THE SCIENCE OF TEACHING READING PROJECT

Research and Recommendations to Support North Carolina's Teachers

ExcelinEd

A MESSAGE FROM THE BELK FOUNDATION

Leaders across North Carolina believe strongly in the potential for all of our students to read proficiently by 3rd grade. Yet despite significant effort and investment, only 36% of 4th graders are at or above proficient in reading.

North Carolina's marquee reading legislation from 2012, Read to Achieve, while well intentioned, has not improved student outcomes. But our state has not given up – the stakes are too high.

The Belk Foundation, in partnership with The North Carolina Department of Public Instruction (NCDPI), The Foundation for Excellence in Education (Excel*in*Ed) and the Florida Center for Reading Research (FCRR), began this research project in 2019 with a central belief in the importance of teachers in developing young readers. We needed to ask: What did our teachers actually know about the science of reading and where did they need more support? This report, informed by a survey sent to a representative sample of NC K-3 teachers, provides valuable insight.

Just before this report was complete, new legislation focused on early reading, the Excellent Public Schools Act of 2021, became statute. Improving on the original 2012 legislation, it focuses on educator professional development and teacher preparation, acknowledging that teachers are central to students' reading development.

With the new law in place, how can the findings from this report help? Our teacher needs assessment survey overwhelmingly found that North Carolina is on the right track to ensure teachers know the research behind reading development.

Further, the survey findings point to the critical work ahead: teachers may know the research, but they must be able to apply that knowledge to their instructional practice.

Our findings show that instructional coaching – helping teachers use the knowledge learned in professional development to adjust their instruction with children – is the next frontier for quality implementation of early literacy initiatives. North Carolina has taken bold steps with state legislation and recent investments in teacher training. That progress now depends on successful implementation.

We offer these findings, and the policy considerations from ExcelinEd, to our education and policy leaders, confident they will continue to take the necessary steps to ensure teachers are well prepared to teach reading.

Johanna Edens Anderson
Executive Director, The Belk Foundation

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Report from the Florida Center for Reading Research

FCRR
FLORIDA CENTER for READING RESEARCH

Survey Development

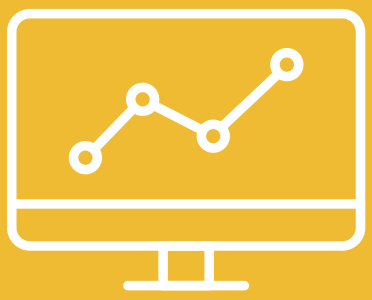
The **Florida Center for Reading Research** (FCRR) is an interdisciplinary research center at Florida State University. Our faculty represents multiple disciplines and investigates all aspects of reading and reading- related skills. Together, our aim is to advance the science of reading to improve learning and achievement for all.

FCRR's role on this began by partnering with Excel*in*Ed and staff at the NCDPI to identify valid and reliable assessment items to gauge teachers' essential knowledge and skills related to the science of reading to be used for the literacy needs assessment. We selected 20 items from the Teacher Knowledge of Early Literacy Skills survey found in Appendix B of the REL Southeast report, ***Educator outcomes associated with implementation of Mississippi's K-3 early literacy professional development initiative***, (Folsom, Smith, Burk, & Oakley, 2017). Next, FCRR categorized the selected items for reading content area (phonemic awareness, phonics, spelling, vocabulary, fluency, comprehension) and item type (knowledge or application) and worked to ensure that items from each category and item type were included in the survey. Our intent was to create an online needs assessment survey for grades K-1 teachers and grades 2-3 teachers that would identify—aligned with the grades they were teaching—their level of knowledge and instructional application of foundational reading skills. In creating the survey, we used a multiple-choice format and incorporated an agreed upon 30-minute time limit for teacher completion.

School Selection and Survey Administration

Working with NCDPI and Excel*in*Ed, we established parameters for identifying a stratified sample for school recruitment for the needs assessment. The team decided to ensure recruitment of schools with the census designation of city, rural, suburban and town; a mix of schools that qualified for Title I status and those that did not qualify; and a mix of schools under priority status for school improvement and those not in priority status.

FCRR determined that to provide a stratified sample of teachers representative of schools in North Carolina, a minimum of 350 teachers would need to participate in the survey. To recruit that number, FCRR selected 100 schools in each stratified category along with 50 alternate sites as potential replacements.
FCRR then worked with Excel*in*Ed and NCDPI to develop outreach language, which NCDPI provided to leaders of the 100 selected schools in early February 2021. Recruitment efforts from the 100 schools were successful, with 355 teachers agreeing to participate in the online survey. A total of 188 grades K-1 teachers and 167 grades 2-3 teachers completed the survey between February 15, 2021, and March 12, 2021. Participating schools received a stipend of $500 for teacher completion of the survey.



Data Analysis

When the survey submissions were complete, FCRR analyzed the data and provided a report to NCDPI and Excel*in*Ed of total response numbers and percent of correct answers for all items, for all participants and for each grade band (K-1 and 2-3 teachers).

In addition, the report included all responses for each individual participant, with corresponding information including date completed, district name, school name and grade band. The team determined that these characteristics would provide the most beneficial information for further analysis while still providing a moderate level of teacher anonymity.

Appendix A provides the selected items used for the North Carolina Literacy Needs Assessment. Appendix B provides a breakdown of the North Carolina Needs Assessment items answered correctly by participants in each grade band.

Survey Findings and Data Analysis

As described above, the literacy needs assessment survey was comprised of 20 items. Nine of these items assessed factual knowledge of components of literacy, while 11 assessed the knowledge of how to apply information.

Overall, teachers performed better on the factual knowledge questions, with 60 percent or more of K-1 teachers answering seven of the nine questions correctly, and 60 percent or more of grades 2-3 teachers answering six of the nine questions correctly.

In answering the application questions, teachers in both grade bands were less successful. In fact, fewer than 40 percent of K-1 and grades 2-3 teachers answered application questions correctly.

This is an important finding. Although this online survey could not measure a teacher's ability to actually apply knowledge in the classroom, the results of the survey suggest that North Carolina teachers would benefit from professional development. Goals would be to build their knowledge on how to provide instruction in the foundational skills of reading and then be able to translate that knowledge into classroom practice.

Appendix B reflects the breakdown of questions by reading component and knowledge versus application and indicates the percentage of K-1 and grades 2-3 teachers that answered each question correctly. Item numbers noted in Appendix B correspond with items listed in Appendix A.

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Related Research and Potential Next Steps

The National Reading Panel Report (2000) and subsequent research examined by the panel of experts that developed the practice guide **Foundational Skills to Support Reading for Understanding in Kindergarten Through 3rd Grade** (Foorman et al., 2016) have confirmed that quality instruction in academic language, phonemic awareness, phonics, vocabulary, spelling, fluency and comprehension are all important components of reading. Recommendations in the practice guide incorporate all these components. The developmental sequence of the recommendations in the practice guide are depicted in the following image.

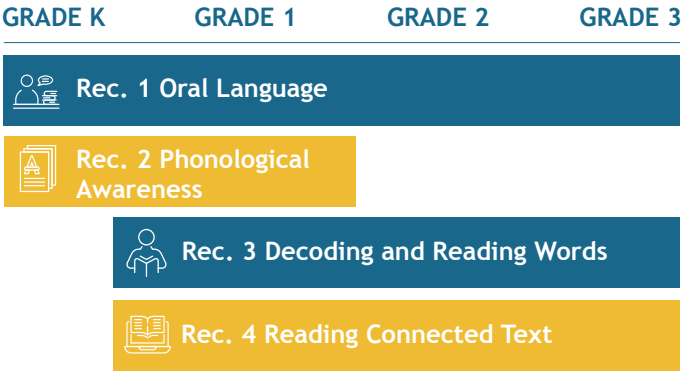

Figure 1: Developmental Sequence of Recommendations

Recommendation 2 in the practice guide indicates that teachers must be able to teach the prerequisites of reading, including phonemic awareness, which is the ability to identify individual sounds, or phonemes, that make up the words heard in speech.

Phonemic awareness falls under the umbrella of phonological awareness, which pertains to the ability to hear and manipulate units of sound in spoken words. This is an important skill to master and helps students as they begin to associate sounds with letters and ultimately begin to read. While this skill is typically taught in kindergarten and grade 1, as shown in Figure 1 above, it is imperative that grades 2 and 3 teachers also know how to provide instruction in phonemic awareness to support students in their classroom who have not mastered this skill.

Three items on the literacy needs assessment survey addressed phonemic awareness. One of the three assessed teacher knowledge; the other two items assessed the teacher's ability to apply knowledge of phonemic awareness in the classroom. Teachers did not perform well on any of these items, with fewer than 20 percent of teachers responding to one of the application questions correctly.

Again, this is an important finding. While teachers answered fewer application items correctly overall, survey results on phonemic awareness and how to provide instruction in this component of reading stood out, indicating professional development in this area may prove especially beneficial.

Limitations

While the required minimum stratified sample side was met, we feel that it is important to note that the sample size for this project was small and that the number of questions on the literacy needs assessment survey were extremely limited. Therefore, while the survey provides some insight into teacher knowledge, the findings show that more research will be needed to ascertain the specific needs of teachers in this area.

Commentary from the North Carolina Department of Public Instruction

North Carolina Department of PUBLIC INSTRUCTION

Building Teacher Knowledge through Professional Development

Educators know that learning to read is a continuum of knowledge and skills, beginning at birth with oral language development and progressing to the development of written language skills and knowledge of the world that continues into adulthood. NCDPI was pleased to have a role in this Science of Teaching Reading Project, as it helped us examine teacher knowledge of early literacy skills and teaching competencies. The study offers a systematic investigation in educators' early literacy knowledge and application, which are targeted areas for support through professional development for all Pre-K-5 teachers, per the 2021 Excellent Public Schools Act.

Results from the literacy needs assessment survey have provided NCDPI with information to help guide professional development and support aimed at increasing teacher knowledge and abilities to provide strong literacy instruction in the classroom. NCDPI is committed to working with school principals and teachers to ensure they have the resources and tools necessary to support grade-level reading success for all students. This includes literacy-focused training aligned to the science of reading and access to ongoing coaching support in the classroom.

Throughout North Carolina, early literacy professional development will be provided to all Pre-K-5 teachers using the Language Essentials for Teaching Reading and Spelling program (LETRS). The LETRS program connects research to practice using accessible language and interactive exercises.

Expanding teacher knowledge of early literacy skills, the quality of early literacy skills instruction, student engagement during early literacy skills instruction and improving teaching competencies among educators together will provide the foundation for ensuring all North Carolina students become proficient readers. As this process begins, NCDPI realizes it is not a journey that ends after students leave elementary school or teachers complete a professional development program. Long-term success in North Carolina will require ongoing support, resources and alignment as we focus on continuously improving and establishing a brighter future for our students and our state.

State Policy Solutions to Strengthen Efforts and Enact Change

ExcelinEd

ExcelinEd supports state leaders in transforming education to unlock opportunity and lifelong success for each and every child. Our work includes leveraging the results of state-specific research to offer policy solutions that translate to rising student achievement.

With passage of the Excellent Public Schools Act this year, North Carolina is recommitted to early literacy and to developing a common language for literacy instruction grounded in the science of reading. These results of the North Carolina Science of Teaching Reading Project are timely, as they provide guidance for a targeted approach to building teacher capacity in the knowledge and application of the science of reading in elementary classrooms.

To that end, ExcelinEd offers the following state actions and policy solutions to further support teachers in improving literacy instruction and increasing literacy achievement:

Develop a Clear Communications Strategy

To address questions that stakeholders may have about the science of reading professional development rollout, NCDPI should consider a proactive strategy for communicating why the science of reading has been adopted as the approach to teaching reading, who will be trained (e.g., school administrators, teachers, literacy coaches/reading specialists), when the training will occur, and how the NCDPI will support educators in making this shift in instructional practice.

Develop a Statewide Model for District Implementation

After investing time and resources into ensuring that teachers are trained in the science of reading, it is important to create clear expectations for effective implementation. When educators return to their schools after training, how will they transfer theory to instructional practice?

One example is that best practices for reading instruction grounded in science should be reflected in the district's adoption of high-quality instructional materials; teachers' lesson plans; school schedules that allow for a designated, uninterrupted reading block; and administrator/coach classroom observation forms. Accountability for implementation must occur at all levels—including NCDPI, local school leaders, building administrators, support staff and teachers—to identify examples of effective or ineffective implementation. Identifying gaps helps to target support.

Establish "Boots-on-the-Ground" Support with Literacy Coaches

Literacy coaches can be an important resource to support teachers in the classroom. School-based literacy coaches work closely with teachers to improve classroom practice and, ultimately, student reading achievement school-wide.

As site-based personnel, literacy coaches are able to facilitate teacher training on evidence-based reading instruction and data-based decision making; demonstrate lessons; co-teach and/or observe teaching; and provide immediate feedback. Literacy coaches serve as a stable resource for professional development throughout an entire elementary school, helping to build master teachers of reading and improve student reading achievement schoolwide.

Plan for Sustainability - Build Teacher Leaders

It is critical that all teachers are equipped with the knowledge and skills they need to effectively teach all students to read, including students with severe reading difficulties. In addition to the key roles identified for overseeing and supporting statewide implementation of science of reading professional development, it is important to identify teachers who embrace the science and improve their students' achievement. These teachers could be designated as teacher leaders and their classrooms operate as model classrooms for other teachers who need to see the science of reading in action. This plan for sustainability further expands "boots-on-the-ground" efforts.

In Conclusion

Transforming student achievement in early literacy requires multiple, sustained steps by leaders and educators at every level of our education systems. Targeting state resources where they will have the most impact is a vital part of this work. Commendably, North Carolina has taken a close look at teacher skill sets through this Science of Teaching Reading Project and identified ways to support elementary teachers in improving their professional practice—and by extension, the reading skills of their students.

These research-based recommendations align with goals in the state's Excellent Public Schools Act and, further, offer key steps to achieve successful implementation in the months and years ahead. ExcelinEd celebrates North Carolina's focus on early literacy improvement and stands ready to assist at every step along the way.

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APPENDICES

Appendix A. North Carolina Needs Assessment Survey Items

Item	Question	Choice A	Choice B	Choice C	Choice D	Correct Answer	Categories & Item Types
1	What does morphemic analysis help students do?	identify letter-sound correspondence	blend speech sounds	examine words for meaningful parts	separate syllables into onsets and rimes	C	Vocabulary Knowledge
2	What is the difference between sight words and vocabulary words?	sight words are learned through decoding and vocabulary words are not	sight words are learned on sight and vocabulary words are learned by decoding	sight words are related to recognition and vocabulary words are related to meaning	none of the above	C	Phonics/ Vocabulary Knowledge
3	What is a reading method that focuses on teaching the application of phonemes to letters called?	phonics	phonemics	orthography	phonetics	A	Phonics Knowledge
4	Two or three times each week Mrs. Hruby teaches "phonics through spelling" with her students. She pronounces words sound-by-sound as her students listen, write the appropriate letters, and then blend the letters to identify the words. Why is this activity likely to be effective?	reinforces students' recognition of common spelling patterns	requires students to use letter-sound relationships to blend unfamiliar words	reviews and strengthens students' ability to recognize and blend word chunks	prepares students to combine letter-sound relationships with meaning-based clues	B	Phonics/ Spelling Application

Item	Question	Choice A	Choice B	Choice C	Choice D	Correct Answer	Categories & Item Types
5	Mr. Lewis' class has been learning spelling rules for adding "ing" to base words. He is looking for groups of words that illustrate the various rules to give his students a complex challenge. Which of the following groups of words would be best for this purpose?	hopping, running, sending, getting	hoping, buying, caring, baking	seeing, letting, liking, carrying	all of the word sets are useful for this purpose.	C	Spelling Application
6	Why is metacognition important in reading comprehension?	it helps students to monitor their comprehension	it makes the teacher aware of when the students are experiencing difficulty during reading	it prompts students to create mental images	it causes automatic processing of the text so that students can make meaning of the text	A	Comprehension Knowledge
7	After reading a story, what should the discussion focus on in order to maximize comprehension?	sequencing the events of the story	the most important parts of the story	the details of the story	the characters in the story	B	Comprehension Application
8	Which of the following is an example of reading comprehension instruction that helps to promote active construction of meaning?	independent silent reading	doing a think aloud	sounding out difficult words	looking up words in a dictionary	B	Comprehension Application
9	Which is a distinguishing characteristic of phonemic awareness instruction?	uses printed letters	uses two cueing systems	does not use printed letters	links meanings to sound	C	Phonemic Awareness Knowledge

Item	Question	Choice A	Choice B	Choice C	Choice D	Correct Answer	Categories & Item Types
10	Following her lesson on recognizing diphthongs in words, Mrs. Byrnes wants to provide her students with additional practice. Which type of text should she select to provide the best practice?	predictable text with repetitious phrases	authentic text from children's literature	text with a high percentage of selected decodable words	none of the above	C	Phonics Application
11	Mr. Kubota teaches his students to decode unfamiliar words by breaking words into parts such as word root, prefix, and/or suffix (e.g., un-imagine-able). Which skill is he teaching?	structural analysis	analyze the meaning of the word parts	syllabication	chunking the word	A	Phonics Application
12	A teacher assigns pairs of students to reread a text aloud to each other three times. What skill will this activity strengthen most effectively?	choral reading	text comprehension	fluency development	automatic word recognition	C	Fluency Application
13	How many morphemes are in the word "unhappiness"?	2	3	4	5	B	Phonics/ Vocabulary Application
14	Which phonemic awareness activity would be the most difficult for a student?	blending phonemes into real words	blending onset-rime units into real words	deleting a phoneme and saying the word that remains	segmenting words into phonemes	C	Phonemic Awareness Knowledge
15	How many phonemes are in the word "box"?	1	2	3	4	D	Phonemic Awareness Application
16	Which of the following is NOT an irregular high frequency word?	when	does	were	said	A	Phonics Application

Item	Question	Choice A	Choice B	Choice C	Choice D	Correct Answer	Categories & Item Types
17	What is the rule for using a 'ck' in spelling?	when the vowel sound is a diphthong	when the vowel sound is short	when the vowel sound is long	all of the above	B	Spelling Knowledge
18	What is one reason that eaching students the meanings of a new word's parts (affixes and root words) is useful for vocabulary development?	helps students learn alternate spellings for words.	helps students use the new word to understand the sentence.	helps students decode multi-syllabic new words.	helps students comprehend other new words.	D	Vocabulary/ Comprehension Knowledge
19	Which of the following is the best description of reading fluency?	reading fluency is the ability to read grade-appropriate text with good comprehension and a high degree of engagement	reading fluency is the ability to read grade-appropriate text with a high degree of accuracy and comprehension	reading fluency is the ability to read individual words, including both real words and nonsense words, with a high degree of accuracy	reading fluency is the ability to read grade-appropriate text accurately, effortlessly, and with appropriate intonation and expression	D	Fluency Knowledge
20	Fluency serves as a bridge between which two processes?	word recognition and comprehension	comprehension and vocabulary	phonological awareness and comprehension	word recognition and vocabulary	A	Fluency Knowledge

Appendix B. Breakdown of Responses to Literacy Needs Assessment Items

Summary of Responses to Literacy Needs Assessment					
Grade Band	Questions that 80 percent or more answered correctly	Questions that 60-79 percent answered correctly	Questions that 40-59 percent answered correctly	Questions that 20-39 percent answered correctly	Questions that fewer than 20 percent answered correctly
K-1 Teachers (n=188)	2K – phonics/vocab 8A – comprehension 12A - fluency	1K – vocab 3K – phonics 4A – phonics/spelling 14K – phonemic awareness 16A – phonics 17K – spelling 19K – fluency 20K - fluency	6K – comprehension 10A – phonics 18K – vocab/ comprehension	5A – spelling 7A – comprehension 9A – phonemic awareness 11A – phonics 13A – phonics/ vocab	15A – phonemic awareness
2-3 Teachers (n=167)	2K – phonics/vocab 12A - fluency	1K – vocab 3K – phonics 4A – phonics/spelling 8A – comprehension 13A – phonics/vocab 16A – phonics 17A – spelling 18K – vocab/ comprehension 19K – fluency 20K - fluency	6K – comprehension 7A – comprehension 10A – phonics 14K – phonemic awareness	5A – spelling 9A – phonemic awareness 11A - phonics	15A – phonemic awareness

K = knowledge question

A = application question