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**Teachers' Knowledge of Early Reading Development and Instruction:  
A Survey of Primary Grade Teachers in FCT Abuja, Nigeria**

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**by**

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**Dissertation**

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

**Doctor of Philosophy**

**The University of Texas at Austin**

**August 2022**

## **Dedication**

To my mother Felicia and grandmother Naomi, who made me believe I can do hard things,  
even when I did not believe it myself.

## **Acknowledgements**

There are so many people I would like to appreciate and thank, especially at The University of Texas at Austin (UT). First and foremost, I'd like to thank my advisor, Dr. Jessica Toste, as she has been a critical pillar to my success at UT during my studies. Dr. Toste went above and beyond to ensure I was supported, not just in regard to my academics but also ensured my mental health was always taken care of, and for this I am eternally grateful. She pushed me to achieve the unimaginable, and I would not be who I am today without Dr. Toste. I would also like to thank the Toste Team members as you are my other family here at UT. I am truly grateful for the members of the Toste Team who paved the path of mentorship before me and the members who have come after me. You all are amazing! I am also extremely grateful to Drs. Nathan Clemens, Terry Falcomata, and Toyin Falola who served as members of my dissertation committee. They provided me with critical feedback, which helped me to design this study and further supported my development as a researcher. This research was supported, in part, by the Candace S. Bos Innovative Grant Award from the Division of Learning Disabilities (DLD) of the Council for Exceptional Children.

Finally, I would like to thank my family. My mother and grandmother, who constantly prayed for my success and always encouraged me. My siblings Umar, Hamci, Abdul, and Aisha who have, a countless number of times, told me how proud they are of me and encouraged me to keep going. My husband, Jud, for being there through the final phase of my dissertation. My children, Aally and Kira, for understanding and bearing with me when I couldn't mom them. Last but not the least, to my friends turned family: Cate, Robin, Uwa, Uncle Obi, Angela, Erima, Elham, Nwazi, Joannah, Tolani, Bimbo, and Chisom. I am here today because of your friendship.

## Abstract

### **Teachers' Knowledge of Early Reading Development and Instruction: A Survey of Primary Grade Teachers in FCT Abuja, Nigeria**

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The University of Texas at Austin, 2022

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Despite investment of resources in education across Nigeria, low rates of literacy among the student population continue to remain a concern. Previous research has suggested that one critical factor related to student reading achievement is teachers' knowledge of reading development and instruction. Thus, the current study sought to explore knowledge of early literacy development and instruction among primary grade teachers in the Federal Capital Territory (FCT) Abuja, Nigeria. The data used in this study were collected through a secure Qualtrics survey between January and May 2022. Following thorough screening and cleaning of the survey data, the final sample included 391 primary grade teachers (58.82% female) from both the public (53.96%) and private sectors (46.04%). Overall, knowledge of primary grade teachers in FCT Abuja, Nigeria regarding reading instruction was low, with scores ranging between 4-24 on the 40-item teacher knowledge survey (TKS). Across three sections of the TKS, participants obtained mean scores of 3.73 ( $SD = 1.85$ ) on 14 items related to pedagogy, 7.29 ( $SD = 2.65$ ) on 21 items tapping foundational reading skills, and 0.93 ( $SD = 1.00$ ) on 5 items tapping meaning making/comprehension. Private school teachers performed higher on the TKS ( $M = 13.30$ ,  $SD = 4.25$ ), compared to those in public schools ( $M = 10.80$ ,  $SD = 3.08$ ). When measuring teachers'

perceptions and beliefs about early reading instruction, there was a high level of endorsement of all statements, both those that were supported by evidence and those that were not. Most teachers in this sample reported that English was the language in which they first learned to read (85.42%) and their secondary school instruction was in English (95.91%). Finally, regression analyses were used to examine the relative influence of teachers' professional characteristics on TKS score. Teaching certification, years of experience, and formal coursework were not statistically significant predictors of knowledge, while participation in professional development significantly predicted teachers' TKS scores. Findings from this study have implications for understanding the teaching workforce in Nigeria and how this may support initiatives that attempt to improve teacher training, reading instruction, and the overall educational landscape.

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## Chapter I: Introduction

Literacy is a critical social issue related not only to educational outcomes, but also economic growth, public health, and democratic governance (Igwe, 2011; Kim et al., 2020). As such, high-quality reading instruction is an essential for students' educational success. In general, students with or at-risk for reading disability need more intensive instructional supports than their typically developing peers to acquire reading proficiency. In African nations, students both with and without disabilities struggle with reading proficiently; it is estimated that 90% of the world's illiterate population live in developing countries represented on this continent (Verner, 2005). These high levels of illiteracy contribute significantly to the disease burden of poor communities and countries, which reinforces health and economic inequalities. Kickbusch (2001) described an Organization for Economic Cooperation and Development (OECD) study from the late 1990s, which raised the distressing fact that a quarter of adults are failing to meet the minimum level of requirement for literacy needed to cope with the demands of life and work in OECD countries. Most post-colonial and post-military regions in African countries, including Nigeria, grapple with unfavorable social and political situations that have resulted in limited educational opportunities, and these problems are further exacerbated by poverty (Ucha, 2010).

There is a mountain of empirical research and comprehensive government reviews (Foorman et al., 2016; National Reading Panel, 2000; National Education Reading Panel (NELP), 2008; Rose, 2006; Rowe, 2006) showing evidence of a consensus on the instructional methods that support reading acquisition. Students need to be taught how to connect letters to speech sounds, analyze the printed forms of words, link words to meaning, and construct conceptual models of the knowledge presented in text (Castles et al., 2018; Rayner et al., 2001; Seidenberg, 2017). Reading instruction in the primary grades (Kindergarten through third grade)

is especially important as students who do not develop proficient reading skills are likely to require more intensive intervention supports as they move into the upper elementary grades (Felton & Pepper, 1995; Partanen & Siegel, 2014). Moreover, it becomes increasingly difficult for students to attain and maintain grade-level reading skills when they require continued, intensive interventions (Applebee, 2002).

There are 54 countries located in the continent of Africa (Mans et al., 2016) and Nigeria is the largest, with a great diversity among the people in terms of religion and ethnic groups. The present dissertation study is focused specifically on the Federal Capital Territory (FCT) of Abuja, Nigeria; it is central to all other states in Nigeria and holds the seat of power of the Federal Republic of Nigeria. Focusing on the continent's largest country, one that continues to be impacted by the aforementioned social and economic issues, provides a foundation to better understand reading instruction in other African nations with similar populations, level of resources, and infrastructure. An important step in improving literacy rates and, ultimately, the economy of developing countries such as Nigeria is to ensure that all students are receiving high-quality reading instruction.

### **Reading Achievement in the Primary Grades**

Reading is necessary for student success both inside and outside of school; as such, teachers must be prepared to provide effective, high-quality reading instruction. Teachers should not just be able to teach students any reading curriculum but need to know how to deliver good and effective reading instruction to their students. Seidenberg (2017) noted that reading is a science, with the National Reading Panel report (2000) going further to break it down into various components. The report states that reading comprises of five essential components: phonemic awareness, phonics, fluency, vocabulary, reading comprehension and must be taught

explicitly to students. When students fail to learn how to read during daily classroom instruction, often in primary grade levels, early literacy interventions are introduced. These interventions focus on skills and strategies essential to developing reading proficiency for students enrolled in Kindergarten through third grade, in order to remediate reading problems that might occur later on in a child's later elementary years (Snow, 2006).

There are many variables that impact student's reading achievement in a positive way; one such variable is the effectiveness of the teacher. There is mounting evidence to show that no educational system can do better than the quality of teachers it acquires (Boyi, 2013). Studies like Landry et al. (2009) demonstrate that the effectiveness of literacy classroom teachers, in primary schools can be impacted by variables such as professional development (PD) training. Even when these trainings are offered as part of an online teacher PD curriculum (Erickson et al., 2012). However, it is very important to understand the teachers' knowledge base before creating specific forms of professional training for teachers in the field, so as to tailor instruction in such a way that it covers the gaps in teachers' knowledge, based on what they aim to achieve with their students. This in turn enables us to save time and resources.

In summary, early reading development is a complex cognitive process that involves the successful integration of a range of foundational skills. Research clearly indicates that students' reading achievement is influenced by the instruction that they receive, and this instruction is highly related to their teachers' content knowledge.

### **Teacher Knowledge**

The Peter Effect refers to a popular saying which states, "you cannot give what you do not have" (Applegate & Applegate, 2004). In this regard teachers who lack the basic knowledge of how reading works cannot impart this knowledge to their students. According to Walshaw

(2012), teachers who merely have the intention of developing students understanding will not necessarily produce the desired effect. What is clear, however, is that teachers' content knowledge can provide the means to help them realize their good intention of developing their students understanding as regards to reading instruction and there are numerous studies to this effect. Hirsh (2009) pointed out that providing teachers with teacher training and instructional support is crucial to providing quality education and improving students' outcomes. There are several systematic reviews and meta-analysis that explores the impact of teacher PD on student literacy outcomes. Several studies have explored the role of pre-service and in-service teacher training geared toward improving the content knowledge of teachers in order to equip them to successfully teach reading to the students in their classrooms. The findings from these studies suggest that teacher preparation programs do not provide future teachers with sufficient content knowledge with respect to explicit reading instruction (Binks-Cantrell et al., 2012; Cheeseman et al., 2009).

Piasta et al. (2009) examined the relationship of first grade teachers' explicit instruction related to coding on student word gain outcomes. The results of the study reported a significant interactive effect between teacher knowledge and the number of observations of explicit decoding instruction that were reported. Hence, this study found that when teachers have low content knowledge, this will negatively impact their students word reading outcomes by hindering students from making gains. However, the negative effects do not end here. The more time teachers who possessed low content knowledge spent in student instruction, the worse their students performed. Similarly, Piasta et al. (2020) investigated teachers' knowledge in the area of emergent literacy skills as a crucial predictor of classroom practices and students learning



outcome. The results of the study showed that there were positive relationships between teacher knowledge, their classroom practices and student outcomes.

There are several studies that measure teachers' knowledge of language constructs, using surveys and questionnaires to understand teacher's knowledge base. Research has shown that teachers will have little or no impact on the reading knowledge of their students and will be unable to successfully teach the skill of reading unless they can acquire, retain and practice reading instruction knowledge (Moats 1994, 1995, 1999, 2009). Moats and Lyon (1996) suggest that teachers who teach reading to their students often feel unprepared. This is alarming as majority of the students we find in remedial and special education classrooms are taught by these teachers. The authors stated that many times the teachers lack the understanding of how students learn to read and write, or why many of their students experience difficulty with this foundational task of schooling. Other studies, such as Moat and Foorman (2003) and Cunningham et al. (2004), found that not only do teachers have minimal knowledge about reading instruction related to phonemic awareness and phonics, but they are also often unable to use their knowledge of reading instruction in a precise way to enhance students' outcomes.

Spear-Swerling and Brucker (2003) reported on a set of teacher knowledge tasks that assessed the knowledge of teachers in relation to reading constructs. The authors found that none of the elementary and special education, pre-service and in-service teachers scored a high level on all of the tasks. Another study by Spear-Swerling and Cheesman (2012) explored the teacher knowledge of 142 elementary school teachers who were administered a 66-item teacher knowledge survey assessing teachers' professional background for teaching reading, as well as their familiarity with certain assessments, response to intervention (RTI), and interventions that are crucial to the implementation of RTI practices. The findings of this study suggest that there is

a need to understand teacher knowledge in order to cover teachers' gaps in knowledge that will enable many teachers implement reading instruction efficiently and effectively.

It is important to understand teacher's knowledge related to reading development and instruction; and thus, the present study seeks to investigate this topic among primary grade teachers within FCT, Abuja. Findings related to this issue can support schools and educational organizations as they intentionally provide resources to address knowledge gaps that teachers may have, which in turn should support the ongoing improvement of reading outcomes for students in primary classrooms.

### **Reading Initiatives and Nigeria**

As international agencies have recognized the challenges related to literacy, there have been targeted reading initiatives across the African continent. Agencies such as the United Nations Children's Fund (UNICEF), United Nations Educational, Scientific, and Cultural Organization (UNESCO), U.S. Agency for International Development, the Organization for Economic Cooperation and Development (OECD), and the United Kingdom Department for International Development (DFID) have provided funding to improve education through such initiatives. For example, Education for All (EFA) has focused on eradicating illiteracy for every citizen in every society by providing activities such as teacher training, paying teachers promptly, assessing students learning, provision of infrastructure, reading materials, and reading intervention programs which sometimes includes the use of local dialect of the individuals living in particular communities (Benavot, 2010; Graham & Kelly, 2018; Pflapsen et al., 2016). Many of these initiatives believe that focusing on improving teachers' knowledge of basic education skills, which includes early grade literacy will have an overall impact on students learning outcomes. As previously pointed out, past research has provided clear support for the importance

of improving teachers' knowledge, skills, and practice as a pathway to improve students' educational outcomes.

The Literacy Enhancement Assistance Programme is an example of an initiative that has focused specifically on Nigeria. This was a collaborative project funded by United States Agency for International Development (USAID) and the Nigerian Federal Ministry of Education. This initiative took place in three Nigerian states (i.e., Kano, Nasarawa, Lagos), with one of the aims of this program being the ability to enhance the Nigerian child's skill to read and write by the end of their primary school years. This program used a combination of interactive radio instruction and teacher training on literacy skills that were taught at the grassroots levels, in the communities and its classrooms. This program was suggested to improve the literacy skills of the primary students living in these three Nigerian states where the initiative was implemented (UNESCO, 2003).

A study by Barnes et al. (2019) analyzed the results from a pre-service teachers' capacity building initiative, implemented through the Northern Education Initiative Plus (NEI Plus). This was a 5-year project (2015-2020), funded by the U.S. Agency for International Development through Creative Associates International, and implemented in Northern Nigeria. The goal of this project was to reinforce the northern states' ability to provide high-quality early grades education to students which in turn was supposed to improve the students' literacy skills by targeting the teachers' knowledge, skills, and attitudes in relation to literacy instruction, content and pedagogical knowledge. The teacher's knowledge on items that included vocabulary, phonics, phonological awareness, fluency, comprehension, writing and the concepts of print was assessed at pre-test and post-test. The results of this study showed that the teachers assessment scores for questions related to teacher knowledge instruction moved from an average of 58% correct

answers to an average of 68% of correct answers at posttest for items related to teacher knowledge of reading instruction, and 55% at pre-test to 67% at post-test for teachers' skills related to teaching their students reading. The findings from this study showed an improvement in the student teachers' engagement and knowledge when the teachers were provided training.

Another such initiative is the Literacy Initiative for Empowerment (LIFE), which was launched by UNESCO in the context of the 33rd General Conference in October 2005 as one of the three core EFA initiatives. Based on the LIFE initiative, countries like Nigeria benefitted through UNESCO's strategy of enabling learners acquire literacy skills through country-led practice, informed by evidence-based research. The aim of the LIFE program was to build literacy agendas that are grounded upon what works, that have proven success-stories and best practices (UNESCO, 2007), and implementing strategies from the science of reading. Based on these several initiatives teachers in the Nigerian setting have been exposed to, one would expect that these teachers possess the knowledge of phonemic awareness, phonics, fluency, vocabulary, comprehension, good and effective reading instruction, etc. However, this seems not to be the case as the country's educational system continues to fail. In order to successfully achieve the goals initiatives such as LIFE hope to implement after investing heavily in the educational sector of Nigeria, it is vital to first understand what the knowledge of teachers in regard to literacy instruction is, and how familiar these teachers are with what has worked and been successful in other settings around the globe.

### **Nigerian Context and the Federal Capital Territory (FCT)**

Nigeria has a population estimate of about 209 million people with differences in stages of educational development, indeed, some states of the federation are officially classified as "educationally disadvantaged states" due to their having low enrollment ratios and high adult

illiteracy rates. Nigeria is said to be the seventh most populous country in the world. The United Nations anticipates that Nigeria will become the third largest country in the world by the year 2050 with a record 399 million people. Nigeria runs a federal system of government with 36 states. Within the states, there are 774 local governments in total. FCT, Abuja is the Capital of Nigeria. This is the seat of power and administration. The FCT Administration administers the whole of the Federal Capital Territory, the Federal Capital Development Authority (FCDA) specifically manages the construction and infrastructure development of the region (Musa & Jacob, 2021).

The FCT was formed in 1976 from parts of the states of old Kwara, Niger, Kaduna and Plateau States with the bulk of landmass carved out of Niger State. It is within the middle belt region of the country. Unlike the other states of Nigeria, which are headed by elected Governors, FCT administration is headed by a minister appointed by the president. It is located just north of the confluence of the River Niger and River Benue. It is bordered by the states of Niger to the West and North, Kaduna to the northeast, Nasarawa to the east and south and Kogi to the southwest. Lying between latitude 8.25 and 9.20 north of the equator and longitude 6.45 and 7.39 east of Greenwich Meridian, Abuja is geographically located in the center of Nigeria. FCT has a landmass of approximately 7,315 km<sup>2</sup>, and it is situated within the Savannah region with moderate climatic conditions (Wikipedia, 2021). The capital city Abuja is located inside the wider Abuja Municipal Area Council. The territory is currently made up of six area councils, namely: Abaji, Abuja municipal, Bwari, Gwagwalada, Kuje, and Kwali. At the 2006 census, the city of Abuja had a population of 776,298 making it one of the ten most populous cities in Nigeria (placing eighth as of 2006). According to the United Nations, Abuja grew by 139.7%

between 2000 and 2010, making it one of the fastest growing cities in the world (Musa & Jacob, 2021).

As in many African countries, more than half the population live below the poverty line, that is, less than a dollar per day. Evidence shows that in many cities and some rural areas of Nigeria, adults are eager to overcome the challenge of illiteracy by attending evening adult literacy classes. However, very few of them attend long enough to become permanently literate. The Nigerian school system consists of public and private schools, with some of the private schools being unregistered, and run without approval from the appropriate authorities. Though most of the public (or government) schools in Nigeria tend to cater to the poor and suffer from inadequate conditions such as lack of infrastructure, teaching materials, and funds to effectively run the schools. The quality of teachers in both private and public schools are comparable, though student instruction has been deemed to be of higher quality in private schools than public schools (Tooley et al., 2005).

A study conducted by Akinwale (2020) reported positive effects of adult literacy rates on the economy of Nigeria. This further emphasizes the importance of education in this context as there is a huge gender disparity of literacy rates in Nigeria. In certain parts of the country, the female literacy rates are much lower especially in the North, as more men than women get access to education (Boyi, 2013). In 2006 there were about 40 million illiterates in Nigeria of which more than half (60%) were women. A 2002 UNICEF report went on to emphasize that 56% of women were literate compared to a 72% literacy rate for men in the country. For example, in the state of Sokoto enrollment for girls was reported to be only 15% while the enrollment rate for boys was 59% (Oyitso & Olomukoro, 2012). It is vital to address this literacy gaps because

research shows that educated women contribute to the overall economic growth of the communities they live in (Kickbusch, 2001).

In summary, reading is a skill that has the potential to change the trajectory of a failing society and better enhance individuals living condition. Failure to achieve this skill in primary grade levels will have lasting detrimental effects to the people and communities. Thus, it is quite evident to see that when students fall through the cracks at these grade levels, though they might be eager to learn how to read as adults, the gap of becoming literate continues to widen. Hence the urgency to train knowledgeable teachers who can deliver effective literacy instruction and are equipped to support students who struggle with reading in primary classrooms in Nigeria, before they become a statistic added to the number of illiterates in the country.

### **The Current Study**

The primary goal of the present study was to examine primary grade teachers (Kindergarten to 3<sup>rd</sup> grade) knowledge of reading, and their perceptions and beliefs of reading related practices in FCT Abuja, Nigeria by using the work of Bos et al. (2001), Spear-Swerling and Cheesman, (2012), and Texas Educator Certification Examination Program, (2020). Findings from this study allows for a better understanding of why students in Nigerian classrooms are not meeting educational standards and if teacher quality has a role to play in these students' inability to read proficiently. Another goal of this study was to explore teachers educational background, whether or not they possess the knowledge to successfully deliver these models , their perceptions and beliefs about early reading instruction within primary schools of FCT, Abuja. This study also looked at how well teachers in primary schools within FCT, Abuja did on a teacher knowledge survey, and if certain factors like teachers' educational certification, what sector (public or private) they work in, and whether or not teachers' years of experience, formal

course work related to reading instruction, and professional development training had an impact on the outcome of the survey. As evidence suggests that if teachers do not understand the process of identifying struggling readers, cannot select appropriate intervention to be implemented, and cannot monitor and evaluate students' progress during the process of intervention. It is needless to say that students who have reading problems in the Nigerian setting will continue to do so unless teachers themselves are equipped with the knowledge of how to tackle reading problems. In a nutshell this study will support an increased understanding of the current state of teacher knowledge, and potential gaps, as it relates to early literacy instruction among teachers in FCT, Abuja. Thus, I sought to address four research questions:

1. How do primary grade teachers (Kindergarten to 3<sup>rd</sup> grade) in FCT Abuja, Nigeria perform on a survey tapping their knowledge about reading?
2. Are there differences on reported knowledge between teachers in the public and private sector in FCT Abuja, Nigeria?
3. What are the perceptions and beliefs about early reading reported by primary grade teachers in FCT Abuja, Nigeria?
4. Does teacher certification, years of teaching experience, coursework, or professional development training impact teachers' performance on different sections of the knowledge survey?



## **Chapter II: Literature Review**

The purpose of this study was to examine primary grade teachers' knowledge of early reading instruction in FCT, Abuja. These findings provide an understanding of areas where teachers are lacking, and training support is needed. This study also extends the literature base on teacher knowledge in the area of reading, specifically by considering whether findings from studies conducted in the U.S when used in the context of FCT, Abuja Nigeria, will demonstrate the same results. Recognition of similarities and differences between knowledge of teachers across these contexts provides a frame for understanding how evidence-based practices in a U.S. context can (or perhaps cannot) be transferred to a Nigerian context.

The following sections reviews the existing literature related to this current study. First, I discussed reading instruction at the primary level and the need to address reading difficulties to promote student success. Secondly, I discussed teacher knowledge in the area of reading. I reviewed what is known about teacher knowledge and why knowledge is important in terms of its impact on instruction and student outcomes. Next, I introduced and reviewed factors that are known to influence teacher knowledge. Finally, I discussed the Nigerian educational system, literacy rates, and the current state of reading achievement in Nigeria. I also provided an overview of teacher training in Nigeria and special education in the context of Nigerian colleges and classrooms. Lastly, I concluded with a rationale for this current study.

### **Reading Instruction in the Primary Grades**

Education plays a vital role in the growth of any country's economy—that is, literacy is a critical social issue related not only to educational outcomes, but also economic growth, public health, and democratic governance (Igwe, 2011; Kim et al., 2020). Addressing the lack of reading proficiency amongst school-aged students has been a long-stated goal among global

organizations and governments in African nations (Alidou, 2003), including Nigeria. However, this has proven to be a difficult goal to attain. This can be linked to the fact that students fail to become fluent readers in the primary grades, and governments of developing countries often do not have the human and financial resources to implement high-quality, supplemental interventions. Therefore, not only is there limited number of well-trained teachers available to teach young children in developing countries, but the educational infrastructure in terms of buildings and facilities remain woefully substandard. Hence, teaching students, especially literacy in this setting is a struggle. Literacy is a huge part of the foundational blocks that makes education successful. Students need to be able to communicate via written language as they go through a formal school setting, else they are automatically set to fail.

### ***Struggling Readers***

The ability to read and comprehend text is integral for academic and life outcomes. Literacy skills add ease to an individuals' daily life and enhance socialization opportunities (e.g., accessing instructions, grocery shopping, emails, or letters for communications purposes), and are known to be related to quality of life (Igwe, 2011). Consequently, failure to deliver effective reading instruction to school-aged students should be considered a critical issue. Literacy is related not only to educational outcomes, but also to public health, and economic growth of communities. For this reason, once students fail to acquire the skill of reading proficiently in the primary grade it is almost impossible for them to catch up to their typically developing peers. Students who struggle with reading, continue to face mounting negative consequences as they grow older such as a risk for disciplinary problems, higher school dropout rates, and un- or underemployment (Goldberg et al., 2003; Reynolds & Ou, 2004; Wagner, 2005). Reading proficiently has been shown to further relate to participation in a democratic society and

improved safety in the workplace (World Literacy Foundation, 2012). Juels (1988) suggested that students who do not read proficiently by the end of first grade will have a 90 percent probability of continuing to struggle well into the fourth grade. There is additional evidence to suggest that students who cannot read proficiently by the end of third grade rarely catch up across their school years (Francis et al., 1996; Vaughn et al., 2003).

Studies have shown that students literacy outcomes can be improved through targeted instruction. Guthrie et al. (2009) conducted an intervention study exploring students who struggle with reading in 5<sup>th</sup> grade's ability to improve their comprehension strategies, domain knowledge, word recognition skills, fluency, and motivation to read, through the use of Concept-Oriented Reading Instruction (CORI) with traditional instruction (TI). There were a total of 156 participants who participated in this study. The experimental group consisted of 94 students from three classrooms in each of two schools which represented the CORI group, and data from 62 students of three classrooms in one school represented the TI group, for a total of 156 students. The intervention was administered for a period of 12-weeks for low achievers and high achievers. Low achievers in the CORI group were afforded explicit instruction, leveled texts, and motivation support. The findings of this study shows that the students in the CORI group scored higher on posttest measures of word recognition speed, reading comprehension on the Gates-MacGinitie Reading Test, and ecological knowledge. Also, the authors found that CORI was just as effective for lower achieving students as it was for the high achieving students.

Weiser and Mathes (2011) conducted a meta-analysis of the decoding and encoding abilities of teachers that work reciprocally to enhance the reading and spelling ability instruction for students enrolled in Kindergarten through third grade. The authors reported that there is support for using encoding instruction to increase the literacy performances of at-risk primary

grade students to successfully improve reading and spelling performances in this grade level. It is of utmost importance to point out that, in order for these interventions to be successfully implemented, the teachers had to possess the knowledge to deliver instruction explicitly to the students. These studies support the fact that teacher knowledge should include explicit reading instruction for educators that teach reading and suggest that teacher's awareness of sufficiently intensive instruction may be important in developing the reading knowledge of struggling students. Which might be something, teachers in FCT Abuja might be lacking. Hence the lack of reading gains for the students in this setting.

In summary, an accumulation of knowledge from rigorous experimental and quasi-experimental research suggests that students require explicit literacy instruction, regular assessments and intensive intervention when necessary in order to successfully learn how to read (Bus & IJzendoorn, 1999; Gersten et al., 2020; Ehri et al., 2001; Elbaum et al., 2000), and teachers will need to possess the knowledge of how reading develops, instructional principles and various reading assessments to provide this service to their students.

### **Teacher Knowledge of Reading**

Though millions of dollars have been invested in education in Africa, many students have failed to make gains in relation to reading, and one of the reasons might be teachers lack knowledge on how to teach reading successfully to their students. Research has consistently shown that teachers are an integral part of making a difference in students reading outcomes (Wilkinson, 2005). Several studies have explored teacher knowledge and how this affects reading outcomes for students in the primary grades. These studies demonstrate that one way to impact teacher knowledge in order to improve student outcomes is through PD (Didion et al., 2020; Yoon et al., 2007; Basma & Savage 2018). Findings from these studies have suggested

that you can increase teacher knowledge; and this leads to improved classroom instruction which, in turns, contributes positively to students' reading performance.

A study conducted by Moats (1994) explored the cognizance of special education teachers' knowledge of phonemes, morphemes, and of how these elements were depicted in writing. The findings from this study showed the association between educators' knowledge and the overall quality of classroom practices having a stronger positive slope for those educators scoring above 7 or 8 on the knowledge measure, reporting positive linear associations between educators' knowledge and classroom practices. This study showed that even when teachers are motivated and experienced, they consistently possessed very little knowledge about spoken, and written language structure to enable them to provide sufficient literacy instruction to their students in these content areas. Another teacher knowledge survey study by Moats and Foorman (2003) explored the reading instruction in low-performing, high-poverty urban schools of K-4 teachers. The teachers' misconceptions about sounds, words, sentences, and principles of instruction were pinpointed so that strategic PD training could address their unique needs. The authors investigated the linguistic and disciplinary misunderstandings that teachers typically demonstrate by establishing a modest predictive relationship between teachers' knowledge, classroom reading achievement levels, and teachers observed teaching capabilities. The authors found a significant but modest relationship between overall teacher competence as reflected on the TTAS and 3rd and 4th grade students' end-of-year achievement on the Woodcock-Johnson Basic Reading and Broad Reading Clusters-Revised ( $F[1,82] = 4.46$  and  $4.87$ ,  $p < .05$ , respectively). Effect sizes were between .046 and .049. The results of this study showed that, though teachers were motivated and experienced, they still demonstrated serious gaps in

knowledge as they possessed very little understanding in regard to how to teach reading to their students.

Another study by Pittman et al. (2020) investigated the literacy knowledge of 150 elementary school teachers from 11 low-income schools in Texas. The teachers' knowledge on phonological awareness, phonemic awareness, alphabetic principle/phonics, and morphology as well as their knowledge about teaching these fundamental skills were assessed using the Survey of Basic Language Constructs (SBLC) composed of 11 background items, eight self-perception items, and 53 content knowledge and ability items. The results of the study reported a range of the total scores of the 53 items was 12 to 45 with a mean raw score of 31.05 (percentage score = 58.58%). Thus, on average, teachers answered more than half of the items of the SBLC correctly. However, it is important to point out that the results of the study also revealed that the teachers did not have explicit knowledge needed to effectively teach their students who struggle with reading, and lacked knowledge related to morphology, but possessed very high levels of knowledge regarding their syllable counting skills.

Cunningham et al. (2004) examined the teacher knowledge of 722 K-3 teachers. The study examined whether teachers were aligned based on their actual and perceived knowledge of early literacy reading skills, their knowledge of children's literature, phonological awareness, and phonics. The results reported that only 10% of teachers were able to identify half or more of the most popular books for students in grades K-3. 20% of the teachers were not able to correctly identify the number of phonemes in any of the 11 words presented to them, 30% of the teachers were able to correctly identify the number of phonemes in half of the words, and less than 1% of the participants were able to correctly identify the phonemes in all 11 words on the phonological awareness tasks, 28% of teachers were able to correctly answer more than half of the questions

and identify explicit phonics, with less than 1% (four teachers) answering all seven items. The authors reported that 37% of the K-3 teachers could not do what Kindergarteners are being asked to do in a beginning reading program, which is considered a simple phonemic awareness task of segmenting sounds. This study further strengthens the evidence that suggest teachers lack knowledge in regard to reading instruction, which has detrimental effects on their ability to deliver high-quality instruction to support students' foundational skills.

Piasta et al. (2009) explored the link between the specialized knowledge 42 first grade teachers utilize when delivering explicit decoding instruction, and the word-reading gains of their 437 students. The findings from this study showed that teachers ranged in their knowledge of language and literacy, with scores of 9 to 36 on a scale of 45. The average score of 23.45 is equivalent to answering 52% of questions correctly. Item analyses showed that, on average, teachers were most successful in answering questions pertaining to instructional practices (5 items; 63.33% correct) and phonics (12 items; 62.10% correct), followed by onset/rimes (2 items; 58.34% correct), phonological awareness (7 items; 55.10% correct), and morphology (4 items; 42.86% correct). The results of the study show that there was a significant interaction of teacher's knowledge and number of observations of explicit decoding instruction that was reported. Also, the authors found that students whose teachers were both knowledgeable and devoted more time to explicit decoding instruction, made significantly higher gains in word reading. While for students whose teachers were far less knowledgeable, the more time those teachers spent delivering explicit instruction to those students the worse their performance.

Another study conducted by Piasta et al. (2020) investigated teachers content knowledge in relation to emergent literacy skills as an important predictor of classroom practices and students learning outcome. Data providing the content knowledge of 437 early childhood

educators serving children ages 3-5 was collected using an adapted Moats (1994) teacher knowledge survey. The teacher's classroom practices were observed in the fall and spring (twice) of one academic year, with applied standardized coding schemes to code the latter in respect to the quality and quantity of emergent literacy practices. The results showed the association between educators' knowledge and the overall quality of classroom practices having a stronger positive slope for those educators scoring above 7 or 8 on the knowledge measure. The authors further reported positive linear associations between teachers' knowledge, classroom practices, and their students' outcomes. As an increase in the teachers' literacy knowledge translated to an increase in their emergent literacy practices.

Spear-Swerling et al. (2005) explored 132 graduate teacher-education students' self-perceptions and reading knowledge on five tasks intended to measure their actual disciplinary knowledge in the areas of their background, general knowledge about reading and reading development, phonemic awareness and phonics knowledge and morpheme awareness and structural analysis knowledge. The results of the study showed that participants with a background  $z$ -score  $\geq .5$  comprised the high-background group ( $n = 34$ , mean age = 34.47,  $SD = 8.55$ ). The teachers in this group had a mean preparation score of 6.62 ( $SD = 2.07$ ) and an average of 7.48 ( $SD = 4.20$ ) years of experience teaching reading. While the participants in the medium-background group ( $n = 56$ , mean age = 30.54,  $SD = 7.15$ ) had background  $z$ -scores between  $-.5$  and  $.5$ , a mean preparation score of 4.09 ( $SD = 1.16$ ), and an average of 3.02 ( $SD = 1.86$ ) years of teaching experience. While the participants in the low-background group ( $n = 42$ , mean age = 33.76,  $SD = 10.44$ ) had background  $z$ -scores  $< -.5$ , a mean preparation score of 1.76 ( $SD = 1.03$ ), and less than a year of experience teaching reading on average (mean = .41,  $SD = .59$ ). The findings of this study consistently showed that the high-background participants rated



themselves significantly more knowledgeable than the teachers in the medium background group, who in turn rated themselves significantly more knowledgeable than the teachers in the low-background group. All three groups rated themselves lowest for perceived morpheme awareness and having adequate structural analysis knowledge. The findings from this study further shows that teachers experience was not a predictor of the teachers actual measured knowledge.

Another study by Spear-Swerling and Brucker (2003) examined the teacher education student's knowledge of 90 teachers from a special education certification program. The authors investigated word structure, and improvements in teachers' knowledge as a result of instruction, using three tasks: graphophonemic segmentation, classification of pseudowords by syllable type, and classification of real words as phonetically regular or irregular. The authors used a multivariate analysis of variance (MANOVA) on the pre-test which showed that participants who had some prior preparation ( $n = 31$ ) outperformed those with no prior preparation ( $n = 59$ ), with Wilks' Lambda = .829 and  $F(1, 89) = 5.912, p < .001$ , where participants who had prior preparation obtained a mean score of 6.871 ( $SD = 2.604$ ) and those without prior preparation had a mean of 4.373 ( $SD = 3.269$ ). Also, on the irregular words task, significant univariate differences were found,  $F(1, 88) = 4.822, p < .05$ ; participants with prior preparation obtained a mean score of 7.516 ( $SD = 3.549$ ) whereas those without prior preparation had a mean of 5.695 ( $SD = 3.834$ ). Though, on the GPS task, no univariate differences were found,  $F(1, 88) = .004, ns$ ; for participants with prior preparation, the mean score was 9.903 ( $SD = 2.993$ ), and for those without prior preparation, the mean score was 9.864 ( $SD = 2.939$ ). However, when participants were grouped based on prior experience teaching reading ( $n = 57$  for no experience,  $n = 33$  for some experience) rather than prior preparation, a multivariate analysis of variance found no

significant differences, with Wilks' Lambda = .945 and  $F(1, 89) = 1.657$ ,  $p = .182$ . The findings of this study indicated that across all three groups, participants varied in prior preparation and their experience of teaching reading to students. Prior preparation to teach reading influenced teachers' initial performance on two of the three word-structure tasks (all but graphophonemic segmentation); however, prior experience in teaching reading did not influence the teachers' word-structure knowledge.

A third study by Spear-Swerling and Cheesman (2012) explored the teacher knowledge of 142 elementary school teachers from two states in the United States of America. The states were implementing schoolwide response to intervention (RTI) models in reading with 38% of the teachers across both states having received an additional amount of PD training in reading, beyond the reading-related courses they had taken as part of their preservice or graduate education program. The teachers were administered a 66-item multiple choice teacher knowledge survey which assessed participants' professional background for teaching reading, as well as their familiarity with specific assessments, research-based instructional models, and interventions that are crucial to RTI practices. The questionnaire was divided into two parts; one part gathered data on teacher's background information about teachers' certifications, graduate programs/degrees, reading-related course work, the amount and type of teaching experience teachers possessed. While the second part of the questionnaire asked information about the teachers' familiarity with specific types of assessments, instructional models, programs, and interventions with a history of use in RTI models.

The results of this study reported that teachers obtained the highest mean score on the FLU/VOC/COMP subscale ( $M = 64.9$ ,  $SD = 15.6$ , minimum = 8, maximum = 96). For the PA/PH subscale, teachers obtained a mean percentage correct of 61.2 ( $SD = 19.0$ , minimum = 0,

maximum = 100), and teachers obtained the lowest mean score on the AS/RTI subscale ( $M = 57.9$ ,  $SD = 18.5$ , minimum = 8, maximum = 92). Paired samples t-tests indicated that all of these mean differences across subscales were significant. For FLU/VOC/COMP versus PA/PH,  $t = 3.052$ ,  $df = 141$ ,  $p = .01$ . For PA/PH versus AS/RTI,  $t = 2.322$ ,  $df = 141$ ,  $p = .05$ . For FLU/VOC/COMP versus AS/RTI,  $t = 5.352$ ,  $df = 141$ ,  $p = .001$ . On the familiarity items, the authors reported that the teachers were most familiar with RTI models as 52.1% were familiar with though not experienced using RTI; and 33.1% said they were experienced using RTI models. The findings from this study showed that only about three-quarters of the teachers could correctly answer items that required knowledge about the general utility of structural analysis in decoding multisyllabic words on the phonemic awareness/phonics subscale. However, the teachers performed well on an item that presented the spelling errors of different children and asked them to find the child with the poorest phonemic awareness. Teachers also had a hard time with items that required them to select the best examples of words to use for introducing children to structural analysis or for easing phoneme blending demands, and items involving an appropriate activity for teaching phonological awareness to students. The results of the familiarity items showed that teachers' familiarity and experience with various instructional models and interventions listed in the questionnaire were especially limited and emphasized the need for PD to enable many teachers implement RTI in reading efficiently and effectively.

The Science of Reading is an extensive body of research that includes many years of evidence-based knowledge and several languages, that fuses together the knowledge of many specialists from relevant disciplines such as general education, special education, literacy, psychology, neurology, etc. The Science of Reading was birthed from a wide variety of research designs, experimental methods, sample sizes, and statistical analysis, that uses empirically

supported inquiry which gives us the knowledge we require to understand how students learn to read, what skills are involved in reading successfully, how they work collectively, and which parts of the brain is responsible for the development of reading. These findings allows us to recognize evidence-based best practices for teaching Structured Literacy to students, which is the foundational literacy skills students will need in order to become successful readers (Ordetx, 2021).

A study by Bos et al. (2001) examined the perceptions, beliefs and knowledge of 252 pre-service and 286 in-service primary school teachers in the U.S., around the science of reading. The authors collected data through the use of two measures; a 12 item, six-point Likert scale teacher perception survey, where the teachers were asked to rate their level of preparedness for teaching reading, teaching struggling readers, and using specific approaches to reading such as phonological awareness/phonics, guided reading/reading recovery, and whole language. And a 20-item multiple-choice Teacher Knowledge Assessment (TKA) investigating the knowledge of the teachers, through the structure of the English language at both the word and sound levels. The findings from this study showed that the preservice and in-service educators indicated that they felt somewhat prepared to teach reading to their students, with their mean ratings ranging from 2.32 to 2.26, respectively, on a scale of 1 (not prepared) to 4 (well prepared). However, this did not align with the results of the TKA as the findings from the TKA showed that the pre-service and in-service teachers exhibited limited knowledge of phonological awareness, or terminology related to language structure, and phonics. The pre-service teachers scored an average of 10.6 items correctly out of 20 items on the TKA. While the in-service teachers scored an average of 12 out of 20 correct responses on the TKA.

Taken together, findings from prior research suggest that teacher's knowledge of basic reading strategies, and assessment was low overall. These findings are relevant because it establishes the fact that when teachers lack explicit reading instruction, their students fail to acquire this essential skill and understanding. Whether or not Nigerian teachers have the knowledge to teach reading to their students is critical in tackling the reading problem in the country. These studies examined the teacher knowledge base of teachers in a developed country (i.e., U.S). The U.S has more resources in terms of capital and infrastructure in comparison with a country like Nigeria which is a developing country. Therefore, assessing teachers' knowledge in the Nigerian school setting further expands the available research on teacher knowledge studies, which in turn improves our understanding of teacher knowledge, further enhancing the reliability of the Teacher Knowledge Surveys, perceptions and beliefs questionnaire that has previously been implemented with U.S participants, which brings it one step closer to making it more generalizable to other countries and participants who have similar traits to countries like the U.S and Nigeria.

### **Factors Known to Influence Teacher Knowledge**

There are several factors that influence teacher knowledge such as their level of expertise, teaching experience or type of teaching license held. Understanding the factors that influence teacher knowledge is also important as this will better enable us to understand how to impart knowledge in regards specific reading instruction to teachers and how this knowledge develops. In this section, I reviewed evidence for three factors that have the potential to influence teachers' content knowledge in the area of reading: (a) teacher certification, (b) teaching experience, and (c) professional development (PD) training.

## ***Teacher Certification***

Research shows that teachers who are certified or possess some form of teacher licensure are more knowledgeable, provide better instruction to their students, which in turn results in improved positive student outcomes. Studies have also shown that the quality of early teacher preparatory education programs is strongly related to the qualifications of the teachers who implement these educational programs (Neuman & Cunningham, 2009) and this is not an exception to language and literacy instruction programs.

Cheeseman et al. (2009) explored the teacher knowledge base of 223 teachers in their first year of teaching who were initially certified in special education, early childhood education, and elementary education. The authors were primarily focused on phonemic awareness (PA) instruction with results from this study showing that there were no significant differences between special and general education teachers. However, many teachers entering the world of teaching who are certified in special and general education lacked adequate PA instruction skills, that will enable them to deliver explicit reading instruction to their students.

Another study by Darling-Hammond et al. (2005) examined a large student-level data set that linked student outcomes with the data of their teachers' certification status, years of experience, and degree levels from 1995–2002. The results of the study consistently found that certified teachers produced stronger student achievement gains than the uncertified teachers. The authors further found that the students of uncertified Teach for America (TFA) recruits were much less effective than certified teachers and performed about as well as other uncertified teachers' students. Findings from this study showed that the TFA recruits who became certified after 2 or 3 years did about as well as other certified teachers when it came to supporting their student in having better educational achievement gains.

### *Teaching Experience*

Studies that look at experience as a factor that impacts teacher knowledge report mixed findings. Some have found that years of teaching experience is associated with higher levels of teacher knowledge in reading, while other studies report no clear association between years of experience and increased knowledge. Al-Hazza et al. (2008) explored the teacher knowledge of 141 K-3 full time teachers, participating in a four-day PD workshop on research-based reading instruction. The teachers were administered a three-part survey designed to gather data on teachers' demographic information, knowledge calibration questions intended to measure teachers' perceived knowledge of phonics, phonemic awareness, and syllabication, and a phonics pretest designed to measure actual teacher knowledge. The authors wanted to determine if years of experience had any effect on teachers' reading knowledge. The result of the study shows that 53% of teachers responded correctly on the knowledge of phonological awareness. The authors used an independent samples t-test to examine the difference between teachers classified as new teachers (0-5 years of experience) and teachers who were experienced (6 + years of experience). However, no significant differences were detected.

Carreker et al. (2010) conducted two studies exploring teachers' knowledge of informed literacy instruction and in-depth knowledge of literacy. In Study 1, 36 pre-service teachers and 38 in-service teachers completed measures to evaluate their literacy knowledge and ability to identify appropriate spelling activities. In Study 2, the teacher knowledge of 196 in-service teachers completing varying numbers of hours of PD ranging between 0 to 120 hours, was analyzed to determine the effects of PD on literacy content knowledge and the teacher's ability to identify appropriate activities. Generally, the authors reported that teacher knowledge and identification of appropriate activities increased in relation to the number of hours of PD teachers

completed. Study 1 showed that in-service teachers outperformed preservice teachers on counting phonemes and morphemes, and on identifying instructional activities. However, there were no statistically significant differences on the syllable counting task. This study highlights the vital impact teachers experience level has on their knowledge and how well they perform on an informed literacy instruction and in-depth knowledge of literacy content task. In summary, while it is unclear where teaching experience has a consistent relation with teacher knowledge of reading, there is enough evidence to suggest that it is worthy of further investigation.

### ***Professional Development (PD) Training***

Converging evidence suggests that prior courses or PD training for teachers who teach reading to their students influence teachers' knowledge and their ability to translate knowledge to practice in their various classrooms. Teacher knowledge is critical in successfully educating students, and one way to ensure teachers are constantly up to date on the most current research based educational practices including reading knowledge is via PD. Several studies have shown that when PD training focuses on teacher's content knowledge this significantly improves student's outcomes (Desimone et al., 2011; Hill & Chin, 2018; Ingvarson et al., 2005). Timperley et al. (2008) presented findings and evidence from 97 empirical studies that demonstrates the development of teacher knowledge yield positive impacts on the learning outcomes of diverse learners. While Kratochwill et al. (2007) noted that PD training for preservice teachers can help to overcome some of the difficulties in the system-wide change of quality multi-tiered prevention and research-based intervention programs. The authors further pointed out that PD has a positive impact on teachers' knowledge and practices as well as students' reading outcomes.



Binks-Cantrell et al. (2012) reported on findings from a PD training and how knowledge transferred from one teacher to another. The results of this survey study showed that the PD participants outperformed their non-PD counterparts on their understanding involving teacher knowledge and ability items on the survey they were administered. The authors went on to point out that there is mounting evidence that ineffective classroom instruction, particularly at the primary grades, may be a major contributing factor to the high incidence of reading problems, they attributed the poor classroom instruction to a lack of teachers' basic understanding of the concepts related to the English language, that are necessary to teach reading skills to students.

Podhajski et al. (2009) examined the effects of teacher's PD training in scientifically based reading instruction on teachers' knowledge and students reading outcomes. The experimental group consisted of four first- and second-grade teachers and 33 students. While the control group consisted of three teachers and 14 students. The teachers in the experimental group participated in a 35-hour course on instruction of phonemic awareness, phonics, fluency and were coached by professional mentors for a year. Although at pre-test teacher knowledge in the experimental group was initially lower than that of the teachers in the control group, their scores surpassed the control group teachers scores at posttest. Also, for student outcomes, the first-grade experimental group students' growth exceeded the control group students in letter name fluency, phonemic segmentation, nonsense word fluency, and oral reading.

The findings from these studies suggest that action taken to improve teachers' skills and knowledge will result in better student outcomes with teachers staying in the field longer and tending to be more satisfied with their jobs (Darling-Hammond et al., 2009; Ingvarson et al., 2003; Ingvarson et al., 2005; Borg, 2018; Kedzior, & Fifield, 2004). With the high rates of illiteracy in Nigeria, it is safe to say that improving teachers' skills and knowledge should be

high on the priority list when considering ways to improve literacy. However, it is vital to first understand what teachers' knowledge base is, to begin with.

### **Nigeria: Current State of Reading Achievement**

Nigeria has received a lot of help regarding education from international agencies and developed countries around the world. However, the educational sector has failed to improve though billions of dollars have been invested in the economies of developing countries such as Nigeria (Andrews, 2009). Pham et al. (2018) reported that, from 2001 to 2011 alone, China committed about \$75 billion in aid to the continent of Africa, which consists of about 20 percent of the \$404 billion total that the Organization for Economic Cooperation and Development's Development Assistance Committee calculated for the period. The U.S. during this period had also promised the sum of \$90 billion. Previous research has shown that African governments spend more on primary school education than any other sector of education (Stasavage, 2005).

In Nigeria, the educational system continues to fail students with many students struggling to read, if at all they learn the skill of reading. There is a crisis in the educational sector as learners fail to achieve the necessary outcomes related to the areas of language and literacy acquisition with dropout rates for students in Nigeria being high. According to the Federal Ministry of Education out of the 1,142,966 adult learners who enrolled in 1996, only 814,143 stayed on to complete their respective programs. This means a completion rate of 71.2% or dropout rate of 28.8%. Total enrollment in reading classes between 1997 and 2000 show some increase from year to year though an impressive progress is not reported (Federal Ministry of Education, 2003). Access to primary education has also been a source of concern to successive administrations in the country. In view of the past efforts of governments at universalizing access to education for all by embarking on the Universal Primary Education (UPE) of the regional

governments in the 50s, the Federal Government UPE program of 1976, the universal basic education of 1992, and lately the Universal Basic Education (UBE) program of 1999), one would expect a near 100% enrolment of all school age children in the country.

The net attendance ratio (NAR) is the percentage of children aged 6-11 attending primary school in Nigeria. The 1999 multiple indicator cluster survey (MICS) report gives estimates of the NAR, indicating that it was lowest for six-year old's (39%) and highest for nine-year old's (67%). It finds that the main reason for the low NAR is that children tend to start primary school late (FOS/UNICEF, 1999). This was corroborated by the 1999 Demographic and Health Survey, which found that 43% of children aged 6-10 years were not in school (MOH, 1999). The surveys indicate that over three-fifths of Nigerian children do not enter primary school at the official age for Primary One which is age 6. And that the primary school NARs for each gender in Nigeria (61% for boys and 57% for girls) are lower than the averages for Africa (Federal Ministry of Education, 2003). These reasons explain the fact that though students with or at risk for reading disability need to work harder than their typically developing peers to acquire the skill of reading. In Nigeria even students without disabilities struggle with reading proficiently. Thus, there is a need to better understand teachers' ability to explicitly teach reading to students in this setting and whether they possessed the knowledge and resources to attain this goal.

### ***Reading Instruction in Nigeria***

There is an extremely limited number of studies that have explored literacy interventions in this context. Adekola (2007) in a report presented to the World Bank and Nigeria's development partners, synthesized the main findings on the quality of teaching and learning in Nigerian classrooms. The author pointed out that there has been no progress in regard to education in Nigeria since 1996 and this can be attributed to the poor infrastructure of

classrooms, wide variations of student to teacher ratio across states, lack of safe adequate learning facilities, inadequate distribution of textbooks, poor quality of teacher education and limited opportunities for teacher PD training. The effect of this stunted growth in education can be seen in the results of primary students' weak literacy skills and low English levels.

The current requirement to become a school teacher in Nigeria is a three-year National Certificate of Education after graduating high school. However, only about 51% of Nigerian teachers possess this certification. There is limited research available to the effect of the cost of financing primary teachers' education in Nigeria even though the importance of this cannot be over emphasized. Knowing the potential cost of becoming a teacher and doing a cost benefit analysis can help stir more individuals towards a career in teaching thereby increasing the number of teacher to student's ratio. There is also a huge need to review the current teacher curriculum as teachers need to be aware of the knowledge they need to possess in order to become effective classroom teachers especially in the primary grade level. The report also pointed out the need for a continuous school-based teacher mentorship and efficient PD programs. Even though efforts have been made recently to upgrade schools, the conditions of teaching standards in Nigerian classrooms is still way below the minimum standard required for a school to implement teaching effectively, not even adding much needed literacy interventions.

Results from three national assessments carried out between 1996-2003 show that primary education in Nigeria is still way below expectation by international standards. Further results of a Monitoring Learning Achievement (MLA) program carried out by UNESCO/UNICEF showed that students in Nigeria at the time could only answer about 25% of the literacy test items correctly. Also, the Universal Basic Education Commission (UBEC) carried out a national assessment in 2001 and 2003. Test were administered to students in grade

4, 5 and 6, the results of the test in 2001 showed that only one in five students were able to answer more than 30% of the questions asked correctly. In 2003 students were able to answer correctly one in four test items in regard to Literacy instruction. The author pointed out that the analysis of responses on the national assessments of learning achievement at the 4<sup>th</sup> and 6<sup>th</sup> grade level show a strong correlation between higher scores overall, English language (literacy instruction) scores and the overall low performance of student's achievement tests being attributed to the students' inability to read. The report suggested that in order to improve students' educational outcomes, the literacy skills of students' needs to improve. This is first to enable students read and understand test questions they are being asked and possess the ability to write down the correct answer. Students also need to be fluent in English language, which is the vocabulary and syntax sufficient to comprehend the language of which the test items are written in and finally, students need to possess the knowledge and understanding of the concepts they are being tested in.

A study conducted by Uwatt and Egbe (2011) identified RTI practices to improve the literacy skills of students by identifying and analyze the common oral reading problems that hamper the oral reading fluency of 120 3<sup>rd</sup> grade students in a semi-urban community in Cross River State, Nigeria. The reading outcomes of this study focused on word relationship/word parts; using read aloud and songs; using games/play; using talk/discussion/think aloud; using word walls/word banks; and exposing students to difficult words in line with the strategies identified by Berne and Blachowicz (2008). The results of this study as illustrated by a pie chart coded as "can read" and "cannot read" showed that, at pre-test 28.1% of students could read, while 71.9% of students could not. However, at posttest the results of the pie chart showed that 52.8% of students could read while 47.2% of students still could not read. This study illustrates

that the oral reading ability of learners who use English as a second language can be improved by using RTI strategies.

Adeniji and Omale (2010) conducted a study investigating the problems faced by primary grade students who are learning to read in select primary schools within Oyo state, Nigeria. The authors randomly distributed a 30-item questionnaire to a random sample of 200 participants in selected schools. The results of the study showed that 88% of responders felt that teachers have a role in teaching reading, while 12% of responders felt that teachers did not have a role in teaching reading. 76% of respondents believed that the government plays a role in promoting reading comprehension and reading culture, while 24% of responders believed otherwise, 72% of responders believed that parents' attitudes affect their children's learning of English as a school subject, while 28% of responders did not believe that parents' attitudes affected their children's learning of English as a school subject, 80% of responders saw a conducive environment as a factor that promotes reading and learning among students, while the remaining 20% of responders did not see a conducive environment as a factor that promotes reading and learning among the students.

In a recent systematic review by White et al. (2022), the authors explored the effects of early literacy interventions on the reading performance of students in kindergarten through 3<sup>rd</sup> grade delivered in Africa. The authors conducted an extensive search of experimental and quasi-experimental research pertaining to English-language, early literacy interventions, in Africa between 1975 - 2019. The authors found 10 studies that met the inclusion criteria for the review, with 50% of the studies that met inclusion criteria having been conducted in the country of South Africa; and not a single study conducted in Nigeria. Results of the study showed that effects of early literacy interventions conducted in Africa varied widely ( $g = -0.88$  to  $6.98$ ), with

substantial variability in study methodology and the reading interventions delivered. Another study conducted by Nkechi (2011) explored the results of a phonics-based pilot project while giving prominence to teacher's response. However, the website where this study was published was not in English, denying me access through this means. The University of Texas at Austin library could not find the study online either. This sheds light on the dearth of literacy instruction and RTI model research conducted in this setting, and how currently understudied this is in the Nigerian context.

In summary, reading has been taught to students since the inception of education. How to write and understand written text is something teachers in primary grade levels strive to teach their students on a daily basis. As students advance in grade level, they are expected to have learnt the science behind reading and use their reading skills to advance in other subject areas. Snow et al. (1998) in their report on preventing reading difficulties in young children pointed out that adequate initial reading instruction requires that children: use reading to obtain meaning from print, should be given frequent and intensive opportunities to read, are exposed to frequent, regular spelling-sound relationships, can learn about the nature of the alphabetic writing system, and understand the way spoken words are structured. However, the real question is are teachers able to deliver this reading instruction to students effectively and do they possess the knowledge to do so.

There have been several studies conducted outside of Nigeria that evaluated means of increasing the reading and spelling abilities of students who are at risk for reading failure. It is clear that teacher knowledge has a huge impact on students' outcomes and reading is an integral part of individual lives, and an important life skill for students in the primary grade levels to acquire. It is also quite evident that teacher's knowledge has a huge impact on the delivery of

effective reading instruction. Though there is some research looking into teacher knowledge, teacher training and PD impacts on student's outcome, there is still a need for further work related to PD, teachers' practices and teacher knowledge (Alahmari, 2019). Majority of the available research on teacher knowledge, what influences teachers' knowledge, and how this impacts students' outcomes are concentrated in the U.S. There is a scarcity of research in regard to reading intervention programs in the Nigerian setting. Teacher policies in this setting seriously need to be reevaluated to incorporate support and training for teachers as this is lacking at the moment. When teachers fail to be adequately trained, the concern in a Nigerian setting supersedes the fact that students will have negative outcomes but also the fact that there is the threat of mismanaging or wasting scarce teaching resources because teachers lack the content, assessments, and intervention knowledge to provide adequate support to their students. Therefore, it is vital to explore teacher knowledge based on early reading instruction within the Nigerian context.

### **Study Rationale**

Reading is an essential skill that should be taught seriously at the primary grade levels. Evidence from international assessments provide comparable data across developing countries Nigeria inclusive, that has demonstrated serious gaps in the skills and knowledge that students are expected to achieve in the formal school setting (Davidson & Hobbs, 2013). To improve the educational system of Nigeria, it is vital to understand the concept of reading, how to teach it to students and what to do when students fail to read at grade level, as research now shows that a child who doesn't learn the basic reading skills early is unlikely to learn them at all (Moats, 1999).



Davidson and Hobbs (2013) found that the global discourse has shifted from access to education for all towards focusing on the quality of education available to students. In Nigeria not only is there a shortage of qualified teachers available to teach young children reading, but the educational infrastructure in terms of buildings and facilities remain woefully substandard. A significant number of teachers in this region report a low confidence in their abilities to impact student learning (Onderi & Croll, 2009), and many others report a lack of knowledge necessary to improve reading instruction despite their dedication to the profession (Dubeck et al., 2015). The fact that Nigerian students are not attaining reading proficiency is supported in the data (UNESCO, 2010). Evidence suggests that students attain only minimal reading skills by the upper elementary grades—and these literacy rates are concerning compared to global standards (Elley, 1992; Gove & Cvelich, 2011). There is no denial that there is a need to systematically introduce students to a range of skills and strategies that will improve their reading skills in Nigeria. More importantly, there is a need to systematically support and train qualified teachers on how to deliver effective reading instruction to their students. However, there is limited research on teacher knowledge as regards to reading in Nigeria though there is evidence that many graduates in Nigeria are failing to meet proficient reading levels (Aduwa-Ogiegbaen & Iyamu, 2006; Amakiri & Igani, 2015) and this begins in the primary grade levels. Thus, the goal of the present study was to add to the literature base on Nigerian teachers' knowledge on reading development and instruction in the primary grades.

## **Chapter III: Method**

The purpose of this study was to examine the reading content knowledge of primary grade teachers in FCT Abuja, Nigeria, including their familiarity with best practices in early reading instruction for students who struggle with reading. I further explored the potential impact of relevant professional characteristics, including teachers' professional background and prior training, on their reading knowledge. Specifically, this study aimed to address the following four research questions:

1. How do primary grade teachers (Kindergarten to 3<sup>rd</sup> grade) in FCT Abuja, Nigeria perform on a survey tapping their knowledge about reading?
2. Are there differences on reported knowledge between teachers in the public and private sector in FCT Abuja, Nigeria?
3. What are the perceptions and beliefs about early reading reported by primary grade teachers in FCT Abuja, Nigeria?
4. Does teacher certification, years of teaching experience, coursework, or professional development training impact teachers' performance on different sections of the knowledge survey?

### **Study Design**

The data used in this study were collected through a secure Qualtrics survey platform between January and May 2022. The survey included three sections: (a) background information, (b) teacher knowledge survey, and (c) perceptions and beliefs about early reading. It was piloted with three members of the first author's research team and the median time to completion was seven minutes.

## **Participants**

Participants were teachers who provided reading instruction to students enrolled in Kindergarten through third grade (primary grades) in FCT Abuja, Nigeria. An a priori power analysis was conducted using the SurveyMonkey sample size calculator (SurveyMonkey, 2021). This calculator uses the estimated size of the population of interest to calculate the number of completed survey responses needed to ensure this study has adequate power to detect statistical significance. According to the Universal Basic Education Commission (UBEC, 2018) in the publication titled *Digest of Basic Education for Public and Private Schools in Nigeria* there were 20,380 primary school teachers in FCT Abuja, Nigeria at the time of reporting. A 5% margin of error with a confidence level of 95% was used to reduce the risk of a Type 1 error rate. It was estimated that 378 teachers would be needed for this study to be adequately powered.

## ***Screening Procedures***

A total of 660 individuals accessed the study survey. All entries were screened by the first author, and these screening procedures were replicated by a postdoctoral researcher from The University of Texas at Austin for reliability purposes. PDF versions of all completed surveys were downloaded from Qualtrics and, those that were not excluded for the reasons described below, were assigned a participant ID.

A total of 269 entries were excluded. Surveys were excluded if the respondent did not provide consent ( $n = 9$ ) or they were exited from the survey prior to completion ( $n = 12$ ) based on responses to eligibility questions (i.e., teaching students in grades K-3, responsible for reading instruction, teaching in FCT Abuja, Nigeria). We also checked for invalid or fraudulent responses, representing 248 of the excluded surveys. Invalid responses were checked by detecting repeated entries (e.g., same combination of signature on consent form, email address,

and/or telephone number;  $n = 2$ ) and “fast clicks” (e.g., completion of the survey in less than 7 min;  $n = 246$ ). Only two surveys had different screening decisions between the two researchers; these were reviewed and discussed to reach consensus. At the end of this process, the agreement between both researchers was 100% for all surveys.

### ***Final Study Sample***

The final sample included 391 primary grade teachers who work in schools in FCT Abuja, Nigeria; participants identified as female ( $n = 230$ ; 58.82%), male ( $n = 157$ ; 40.15%), and other or prefer not to answer ( $n = 4$ ; 1.02%). The sample included 211 teachers from public schools (53.96%) and 180 teachers from private schools (46.04%). This distribution is somewhat reflective of student enrollment ratio of Nigerian students across public and private school settings (67% and 33%, respectively) in FCT Abuja, Nigeria (National Population Commission and RTI International, 2015). The majority of participants were between the ages 30-39 years ( $n = 205$ ; 52.43%). An additional 78 participants reported their ages as 20-29 years (19.95%), 75 reported 40-49 years (19.18%), and 33 reported their age as 50 or above (8.44%).

The sample for this study comprised of teachers who taught Kindergarten ( $n = 56$ ; 14.32%), 1<sup>st</sup> grade or primary 1 ( $n = 68$ ; 17.39%), 2<sup>nd</sup> grade or primary 2 ( $n = 109$ ; 27.88%), or 3<sup>rd</sup> grade or primary 3 ( $n = 158$ ; 40.41%). Participants were asked to report on the language they first learned to speak at home. The majority of participants reported having learned to speak English ( $n = 140$ ; 35.81%), followed by participants who reported having learnt to speak Yoruba ( $n = 139$ ; 35.55%) first. Some participants ( $n = 39$ ; 9.97%) reported learning to speak Igbo first, while others reported learning to speak other Nigerian languages ( $n = 68$ ; 17.39%). There was a small number of participants ( $n = 3$ ; 0.77%) who reported learning to speak English in addition to another Nigerian language, with an even smaller number of participants ( $n = 2$ ; 0.51%)

reporting that they had learned to speak Hausa first. However, when asked about the languages currently spoken at home, most of the participants reported English ( $n = 142$ ; 36.32%); and 120 participants (30.69%) reported speaking English in addition to another Nigerian language. Other languages reported as spoken primarily at home include Yoruba ( $n = 25$ ; 13.81%), Igbo ( $n = 20$ ; 7.67%), Hausa ( $n = 54$ ; 6.39%), or other Nigerian languages ( $n = 30$ ; 5.12%).

Participants were also asked to report the age at which they learned to read. This ranged from 3 years of age, as reported by 7 participants (1.79%) to 13 years ( $n = 2$ ; 0.51%). Most participants ( $n = 133$ ; 34.02%), reported having learned to read at age 5. Majority of participants ( $n = 248$ ; 63.43%) reported having a bachelor's degree, while others ( $n = 2$ ; 0.51%) reported having a PhD. There were other participants ( $n = 3$ ; 0.77%) who reported having other types of qualifications to teach. There are 36 states in Nigeria in addition to the FCT, Abuja and all 36 states of the Federal Republic of Nigeria were represented in this study sample; with Abia being the state of origin reported by the largest number of participants ( $n = 26$ ; 6.65%). Participants demographics are summarized in Table 1 and Table 2 below based on information collected in the first section of the survey.

Table 1: Summary of Participants Demographic Data

Demographics	Distribution of Participants $n= 391$	Percentage of Participants %
Gender		
Female	230	58.82
Male	157	40.15
Other	2	0.51
Prefer Not to Answer	2	0.51
School Setting		
Private	180	46.04
Public	211	53.96
Age Group		
20-29 years	78	19.95
30-39 years	205	52.43
40-49 years	75	19.18
50+ years	33	8.44

Grade Taught		
Kindergarten	56	14.32
1 <sup>st</sup> grade/primary1	68	17.39
2 <sup>nd</sup> grade/primary2	109	27.88
3 <sup>rd</sup> grade/primary3	158	40.41
First Language Participants Learnt to Speak		
English	140	35.81
English + Nig Lang.	3	0.77
Yoruba	139	35.55
Igbo	39	9.97
Hausa	2	0.51
Other	68	17.39
Current Spoken Home Language		
English	142	36.32
English + Nig Lang.	120	30.69
Yoruba	25	13.81
Igbo	20	7.67
Hausa	54	6.39
Other	30	5.12
Age Participants Started Reading		
3	7	1.79
3.5	1	0.26
4	17	4.35
5	133	34.02
5.5	2	0.51
6	126	32.23
6.5	2	0.51
7	51	13.04
7.5	2	0.51
8	25	6.39
9	5	1.28
10	7	1.79
11	1	0.26
12	1	0.26
13	2	0.51
NR	9	2.30
Highest Degree Obtained		
PhD	2	0.51
Master's	47	12.02
Bachelor's	248	63.43
NCE, PGDE	64	16.37
HND	21	5.37
OND	6	1.53
Other	3	0.77

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*Note.* Nig Lang. = Nigerian language; NR= not reported; PhD = Doctor of Philosophy; NCE, PGDE = Nigerian

college of education, post graduate diploma in education; HND = higher national diploma; OND = ordinary national diploma.

Table 2: Summary of Participants Demographic Data (State of Origin)

Demographics	Distribution of Participants	Percentage of Participants
	<i>n</i> = 391	%
State of Origin		
Abia	26	6.65
Imo	25	6.39
Oyo	22	5.63
Kaduna	22	5.63
Kogi	21	5.37
Edo	18	4.60
Adamawa	20	5.07
Taraba	16	4.09
Ogun	15	3.84
Benue	15	3.84
Delta	15	3.84
Plateau	15	3.84
FCT/Abuja	14	3.58
Ondo	12	3.07
Ekiti	11	2.81
Anambra	9	2.30
Borno	9	2.30
Katsina	9	2.30
Lagos	8	2.05
Osun	8	2.05
Kwara	8	2.05
Kano	7	1.79
Yobe	7	1.79
Nasarawa	7	1.79
Enugu	7	1.79
Sokoto	6	1.53
Akwa	5	1.28
Jigawa	5	1.28
Bayelsa	5	1.28
Bauchi	5	1.28
Rivers	4	1.02
Kebbi	4	1.02
Gombe	4	1.02
Crossriver	3	0.77
Zamfara	2	0.51
Niger	1	0.26
Ebonyi	1	0.26

*Note.* FCT = Federal Capital Territory.

### Study Procedures

Following approval by the Institutional Review Board at UT Austin, the study recruitment flyer was shared with teachers within the private school setting, through the President of FCT Chapter of the National Association of Proprietors of Private Schools

(NAPPS), at a monthly meeting for private school owners. Teachers in the private school sector were also recruited at two separate conferences held on February 5<sup>th</sup> and May 6<sup>th</sup>, 2022.

Upon approval by the Federal Ministry of Education, teachers in the public school system who teach reading to students in the primary grades were sent the study flyer through the Ministry's Department of Training via text message and email with an introduction of the study, clearly stating the voluntary nature of participation. The study flyer was also distributed through other social media platforms (i.e., Facebook, Instagram, Twitter).

Teachers accessed the survey from the Qualtrics link provided on the study flyer. They could complete the survey using a personal web-enabled device, or they could access a computer and modem for Wi-Fi connection kept in a secure office space at Royal Family Academy. This computer was purchased for the study to ensure that teachers that did not have access to a web-enabled device or reliable internet services had the opportunity to participate. An incentive of 500-naira worth of mobile call card credit for the telecommunication service network of the teacher's choice was given to each participant who completed the survey. Participants were asked to provide their email address and/or mobile number in order to receive this credit.

## **Measures**

The survey was divided into three sections to tap: (a) background information, (b) teacher knowledge, and (c) perceptions and beliefs about early reading. Complete set of survey items are included in Appendix A, B, and C.

### ***Background Information***

The first part of the survey included a series of questions to collect demographic and background information about participants. Teachers were asked to specify their age, gender, state of origin, what the first language they learned to speak at home was, what language(s) they



currently speak at home, at what age they learned to read, in what language they first learned to read, what the main language of instruction was when they started secondary school, and what languages they are able to read fluently in. Participants were also asked to specify what educational sector (public or private) they currently teach in, what grade level(s) they teach, degrees completed, numbers of years teaching experience they have accumulated, and their teaching credentials/certifications. Further, they were asked to report whether they have attended any graduate programs or certification courses, and how many formal courses and number of PD training they have attended related to reading or reading instruction. This section of the survey instructed participants by stating, “The following information is being collected so that we can describe the overall characteristics of study participants. You may skip any questions you do not wish to answer. Please do not write your name on this form. All collected information is confidential and will be reported in terms of overall percentages and averages (i.e., no individual participant characteristics will be shared).”

### ***Teacher Knowledge Survey***

Participants completed a 40-item teacher knowledge survey. These items were taken from Bos et al. (2001), Spear-Swerling and Cheesman (2012), and the Texas Educator Certification Examination Program (2020). The current data collection included 20 items from Bos et al.’s (2001) assessment of foundational knowledge of teachers, including structure of the English language at both the word and sound levels . The authors reported a Cronbach’s alpha of 0.60 for the 20 items. I also included 10 items from Spear-Swerling and Cheesman (2012) survey designed to mimic Pearson’s Foundations of Reading Test used for teacher licensure. The items tap participants’ knowledge related to development, instruction, and intervention in key areas of reading (i.e., phonemic awareness, phonics, fluency, vocabulary, comprehension).

Approximately 33% of the items tap content knowledge and the remaining 67% focus on application. Spear-Swerling and Cheesman (2012) reported Cronbach's alpha for the original survey items across the following categories: phonemic awareness/phonics = 0.71; fluency, vocabulary, and comprehension = 0.71; and assessment/RTI = 0.77. Finally, I included 10 items that were drawn from the Texas Educator Certification Examination (2020); this is the exam required by the state of Texas for every teacher seeking certification. This exam is designed to ensure that teacher possess the prerequisite content and professional knowledge that is necessary for an entry position into the Texas public school system.

All 40 items on the survey were divided into three categories: 14 items tapped reading pedagogy, with questions related to instruction and assessment practices; 21 items tapped reading development related to foundational reading skills; and 5 items tapped reading development related to meaning making and comprehension. All items were multiple-choice, with a five-response option. Participants were directed to "Read each of the following multiple-choice questions carefully. Select the one best answer. If you do not know the answer to an item at all and would just be guessing, you can select option "e" (I don't know)."

### ***Perceptions and Beliefs about Early Reading***

Participants were asked to complete a 16-item Likert scale survey tapping their perceptions and beliefs about various early reading practices. Each item was answered on a six-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). The survey included 12 items from the Bos et al. (2001) Teacher Perceptions About Early Reading and Spelling survey, with 6 questions focused on explicit code instruction and 6 questions focused on implicit code instruction respectively. I included an additional 4 questions specific to the Nigerian context (i.e., Parents/guardians have a role in teaching their children how to read; It is important for Nigerian

students to be proficient readers in English; It is important to teach Nigerian students how to read in other Nigerian languages *instead* of English; It is important to teach Nigerian students how to read in other Nigerian languages in *addition* to English). Questions were also tailored to not only specifically understand teachers' perceptions and belief of how to teach reading to students, but to also understand teachers' perceptions and believes about how to teach reading to students including the use of Nigerian languages. Participants were provided with the following instructions: "Each of the following statements represents a belief of early reading development and instructional practices. Read each item carefully, then mark your level of agreement or disagreement (1-6)."

### **Data Analysis Plan**

This study involved data gathered from an online survey conducted with primary grade teachers within FCT Abuja, Nigeria. The data used to address research questions came from the following three sections: background information, the teacher knowledge survey, and the perceptions and beliefs about early reading questionnaire. Analytic procedures used in answering the four research questions are described below.

**RQ1: How do primary grade teachers (Kindergarten to 3<sup>rd</sup> grade) in FCT Abuja, Nigeria perform on a survey tapping their knowledge about reading?**

Descriptive statistics were used to address this research question and explore responses from the Teacher Knowledge Survey (TKS). The percentage of correct responses, means, standard deviations, as well as range of teachers' scores are calculated and reported in the results.

**RQ2: Are there differences on reported knowledge between teachers in the public and private sector in FCT Abuja, Nigeria?**

Based on reported finding from RQ1, I disaggregated data for participants within the public and private school settings. A series of independent t tests were conducted to compare the knowledge of teachers in the public and private sectors across the three sections (i.e., reading pedagogy, foundational skills, and meaning making/comprehension). The differences in scores and statistical significance of the result of the t tests are reported.

**RQ3: What are the perceptions and beliefs about early reading reported by primary grade teachers in FCT Abuja, Nigeria?**

Descriptive analyses was used to address this research question and used to explore participants responses from the perceptions and beliefs questionnaire. The percentages of participant's responses was analyzed and reported based on the answers participants selected on the Likert scale of 1= strongly agree, 2= disagree, 3= mildly disagree, 4= mildly agree, 5= agree, and 6= strongly agree.

**RQ4: Does teacher certification, years of teaching experience, coursework, or professional development training impact teachers' performance on different sections of the knowledge survey?**

In the background information section of the online survey, teachers were asked to report whether they had a teaching certification(s) and years of teaching experience. They were also asked to report whether they had completed formal coursework related to reading development, reading instruction, or intervention. These courses could have been part of their pre-service teacher training or completion of another teaching certification. Teachers were separately asked to report professional development (PD) trainings. Both coursework and PD were coded as received or not.

To further analyze this research question, a multiple regression analysis was conducted to determine the relationship between key variables of interest and teachers' knowledge as measured by the TKS. The regression model looked at the effect of teaching certification (**cert**), years of teaching experience (**yrsteaching**), formal coursework (**fcourses**), and professional development training (**PD**) and how this relates to the TKS scores of primary grade teachers in FCT, Abuja. All analyses were conducted in RStudio (R Core Team, 2021). All variables were categorical. Specifically, **cert**, **fcourses**, and **PD** were treated as dichotomous variables scored as yes or no. The variable **yrsteaching** was dummy coded based on participants reported years of teaching experience. This variable was coded as 0 for participants that had less than 1 year of teaching experience, 1 for participants that had 1 year of teaching experience, 2 for participants that had 2 years of experience, 3 for participants that had 3 years, 4 for participants whose experience ranged between 4 to 9 years, 5 for participants that had between 10 to 14 years of teaching experience, and 6 for participants that had teaching experience of 15 years or more. The final model compared dummy coded 0 versus 1, 2, 3, 4, 5, and 6 respectively. The interaction terms of interest were created based on these contrasts. The full regression model is:

$$\mathbf{knowledge} = \beta_0 + \beta_1 (\mathbf{cert}) + \beta_2 (\mathbf{yrsteaching}) + \beta_3 (\mathbf{fcourses}) + \beta_4 (\mathbf{PD}) + \boldsymbol{\varepsilon} ,$$

Where  $\boldsymbol{\varepsilon}$  is the error term related to the variance of  $N(\mathbf{0}, \sigma^2)$ . The results of this multiple regression analysis is interpreted and reported.

## Chapter IV: Results

The current study analyzed data from a survey of primary grade teachers in FCT Abuja, Nigeria. The following sections describe the background and characteristics of the study sample, followed by results for each of the four research questions.

### **Teachers' Background and Characteristics**

To better describe the sample, participants were asked to report the first language in which they learned to read, the main language of instruction in secondary school, and the language(s) in which they currently read fluently. Participants were also asked to report their years of teaching experience, any teaching certification(s) or qualifications held, any formal courses related to reading instruction at the university-level or as part of their teaching certification process, and any professional training they have received related to reading instruction. This information is described below and summarized in Table 3.

### ***Reported Languages***

Most participants reported that English ( $n = 334$ ; 85.42%) was the first language in which they learned to read. A substantially smaller number of participants reported first learning how to read in Nigerian languages: Hausa (6.39%), Yoruba (2.81%), or Igbo (1.28%). The majority of participants reported being able to read fluently in English, with 113 participants reporting they read fluently in a Nigerian language in addition to English (28.90%). Notably, five participants (1.28%) reported that they did not read fluently in English.

Participants were also asked about the language of instruction when they first started secondary school. Most said their instruction was mainly in English ( $n = 375$ ; 95.91%) and an additional 9 participants (2.3%) indicated that instruction was in both English and a Nigerian

language. Interestingly, less than 1% of participants reported that their secondary school instruction was mainly in one of the three major Nigerian languages.

### ***Teaching Experience***

The largest group of participants reported having between 4 and 9 years of teaching experience ( $n = 149$ ; 38.11%). A small group of teachers reported 10 to 14 years of experience ( $n = 62$ ; 15.86%), followed by 15 or more years ( $n = 43$ ; 11%), and less than one year of experience ( $n = 10$ ; 2.56%).

### ***Teaching Certification***

Initially less than three-quarters of the sample reported having some form of teaching certificate or credential ( $n = 279$ ; 71%). Of the 112 participants who reported not having a teaching certification, 5 of those participants did later note holding a specific credential (e.g., Nigeria Certificate in Education [NCE], National Teachers Institute [NTI]) in a later item. For these participants their response to the question of whether or not they had a teaching credential was changed to 1 which changed their responses to a yes. There were two participants whose responses on the type of certification they possessed, that did not align. For those participants, they had indicated they had a teaching certificate but specifically entered none for the type of certificate, this was coded as 0 and the variable certificate (Cert) was changed to 0 which represents a no. If participants filled anything other than an actual teaching certificate/credential (e.g., NCE, NTI, TRCN, Post Graduate Diploma in Education (PDE; PGDE; PGD) Certification) this was also coded as 0. In total there were 284 participants (72.63%) who had some form of teaching credential, 107 participants (27.37%) who did not. The breakdown of the type of certification or credential is provided in Table 3; however, the most commonly reported

credential ( $n = 174$ ; 44.50%) was teaching certification from the Teachers Registration Council of Nigeria (TRCN).

### ***Reading Instruction Coursework and Professional Development***

Less than one-third of participants ( $n = 124$ ; 32%) reported having had formal coursework related to reading instruction in their university or teacher certification program. With majority of participants ( $n = 267$ ; 68%) reporting that they did not have any formal coursework related to reading. However, there were also two participants whose responses on the number of formal reading coursework they had taken, that did not align. For those participants, they had indicated they had attended formal classes for reading instruction but specifically entered 0 for the item number of formal courses. This was coded as 0 and the variable formal courses was changed to 0 which represents a no. In the end a total of 269 participants had no formal reading course work (68.80%) to report, and 75 did not know how many courses related to reading instruction (19.18%) they had taken.

Similarly, only one-third of participants indicated that they had previously attended a professional development training focused on reading ( $n = 161$ ; 33.50%), while the majority of participants ( $n = 260$ ; 66.50%) had not. Of those participants who reported having had some professional development training related to reading, there were participants who did not know how many trainings they had attended ( $n = 44$ ; 11.25%), some participants reported attending 2 trainings ( $n = 22$ ; 5.63%), and the remaining responses varied from 1 to 12 trainings.

### **Primary Grade Teachers' Knowledge About Reading**

To address research question 1, percentages of correct responses, means, and standard deviations were calculated for responses to the Teacher Knowledge Survey (TKS). This question sought to describe how primary grade teachers in FCT Abuja, Nigeria performed on a survey



tapping their knowledge about reading. For the total sample of 391 participants, the mean performance across all 40 items was 11.94 ( $SD = 3.86$ ). There was a total of 19 participants (4.86%) who scored between 20 to 24 on the TKS. Not one participant responded correctly to more than 24 of 40 items on the TKS.

Mean performance on the TKS by each of the three sections are reported as follows. Participants obtained a mean score of  $M = 7.29$  ( $SD = 2.65$ , range = 1-16), on the section related to foundational skills. For the section focused on pedagogical practices related to reading, participants obtained a mean score of 3.73 ( $SD = 1.85$ , range = 0-11). The mean score for the section related to meaning making/comprehension was  $M = 0.93$  ( $SD = 1.00$ , range = 0-4). Overall, teacher knowledge among this sample of teachers was extremely poor, although there was wide variability noted across all three sections of the TKS.

Table 3: Summary of Participants Background Characteristics

Background Characteristics	Number of Participants	Percentage of Participants (%)
First Language Participants Learnt to Read		
English	334	85.42
English + Nigerian Language	6	1.53
Yoruba	11	2.81
Igbo	5	1.28
Hausa	25	6.39
Other	7	1.79
NR	3	0.77
Current Language Participants Read Fluently		
English	272	69.57
English + Nigerian Language	113	28.90
Yoruba	2	0.51
Igbo	0	0
Hausa	3	0.77
Other	0	0
NR	1	0.26
Main Language of Instruction in Secondary School		
English	375	95.91
English + Nigerian Language	9	2.30
Yoruba	1	0.26

Igbo	1	0.26
Hausa	0	0
Other	4	1.02
NR	1	0.26
Years of Teaching Experience		
Less than 1	10	2.56
1	12	3.07
2	38	9.72
3	77	19.69
4 to 9	149	38.11
10 to 14	62	15.86
15 or more	43	11.00
Certification		
Yes	284	72.63
No	107	27.37
Type of Certification		
NCE	76	19.44
NTI, PDE, PGDE, PGD	34	8.70
TRCN	174	44.50
NR	107	27.37
Formal Coursework		
Yes	122	31.20
No	269	68.80
Number of Formal Courses		
0	269	68.80
1	7	1.79
2	14	3.58
3	9	2.30
4	8	2.05
5	2	0.51
6	2	0.51
9	2	0.51
12	3	0.77
I don't know	75	19.18
Professional Development Training		
Yes	131	33.50
No	260	66.50
Number of PD Trainings		
0	260	66.50
1	18	4.60
2	22	5.63
3	18	4.60
4	8	2.05
5	9	2.30
6	6	1.53
7	1	0.26

8	2	0.51
9	2	0.51
12	1	0.26
I don't know	44	11.25

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*Note.*  $N = 391$ . NR = not reported; NCE = National College of Education certification; NTI = National Teachers Institute certification; PDE, PGDE, PGD = Post Graduate Diploma in Education certification; TRCN = Teachers Registration Council of Nigeria certification

### **Differences in Knowledge Between Public and Private School Teachers**

To address the second research question, I disaggregated the data to examine differences on reported knowledge between teachers in the public and private sector in FCT Abuja, Nigeria. The mean performance for each group (i.e., public and private) across all 40 items of the TKS was examined. Private school teachers had a mean score of 13.30 ( $SD = 4.25$ , range = 5-24) on the TKS, while public school teachers had a mean score of 10.80 ( $SD = 3.08$ , range = 4-24). These scores suggest that teachers in private schools performed somewhat better on the TKS than teachers in public schools.

Next, a series of independent sample t-tests were run to further compare public versus private school teachers' scores on the three sections of the TKS: reading pedagogy, foundational skills, and meaning making/comprehension. Independent samples t-test is a long-established procedure that has been used to statistically examine the difference between two means based on an assumption of equal variances. The test used in the current study is known as the Welch t-test, which relaxes the assumption of equal variances (White et al., 2022). Results are reported in Tables 4 below. The statistical hypothesis for this research question is alternative hypothesis true difference in means is not equal to 0:

$$H_0 : \mu_1 = \mu_2$$

$$H_1 : \mu_1 \neq \mu_2$$

Table 4: Independent Samples T-Test

	T-test for Equality of Means		
	<i>t</i>	<i>df</i>	Mean Diff
Reading Pedagogy	4.07	335.98	0.76*
Foundational Skills	5.11	335.15	1.36*
Meaning Making/Comprehension	3.37	377.73	0.34*

Note. *df* = degrees of freedom; \* = .05, \*\* = .01

Results indicate that the mean difference between public versus public school teachers was statistically significant, with teachers in the private sector performing better on all three sections of the TKS. On the reading pedagogy section, private school teachers had a mean score of 4.14 (*SD* = 2.05) compared to public school teachers (*M* = 3.37, *SD* = 1.60; *t* = 4.07, *df* = 335.98, *p* = <.05). The same pattern held true on the foundational skills section (*t* = 5.11, *df* = 335.15, *p* = <.05), with means of 8.02 (*SD* = 2.91) and 6.66 (*SD* = 2.24) for private versus public school teachers, respectively. A significant difference was also found on the meaning making/comprehension section (*t* = 3.37, *df* = 377.73, *p* = <.05), with means of 1.11 (*SD* = 0.10) and 0.77 (*SD* = 0.98) for private versus public school teachers, respectively.

### **Teachers’ Perceptions and Beliefs About Early Reading**

To address research question 3, participants’ responses on their perceptions and beliefs about early reading were analyzed by calculating percentages across items. Beliefs about explicit and implicit code instruction were tapped with 6 items each, and I included an additional 4 items specific to learning in the Nigerian context. According to Bos et al. (2001), participants should report agreement for the explicit code instruction and disagreement for the implicit code instruction statements, based on their alignment with reading science. The questions about the Nigerian context did not have an expected response.

Percentages for responses to each survey item are presented in Table 5. However, in the section below, I report combined percentages for “strongly agree,” “agree,” and “mildly agree” to represent an affirmative response, and “strongly disagree,” “disagree,” and “mildly disagree” to represent a negative response. For explicit code instruction, the total mean across all 6 items was 86.13% for agree and 12.87% for disagree. To the statement that it is important for early elementary teachers (K-3) to know how to teach and assess their student’s phonological awareness skills, 85.42% agreed while only 14.58% disagreed. When asked whether poor phonemic awareness adds to reading failures, 82.35% of participants agreed and 17.65% disagreed. Participants were asked if controlling text through consistent spelling patterns was an effective method in helping students with reading challenges identify words, 82.23% agreed and 11.76% disagreed. When asked if it is important for K-3 teacher to be able to effectively administer phonics instruction to their students, 87.47% of participants agreed while 12.53% disagreed. Participants were asked if they believed that it was important for teachers to demonstrate how to segment words into phonemes: 89.26% agreed and 10.74% disagreed. For the final statement that phonics instruction is beneficial for children who are struggling readers, 90.02% agreed and 9.98% disagreed.

For the implicit code instruction, the total mean across all 6 items was 79.24% for agree and 20.76% for disagree. When asked if they thought time spent reading contributes to students reading improvement, 89.26% of participants agreed while 10.73% disagreed. Participants were asked if they believe all children could read using literature-based texts, 80.05% agreed and 19.95% disagreed. When teachers were asked if beginning readers should not be corrected if they say the word “house” instead of “home,” 61.13% agreed and 38.87% disagreed. To the statement that students’ abilities to use context clues are more important than their grapho-phonics cues

abilities, 65.73% agreed and 34.27% disagreed. When asked whether pictures could help children identify words in the beginning stages of reading, 89.26% agreed and 10.75% disagreed. Finally, participants were asked if they thought adult-child shared book reading enhances literacy growth: 90.03% agreed and 9.97% disagreed. There was a slight decrease in the percentage of teachers' agreement with some implicit code instruction statements, though level of agreement level across items was still high.

Next, I examined responses to the four questions about early reading in the Nigeria context. When asked whether parents or guardians can play an essential role in teaching their children how to read 91.82% of participants agreed, while 8.18% disagreed. When asked if they felt it is important for Nigerian students to be proficient in reading the English language, the majority of participants (91.05%) agreed, while only 8.94% disagreed. One item asked if it is important to teach Nigerian students how to read in Nigerian languages *instead of* English; 45.02% agreed and 55% disagreed. Finally, when asked if it is important to teach Nigerian students how to read in Nigerian languages *in addition to* English, 91.82% agreed and 8.18% disagreed.

Table 5: Teachers Perceptions and Beliefs About Early Reading

	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
	Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree
<b>Explicit Code Instruction</b>						
K-3 teachers should know how to assess and teach phonological awareness (i.e., knowing that spoken language can be broken into smaller units)	24 (6.14)	12 (3.07%)	21 (5.37%)	58 (14.83)	196 (50.13%)	80 (20.46%)
Poor phonemic awareness (awareness of individual sounds in words) contributes to early reading failure	9 (2.30%)	19 (4.86%)	41 (10.49%)	92 (23.53%)	171 (43.73%)	59 (15.09%)
Controlling text through consistent spelling patterns (The fat cat sat on a						

mat) is an effective method for children who struggle to learn to identify words	9 (2.30%)	11 (2.81%)	26 (6.65%)	78 (19.95%)	209 (53.45%)	58 (14.83%)
K-3 teachers should know how to teach phonics (letter-sound correspondence)	10 (2.56%)	11 (2.81%)	28 (7.16%)	64 (16.37%)	165 (42.20%)	113 (28.90%)
It is important for teachers to demonstrate to struggling readers how to segment words into phonemes when reading and spelling	7 (1.79%)	14 (3.58%)	21 (5.37%)	69 (17.65%)	192 (49.10%)	88 (22.51%)
Phonics instruction is beneficial for children who are struggling to learn to read	4 (1.02%)	7 (1.79%)	28 (7.16%)	79 (20.20%)	174 (44.50%)	99 (25.32%)
<b>Implicit Code Instruction</b>						
Time spent reading contributes directly to reading improvement	13 (3.32%)	11 (2.81%)	18 (4.60%)	75 (19.18%)	179 (45.78%)	95 (24.30%)
All children can learn to read using literature-based authentic texts	9 (2.30%)	29 (7.42%)	40 (10.23%)	86 (21.99%)	175 (44.76%)	52 (13.30%)
If a beginning reader reads “house” for the written word “home,” the response should not be corrected	49 (12.53%)	75 (19.18%)	28 (7.16%)	60 (15.35%)	129 (32.99%)	50 (12.79%)
Learning to use context clues (syntax and semantics) is more important than learning to use grapho-phonetic cues (letters/sounds) when learning to read	15 (3.84%)	70 (17.90%)	49 (12.53%)	100 (25.58%)	124 (31.71%)	33 (8.44%)
Picture cues can help children identify words in early stages of reading	8 (2.05%)	10 (2.56%)	24 (6.14%)	68 (17.39%)	172 (43.99%)	109 (27.88%)
Adult-child shared book reading enhances language and literacy growth	10 (2.56%)	11 (2.81%)	18 (4.60%)	87 (22.25%)	189 (48.34%)	76 (19.44%)
<b>Nigerian Context</b>						
Parents (or other caregivers) play an essential role in teaching their children how to read	4 (1.02%)	7 (1.79%)	21 (5.37%)	57 (14.58%)	180 (46.04%)	122 (31.20%)
It is important for Nigerian students to be proficient readers in English	6 (1.53%)	6 (1.53%)	23 (5.88%)	67 (17.14%)	184 (47.06%)	105 (26.85%)
It is important to teach Nigerian students how to read in other Nigerian languages <i>instead</i> of English	81 (20.72%)	93 (23.79%)	41 (10.49%)	50 (12.79%)	102 (26.09%)	24 (6.14%)

It is important to teach Nigerian students how to read in other Nigerian languages in <b><i>addition</i></b> to English	4 (1.02%)	6 (1.53%)	22 (5.63%)	40 (10.23%)	179 (45.78%)	140 (35.81%)
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*Note.*  $N = 391$ .  $n$  = distribution of participants; % = percentage of distribution.

### **Influence of Professional Characteristics on Teacher Knowledge**

To answer research question 4, I conducted a multiple regression analysis to determine the relation between key variables of interest and teachers’ knowledge as measured. Professional learning variables included teaching certification, years of teaching experience, formal coursework, and professional development training related to reading instruction. All variables were categorical. Professional development, formal courses, and teaching certification were treated as dichotomous variables, whereas years of teaching experience was dummy coded based on participants’ reported experience.

#### ***Multiple Linear Regression Assumptions***

There are four key assumptions that must be met in order to conduct a multiple regression analysis: (a) normality, (b) linearity, (c) reliability of measurement, and (d) homoscedasticity (Osborne & Waters, 2002). Normality is the assumption that the dependent variables are normally distributed. I examined a quantile-quantile plot (Q-Q plot), histogram, and boxplot for TKS scores. The Q-Q plot uses the distributional assumption for a generalized linear model by checking the plot’s ordered deviance residuals against the quantiles of a standard normal distribution (Augustin et al., 2012). Visual analysis of the Q-Q plot presented in Figure 1 showed that the data were slightly deviated from normality. Thus, I further analyzed the data by plotting a histogram (Figure 2). Visual analysis of the histogram indicated that the data distribution was slightly skewed to the right, but otherwise looked normally distributed. This provides evidence that the assumption of normality has been met.



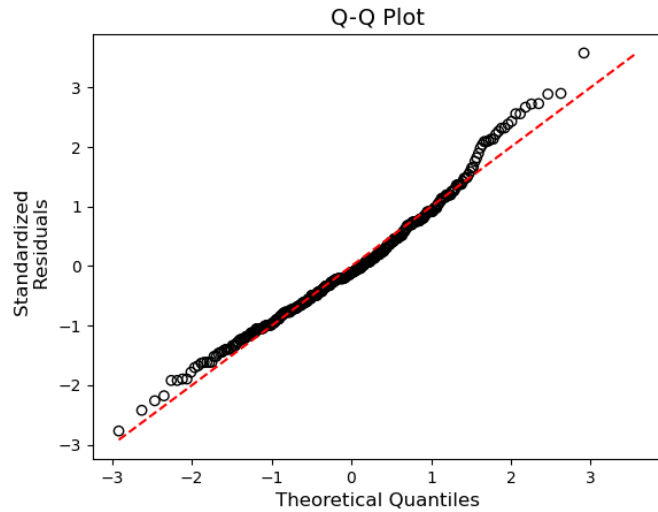


Figure 1: Q-Q Plot for Teacher Knowledge Survey

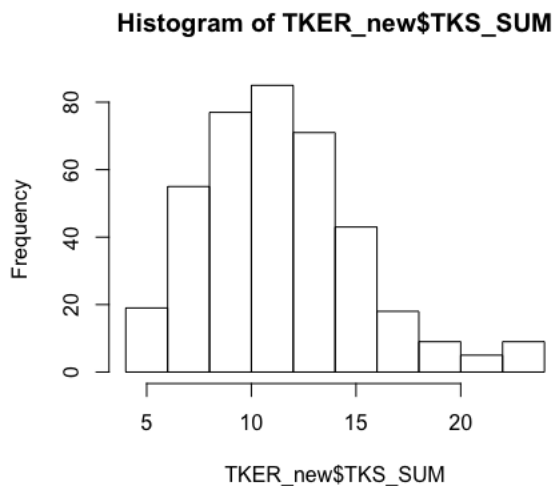


Figure 2: Histogram for Teacher Knowledge Survey

I also examined distribution of TKS scores on a boxplot, which showed three outliers (see Figure 3). I then proceeded to delete the outliers in order to run the analysis again with the outliers removed, and results with and without the outliers were compared to ensure there were no influential cases biasing the model. The outliers did not appear to have any significant effect on results of the analysis, so I retained these cases in the final study sample.

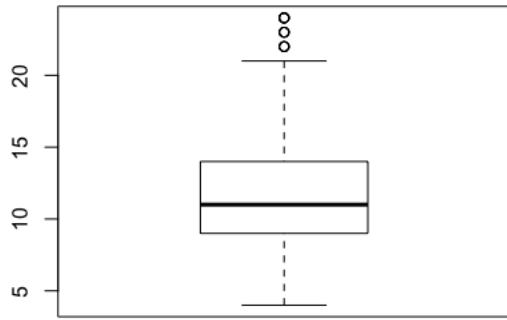


Figure 3: Boxplot for Teacher Knowledge Survey

For the assumption of linearity to be met, the residual plot should show a horizontal band around zero (Belloto & Sokolovski, 1985). A visual analysis of the plot below (Figure 4) shows the red trend line deviates slightly from the zero residual constant line, which implies a slight deviation from linearity. However, I proceeded with my analysis as the deviation was so slight that in this case, did not show a significant violation of the assumption of linearity.

To test reliability of measurement, which is the assumption that the reliability coefficients in our regression analysis range from 0.00 to 1.00, with higher coefficients indicating higher levels of reliability, I used the Cronbach's alpha test. The results showed a standardized alpha value of 0.78, which satisfied the assumption (Kimberlin & Winterstein, 2008). Finally, in order to test homoscedasticity of variance, which is also known as the assumption of constant variance, I visually analyzed the residual plot in Figure 4. The residual plot shows a horizontal band around zero (Dibiasi & Bowman, 1997). It also shows two distinct clusters of data points, which can be explained by the data sample coming from two school settings (i.e., public and private) within FCT, Abuja Nigeria. As such, the residual plot shows that this assumption of constant variance has been met.

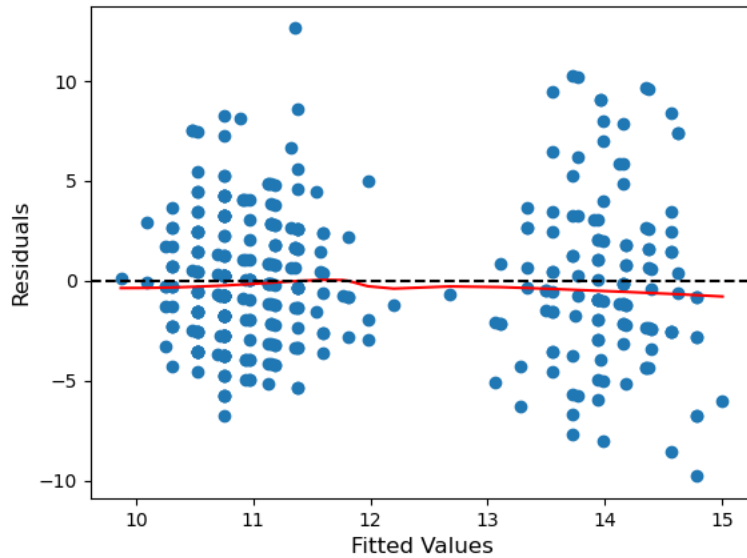


Figure 4: Residual Plot for Teacher Knowledge Survey

### ***Findings Related to Impact of Professional Learning***

To answer research question 4, I conducted a multiple linear regression analysis to examine the impact of professional learning characteristics on teacher knowledge. Table 6 presents the regression findings and the model's degree of explaining the variance in the independent variable was  $R^2 = 0.15$ . The results show the relative impact of teaching certification, years of experience, formal coursework, and professional development training on TKS scores. Overall, the results of the analysis suggest that three of these variables (i.e., teaching certification, years of experience, formal coursework) did not have any statistical significance on the TKS scores. However, PD was shown to have a significant positive impact on teachers' TKS scores, suggesting that teachers who reported having participated in some sort of professional development training had a significantly higher score on the TKS than the participants who did not receive PD at all.

Table 6: Multiple Linear Regression Analysis Results Showing Influence of Professional Learning Characteristics on Teacher Knowledge

Variables	Teachers' TKS Scores			
	Estimate	Std. Error	<i>t</i> -value	<i>p</i> -value
(Intercept)	10.18	1.23	8.28	<0.001***
Cert1	-0.65	0.40	-1.60	0.11
YrstTeaching1	0.87	1.54	0.57	0.57
YrstTeaching2	0.60	1.29	0.46	0.64
YrstTeaching3	1.46	1.23	1.19	0.23
YrstTeaching4	0.96	1.19	0.80	0.42
YrstTeaching5	1.03	1.24	0.84	0.40
YrstTeaching6	2.22	1.28	1.73	0.08
Fcourses1	0.45	0.44	1.03	0.30
PD1	2.78	0.43	6.520	<0.001***

*Note.* Cert1 = Certification; YrsTeaching = years of teaching experience; Fcourses = formal courses related to reading; PD= professional development training; \* = .05, \*\* = .01, \*\*\* = 0.001.

## Chapter V: Discussion

The current study sought to examine the knowledge of early reading development and instruction among primary grade teachers in FCT Abuja, Nigeria. Previous research has revealed that very few reading intervention studies have been conducted in Nigeria or on the continent of Africa as a whole (White et al., 2022) and, as such, we are limited in our knowledge of how best practices in reading have been implemented within this context. Further, there has been little research to date investigating the teaching workforce. Some work has examined teachers' reading knowledge as associated with instructional practices and, consequently, student outcomes at the secondary or higher education level (Bada, 2007; Olasehinde-Williams et al., 2018), but no studies have focused specifically on teachers' knowledge of early reading. As such, this work sought to expand the literature base related to primary grade teachers' reading knowledge in FCT Abuja, Nigeria. The findings related to the four research questions are discussed in the sections below.

Overall, the findings from this study align with previous research indicating that teachers have very limited knowledge when measuring key knowledge and skills known to be associated with effective reading instruction (Borg, 2003; Wong & Russak, 2020). The findings from this study are also consistent with some previous research suggesting that years of teaching experience does not necessarily influence teacher knowledge (Al-Hazza et al., 2008; Carreker et al., 2010). However, participation in professional developing (PD) trainings was found to have an impact on teachers' knowledge. This also aligns with prior research suggesting that PD training for teachers who teach literacy to their students impacts teachers' knowledge and their ability to translate this knowledge to practice (Binks-Cantrell et al., 2012; Desimone et al., 2011; Hill & Chin, 2018; Ingvarson et al., 2005; Timperley et al., 2008).

## **Performance of Teachers in FCT Abuja, Nigeria on the TKS Measure**

The first research question explored the depth of teacher's knowledge based on their performance on a 40-item Teacher Knowledge Survey (TKS). Thus, the first question asked: How do primary grade teachers (Kindergarten to 3<sup>rd</sup> grade) in FCT Abuja, Nigeria perform on a survey tapping their knowledge about reading? The findings indicated that teacher's knowledge was very limited across all three sections of the survey: reading pedagogy, foundational skills, and meaning making/comprehension.

On the TKS measure, teachers had a mean overall score of 11.94 across the 40 items, which is a mean of 29.85% correct. Low performance was observed across the three sections: mean of 34.71% correct on items related to foundational skills, 26.64% correct on pedagogical practices, and 18.6% on meaning making/comprehension. This low performance on the TKS was consistent across participants, with none of the participating teachers performing particularly well. There were 19 participants out of 391 who scored 20 and above, with the highest score attained being 24 items correct out of the total 40 (60% correct). This is concerning as students require continued explicit instruction to make gains in reading. They are increasingly faced with more complex text as they advance in grade level and those who struggle are often unable to catch up with their peers (Juel, 1988; Moats, 1999). There is compelling evidence that teachers' knowledge is an important indicator of classroom practices (Wilkinson, 2005; Yoon et al., 2007) that can have an impact on student achievement (Basma & Savage 2018; Didion et al., 2020).

While I was unable to directly test differences between Nigerian teachers in this sample and teachers in a U.S. context, I compared TKS scores reported here to teachers' performance on the full 66-item survey used by Spear-Swerling and Cheesman (2012). The participants in that study obtained the highest mean score on the fluency/vocabulary/comprehension subscale with a

mean of 64.9% correct items. On the phonemic awareness/phonics subscale, participants obtained a mean score of 61.2%, and 57.9% on the assessment/RTI subscale. While teachers in the Spear-Swerling and Cheesman (2012) study appeared to have low knowledge overall, they performed substantially better than those in the present study sample. It may also be worth noting that 27.37% of teachers in the present study sample did not hold a teaching certification.

The level of teacher knowledge across different contexts is an important consideration. It is possible that best practices in reading instruction and intervention will have a hard time being used in a Nigerian setting, not necessarily because different practices are needed, but because teachers are lacking the knowledge necessary to implement these practices. This is an empirical question that has yet to be investigated. As Olasehinde-Williams et al. (2018) pointed out, teachers have to have adequate knowledge in order to successfully transfer this knowledge to others. Implementation effectiveness is often a struggle even in the U.S. context (Moats, 1994; Piasta et al., 2009; Pittman et al., 2020), so one might imagine this would be exacerbated in a context with more limited resources and a less skilled workforce.

### **Differences in Knowledge Between Teachers in Public and Private Schools**

For the second research question, I wanted to better understand how teachers' knowledge might differ across the public and private school sectors. Hence, I asked: Are there differences on reported knowledge between teachers in the public and private sector in FCT Abuja, Nigeria? Results suggested that there were significant differences between the groups, with private school teachers performing better on the TKS. Private school teachers performed higher on all three sections of the TKS, with an overall mean score of 13.30 (out of 40) for teachers who teach students in private schools as opposed to their colleagues who teach students in public schools who had an overall mean score of 10.80.

This might be explained by the fact that private school teachers, though coming from the same pool as public school teachers, have access to more infrastructure, training, and resources (Ugwulashi, 2012). There is lower student school enrollment for Nigerian children than the average enrollment ratio for other African countries (Federal Ministry of Education, 2003). Students who attend private schools tend to be from more affluent socioeconomic backgrounds than their counterparts who attend public schools (Adegun et al., 2013), and instruction is considered higher quality in private schools than public schools (Tooley et al., 2005). This is an important consideration because in Nigeria, unlike the U.S. context, private schools accommodate a greater number of students; data reported in the 2015 Nigeria Education Data Survey (National Population Commission [Nigeria] and RTI International, 2015) suggests that approximately 33% of students are enrolled in private schools.

### **Teachers' Perceptions and Beliefs About Early Literacy**

This study also tapped teachers' perceptions and beliefs about how reading should be taught at the primary level. The third research question asked: What are the perceptions and beliefs about early reading reported by primary grade teachers in FCT Abuja, Nigeria? A 16-item survey was used, with 12 items directly drawn from Bos and colleagues' (2001) survey of teacher perceptions of early reading and 4 questions focused on the Nigerian context. For the purpose of comparison, I converted the percentages reported earlier in the results section of the current study to means on the 6-point Likert scale. The results from the Bos et al. (2001) study, which explored the perceptions and beliefs of preservice and in-service teachers indicated that, preservice teachers and in-service teachers generally agreed on the importance of explicit code instruction ( $M = 5.2, SD = 0.5; M = 5.4, SD = 0.4$ , respectively), while agreement about the importance of implicit code instruction fell between mildly agree and agree for both preservice



( $M = 4.5$ ,  $SD = 0.6$ ) and in-service teachers ( $M = 4.5$ ,  $SD = 0.5$ ). The teachers in FCT Abuja, Nigeria's perceptions and beliefs on the other hand, fell between mild agreement to agreement ( $M = 4.68$ ,  $SD = 1.13$ ) for the explicit code instruction statements, with similar results ( $M = 4.38$ ,  $SD = 1.26$ ) for statements related to implicit code instruction.

The preservice and in-service teachers in the Bos et al. (2001) study had a mean of 3.40 ( $SD = 1.30$ ) and of 3.13 ( $SD = 1.16$ ), respectively, when responding to whether using context clues is more important than learning letter-sound relationships while learning to read while teachers in the present sample has a mean of 3.85 ( $SD = 1.35$ ). The preservice and in-service teachers in the Bos et al. (2001) study had mean scores as follows: 3.75 ( $SD = 1.49$ ) and 3.14 ( $SD = 1.45$ ) for the statement all children can learn to read using literature-based authentic text, and 5.77, ( $SD = 0.54$ ); 5.84 ( $SD = 0.40$ ) for the statement related to adult child shared reading. For the present sample, teachers in FCT Abuja had a mean of 3.89 ( $SD = 1.35$ ) for their perceptions that context clues are more important than letter-sound knowledge, 4.39 ( $SD = 1.20$ ) for the same statement above about literature-based text, and a mean of 4.69 ( $SD = 1.08$ ) for the statement related to adult-child shared reading. Bos et al. (2001) highlighted that participants should report agreement for the explicit code instruction and disagreement for the implicit code instruction statements, based on their orientation with the science of reading. However, teachers in FCT, Abuja Nigeria reported agreement not only for the explicit code instruction statements, but for the implicit code instruction statements as well, which is concerning.

I separately considered four questions focused on teachers' perceptions and beliefs about reading development and instruction in the Nigerian context. When asked whether parents or guardians play an essential role in teaching their children to read, 91.82% of participants agreed. When asked if they felt it is important for Nigerian students to be proficient readers in English,

91.05% agreed. I asked two other questions focused on the language that children are taught how to read in; 91.82% reported that it is important to teach Nigerian students how to read in Nigerian languages *in addition to* English and 45.02% reported that it is important to teach Nigerian students how to read in a Nigerian language *instead* of English. This last statement is the only one where the majority of participants disagreed, with 55% saying that students should not have another language instead of English, which sheds some light on the feelings of teachers in the FCT Abuja, Nigeria regarding the importance of the English language to their students learning.

Overall, there was a high level of endorsement of all statements about early reading instruction (related to both explicit and implicit code instruction) among teachers in this sample from FCT Abuja, Nigeria. As previously reported, this sample had low levels of knowledge related to reading development and instruction as measured by the TKS; as such, it possible that their limited knowledge led to generalized endorsements of a broader range of literacy-related practices. Future research should expand these findings to examine instructional practices taking place in Nigerian classrooms and how they relate to teachers' beliefs about various aspects of early reading instruction.

### **Variables that Impact Teachers Performance on the TKS**

Finally, I wanted to understand whether teacher characteristics that previous studies have suggested to influence reading knowledge would play a role for teachers' knowledge in FCT Abuja. Specifically, I considered four professional characteristics: certification, years of teaching experience, formal coursework related to reading, and professional development training. I asked: Does teacher certification, years of teaching experience, coursework, or professional development training impact teachers' performance on different sections of the knowledge survey? My findings indicated that participation in PD focused on reading instruction did have a

positive significant effect on TKS scores. However, teacher's certification, formal course work, and years of experience did not statistically effect teachers' scores on the TKS. That is to say, teachers performed similarly on the TKS regardless of whether or not they were credentialed, whether or not they had completed formal coursework related to related, and regardless of the number of years that they had been teaching. Previous research conducted in the U.S. has shown mixed findings related to the importance of these professional characteristics.

Although not statistically significant, teachers who had 15 years or more of teaching experience outperformed teachers who had 0 years of teaching experience on the TKS with a *p*-value of 0.08. Bos et al. (2001) reported that for participants in their study, the teacher knowledge scores were not statistically impacted by their years of teaching experience, for teachers who had 1 to 5 years of teaching experience versus teachers who had 6 to 10 years of experience. However, in-service teachers who had 11 or more years of teaching experience demonstrated statistically significant higher knowledge on the reading survey than the teachers who had 1 to 5 years of teaching experience. This aligns with the findings of this current study as teachers who had more than 15 years of teaching experience in this current sample showed some significant knowledge difference than the teachers whose teaching experience ranged from less than one year to 14 years. It is assumed that years of teaching experience is associated with exposure to more professional development trainings; however, the inconsistent findings across studies (e.g., Al-Hazza et al., 2008; Bos et al., 2001; Carreker et al., 2010; Daniel, & King, 1998) seem to suggest that it takes several years for the effect of "experience" to accumulate, which would indicate the need to better address teachers' reading knowledge through other direct, intensive training opportunities.

## **Limitations**

There are several limitations to this study. First, due to the COVID-19 pandemic, I was unable to travel to Nigeria to oversee an in-person data collection process; thus, participants completed the survey online at their convenience. Online research has limitations, which I tried to account for in our research design and implementation. For example, it is possible that participants attempted to complete the survey multiple times or clicked through the survey, either falsifying or not attending to their responses, in order to receive the incentive. In order to address these concerns, I applied best practices in survey research to screen all incoming data. All entries were screened by two researchers for reliability purposes and procedures were put in place to exclude invalid or fraudulent responses. Specifically, I excluded repeated entries (e.g., same combination of signature on consent form, email address, and/or telephone number) and “fast clicks” (e.g., completion of the survey in less than 7 min).

Another potential limitation of the present study is that of generalizability. The current sample included only teachers from FCT Abuja, Nigeria. Though all 36 states of the Federal Republic of Nigeria were represented in this current participants’ sample of 391 teachers, it remains unclear whether findings related to teachers in FCT Abuja would generalize to teachers of other states in Nigeria. Nigeria is popularly known as the “giant of Africa” as it is the largest country in the continent, with an extremely diverse population of over 450 ethnic languages (Anyanwu et al., 2013). While the current study included only teachers from the Federal Capital Territory (FCT), I purposefully selected this state because it is the Capital of Nigeria. This is where the President, Senate, and House of Assembly is located, and the government oversees the whole country from the FCT (Musa & Jacob, 2021). FCT, Abuja is geographically centered in the middle of Nigeria, and it is likely that teachers in this region have access to training and

resources. Thus, if teachers in FCT, Abuja are lacking knowledge of effective reading practices, it is likely that this would be true across other parts of Nigeria. However, this is a question that must be addressed in future research.

Finally, there are potential limitations related to measures used in this study to tap teachers' knowledge and beliefs about early reading. For example, the Perceptions and Beliefs About Early Reading survey was developed by Bos and colleagues (2001). This survey has been used only in a U.S. context and was developed 20 years ago. It is possible that some of the items across my two study measures are not relevant in certain international contexts or that the phrasing of some items may be interpreted differently by teachers in Nigeria. Further, Bos et al. (2001) coded the items as representative of explicit or implicit code instruction—and interpreted agreement with explicit code instruction statements as positive and with implicit code instruction statements as negative. However, reading science has continued to evolve over since this measure was developed and there have been evolutions in our understanding of some of these instructional practices; as such, it is possible that the coding of explicit and implicit statements requires revision. However, I selected these measures of teacher knowledge and perceptions of early reading because they have been widely used in the past and have been tested for reliability. I did not alter items to allow for comparison between the current study sample and previous studies that have been conducted with U.S. samples. Future studies should consider exploring updated measures in these areas, as well as adapted questions for international contexts.

### **Implications for Future Research**

Findings from this study have important implications for understanding the teaching workforce and potential influences on delivery of reading instruction in Nigeria. Previous studies have demonstrated that knowledge of reading instruction has an impact on their practices and,

indirectly, on student achievement outcomes (Darling-Hammond et al., 2009). However, these studies have all been within the U.S. context; as such, there is a need to investigate workforce issues, such as teacher knowledge, within Nigeria if we are to translate evidence-based instructional practices to this context. The present study offers important information related to teachers' knowledge related to reading development and instruction in Nigeria, but there is more to be learned. It is likely that there are contextual and cultural adaptations required to apply instructional programs and practices developed in the U.S. to a Nigerian context, but the first step must be to understand the differences that impact implementation in order to systematically apply and test these adaptations. As noted earlier, there is also a need to explore the cultural relevance of the items and statements used to tap teachers' knowledge and perceptions of early reading. To investigate the appropriateness of these items, specifically within the Nigerian context, there is a need to understand how participants interpreted the phrasing of the statements presented to them. On my 40-item TKS, there were 19 questions that more than 75% of the participants answered incorrectly. For example, when asked "How many speech sound are in the word *box*?" more than 90% of participants ( $n = 355$ ) were incorrect in their response. For these items, there is potential for a future follow-up study that integrates cognitive interviewing to explore how participants are understanding the statements (e.g., whether semantics or syntax are impacting their interpretation) and their rationale for the responses provided.

There are strong critiques related to the focus on English language and literacy skills in African countries (Mesthrie & Rajend, 2002; Setati et al., 2002). I would be remiss to overlook the social, political, and cultural ramifications of colonization in Nigeria, including the devaluing of traditional Nigerian culture and languages (Brock-Utne, 2005; Williams, 2011). However, the reality in present day Nigeria is that English language is prioritized in the education system and

beyond. Fluency in speaking and reading English is associated with higher education and employment outcomes (Arkoudis et al. 2009; Benzie, 2010; Duff, 2008; Her, 2007; Murray, 2012) and, internationally, literacy rates are highly related to a nation's economic growth and stability (Azariadis, 1990; Diamond; Weede, & Kämpf, 2002). The prioritization of English is seen even among the teachers in the current study sample in the reporting of their own literacy experiences. The vast majority of teachers in this sample reported that English was the language in which they first learned to read, and all except five participated that they read fluently in English. Most said their secondary school instruction was in English, with only approximately 3% of the sample reporting that their secondary school instruction included a Nigerian language (and of those, less than 1% reported that instruction was *only* in a Nigerian language). Thus, while it is important for researchers to continue to work with Nigerian schools and government to better address multilingual students' learning needs and ensure cultural alignment in the instructional programs being delivered, we cannot ignore the critical need to deliver effective instruction and interventions programs that meet the needs of all students as they develop English language reading proficiency.

## **Conclusions**

The present study sought to answer four research questions regarding, teachers' knowledge base on effective early reading practices. Overall, the findings of this study showed that teachers in the FCT Abuja, Nigeria are not quite knowledgeable on how to teach reading to their students. Though statistically significant results did show that PD had a positive impact on the teacher's knowledge for participants who responded to having attended some form of professional development training related to reading. There is clear evidence to suggest that students are struggling to attain reading proficiency in Nigerian classrooms (Uwatt & Egbe,

2011). However, before we can truly understand and address the practice gaps in literacy education in Nigeria, there is a need to critically study the universality of the current instructional methods being used in this setting. Future research is needed in order to effectively bridge the gaps in the teacher's knowledge, so as to tackle the reading problem and failing education system in the country of Nigeria. In order to achieve this, there is a need for high-quality research, including ongoing follow-up data collection, that improves teachers' knowledge in regard to early reading instruction, that have an established evidence base.



## Appendix A

### BACKGROUND INFORMATION

The following information is being collected so that we can describe the overall characteristics of study participants. You may skip any questions you do not wish to answer. Please **do not** write your name on this form. All collected information is confidential and will be reported in terms of overall percentages and averages (i.e., no individual participant characteristics will be shared).

1.	Age	_____
2.	Gender	<input type="checkbox"/> Female <input type="checkbox"/> Male <input type="checkbox"/> Other: _____
3.	State of Origin	_____
4.	What was the first language you learned to speak at home?	_____
5.	What language(s) do you currently speak at home?	_____
6.	At what age did you learn to read ?	_____
7.	In what language did you first learn to read?	_____
8.	What was the main language of instruction when you first started secondary school?	_____
9.	What languages are you able to read fluently?	_____
10.	Type of School where you currently work	<input type="checkbox"/> Public school <input type="checkbox"/> Private School <input type="checkbox"/> Other: _____ <input type="checkbox"/> Prefer not to answer
11.	Grade-level that you currently teach?	<input type="checkbox"/> Kindergarten <input type="checkbox"/> 1st grade/primary 1 <input type="checkbox"/> 2nd grade/primary 2 <input type="checkbox"/> 3 <sup>rd</sup> grade/primary 3
12.	Highest degree completed	<input type="checkbox"/> OND <input type="checkbox"/> HND <input type="checkbox"/> NCE <input type="checkbox"/> Bachelor's <input type="checkbox"/> Master's <input type="checkbox"/> PhD <input type="checkbox"/> Other: _____

13. Please indicate the number of years that you have been a teacher in a public or private school.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0	1	2	3	4-9	10+

14. List your teaching credentials/certifications: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

15. During your training to become a teacher (e.g., Federal College of Education, University, Nigerian Teachers Institute etc.), did you have any **formal coursework** that focused on reading development and instruction?

<input type="checkbox"/>	<input type="checkbox"/>	
No	Yes	If yes, how many courses covered this topic? If you are unsure please write "I don't know."  _____

16. Have you ever attended a professional development training focused on **reading development, instruction, or intervention**? If you yes, how many trainings have attended ? (Count each training session you've attended, regardless of number of hours.) If you are unsure, please write "I don't know."

<input type="checkbox"/>	<input type="checkbox"/>	
No	Yes	If yes, how many?  _____

## Appendix B

### TEACHER KNOWLEDGE SURVEY

Directions: Read each of the following multiple-choice questions carefully. Select the **one** best answer. If you do not know the answer to an item at all and would just be guessing, you can select option “e” (I don’t know). *Survey items drawn from Bos et al. 2001; Spear-Swerling & Cheesman, 2012; Texas Educator Certification Examination Program, 2020.*

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#### Reading Pedagogy: Instruction and Assessment Practices

1. Which of the following beginning Kindergartners is at greatest risk of developing reading difficulties?
  - a. kindergartner who has a history of language delay
  - b. kindergartner who has poor fine motor control (e.g., difficulty cutting, pasting, and writing with a pencil)
  - c. kindergartner who frequently confuses the letters b and d despite knowing most other letters
  - d. kindergartner who cannot decode simple nonsense words
  - e. I don’t know
  
2. Which of the following is a central characteristic of all response-to-intervention (RTI) models?
  - a. routine screening and progress monitoring of all students in a school
  - b. routine screening and progress monitoring of at-risk students only
  - c. full inclusion for virtually all special education students
  - d. allowing general education teachers the flexibility to design Tier I curricula
  - e. I don’t know
  
3. Which of the following statements is the best description of the relationship between children’s ability to decode words and their reading comprehension?
  - a. Reading comprehension and decoding skills develop independently of each other in most children
  - b. Good reading comprehension is essential for the development of decoding skills
  - c. The ability to use context cues is more important to reading comprehension than are accurate decoding skills
  - d. Accurate decoding skills provide a foundation for the development of reading comprehension
  - e. I don’t know

4. Which of the following sets of words would be best to use when providing students with examples of words conforming to the silent e (magic e) phonics generalization?
- a. *time, make, cube, done*
  - b. *brake, use, hope, shine*
  - c. *lake, breathe, raise, fate*
  - d. *tree, lie, blue, toe*
  - e. I don't know
5. Mark the statement that is false:
- a. Phonological awareness is a precursor to phonics
  - b. Phonological awareness is an oral language activity
  - c. Phonological awareness is a method of reading instruction that begins with individual letters and sounds
  - d. Many children acquire phonological awareness from language activities and reading
  - e. I don't know
6. Which of the following activities would be best for promoting reading fluency in typical second graders?
- a. having children sort words into piles based on their spelling patterns and then practice decoding the words
  - b. having children predict what is likely to happen next when the teacher reads a predictable book aloud to them
  - c. providing regular opportunities for children to read independently in books that are at an appropriate level of difficulty for them
  - d. teaching children the meanings of unusual vocabulary words
  - e. I don't know
7. Which of the following is the best description of reading fluency?
- a. Reading fluency is the ability to read grade-appropriate text with good comprehension and a high degree of engagement
  - b. Reading fluency is the ability to read grade-appropriate text with a high degree of accuracy and comprehension
  - c. Reading fluency is the ability to read individual words, including both real words and nonsense words, with a high degree of accuracy
  - d. Reading fluency is the ability to read grade-appropriate text accurately, effortlessly, and with appropriate intonation and expression
  - e. I don't know
8. Assessments used in progress monitoring in reading should have which of the following characteristics?

- a. Should provide diagnostic information about student's decoding skills, reading fluency, and reading comprehension
- b. Should yield accurate estimates of a student's current grade level of functioning
- c. Should be relatively quick to administer and have multiple equivalent forms
- d. Should provide many different types of norm-referenced scores
- e. I don't know

9. Implementing an intervention *with fidelity* means that:

- a. the intervention has been implemented as intended (e.g., required amount of time or sequence of instruction)
- b. the intervention is well supported by scientific research and is usually effective for struggling students
- c. the intervention targets an individual student's needs appropriately, for example, it addresses comprehension for a student with comprehension difficulties
- d. the intervention is consistent with the requirements of the general education curriculum and is generally feasible for classroom teachers to implement
- e. I don't know

10. A first-grade teacher provides reading instruction that is systematic and explicit and emphasizes both foundational reading skills and various dimensions of comprehension. According to research in preventing reading difficulties, which of the following additional actions would be most important for the teacher to take to ensure that reading instruction addresses all students' reading needs?

- a. engaging students in frequent oral reading activities to develop reading fluency
- b. exposing students to a variety of genres to enhance reading comprehension
- c. providing students with daily opportunities to work independently on written exercises that emphasize key grade-level reading and spelling skills
- d. assessing students' reading development regularly to implement timely and effective instructional responses when a delay is apparent
- e. I don't know

11. A second-grade teacher periodically conducts reading interest surveys with individual students. The teacher could best use the results of these assessments for which of the following instructional purposes?

- a. determining the level of parent/guardian involvement in students' literacy development
- b. assisting students in selecting books for independent reading time
- c. selecting texts at students' instructional reading level for small-group reading lessons
- d. identifying appropriate reading activities for students to complete at home
- e. I don't know

12. A first-grade student has been identified as having dyslexia and has begun intervention. Which of the following approaches to instruction would be most effective to enhance the student's reading development?
- a. allowing the student to use colored overlays on all classroom texts to ameliorate the visual difficulties caused by dyslexia
  - b. using reading materials with the student for instruction and guided practice that utilize specialized fonts designed for people with dyslexia
  - c. arranging for the student to spend time each day on the classroom computer using a working-memory training program
  - d. providing the student with systematic, explicit multimodal instruction in all the essential, evidence-based components of reading
  - e. I don't know
13. A third-grade teacher frequently uses an online application at the end of a lesson that allows the teacher to post a small task or question for students on the classroom computer. For example, after a lesson on prefixes, the teacher posts three base words and asks students to change the meaning of each word by adding an appropriate prefix from the lesson. Throughout the day, students post their individual responses for the teacher to review. In this scenario, the teacher is using technology for which of the following assessment purposes?
- a. formative assessment
  - b. diagnostic assessment
  - c. summative assessment
  - d. screening assessment
  - e. I don't know
14. A reading method that focuses on teaching the application of speech sounds to letters is called:
- a. phonics
  - b. orthography
  - c. phonetics
  - d. phonemics
  - e. I don't know

## **Reading Development: Foundational Skills**

15. At the beginning of the school year, a first-grade teacher conducts a brief screening assessment in which the teacher asks small groups of students to spell four CVC words and one word with a consonant blend (e.g., *bag, hen, sit, mop, slug*). In addition to providing the teacher with information about students' knowledge of letter-sound correspondences, this type of assessment would also provide information about students' development in which of the following other areas related to emergent reading?

- a. vocabulary knowledge
- b. phonological awareness
- c. phonemic awareness
- d. listening comprehension
- e. I don't know

16. A kindergarten teacher reads a decodable text about cats with a small group of students and then incorporates the content of the text into an interactive writing lesson. First, the teacher has students orally generate several sentences that relate to the actions of the cat in the story. The teacher then says, "Those are great sentences. Help me write them on the chart paper." For each decodable word in a sentence, the teacher pauses to prompt the students to listen to the sounds of the word and use their knowledge of the letter-sound correspondences that they practiced in the decodable text to identify which letter the teacher should write next. This scenario best demonstrates the teacher's awareness of which of the following concepts related to students' development of beginning reading skills?

- a. the role of basic print concepts in writing development
- b. the importance of fostering students' motivation to read and write
- c. the role of accurate, automatic decoding in fluent writing
- d. the importance of applying newly taught phonics elements to writing
- e. I don't know

17. Several students in a first-grade class have progressed from the partial-alphabetic phase of word-reading development to the full-alphabetic phase. Which of the following instructional activities would be most appropriate for promoting these students' word-reading accuracy and automaticity?

- a. having the students practice reading simple closed-syllable words in isolation and in decodable texts
- b. modeling the use of contextual strategies to read unfamiliar words
- c. increasing the amount of time the students spend practicing reading irregular high-frequency words
- d. supporting the students in reading predictable texts in a variety of genres
- e. I don't know

18. Which word contains a short vowel sound?

- a. treat
- b. start
- c. slip
- d. cold
- e. I don't know

19. A phoneme refers to:

- a. a single letter
- b. a single speech sound
- c. a single unit of meaning
- d. a grapheme
- e. I don't know

20. A pronounceable group of letters containing a vowel sound is a:

- a. phoneme
- b. grapheme
- c. syllable
- d. morpheme
- e. I don't know

21. If *tife* were a word, the letter i would probably sound like the i in:

- a. if
- b. beautiful
- c. find
- d. sing
- e. I don't know

22. A combination of two or three consonants pronounced so that each letter keeps its own identity is called a:

- a. a silent consonant
- b. consonant digraph
- c. diphthong
- d. consonant blend
- e. I don't know

23. Example of a voiced and unvoiced consonant pair would be:

- a. b-d
- b. p-b
- c. t-f
- d. c-s
- e. I don't know

24. Two combined letters that represent one single speech sound are a:

- a. schwa
- b. consonant blend
- c. phonetic



- d. digraph
- e. I don't know

25. How many speech sounds are in the word "eight"?

- a. two
- b. three
- c. four
- d. five
- e. I don't know

26. How many speech sounds are in the word "box"?

- a. one
- b. two
- c. three
- d. four
- e. I don't know

27. How many speech sounds are in the word "grass"?

- a. two
- b. three
- c. four
- d. five
- e. I don't know

28. What type of task would this be? Say the word "cat." Now say cat without the/c/sound.

- a. blending
- b. rhyming
- c. segmentation
- d. deletion
- e. I don't know

29. What type of task would this be? "I am going to say some sounds that will make one word when you put them together. What does/sh//oe/say?"

- a. blending
- b. rhyming
- c. segmentation
- d. manipulation
- e. I don't know

30. What is the **second sound** in the word "queen"?

- a. u
- b. long e
- c. k
- d. w
- e. I don't know

31. A soft c is in the word:

- a. Chicago
- b. cat
- c. city
- d. none of the above
- e. I don't know

32. Identify the pair of words that begins with the same sound:

- a. joke - goat
- b. chef - shoe
- c. quiet - giant
- d. chip - chemist
- e. I don't know

33. If you say the word, and then reverse the order of the sounds, "ice" would be:

- a. easy
- b. sea
- c. size
- d. sigh
- e. I don't know

34. If you say the word, and then reverse the order of the sounds, "enough" would be:

- a. fun
- b. phone
- c. funny
- d. one
- e. I don't know

35. All of the following nonsense words have silent letters, except:

- a. bamb
- b. shipe
- c. knam
- d. phop
- e. I don't know

## Reading Development: Meaning Making/Comprehension

36. A kindergarten teacher meets with individual students and asks them to point to the words in the text of a familiar nursery rhyme as the teacher and student read the nursery rhyme aloud together. Some students demonstrate understanding of the directionality of print by sweeping their finger as they "read," but they are not able to accurately point to the individual words. Other students who readily associate letters with sounds use this understanding to guide their finger as they point to a word that starts with the sound they hear at the beginning of the spoken word. The second group of students clearly try to match their speech to the print as they say the words. The teacher can best use the results of this informal assessment to determine which students are able to:
- apply key concepts related to the alphabetic principle
  - identify accurately the sounds of each letter of the alphabet
  - perform phonological awareness tasks at the syllable level
  - demonstrate advanced knowledge of key concepts of print
  - I don't know
37. Which of the following statements about oral language comprehension and reading comprehension in primary grade (K-3) children is most accurate?
- In typical primary grade children, there is no relationship between oral language comprehension and reading comprehension
  - In typical primary grade children, oral language comprehension and reading comprehension are roughly equivalent
  - In typical primary grade children, reading comprehension far exceeds oral language comprehension
  - In typical primary grade children, oral language comprehension far exceeds reading comprehension
  - I don't know
38. A second-grade teacher divides the class into pairs and presents each pair of students with a unique set of word cards. The teacher models how to match two word cards to build a new word (e.g., *mail* + *box* = *mailbox*, *some* + *thing* = *something*; *mail* plus *box* equals *mailbox*, *some* plus *thing* equals *something*). The teacher then challenges the students to work with their partners to build as many new words as they can using their own set of word cards. The students are assigned to make a list of their new words and draft a sentence for three of the words. Afterward, each pair of students reads aloud their lists of words and sentences to the class. This activity supports students' reading development primarily by promoting their ability to:
- determine the meaning of words containing common roots and affixes
  - read aloud texts with appropriate accuracy, rate, and prosody

- c. self-correct errors when reading multisyllabic words in connected text
- d. decode compound words quickly and accurately while reading
- e. I don't know

39. Students in a second-grade class will be reading a complex informational text about ants as part of a science unit focused on comparing the ways living organisms depend on one another. Prior to the reading, the teacher plans to show students a video depicting activities in ant colonies and to share a picture book about ants. The teacher's actions best demonstrate understanding of which of the following factors affecting reading comprehension?

- a. ability to read fluently with prosody
- b. ability to monitor for understanding
- c. the role of vocabulary knowledge
- d. the role of background knowledge
- e. I don't know

40. Alyssa, a fifth grader, is able to retell the events of stories she has read, and can usually answer questions about details in the stories correctly. However, she has a great deal of difficulty answering questions about characters' motivations, cause and effect questions, and questions about the themes of stories. Moreover, she has the same types of difficulties answering questions even when listening to stories read aloud by the teacher. This pattern of difficulties suggests that Alyssa has problems primarily with:

- a. inferencing
- b. metacognitive awareness
- c. fluency
- d. literal comprehension
- e. I don't know

## Appendix C

### PERCEPTIONS AND BELIEFS ABOUT EARLY READING

Each of the following statements represents a belief of early reading development and instructional practices. Read each item carefully, then mark your level of agreement or disagreement (1-6). *Survey items from Bos et al 2001.*

	Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree
1. K-3 teachers should know how to assess and teach phonological awareness (i.e., knowing that spoken language can be broken into smaller units)	1	2	3	4	5	6
2. Time spent reading contributes directly to reading improvement	1	2	3	4	5	6
3. All children can learn to read using literature-based, authentic texts	1	2	3	4	5	6
4. Poor phonemic awareness (awareness of individual sounds in words) contributes to early reading failure	1	2	3	4	5	6
5. Controlling text through consistent spelling patterns ( <i>The fat cat sat on a mat</i> ) is an effective method for children who struggle to learn to identify words	1	2	3	4	5	6
6. K-3 teachers should know how to teach phonics (letter-sound correspondence)	1	2	3	4	5	6
7. If a beginning reader reads "house" for the written word "home," the response should not be corrected	1	2	3	4	5	6
8. Learning to use context clues (syntax and semantics) is more important than learning to use grapho-phonetic cues (letters and sounds) when learning to read	1	2	3	4	5	6
9. Picture cues can help children identify words in the early stages of reading	1	2	3	4	5	6

10. It is important for teachers to demonstrate to struggling readers how to segment words into phonemes when reading and spelling	1	2	3	4	5	6
11. Phonics instruction is beneficial for children who are struggling to learn to read	1	2	3	4	5	6
12. Adult-child shared book reading enhances language and literacy growth	1	2	3	4	5	6
13. Parents (or other caregivers) play an essential role in teaching their children how to read	1	2	3	4	5	6
14. It is important for Nigerian students to be proficient readers in English	1	2	3	4	5	6
15. It is important to teach Nigerian students how to read in other Nigerian languages <b><i>instead</i></b> of English	1	2	3	4	5	6
16. It is important to teach Nigerian students how to read in other Nigerian languages in <b><i>addition</i></b> to English	1	2	3	4	5	6

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