

Reading Instructional Strategies and Student Achievement: An Analysis of Saudi PIRLS-2016
Data

By

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READING TEACHING STRATEGIES AND STUDENT ACHIEVEMENT: AN ANALYSIS
OF SAUDI PIRLS-2016 DATA

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ABSTRACT

This study explores the relationship between reading instructional strategies and student achievement scores. Specifically, the study investigates the impact of 1) reading aloud to students, 2) asking students to read aloud, 3) asking students to read silently on their own, 4) teaching students strategies for decoding sounds and words, 5) teaching students new vocabulary systematically, 6) teaching students how to summarize the main idea, and 7) teaching or modeling skimming or scanning strategies for Saudi fourth grade students' reading achievement. Data were obtained from PIRLS-2016 of Saudi 4th-grade students and their teachers. Applying multiple linear regressions, the study found that only two of these seven strategies were statistically significant; reading aloud to students and teaching students new vocabulary systematically. Interestingly, reading aloud to students was negatively and significantly associated with their reading achievement scores. Several implications for policymakers and practitioners as well as future research were discussed.

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Dedication

The support of my family and my relatives had empowered me to complete this work. This thesis and degree are dedicated to the memory of my father and my mother. It is also dedicated to my husband for his encouragement and unlimited support during my study generally and my Master study particularly. To my sons, Anas, Majed, Mazen, Yazan, Qais, and my daughter Yara, for their love, support, and understanding. To my sister and brothers in their care, sharing, and prayers throughout the years. The dedication extends to my friends who have supported, helped, and encouraged me during my study.

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CHAPTER 1

INTRODUCTION

Overview

One goal for Saudi Arabia is to become one of the top ten countries in the world. In order to do this, the country is spending the highest percentage of its resources on education and it has supported several educational reform projects (Maroun, Samman, Moujaes, Abouchakra & Insight, 2008). For example, Saudi Arabia's Vision 2030 (the "Vision") is focused on developing students' educational skills, especially developing students' reading skills. To determine if the Vision is improving students' reading performance, Saudi Arabian schools participate in international tests, such as the Progress in International Reading Literacy Study (PIRLS) and the Trend in International Mathematics and Science Study (TIMSS). PIRLS and TIMSS are international assessments administered by the International Association for the Evaluation of Educational Achievement (IEA), which is an independent, international cooperative of national research institutions and governmental research agencies. Two major studies are managed by the TIMSS & PIRLS International Study Center at Boston College in collaboration with the IEA Secretariat in Amsterdam and IEA's Data Processing and Research Center in Hamburg, Statistics Canada, the National Foundation for Educational Research in England, the Australian Council for Educational Research (ACER), and the Educational Testing Service, which consults on psychometrics. Saudi Arabia has participated in these tests since 2011.

Rationale and Statement of the Problem

As declared by the Saudi Minister of Education, PIRLS is a major indicator of improvement to the Saudi educational system. Along with the goal to become one of the top ten countries in the world, Saudi's students' low performance on the PIRLS was another reason for

Saudi Arabia's educational reform initiatives. Despite efforts to improve its educational system through various initiatives, Saudi students have consistently performed below the average on international educational comparative studies (Alyami, 2014). Specifically, Saudi students scored below average in reading compared to peers, both regionally and globally, on the PIRLS (2011; 2016). During the last cycle of PIRLS (2016), Saudi fourth-grade student achievement scores were low (430) while the international average was 500 (PIRLS, 2016). Understanding this phenomenon, unfortunately, is understudied. Based on the evidence currently available, there is no clear picture of which reading strategies are most effective in Saudi classrooms. However, some researchers believe that certain teaching practices in Saudi schools should be emphasized in order to enhance students' reading outcomes (Doseen, Abdelfattah, Shumrani, & Hila, 2012; Wiseman, Alromi, Naif, & Al Sadaawi 2008). The purpose of this study, therefore, is to explore the relationship between instructional practices and Saudi students' performance on the PIRLS assessment. Specifically, this study investigates the impact of specific instructional reading strategies on Saudi fourth grade students' reading achievement. The reading strategies included in this study are: (1) reading aloud, (2) reading silently, (3) decoding sounds and words, (4) learning vocabulary systematically, (5) summarizing the main idea, and (6) skimming or scanning strategies. Consequently, my research question is: Do reading strategies (reading aloud, reading silently, decoding, vocabulary, summarizing, and skimming or scanning) affect Saudi fourth grade students' achievement scores on the PIRLS?

Significance of Study

This study contributes to the literature by extending our understanding of the relationship between reading strategies taught and student achievement. It also expands the generalizability of the existing literature by examining reading strategies in a different culture, Saudi Arabia.

Further, as one of the few studies that utilizes PIRLS data to understand the Saudi Arabian educational system, the results of this study may encourage other researchers to use international large scale assessment (ILSAs) studies, such as PIRLS, TIMSS, and PISA in order to examine different variables in the Saudi Arabian educational system.

Overview of Thesis

This chapter provided an introduction to the study, the rationale and statement of the problem, and significance of the study. Chapter 2, the literature review, includes theoretical aspects of reading in Arabic and information about PIRLS. Chapter 3 presents the methodology, including sample procedures, data collection, the study variables, and analysis procedures. Chapter 4 reports the study findings and Chapter 5 discusses the study findings, presents several implications of the study's findings, and provides recommendations for future research.

CHAPTER 2

LITERATURE REVIEW

In this chapter, I review studies that examined effective literacy reading instruction/strategies, reading in Arabic, and studies that utilize PIRLS data.

Reading Practices

Reading is a complex cognitive activity and student achievement can be influenced by many factors such as motivation, resources, effective instructional practices and specific reading strategies. The following section briefly reviews these factors.

Motivation

Guthrie, Wigfield, and VonSecker (2000) argue that teachers should use students' intrinsic motivations to learn to increase reading engagement. They believe that when a teacher provides clear goals for learning and cares about students' progress and well-being, students are likely to have higher intrinsic motivation. When students have learning goals, they will better understand content, master skills, and gain competence. They also argue on the importance of relatedness, which occurs through collaborative activities and thus enhance intrinsic motivation among elementary students (Guthrie et al., 2000).

Engagement

Student engagement is influenced by classroom resources (Hooper, Mullis, & Martin, 2016). Along with resources, teachers also need proper training to facilitate students' reading engagement and comprehension. Further, teachers should have mastery over classroom subjects to engage students in reading to improve their learning (Hooper et al., 2016). Engagement is important because, internationally, the PIRLS 2011 data revealed that when fourth-grade

students are engaged during reading lessons they achieved more compared with peers who were unengaged during reading activities (Martin & Mullis, 2013).

Effective Practices

Researchers have argued that there are a number of effective practices that support reaching achievement. For example, Day (2002) argued that for students to be able to master extensive reading, they should be exposed to ten principles. First, reading material should be easy. Specifically, texts should have no more than five difficult words per page or "learners must know at least 98% of the words in a fiction text for unassisted understanding" (Day, 2002, p. 137). Teachers and students should select materials based on these criteria, because when students find texts easy and enjoyable to read, they are more motivated to read, which helps improve their reading skills. Second, students should have access to variety of reading material such as books, newspapers, magazines, fiction, non-fiction and on a wide range of topics to increase engagement. Third, as House (2007) also mentioned, learners should be allowed to choose what they want to read. In fact, readers should be encouraged to stop reading "anything they find to be too difficult, or that turns out not to be of interest" (Day, 2002, p. 137). This approach helps students to become responsible for their own learning, independent from their teachers' instruction. Fourth, establishing good habits such as spending extensive time on reading, helps improve students' reading ability. While students should read as much as possible, Beglar and Hunt (2014) found that a book a week is probably the minimum amount of reading necessary to achieve improvement. Fifth, the purpose of reading should not just be to understand the information, it should be also for pleasure and interest; thus, students will not quit reading out of boredom. Sixth, to enrich students' experiences with reading, they should engage in leisure reading not just academic reading. Keeping students engaged in reading will increase their

fluency skills. Seven, while fluency (i.e., accuracy, rate, expression) is important, reading rate or speed should not be overemphasized. Reading slowly helps students enjoy and understand what they read, which affects reading comprehension. Eighth, silent reading is another practice that improves students' reading skills. Ninth, teachers need to introduce and guide their students to texts that they might find interesting in order to encourage them to read extensively. Tenth, and finally, "reading is caught, not taught" (Day, 2002, p. 139), from this perspective, teachers should be teaching by reflecting the attitudes and behaviors of readers.

Studying how fourth-grade students can become strategic readers, Brown and Briggs (1989) identified the following four characteristics of strategic readers: establishing goals for reading, selecting reading strategies appropriate for the text, self-monitoring reading to determine whether comprehension is occurring, and having a positive attitude toward reading. They found that, in particular, determining a goal improves both enjoyment and comprehension. Brown and Briggs (1989) also found that good readers ask questions, which is an effective reading strategy, more often compared to poor readers. Further, they found that students should be taught when to skim for main ideas or scan for particular information. To read with comprehension, students "must recognize the need to read quickly or slowly, carefully or casually, silently or aloud" (Brown & Briggs, 1989, p. 32), and when to apply and utilize these reading strategies. Self-monitoring processes are necessary for reading comprehension. Therefore, teachers must consider what readers know about a text's meaning, how they self-regulate and search for meaning, and encourage students to apply strategies if they fail to understand the text.

Hopper, Mullis, and Martin (2016) conducted a study on effective instructional practices and student achievements. They found that the most effective teachers had a strong sense of tasks

and direction for themselves and their students. Also, when teachers had high expectations for their student achievement, they performed better. Hooper et al. (2016) focused on the impact of small-group activities and reading groups on students' reading achievement. They found that fostering student motivation for reading is fundamental to the learning process. They argued that motivation could be achieved by applying determination theory, which focuses on creating a supportive environment that fosters a sense of relatedness, competence, and autonomy. Further, Hooper and his colleagues (2016) argue that "a classroom environment that is overly controlling can stifle student motivation because it removes the student's sense of autonomy" (p. 48). Therefore, in order to foster student motivation, teachers should create a classroom environment that encourages respect between students, as well as between students and the teacher. Giving students a sense of belonging, such as involvement in peer-tutoring, small group work, and peer mentoring, also fosters student motivation (Hooper et al., 2016). Finally, Hopper and his colleagues (2016) suggest that these instructional practices have a stronger effect on students' achievements than listening to a teacher lecture or watching a video.

Taylor, Pearson, Clark, and Walpole (1999) argue that giving students more responsibility for their learning, providing a variety of academic tasks, sustaining engagement in learning among students, and teaching students to monitor their learning will improve students' achievements in reading. Teaching students how to use strategies that are appropriate for reading also helps them self-regulate their reading and address issues they encounter while reading. In addition, effective reading teachers were skilled at managing time efficiently along with explicitly stating the purposes of activities and utilizing coaching procedures to help students read autonomously (Taylor et al., 1999). Further, activities such as think-aloud and high-level questioning helped students become independent readers.

In addition to teachers, parents influence their children's reading abilities. Parents play a major role in promoting children's enthusiasm for reading through their actions and attitudes towards reading (Brown & Briggs, 1989). Parents' education level affects children's reading achievement and may be mediated by the number of books in the home, and participation in early reading activities with the children during the preschool years (PIRL, 2001). In almost every country participating in PIRLS, home resources for learning, such as books, computers, and Internet access, were the strongest predictor of children's reading achievement.

Literacy Instruction and Reading Strategies

Explicitly teaching reading comprehension strategies (e.g. summarizing, questioning, and predicting) to elementary-aged students is important (Pearson & Dole, 1987). When explicitly teaching reading comprehension strategies, teachers should realize that it requires more student-teacher interactions and student control than in traditional classroom contexts. Also, learning to internalize and implement reading comprehension strategies independently takes time. For example, it can take about eight weeks of instruction before students internalize strategies (Anderson & Pearson, 1984; Block, 1993; Collins, 1991) and possible up to one year (Pressley & El-Dinary, 1997). Thus, "helping students become self-regulated comprehenders is hard work" (Ness, 2011, p. 99). If teachers do not understand the importance of these strategies or instructional practice or find them too challenging to implement with elementary-aged students, they will not be well prepared to utilize these kinds of strategies (Pressley, 1998; Rosenshine, Meister, & Chapman, 1996). Finally, teachers should also consider their instructional practices such as how they introduce lessons, and if they provide clear and concise instructions, immediate feedback and keep transitions short.

Read aloud. One of the most well-researched instructional practices is reading texts aloud to students (e.g., Barrentine, 1996; Klesius & Griffith, 1996; Morrison & Wlodarczyk, 2009; Sipe, 2000; Trelease, 2001). Researchers argue that reading aloud is a particularly powerful and beneficial strategy (e.g., Barrentine, 1996; Wlodarczyk, 2009). When teachers consider "tone, pace, volume, pauses, eye contact, questions, and comments to produce a fluent and enjoyable delivery," that helps students comprehend texts (Wlodarczyk, 2009, p. 111). Reading aloud is an important way to increase students' vocabulary which, in turn, help to develop their comprehension.

In addition, when reading aloud to students, their listening and speaking abilities are more likely improve, which develops their overall language. Reading aloud can help increase students' motivations toward reading, which, in turn, helps to improve student' literacy skills (Barrentine, 1996; Klesius & Griffith, 1996; Morrison & Wlodarczyk, 2009; Sipe, 2000; Trelease, 2001).

Engaging students in interactive reading aloud offers numerous benefits (Braun, 2010). First, through pair-shares and quick-share, a teacher can stop at various points to allow students to discuss topics with peers. If students know they will be discussing the text, they are more likely to focus and actively listen to the text as it is read aloud, as well as consider alternative interpretations of a text through discussion. Second, teachers can help students use illustrations to draw conclusions, remember, and understand what they heard from the read-aloud. This can be done during or after a read-aloud. Third, teachers can ask students use the two-word strategy to write two words or more that reflect the main idea of the text they heard. To demonstrate a deeper understanding, students can be asked to write a sentence or two to explain the connection between the words that they wrote and the text that they heard. Fourth, teachers can ask students

to brainstorm their own lists of words that can be connected to the text that they heard. Lastly, teachers can give students opportunities to ask questions about the reading and discuss issues with their teacher and peers. Finally, Braun (2010) states that there are at least two other benefits of reading aloud to students: vocabulary acquisition and motivation. He argued that when students see and hear vocabulary, they are more likely to better understanding words, and that read aloud motivates students to read more.

Silent reading. Silent reading has received little attention, but a study by Kim, Wagner, and Foster (2011) found that the reading rate between oral and silent reading is significantly different because of this, when students engage in silent reading, they might have poorer reading comprehension. However, they say that silent reading is important, and teachers should provide systematic instruction to guide students through the silent reading process so that they will be more focus and engaged. Likewise, Beers (2003) states that teacher should implement systematic instruction to help students improve their silent reading rate, attitude, and reading comprehension. Beers (2003) suggested several steps to support silent reading: (1) books should be at the student's reading level, (2) students should be given background knowledge about the text, (3) teachers should regularly monitor students silent reading rate for signs of improvement, and (4) teachers should rate their understanding by asking them basic comprehension questions.

Providing systematic silent reading instruction is important because many schools, to promote reading, implement sustained silent reading (SSR), which is an uninterrupted time for students to engage in reading. When teachers use SSR, they should consider issues such as students' ability to engage in self-monitoring, reading stamina, students' ability to learn new vocabulary and develop new interest, and they should understand that students' performances are not consistent. For example, Hiebert, Wilson, and Trainin (2010) found that when students read

silently, they sometimes skip reading to answer the questions, which decreases the time spent reading and developing reading comprehension. Hiebert et al. (2010) suggested that educators should consider what factors support and hinder student learning while silent reading. In regard to SSR, some studies suggest that teachers should set aside 5 to 15 minutes out of each school day to let students read for pleasure without required assignments or grades (Gardiner, 2001; Krashen, 2006). Further, when engaged in SSR, students should be allowed to choose any reading materials they like such as graphic novels, catalogs, manuals, comics, and magazines. This type of reading creates an environment where students find reading to be a pleasant experience and they feel free to explore new information. Thus, the quality and quantity of books in school libraries, as well as the number of books available in students' homes, is important (Krashen, 2006). The more access students have to reading materials, the more likely they are to become successful readers (Krashen, 2006). Finally, Siah and Kwok (2010) argue that any silent reading approach is most effective when parents have encouraged their children to engage in reading when they were young or for students who are already strong readers (Siah & Kwok, 2010). When parents have a positive view of reading, their children often have a positive attitude toward reading, often learn how to read and enjoy opportunities to engage in silent reading.

Decoding. Decoding can mean "sounding out" words letter-by-letter or "context-free" reading (Gough & Tunmer, 1986, p.7). Teaching decoding strategies is important because "the reader who can read isolated words quickly, accurately, and silently" (Gough & Tunmer, 1986, p. 7) is a more effective reader. To support beginning readers, Duke and Pearson (2009) argue that educators should teach students explicit decoding strategies. They also emphasize the importance of choosing appropriate texts to help students implement decoding strategies. For

example, they recommend using texts that emphasize particular letter-sound relationships that aligned with a teacher's decoding instruction. Decoding well support reading achievement.

Vocabulary. Many studies emphasize the importance of vocabulary knowledge for learning new concepts, comprehending texts and expressing ideas (e.g., Beck, McKeown & Kucan, 2002; Dewitz, Jones, & Leahy, 2009). In fact, students should recognize at least 90 percent of the words in a text in order to comprehend its meaning. Consequently, in order for students to improve their comprehension, their vocabulary should increase every year and they should learn, on average, 2,000 to 3,000 words every year (Beck et al., 2002). Typically, as students' vocabulary increases, their reading comprehension improves. So, when students have a weak vocabulary, reading comprehension is hindered. Thus, two factors that hinder students' effective reading and comprehension are beginning school with poor vocabulary or having limited knowledge of the language of instruction.

Questioning. Rosenshine, Meister, and Chapman (1996) state that question generation is an important strategy for supporting reading comprehension and that it helps "students to carry out higher-level cognitive functions for themselves" (p. 181). Generating questions occur through searching and processing the text, combining information, inspecting text, and identifying main ideas. Engaging in these activities can lead to improved reading comprehension, especially when students answer their own questions and are not merely responding to questions from a teacher. Generating questions can also help students become aware of the important points in a text and develop a deeper comprehension of a text. However, Rosenshine et al. (1996) also found that even when teachers use reading comprehension strategies such as questioning, they still spent little instructional time overall on reading comprehension.

Summarizing. Summarizing is important to reading comprehension (Pearson & Gallagher 1983). Summarizing strategies promote stronger reading comprehension because it helps students focus their attention on explicitly extracting meaning from a text and then reconstruct that meaning (Connor, Morrison, & Petrella, 2004). However, summarizing is a difficult task for many students. Consequently, researchers have argued that teachers should explicitly teach summarization (e.g., Connor, Morrison, & Petrella, 2004; Duke & Pearson, 2009) and provide guided practice for students to master it (Duke & Pearson, 2009). To summarize texts in a way that supports comprehension, student can take these steps: (1) delete unnecessary and redundant material to focus only on the important points, (2) use mnemonics to remember complex information, and (3) identify (or create) a topic sentence.

Skimming and Scanning. Skimming is defined as “reading a text or a passage quickly to get a general idea” (Abdelrahman & Bsharah, 2014, p. 170), while scanning is defined as “cover[ing] a great deal of material rapidly to locate a specific facet or piece of information” (Abdelrahman & Bsharah, 2014, p. 170). Skimming and scanning are strategies that help students identify big ideas in texts and therefore, allow them to begin understanding the text (Amalia & Aridah, 2018), which supports reading achievement (Tunaz & Tüm, 2019). Students can skim a text as a pre-reading activity, while they are reading a text, or even after they have read a text and are reviewing it. To skim a text, students should look at the title, subtitles, introduction, and conclusion. On the other hand, students might scan a text to locate a specific name, date, or statistic. To effectively skim and scan a text, student needs explicit instruction (Abdelrahman & Bsharah, 2014). Skimming and scanning can improve students reading speed or fluency (i.e., accuracy, rate, expression) and, more importantly, their abilities of comprehend text (Dyson & Haselgrove, 2000).

Theoretical Reading Aspects

Research related to reading in English has influenced literacy instruction around the world. However, it may be important to consider linguistic factors related to a specific language when considering literacy instruction.

Linguistic Factors of Reading in Arabic

Unique linguistic factors of a language may play a role in the link between instructional activities and students' reading achievement. For example, Zuzovsky (2010) conducted a study to determine which instructional activities are significant in overcoming Arabic-speaking students' diglossia (written and spoken) in Israel. Diglossia is when two dialects of the same language or two language are used under different contexts (e.g., formal and informal). Utilizing PIRLS-2006 data, six literacy activities had significant effects on Arabic diglossia and at least eight other activities had a minimal positive effect (Zuzovsky, 2010). The most significant factor influencing literacy was early home literacy activities such as fostering phonemic awareness and letter sound recognition. School-based factors that influenced literacy included repeated listening in Arabic, actively engaging in reading Arabic texts, and gradually increasing challenging tasks. Zuzovsky (2010) also revealed that, based on the 2006 PIRLS data, literacy attainment of 4th graders in Arabic-speaking countries was poor, which she believed was a result as Arabic diglossia and students' understanding of academic language. Consequently, she recommended that educational interventions should target diglossia in academic and social contexts (Zuzovsky, 2010). These findings have led to additional research on these specific strategies in Arabic learning contexts.

Research suggests that activities focused on learning letter sounds correspondences, and word and sentence structures are the most beneficial for young language learners (Anderson & Hidi, 1988). Reading aloud to students, identifying main ideas, and describing a text's style and structure are classroom-based interventions that support literacy learning. These literacy activities might also help students overcome reading difficulties in Arabic; however, parents and teachers must work together to implement strategies at home and school.

Anderson and Hidi (1988) also identified strategies that, while used less frequently, still showed a positive effect on Hebrew-speaking students' literacy skills. These strategies included inter-sentence code-switching and intra-sentence code-switching. By using inter-sentence code-switching, the teacher switched language between sentences while the intra-sentence code-switching switched between languages within sentences. While implementing these strategies, teachers do not provide translations but instead, they followed the instruction without separating the languages. In addition, teachers used three gestures (e.g., pointing, conventional, and iconic) to facilitate students' bilingual development.

Saudi Arabia's Emphasis on Reading

“Reading literacy is one of the most important abilities students acquire as they progress through their early school years. It is the foundation for learning across all subjects, it can be used for recreation and for personal growth, and it equips young children with the ability to participate fully in their communities and the larger society” (Mullis, Martin, Kennedy, Trong, & Sainsbury, 2009, p. 1). This is Saudi Arabia's goal for its education system, to equip student to participate in their community, country, and a global society. In compliance with its educational reform initiatives, Saudi Arabia has allocated 5.14% of its GDP on education, which amounted to 19.26% of Saudi Arabia's total government expenditure in 2008 (Herrera, 2010). However,

this influx of funding has not measurably improved Saudi Arabia's international academic ranking (Alyami, 2014). Despite the tremendous effort that Saudi Arabia has undertaken to improve elementary students' reading ability, it is not being reflected on the PIRLS assessment.

PIRLS

The PIRLS is an international assessment administered by the International Association for the Evaluation of Educational Achievement (IEA). The PIRLS was first administered in 2001 as a follow-up study to the Reading Literacy Study, which was initially implemented in 1991. Since its inception, the PIRLS test is administered every five years. The fourth cycle, the most recent one, was conducted in 2016. PIRLS was established to assess fourth graders' reading achievement in their respective countries. The fourth grade was chosen because students in this grade should already know how to read, so they can read to learn. In order to obtain useful information that can be used to interpret reading achievement results, PIRLS collects rich background data from several resources, such as the Learning to Read Survey, which is completed by students' parent and caregivers. Other resources include questionnaires completed by students themselves, their teachers, school principals, and curriculum experts in the participants' countries. Both reading achievement and background information provide a framework of educational policies and practices that creates opportunities for educational reform.

Each PIRLS Literacy assessment is comprised of 12 reading passages and supplementary questions. Every assessment has six passages that assess reading for literacy, while the other six assess reading to acquire and use information. The suggested time to complete the 12-passage assessment is eight hours, yet it is not feasible for fourth graders. To minimize the assessment burden, each student is presented with two passages. To accomplish this, PIRLS is divided into ten booklets (five for reading literacy, and five for comprehension) and follows a systematic

booklet assembly and rotation procedure to distribute these booklets among students. Each booklet encompasses two passages and associated questions, which can both be completed in 40 minutes. The systematic booklet procedure allows for comparability within a country across different cycles, so each country can track their educational performance from one cycle to another.

Contextual questionnaires are utilized to better understand the contexts of reading, specifically how it is taught and learned. Through more than 40 scales, PIRLS questionnaires investigate home supports for learning, educational system structure, school organization, curricula, teacher education, and classroom practices. Examples of these different questionnaires can be viewed from PIRLS website (PIRLS, 2016). These questionnaires are given to students' parents, teachers, and principals. Students also complete a questionnaire immediately after they finish the reading achievement assessment.

The main purpose of PIRLS is to empower educational policymakers and educators to understand and promote the evidence-based practices to improve students' literacy achievement and performance by fourth grade (Mullis, Martin, Kennedy, Trong, & Sainsbury, 2009). ILSAs, such as PIRLS, have recently become critical indicators not only for evaluating educational systems but for providing data to conduct research in education and social science (Mullis et al., 2009). Further, PIRLS is considered a curricula-based study (Mullis et al., 2009). In other words, reading passages and corresponding tasks are based on the country's curricula, and students' reading achievement scores are considered in relation to students' socio-demographics, home environments, and teaching and learning contexts within classes and schools (Mullis et al., 2009).

Researchers have utilized PIRLS data for various reasons. Studies have focused on theoretical aspects of reading (e.g., Anderson & Hidi, 1988; Hao & Johnson, 2013; Zuzovsky, 2010), implications and educational policy effectiveness (Baer, Baldi, Ayotte & Green, 2007; Cheung, Tse, Lam, & Ka Yee Loh, 2009) and technical issues related to the PIRLS, such as psychometric and statistical procedures (Lam et al., 2016). However, most studies utilizing PIRLS data have made comparisons between two or more countries.

There are also a limited number of studies that used PIRLS data in a secondary analysis of a specific country. The following section reviews studies that have used PIRLS data in this manner. The purpose of reviewing these studies is to investigate how and to what extent PIRLS data is utilized in educational research. Because I have applied specific inclusion criteria, this review is not comprehensive. Studies for this review included an emphasis on secondary analyses in a specific country and reading instructional practices. The synthesis of these articles reveals gaps in PIRLS literature.

PIRLS Technical Issues

A major concern with ILSAs is the comparability of their measures among translated versions of the same assessment. For example, Lam et al. (2016) discovered that the translated version of the PIRLS questionnaire on reading literacy development used in Hong Kong did not match the original English version. An analysis using exploratory and confirmatory factor analysis revealed that multiple items did not align with the intent of the original English questionnaire items. Therefore, Lam et al. (2016) concluded that comparisons across countries using different translations of PIRLS should be conducted with caution, as the questions themselves may not be measuring the same aspects.

PIRLS Educational Implications

PIRLS requires participating countries to prepare statistical reports based on student performance in that country. The National Center for Education Statistics (NCES) reported that reading literacy scores from the 2001 testing cycle (542) and the 2006 testing cycle (540) did not yield significant differences even though there were high levels of variance in reading instructional practices. Therefore, Baer, Baldi, Ayotte, and Green (2007) concluded that reading instruction does not significantly affect students' reading achievement.

Based on PIRLS 2001 data, Hong Kong ranked 14th in reading among the 35 participating countries. Further analysis found that teachers in Hong Kong spent a lot of instructional time on formal and informal reading strategies. While students in Hong Kong were exposed to various types of reading materials such as fiction, non-fiction, textbooks, worksheets, computer software, and online resources; they also had multiple autonomous choices when it came to academic reading. Commonly, students were required to read aloud to the class, share and discuss what they read and then write ideas about the reading. Teachers also put more emphasis on decoding words. Cheung et al. (2009) reported "Hong Kong teachers had the highest frequency among the world in providing guidelines for such decoding compared with other Western countries" (p. 295). In addition, Cheung, et al. (2009) illustrated that teachers use different tools to assess students' progress in reading, such as oral questioning and summaries, and writing short answer and paragraph-length responses. These assessment methods and students' reading achievement were highly correlated. Therefore, the data reveals that effective teachers maximize students' opportunities to read intensively and build competency and fluency through reading practice.

Some studies emphasized teachers' perceptions of class reading level as related to students' reading achievement. Zimmerman and Smit (2014) studied the achievement of South

African fourth graders using the PIRLS 2006 dataset. South Africa was the lowest ranking country in reading of all participating countries and education systems. Further, the results of the PIRLS 2006 dataset showed that some students' achievement for higher-order comprehension was particularly low. Consequently, Zimmerman and Smit (2014) focused on observations between high and low achieving schools in South Africa, and they identified discrepancies between the qualities of instructional reading practices across these two contexts.

In a case study conducted by Zimmerman and Smit (2014), the researchers showed that the low performance of South African fourth grade learners could be explained by ill-prepared teachers who did not effectively use higher order thinking skills for literacy instruction. Teaching students to use higher-order thinking strategies can help learners to comprehend various texts and become more autonomous in developing their vocabulary. Thus, since some learners did not have enough instructional exposure to strategies, they demonstrated low literacy scores on the PIRLS.

Likewise, Zimmerman and Smit (2014) found that the cognitive comprehension achievement for Grade 4 students in South Africa was low. One reason that students may have performed poorly on the test was because teachers struggled to choose reading materials and instructional practices that would support students' cognitive comprehension. Specifically, teachers did not ask questions that facilitated engagement with and comprehension of texts but instead they asked questions that relied mostly on lower-order retrieval skills of information provided directly in the textbook. Students in this context were not exposed to higher-order reading skills, which may have decreased their overall independent reading, too.

Improving students' reading achievement by increasing students' motivation to engage in reading activities is a critical goal for any education reform. House (2007) examined the PIRLS

2001 data from Hong Kong and the United States to understand the relationship among students' motivation for reading, instructional strategies, and classroom practices, specifically, computer-based activities. He found that using multiple instructional strategies in the classroom to engage students in reading, such as using a computer to write reports and stories, look up information, and completing activities was beneficial (House, 2007). Allowing students to choose texts can increase their motivation, which leads to deeper engagement in reading. Also, students who talked with other students about what they read and wrote showed higher reading engagement compared with those who did not. Finally, students who worked on a group reading project with a teacher-selected text showed lower engagement (House, 2007).

To conclude, this section discussed three parts; reading instructional strategies, reading instruction in Arabic, and PIRLS. Based on PISA's data, the current study examined the relationship of seven of the above instructional reading strategies and student achievement in Saudi context.

CHAPTER 3

METHOD

PIRLS is an indicator of student achievement and improvements within an educational system. Due to Saudi's students' low performance on the PIRLS, Saudi Arabia's initiated educational reform. Despite efforts to improve its educational system, Saudi students have consistently scored below average in reading compared to peers, both regionally and globally, on the PIRLS (2011; 2016). Understanding this phenomenon, unfortunately, is understudied. Thus, the purpose of this study was to investigate the impact of specific reading instructional strategies on Saudi fourth grade students' reading achievement. Specifically, my research question was: Do reading strategies (reading aloud, reading silently, decoding, vocabulary, summarizing, and skimming or scanning) affect Saudi fourth grade students' achievement scores on the PIRLS? The seven instructional reading strategies were the independent variables and student achievement was the dependent variable.

Participation

PIRLS 2016 basic sampling design is a two-stage cluster design consisting of a sampling of schools and intact classrooms from the target grade in the school. Participants in the current study included 4,741 out of 401,006 fourth-grade students from 159 schools. The average student age was 10 years old. The participants were mostly distributed equally in gender (51.6% female).

Study Variables

The study's variables were derived from PIRLS 2016 data. In particular, the study investigated two variables derived from teachers' Self-Reporting Questionnaire (TRQ). Specifically, this variable was asking Saudi fourth-grade teachers the following question: When you have reading instruction and/or do reading activities with the students, how often do you do

the following: read aloud to students (ATBR10A), ask students to read aloud (ATBR10B), Ask Students To Read Silently On Their Own (ATBR10C), teach students strategies for decoding sounds and words (ATBR10D), teach students new vocabulary systematically (ATBR10E), teach students how to summarize the main idea (ATBR10F), and teach or model skimming or scanning strategies (ATBR10G). These variables were measured on a 4-point Likert response (1= every day or almost every day, 2= once or twice a week, 3= once or twice a month, and 4= never or almost never). The second variable was student achievement scores, which were presented based on PIRLS design as plausible values. To minimize the standard errors in such ILSAs, PIRLS provides five plausible values for each student (ASRREA01, ASRREA02, ASRREA03, ASRREA04, ASRREA05).

To obtain the data, I accessed National Center for Education Statistics (NCES) website of the (<https://PIRLS.net>) to download the Progress in Reading Literacy Study (PIRLS) Saudi Arabia datasets. According to the PIRLS codebook, the five DVs are located in one SPSS file called *ASTSAUR4*, and those five DVs are coded as follow:

Five imputed values

1. Plausible value 1 = ASRREA01
2. Plausible value 2 = ASRREA02
3. Plausible value 3 = ASRREA03
4. Plausible value 4 = ASRREA04
5. Plausible value 5 =ASRREA05

Regarding the seven independent variables, they are stored in another SPSS file called *ATGSAUR4*, and those seven IVs are coded as follow:

1. Independent Variable 1 = ATBR10A (read aloud to students)

2. Independent Variable 2 = ATBR10B (ask students to read aloud)
3. Independent Variable 3 = ATBR10C (ask students to read aloud)
4. Independent Variable 4 = ATBR10D (teach students strategies for decoding sounds and words)
5. Independent Variable 5 = ATBR10E (teach students new vocabulary systematically)
6. Independent Variable 6 = ATBR10F (teach students how to summarize the main idea)
7. Independent Variable 7 = ATBR10G (teach or model skimming or scanning strategies)

Because the five DVs are saved in a different SPSS file from the seven IVs, I used a unique variable to combine the two different datasets (*ASTSAUR4* and *ATGSAUR4*). This unique variable is the school identification, which is also coded in both files as *IDSCHOOL*. This vector (*IDSCHOOL*) would allow merging the two different dataset easily.

In order to merge the file and conduct the statistical analyses, the data preparation will be conducted in *R* software version 1.1 (R Core Team, 2016) in foreign (R Core Team, 2016), haven (Wickham & Miller, 2017), rio (Chan, Chan, Leeper, & Becker, 2018), dplyr (Wickham, Francois, Henr, & Müller, 2017), and ggplot2 (Wickham, 2009) packages. These packages have helpful functions that facilitate importing/reading, cleaning, combining, visualizing, exporting, and the datasets. In addition, I will use Stata packages to analyze the data (Macdonald, 2008).

Data Analysis

To analyze the data, I used a function to calculate the one DV, represented by the five dependent variables (ASRREA01, ASRREA02, ASRREA03, ASRREA04, and ASRREA05). These five DVs will be predicted by the seven IVs (ATBR10A, ATBR10B, ATBR10C, ATBR10D, ATBR10E, ATBR10F, and ATBR10G). Then, a multiple linear regression model was conducted to investigate the estimates of those seven IVS on the DV. In addition, I

calculated the explained variability that the seven IVs can explain in the one DV using lm function – *lm* stands for linear model. The model will be presented as follow:

DV (represented by the five DVs) = β + ATBR10A + ATBR10B + ATBR10C + ATBR10D + ATBR10E + ATBR10F + ATBR10G + *e*

CHAPTER 4

FINDINGS AND DISCUSSION

The purpose of this study was to examine the effects of different reading strategies on student reading achievement using Saudi PIRLS-2016 data. Specifically, the present study sought to understand the extent to which different instructional reading strategies impact Saudi fourth-grade students' achievement scores based on PIRLS (2016)? In order to investigate the impact of different instructional reading strategies on student reading achievement, the study utilized multiple linear regression (OLS) utilizing the random intercept model. Prior to conducting the analysis, missing data pattern was examined by applying Stata command `misstable Patterns`. No patterns of missing data were found. Based on that, missing at random (MAR) was assumed. Sample description is as shown in Table 1.

Table 1

Samples Description

<i>IV</i>	N	<i>M</i>	<i>SD</i>
Read aloud to students	4729	1.23	0.45
Ask students to read aloud	4673	1.19	0.43
Ask students to read silently on their own	4713	1.43	0.58
Teach students strategies for decoding sounds and words	4691	1.91	0.84
Teach students new vocabulary systematically	4,715	1.48	0.64
Teach students how to summarize the main idea	4,715	1.66	0.69

Teach or model skimming or scanning strategies	4,715	1.98	0.83
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After data cleaning, 4741 students nested in 159 teachers / schools were included in the analysis. PISA 2016 basic sampling design is a two-stage cluster design consisting of sample of intact classrooms from the target grade in the school. Participants for the current study were 4741 students (out of 401,006) fourth-grade students taught by 159 teachers. The students' age average in this grade was 10.0 years old. The participants were distributed almost equally in gender (51.6% female).

Multiple Regression Model

In this random intercept model, student outcome intercepts of PVM (ASRREA01, ASRREA02, ASRREA03, ASRREA04, ASRREA05) could be predicted by multiple IVs (ATBR10A, ATBR10B, ATBR10C, ATBR10D, ATBR10E, ATBR10F, ATBR10G) as the following equation in Stata:

```

pv, pv( ASRREA*)jkzone(JKZONE ) jkrep( JKREP ) weight(TOTWGT) jrr pirls:
xi: reg @pvATBR10A, ATBR10B, ATBR10C ATBR10D ATBR10E
ATBR10F ATBR10G [aw=@w]

```

The analysis of PIRLS plausible values of reading achievement scores was run once for each plausible value, for a total of five times. The average of these five sets of data has been used as the best estimate for the analysis of student achievement. In addition, sampling weight (TOTWGT), and JKZONE were included in the equation to better estimate the estimator bias. The central focus of the study was whether fourth-grade students' achievement scores in reading are associated with their teachers' instructional reading strategies. The multiple linear regression

model presented in Table 2 provide an illustration of the standardized coefficient of the seven instructional reading strategies on student achievement in reading.

Table 2

Regression Model Output

<i>IV</i>	β	<i>SE</i>	<i>P-Value</i>	<i>R2</i>
Read aloud to students	-26.07	10.26	0.01*	0.004
Ask students to read aloud	6.82	13.88	0.62	0.001
Ask students to read silently on their own	-2.61	7.29	0.72	-0.0002
Teach students strategies for decoding sounds and words	10.44	6.89	0.13	0.01
Teach students new vocabulary systematically	29.12	7.82	0.003**	0.02
Teach students how to summarize the main idea	1.67	8.20	0.83	-0.0002
Teach or model skimming or scanning strategies	1.40	7.16	0.84	0.001
<i>Cons</i>	387.16	37.91	5.18	0.004

N= 4635, R2: 0.058

As shown in Table 2, out of seven instructional reading strategies, only two predicted student achievement scores in reading. The model positively detected a significant association between teaching new vocabulary systematically and student achievement scores in reading (ATBR10E) (PV) $\beta = 29.12(7.82)$, ($p < .0001$), (ES= 0.02). For interpretation purposes, the *never or almost never* option was the reference. Therefore, statistically, this positive association between teaching new vocabulary systematically and students' reading achievement scores

means that when the frequency of using this reading strategy increases, students' achievement scores are more likely to increase, too. Surprisingly, the model detected a negative association between teachers reading aloud to students and students' reading achievement scores (PV) $\beta = -26.07$ (10.26) ($p < .01$), (ES= 0.004). Statistically, this means that when the frequency of teachers reading aloud to students increases, student achievement scores are more likely to decrease on average by 26 points. Although the model did not detect other significant associations between the other five reading strategies and student achievement scores in reading, the model accounts for 6% of the variance in the dependent variable of student achievement scores ($R^2 = 0.06$).

CHAPTER 5

DISCUSSION

The purpose of the present study was to investigate the relationship between reading strategies and student achievement scores. The literature suggests that the strategies assessed by the PIRLS (reading aloud to students, asking students to read aloud, teaching decoding strategies, teaching new vocabulary systematically, teaching students how to summarize, and teaching or modeling skimming or scanning strategies) can contribute in student achievement. However, among the seven reading strategies investigated, only two of them indicated significant relation to student achievement.

Surprisingly, while the study found that teacher read alouds to students is significant, it is negatively associated with their students' achievement, although the relationship was relatively small. This finding is contradictory with studies that have found read alouds to be beneficial (Barrentine, 1996; Włodarczyk (2009). However, researchers have also found a negative relationship between the amount of time teachers spend reading aloud in kindergarten and children's decoding skills (Meyer, Stahl, Wardrop, & Linn, 1994). That is, if teachers spend too much instructional time reading aloud to students than students may not have enough time to learn how to read effectively. Thus, while reading aloud to students is a well-known strategy, findings from the present study found that Saudi teacher read alouds had a negative influence on student reading achievement. There are several possible reasons for this finding. First, Saudi teachers may be not accurately applying reading aloud strategies in their classrooms. Second, Saudi teachers may not be considering factors such as their tone, pace, volume, pauses, eye contact, questions, and comments, all read aloud characteristic that influence student deeper understanding of texts (Barrentine, 1996; Włodarczyk, 2009). Third, Saudi teachers may not be

helping their students comprehend text from what they heard from the read aloud. Fourth, teachers may be spending too much time engaging in reading alouds and spending too little instructional time on other reading strategies (Myer et al., 1994; Rosenshine et al. 1996). Saudi teachers may not be engaging effective read aloud practices because research has found that Saudi teachers tend to ask students to recite or repeat what they have listened to (Alqatani & Alharbi, 2017), which may decrease the effectiveness of read alouds, including student motivation toward reading (Barrentine, 1996; Klesius & Griffith, 1996; Morrison & Wlodarczyk, 2009; Sipe, 2000; Trelease, 2001, Zuzovsky, 2010). Further research is needed to understand Saudi teachers reading aloud style, their understanding of the importance of read aloud strategies and/or if they find them too challenging to implement (Hao & Johnson, 2013).

The other significant and positive finding of the present study is the relationship between teaching new vocabulary systematically and students' achievement scores. This finding is in line with the previous work of Beck, McKeown and Kucan (2002) and Dewitz, Jones, and Leahy, (2009). Typically, student reading comprehension improves when their vocabulary increases and vice-versa. This finding can be attributed to an increased emphasis of teaching new vocabulary in early grades in Saudi Arabia (Ministry of Education, 2019). Although, this teaching strategy is found to be supportive for student achievement, it lacked connections to other related reading strategies investigated in this study.

Finally, the present study found that there was no significant relationship between the other reading strategies (i.e., asking students to read aloud, teaching decoding strategies, teaching students how to summarize, and teaching or modeling skimming or scanning strategies) and student achievement.

Implications and Future Research

Saudi Arabia has participated in PIRLS in the last two cycles; 2011 and 2016. In both cycles, student reading performance was low compared to the international average. The present study investigated several reading instructional strategies and their impact on student achievement. Two of these instructional strategies namely teachers reading aloud to students and teaching new vocabulary systematically were found to be significantly related to student achievement. While the teaching vocabulary systematically was positively and significantly related to the achievement scores, the study detected a significant but negative relationship between reading aloud to students and reading achievement. These findings suggest that many reading instructional strategies may not improve student outcomes if they are not properly implemented.

These findings have several implications for Saudi educational policy makers and practitioners. First, Saudi teachers should continue to systematically teach new vocabulary to students. Second, Saudi teachers should be cautious when engaging in read alouds and review strategies for engaging in effective reading alouds.

Since the present study did not show any connection between most of instructional reading strategies and student achievement except two of them, researchers and policy makers should to investigate what strategies improve students reading achievement. Another implication for future research is to investigate how teachers' implement recommended instructional practices to better on student achievement.

Limitations

Despite several findings of the current study, there are limitations that need to be considered. First, this study is a cross-sectional study that reveal correlations between variables.

It is well known that in this kind of study, causality cannot be assumed. A longitudinal study design would better serve for causality purposes. Second, this study was based on self-report assessments, which are a well-established threat to validity in social science research. Therefore, qualitative studies that utilize observations or/ and interviews could offer more understanding of why some reading in Saudi context are effective than others. Third, the present study considered only one student outcome: achievement. This emphasis can limit finding a relationship between teaching strategies and student outcomes. Future studies should consider examining reading teaching strategies with various student outcomes, such as confidence and engagement in reading. Widening the scope of these relations could shed more light on such issues. Lastly, findings that the present study found were limited to PIRLS-2016 data. Variables that have been investigated in this study should be replicated using PIRLS-2011 to establish a longitudinal trend.

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