on the survey. Overall, Cunningham and colleagues (2004) found that teachers tended to overestimate their phonological knowledge. Cunningham et al. (2004) stated, "We have much work to do in professional development in the domains of phonological awareness and phonics. . . It is of concern because it is critical that people know what they do not know" (p. 162).

This study will fill a gap in the research. Two control teachers and two experimental teachers (who received professional development) will be compared for their alphabetical knowledge, instructional practices, and their student achievement data. Three questions guided this study.

1. What did teachers know about alphabets? Did a thoughtfully planned professional development deepen experimental teachers' knowledge of alphabets?
2. Were differences evident in the quality of teacher instruction based on teacher knowledge?
3. Did students who learned from teachers who received this professional development acquire higher reading scores than peers in other classrooms?

Methodology

Participants

Four first grade teachers and their students at two elementary schools in neighboring Midwestern school districts participated in this study. First grade was selected because the students are beginning readers and explicit instruction for these readers should focus on alphabets (Bear, Invernizzi, Templeton, & Johnston, 2008). The neighboring school districts were carefully chosen by the researcher because they had similar demographics and student achievement data, and both had employed the same alphabets curriculum several years prior to this study. After district approval, the researcher met with district personnel to select the teachers within each school. Although there were more than two first grade teachers at each school, Michelle E. and Jennifer E. (experimental) along with Susan C. and Janet C. (control) were asked to participate, to which they willingly agreed. The four were chosen because they were the most similar in years of experience and their graduate education degrees.

School A was the experimental group. Michelle E. and Jennifer E. (pseudonyms) had instructed first grade students at this particular school for 13 years and 8 years respectively. Both teachers held a master's degree in curriculum and instruction from the same university. Due to low test scores the district elected to provide alphabetic professional development to their teachers. Michelle E. and Jennifer E. attended a week-long professional development training provided by an alphabetic expert, Tamara (outside consultant), during the summer and received four on-site professional visits from Tamara during the 2011-2012 school year. Alphabetic instruction was only a part of the entire literacy curriculum used by the teachers throughout their literacy block. They used shared readings, taught with small groups, and instructed students in fluency, vocabulary, comprehension strategies (Miller, 2002), and writing.

Susan C. and Janet C. (pseudonyms) were two teachers at School B, the control school. Susan C. had taught for 12 years, 10 of which were in first grade at this school. Janet C. taught first grade for 6 years at School B. Janet C. had received her master's degree in curriculum and instruction from the same university as the experimental teachers. Susan C. was currently half-way through her master's degree coursework in curriculum and instruction at a comparable university. Alphabetic instruction was only a part of the entire literacy curriculum. In addition to teaching alphabetic instruction whole group, they employed a Reading Workshop and Writing Workshop model. They taught the same comprehension strategies as the experimental teachers (Miller, 2002). After the whole group alphabetic or comprehension lesson, the students read independently from books while the teacher circulated around the room and listened to their individual reading.

Approximately 20 first grade students in each classroom (N=80) received alphabetic instruction from their teachers. The experimental student population was 91% White and 26%

received free and reduced lunch. The control student population was 94% White and 44% free and reduced lunch. [Reference on equity](#)

Professional development

The experimental teachers received a week-long summer professional development that was provided by an alphabetics expert, Tamara (trainer). Considerable time was given to teachers' knowledge of phonological awareness, phonemic awareness, and phonics. Tamara taught sounds in isolation, consonant articulation, vowel concepts, and segmenting and blending. She also instructed teachers on three types of errors students make including phonemic, phonic, and visual memory, how to identify student errors, and how to provide the right instruction to improve student knowledge. Teachers also learned phonic generalizations and how to meaningfully and purposefully teach those generalizations in a student-friendly way. Student assessments and achievement data with a focus on differentiation, along with a developmental scope and sequence were foundational to the concepts provided in the training.

The experimental teachers were continually supported in their alphabetic knowledge in numerous ways. The alphabetic expert, Tamara, visited them four times during the school year. The literacy coach, Melissa, continually assisted teachers in their growing knowledge of alphabetics as needed. Teachers, along with Melissa, joined together weekly to collaborate about their knowledge, instruction, and data. Further, teachers were able access Tamara's teaching videos on the internet at any time to provide further demonstration and support. Teachers' conceptual learning during the school year emphasized continual growth in their knowledge of English language structure, a focus on research-based instructional practices for alphabetic teaching, and ways to support students to apply their alphabetic knowledge to reading text. Student achievement data was continually integrated for evaluation and improvement.

Data sources

Four data sources answered the three research questions. First, teachers completed a pre-post survey of their knowledge and performance of phonemic awareness and phonic skills. A respected alphabetic researcher, Dr. Cheesman, provided the questions, which were based on the Survey of Teacher PhAKS (Phonemic Awareness, Knowledge and Skills). PhAKS has gone through extensive validity analysis and has an internal consistency reliability coefficient of .69 (Cheesman, et al., 2009). Second, teacher interviews were conducted in May. The purpose of interviews was to solicit teachers' knowledge and perspective in teaching beginning readers and obtain some in-depth insights into their beliefs and actions. Third, classroom observations conducted four times during the school year (October, November, January/February, and March/April) provided evidence of teacher effectiveness. Teachers were observed during their whole-class alphabetic lesson, typically 15-30 minutes. Each observed lesson yielded a numerical score based on an implementation checklist for two levels: the absence/presence of observable features and quality of instruction (Justice, Mashburn, Hamre, & Pianta, 2008). Procedural fidelity identified whether key features were being taught (0=no, 1=yes). The quality of a teacher's instruction was rated as low (1-2 points), medium (3-5 points) or high (6-7 points). Fourth, student achievement data were obtained from AimsWeb standardized scores, collected in August and May by the school districts. AimsWeb is a recognized psychometrically reliable and valid curriculum-based measure (Shinn, 2008).

Data analysis

The pre-post teacher surveys were entered into a spreadsheet. I created one row for each teacher and inserted her total score for pre-post. I also separated the total into two subtotals based on the type of question: knowledge and performance. The survey had 15 questions, with a pre-

post total of 18 points (one question had 4 parts). The survey had ten questions specifically assessing teachers' conceptual knowledge of alphabets and five questions that assessed their performance of alphabets. When separated for analysis, the knowledge section was worth 10 points (one point per question) and the performance section was worth 24 points. Some performance skills were worth one point (multiple choice for isolating and identifying sounds) and other tasks such as segmenting words *horse*, *thrilled*, *suggest*, and *plant* had one point per phoneme.

I followed several steps when analyzing the teacher observational data. I began by transcribing the observations. Next, I read through each transcript and identified the quality of instruction (high (6, 7 pts.) – medium (3-5 pts.) – low (1-2 pts.) for explicitness, purposefulness, and systematic instruction. Also, immediately after each observation I noted routine and teaching activities (9 points possible). The scores obtained from the fidelity checklist (Justice et al., 2008) were put into the teacher observation spreadsheet, one row per teacher.

A final spreadsheet was created for student achievement. Schools provided the AimsWeb data on the first grade students for fall 2011 and spring 2012. One row was created for each child and included scores for nonsense word fluency (total correct) for fall and spring. Curriculum-Based Measure (CBM) was administered in the spring and provided a total score of words read correctly.

Descriptive statistics were used to describe teacher knowledge and instructional fidelity. Analysis of covariance was used to test students' post-instruction achievement, using pre-instruction achievement scores as the covariate. Chi-square test of independence was used to measure students' Curriculum Based Measure (CBM) scores against the AIMSWeb target score.

The interviews were recorded and transcribed in their entirety. Qualitative analyses followed traditional techniques (Merriam, 2009). The interviews were read multiple times. During the first reading I made notes in the margins. During the second reading I matched the notes to the research questions. As I read for the third time I ensured I didn't miss any pertinent findings and that the notes and research questions matched.

All qualitative and quantitative data were analyzed by an outside consultant. Inter-rater reliability was greater than 85%. In sum, a mixed-methods design (Johnson & Onwuegbuzie, 2004) was used to study the complex variables gleaned from the quantitative and qualitative measures to better understand teachers' knowledge, teachers' effectiveness, and students' outcomes.

Results

What did teachers know about alphabets? Did a thoughtfully planned professional development deepen experimental teachers' knowledge of alphabets?

Two data sources were used to answer this research question: teacher survey and the interview.

Teacher survey. Teachers completed a survey assessing their knowledge about and ability to perform phonemic awareness and phonic skills before and after the school year (or before summer training for the experimental teachers). Descriptive statistics, specifically means, were run for the total possible 18 points. The experimental teachers had more prior knowledge and greater performance ($M=12.00$) than the control teachers ($M=7.50$) prior to the study. They also showed some increase in knowledge/performance at the end of the school year ($M=16.00$), whereas the control teachers' knowledge/performance remained relatively unchanged across the year ($M=7.50$). When I separated the 15 questions into two categories, knowledge and

performance, I found an example of a knowledge question both the experimental teachers learned and the two control teachers missed: “Which spelling error suggests a lack of phonemic awareness?” (4 multiple choice answers). Another finding showed both the experimental and control teachers demonstrated greater performance (the ability to isolate and manipulate phonemes) than knowledge (the conceptual understanding) prior to the start of the research. For example, all four teachers could segment the sounds in *horse* and *thrilled*. The experimental teachers learned to segment more challenging words like *suggest*; the control teachers’ performance did not increase. In sum, the control teachers scores remained the same from the beginning to the end of the school year, and the experimental teachers increased during the school year. Specifically the experimental teachers increased some in their performance ($M=21.50$ pre to $M=22.50$ post) and more in their knowledge ($M=6.00$ pre to $M=9.00$ post).

Interview. During the interview, the teachers were asked where and how they learned their alphabetic knowledge. Both control teachers and experimental teachers stated they did not remember much alphabetic knowledge from their bachelor’s degree elementary education program. Of the four, Michelle E. recalled the most information, due to one professor who gave them good alphabetic information in short chunks. Their master’s degree programs were in general curriculum and instruction and had minimal relevant information for enhancing their alphabetic knowledge base.

The control teachers had very little alphabetic knowledge to share. They spoke of the trends of using basals, guided reading, and reading workshop in their district. They said most of their alphabetic knowledge came as a result of teaching and using the district curriculum.

Likewise, the experimental teachers recalled minimal alphabetic training provided by the school district and relied on the adopted method such as a basal or guided reading prior to this

study. Now, the experimental teachers spoke of the rigor and thoroughness of the teacher training. The teachers agreed that understanding the difference between phonemic awareness and phonics is essential and too many times teachers confuse their knowledge of these concepts. The teachers also spoke about their experience teaching first graders multisyllable lessons and how these concepts were so new to them as teachers, especially schwa (i.e., a vowel is an unaccented syllable). Michelle E. said prior to receiving professional development, "I had some alphabetic knowledge, but I forgot it or couldn't explain it to the students." Jennifer E. said, "I couldn't tell them why." After the professional development, these teachers feel empowered to present alphabetic concepts in meaningful and powerful ways for their students to master.

Were differences evident in the quality of teacher instruction based on teacher knowledge?

To answer this research question, observational data supported by interview data were used.

Observation. The teachers were observed during whole group alphabetic instruction four times across the school year, two times per semester. They spent approximately 15-30 minutes teaching alphabetic knowledge during each lesson. Both groups of teachers were similar in their attempts to provide "routine" activities (Justice et al., 2008): all students looked at the teacher, had materials available, used material according to plan, and called students' attention to the activity. The fifth routine activity, no major disruptions, showed differentiation. One control teacher taught alphabetic between recess and lunch and tended to have more disruptions than the other three teachers. The average total "routine" score across all four lessons for the control teachers was 18.00 and the experimental teachers, 19.00 (20.00 points possible). The average total "teaching" score across all four lessons for the control teachers was 9.00 and for the

experimental teachers, 13.50 (16 points possible). “Teaching” activities varied some in teachers’ formal ending to task (review/summarize lesson focus) and completing all components of the lesson.

More noticeable differences were seen in the quality of instruction. The experimental teachers received consistent scores averaging 27.00 out of 28.00 points possible for explicit, purposeful, and systematic instruction. The control teachers received their highest score on purposeful (16.00), followed by systematic (15.00). The control teachers explicit score was 8.50. Total possible was 28.00 points for each aspect of quality of instruction.

Following is a sample of Jennifer E. teaching a November lesson. Students had previously learned how to spot the vowel in a one-syllable word and that long vowels say their name. All students were seated on the rug looking at the smart board. This review lesson began with Jennifer E. asking students how they knew if the vowel was long or short and students chanted the generalization. One word was displayed on the screen and Jennifer E. randomly called on a student to spot the vowel and then read the word. For the first word “tick” a student said, “/i/ tick.” More words were presented such as “but, read, peck, coke, state, say.” Each selected student read his/her word correctly. The next word was “coat. Jennifer E. guided the student in the following manner.

Student: /o/ cot (he pointed with two fingers indicating a long vowel)

Jennifer E.: I see two fingers, but I hear a short sound. Look again.

Student: /oe/ coat

Jennifer E.: Why does it say its name?

Student: Because when two vowels go walking, the first one does the talking and says its name.

Jennifer E.: Good job! Now read the word again.

Student: coat (student looked at smart board and used his two fingers)

To compare, a November control lesson is as follows. The entire class was focused on the teacher and had just sung a song featuring the /b/ sound.

Janet C.: Today to review we have pictures. What letter will they all have?

Students: B

Janet C.: But that letter B is going to be in different places. It may be at the beginning of the word or at the end of the word. I want you to write the words nicely. There is a word bank. I am going to read the words to you. "Box, bat, sub, hat, bus, bat." You decide where the words go. Here is a sentence. "He always plays with his sub in the tub." (Janet C. read sentence twice). What word in that sentence has the letter b?

Janet C. called on student 1.

Student 1: Bat.

Janet C.: Listen closely. "He always plays with his sub in the tub."

Another student yelled out the word sub.

Janet C.: I only have one [student 1].

Student 1: sub

Janet C. called on another student. What is the second /b/ word in that sentence?

Student 2: tub.

Students continued to work independently at their seats writing the /b/ words in either the beginning or ending columns. Janet C. walked around to assist students.

To evaluate the teachers I looked for explicit (consistently used terms for skills and concepts), purposeful (consistently related code-based concepts to application and practice), and

systematic (activities were well-planned and sequenced; link between today's lesson and previously learned concepts and skills) (Justice, et al., 2008). The explicitness in Jennifer E.'s lesson was evident when the students chanted the generalization about vowels, used 1-2 fingers to point to the vowel (1 finger short/ 2 fingers long), and when the student was asked to explain why the vowel was long. Janet C.'s explicitness received fewer points because she briefly used the words beginning/end. Even though a student identified the "b" word (sub) in the sentence, Janet C. did not go back and ask the student if the /b/ was at the beginning or end of the word and in what column the word should be placed. The quality of purposeful was similar between classes in students' reading of real words for application and practice. Jennifer E.'s purposefulness was higher in that students practice learning to spot the vowel would help them read words. Janet C.'s students may not have seen the connection between writing "b" words in the beginning/end columns and applying that skill to reading text. There was a difference in the quality of "systematic." Jennifer E.'s students were engaged reading all the words that flashed on the screen, the review was well-planned and smoothly executed, and the practice was linked to previously learned concepts and skills. Janet C.'s students were less engaged. They had previously learned the "B" song and had some schema for beginning/end sounds.

Interview. The control teachers felt they had a solid grasp on teaching first graders, yet they realized there is knowledge they don't know and thus they do not teach. In contrast, the experimental teachers exclaimed how much they had learned and how their teaching of alphabetic content and teaching strategies had changed.

Michelle E. said,

We had a basal and we kept saying they aren't learning how to read from this. Then we learned about Guided Reading and that was so exciting because we could teach them on their level and give them books. It still wasn't enough.

Jennifer E. expanded the idea,

Guided Reading was more using the books to determine what you are going to teach rather than thinking about what the child needed. You would pull a book on their level and find out what they were going to have trouble with, so you'd teach that instead of always thinking about what the students know.

Michelle E. said, "A decoding foundation is so important. It is a link for both spelling and reading." Jennifer E. said, "Vowels are so important. Now they are identified. You need to link the vowels to spelling." Their knowledge has been enhanced to a much higher-level; they clearly stated they will never return to teaching reading how they previously taught it. They recognized that having a rationale for the concepts students learn, along with child-friendly hooks and strategic questions that respond to student errors are potent for student learning and mastery of foundational skills.

Did students who learned from teachers who received this professional development acquire higher reading scores than peers in other classrooms?

AIMSweb students' scores along with teacher interviews were used to answer this question.

AIMSweb. One test, nonsense word fluency, was given to students in the fall and again in the spring. I used analysis of covariance to test group differences on students' ability to read nonsense words using their pre-test scores as the covariate. In this way I accounted for pre-instructional group differences, a statistical way of leveling the playing field by factoring in

skills some children may have had before the start of the school year. After accounting for pre-instructional differences, the experimental group ($M = 82.16$; $SD = 37.41$) outperformed the control group ($M = 60.95$; $SD = 25.95$), $F(1, 73) = 7.46$, $p = .008$. The experimental group performed 34.8% better than the control group.

Chi-square test of independence was used to compare students' Curriculum-Based Measure scores against the AIMSWeb target score for first graders in the spring. This analysis showed that the tested scores did not differ statistically from the target score, $\chi^2(1, N=79) = .195$, $p = .66$.

Interview. The teachers were asked if students' needs were being met by instruction and if students were making adequate growth. The control teachers responded to this question by saying there was a team, including Title 1 teachers, in place for instructional support. Students who needed to be serviced were grouped according to need and received additional literacy instruction time when their peers received morning calendar math and cooperative group activities. A bit later in the interview the control teachers described how their district curriculum decisions were made. They said in past years they had not received the changes the teachers requested – to help students master long vowels and special sounds. They believed their alphabetic curriculum was beneficial for teaching the skills in isolation, but they recognized there was a break-down when students applied the skills to reading text.

The experimental teachers said it was easy to see growth. They used formative assessments throughout the year and saw students' progress on their rubric scores. The teachers said they also looked at numerous additional assessments including Fountas & Pinnell, AIMSWeb, and informal analysis such as listening to students read and evaluating students'

writing. Each assessment measured different aspects of literacy and they considered the whole picture.

Michelle E. said, "I see growth in every reader!!" Also, she said, "You can really measure their learning on whether they can explain the concept. I've never been able to get some kids to apply it and regurgitate [explain] it." Previously Michelle E. felt she didn't have much to offer high readers and now she sees high readers are making mistakes and don't always have the phonic knowledge. She said, "It's been nice to find the holes and exactly what they are missing. You can still challenge them. They will not be just a sight word reader." Jennifer E. said, "Even in my high readers who came to first grade as high readers, I see growth in them. They aren't tapping out of the curriculum. With the multisyllable words, there is some way to challenge them."

The experimental teachers said there is a direct connection between reading, spelling and writing and they are more able to hold students accountable. Jennifer E. said, "My expectations are higher because they know how to segment sounds in a word and spell each sound." Michelle E. said,

I feel freer to circle words [on students' writing] they should be able to spell that in the past I might not have circled. Now I think 'you know how to spell a five-sound word. You should be able to do that and get a little closer at least.' That is definitely empowering.

All four teachers said they wanted their students to read at grade level, spell according to their ability, and be able to write complete sentences by the end of the school year. When reflecting on their instruction to ensure their students met these goals, the two experimental teachers voiced the following thoughts.

Michelle E. said,

We are so excited now when we see kids that they may not be at the H-I level [Fountas & Pinnell expected first grade level], but they can decode everything at the level they are reading. They are so much more capable and have those tools now. That's exciting!

Jennifer E. said,

It's interesting because I have some students who are not at the H-I level, but they are such better readers than what I've taught in the past. The kids in the past could look at a picture a little bit better to determine the word, or they could use context clues a little bit better. These students are reading words better.

Jennifer E. spoke about the transition from first to second grade. Previously there had been a gap between alphabetic instruction in first and second grade and now that gap was reduced because the second grade teachers had been trained so students will continue to receive the support they need.

I'm excited to see those low kids. They may not be at grade level on Fountas & Pinnell assessment yet, but when they finish their alphabetic lessons, what a stronger reader they will be because they have been exposed to all the concepts and they are not just guessing, which is what they used to do.

As the teachers said, once the students have it [alphabetical conceptual and application knowledge], they know it.

Discussion

Research shows that both beginning teachers (Cheesman, et al., 2009) and practicing teachers (Bos, et al., 2001; Moats & Foorman, 2003) who are directly responsible for teaching children to read do not possess adequate alphabetical knowledge. Therefore the purpose of this

study was compare control and experimental teachers to better understand if alphabetic professional development impacted teachers' knowledge and instruction and their students' learning. Three findings are important for the field.

First, school districts cannot assume their teachers possess adequate alphabetic knowledge and therefore, they need to provide this training. When knowledge is provided to them through ongoing professional development training and collaborative support, teachers become empowered. This study implemented the guidelines presented for effective professional development (Desimone, 2011; Kretlow & Bartholomew, 2010): alignment with district and school reforms, an interactive learning community, ongoing and sustained professional opportunities, a focus on content knowledge, and monitoring students learning of content with achievement data. All four teachers in this study clearly indicated they received minimal alphabetic training from their years as a pre-service teacher as well as from their district, and most of their alphabetic knowledge and skill came as a result of experiential teaching. This study showed that experience is not sufficient for mastering alphabets. One interesting finding revealed that prior to this study both the control and experimental teachers were more skilled in their ability to identify and manipulate phonemes, but they had less conceptual understanding of phonemic awareness and phonics. It is possible that teaching beginning readers promotes teachers' phonemic awareness skills as they use phonemic awareness activities in their classroom, but teaching experience alone cannot build the bridge to knowledge. Knowledge must be specifically taught to teachers in supportive and coherent ways that require them to apply the knowledge to practice. The words of the experimental teachers attest that knowledge has the power to change a teacher's instruction forever and thus impact many students.

Second, knowledge makes a difference in the quality of instruction. All four teachers were recommended by their principals as excellent first-grade teachers; they were committed and open-minded, willing to learn and embrace whatever new technique or idea was needed to help their students be successful. That said, the observational data showed the experimental teachers provided more explicitness, purposefulness, and systematic instruction. The two snapshots of November teaching marked clear differences. Jennifer E. supported all the students with mastering a fundamental phonic generalization through a guided practice opportunity to spot the vowel and read the word. In the specific example, she directed the student who made his mistake and asked him to articulate why 'oa' sounded as long o. In contrast, Janet C. had her students review a consonant sound through song that used alliteration and then complete an alphabetic worksheet that was more of an assignment than an instructional teaching activity. The differences in content were also striking. The experimental children were identifying short/long vowels and the control children were identifying initial or final position for one consonant sound. Both skills are important, but identifying the placement of a particular consonant sound falls earlier in the developmental continuum than reading words with short/long vowels. Teacher interview data also support the finding that knowledge impacts instruction. The control teachers had little to say during the interviews, and it was evident there was some discomfort when the questions were asked. However, the experimental teachers had so much to share about their knowledge, instruction, and students and they expressed each statement with such vigor in their voices. They were clearly empowered.

Third, student achievement data can be measured in a number of ways and the nonsense word findings and teachers' qualitative insights should not be underestimated. Nonsense word fluency "is designed to measure how well a student has learned the underlying letter-sound

correspondences and phonological recording skills of the alphabetic principle” (Fien, Baker, Smolkowski, Mercier Smith, Kame’enui, & Beck, 2008, p. 392). Nonsense word fluency has been shown to be a valid measure because the results indicate which students are proficient when reading (Fien, et al., 2008). In this study, the students who received the alphabetic instruction from knowledgeable teachers significantly outperformed their peers when reading nonsense words. Fien et al., (2008) gave two possible reasons students may have difficulty on nonsense word fluency measures and the dominant one is that the students have not been sufficiently instructed in the alphabetic principle. The second reason is physiological concerns, which affects about 5-7% of the population.

One explanation for the lack of significance of the experimental students on the curriculum-based achievement measure may be attributed to teacher practices and resources. The control students were immersed in contextual reading on a daily basis through readers’ workshop. In contrast, the experimental teachers had a lack of decodable books and it is possible their students did not spend as much time reading in context as the control students. Plus, gaining new knowledge takes time. It is possible the experimental teachers were focused on their learning and with limited resources did not balance the alphabetic instruction with the desired amount of contextual reading.

The qualitative comments provided great insight. The control teachers discussed the role of the entire school team that rallies to support struggling readers. In contrast, the experimental teachers did not defer to the reading specialist, although a team was in place to support numerous first-grade students. This could be, in part, due to the fact that their own knowledge and instruction had changed significantly and they realized the critical role they played in all their students’ success. Both sets of teachers prepared and taught alphabetic lessons to their students

throughout the school year with the ultimate goal of helping their first graders become independent readers. While it appeared the control students were reading at the expected level, the experimental teachers' comments repeatedly stressed the idea that their students were not sight readers, but they could ask their own questions and independently decode words. There is no doubt that student achievement data is an important element for professional development (Desimone, 2011), and the experimental teachers were considerate of numerous measures about their students, including informal and formative data. As the experimental teachers voiced, all of their students (regardless of ability level or progress) are better readers as a result of explicit, systematic, and purposeful instruction that can only be provided by knowledgeable teachers.

As with all research, this study had its limitations. Since this study had a small sample size and the student demographics were not diverse, the findings are limited in the ability to be generalized. Administration of different student assessments may have provided insight into the impact of instruction and the fact that alphabets was one part of the entire literacy instruction. Further, I recognize that teacher knowledge was based on one measure and future studies could include more data on teacher knowledge. It is important that future research follow students as they progress in their schooling and literacy achievement. A longitudinal study may provide greater depth of insight into teacher knowledge, and how it aligns with practice, and the impact on students.

With all the focus on deep reading and text complexity advocated by Common Core State Standards, it is important to remember the role of alphabets in the primary grades. The first-grade year is the watershed opportunity for developing the essential foundational skills that underlie future literacy success...First graders must develop the knowledge and skills to understand the alphabetic principle to read and spell" (Walpole & McKenna, 2013, p. 143).

Research has repeatedly shown teachers of beginning readers do not possess adequate alphabetic knowledge (Bos, et al., 2001; Cheesman, et al., 2009; Cunningham, et al., 2004; Mather, et al., 2001; Moats & Foorman, 2003; McCutchen, et al., 2002). This research supports the findings of McCutchen, et al., (2002): teachers' alphabetic knowledge can deepen with training, teachers can use that knowledge to instruct their students, and instructional practices can improve student learning.

In sum, this study documented that teachers became empowered when they were given quality professional development on the topic of alphabets. The results also showed that teacher knowledge impacted instruction in measureable and observable ways. Lastly, the results illustrated that alphabets is important for student literacy development. Teacher knowledge about alphabets can be strengthened and this knowledge is critical and significant for teachers of beginning readers.

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