

RESEARCH ARTICLE

The “GIST” of the reading comprehension problem in grades 4 and 5

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Main idea and summary are essential elements of reading comprehension. We report results from Grades 4 and 5 student performance on two years of state-mandated standardized reading testing which indicate that students perform statistically significantly lower on main idea and summary questions on the tests than any other question category. In this study, teacher competency was measured in a main idea task and teacher surveys were used to understand what instructional practices and materials they use to teach reading comprehension. Descriptive analyses indicate that teachers have a moderate competency for writing main ideas and many use instructional practices that are not supported by empirical evidence or reviewed by the What Works Clearinghouse. Thus, teacher knowledge and instructional practices may be malleable factors that contribute to student outcomes.

KEYWORDS

gist, main idea, state assessments, summary, teacher knowledge

Getting the “gist” of a passage, a book, or a movie is a common approach to showcase knowledge and understanding of a topic or text. Beginning in elementary school, children are instructed to find main ideas and/or generate summaries while reading to demonstrate their understanding of the books or passages they read (Beerwinkle, Wijekumar, Walpole, & Aguis, 2018). Measures of comprehension focus on students’ ability to write (or identify) main ideas and summaries because the constructs showcase their ability to select important ideas and connect them logically while reading. Many reading comprehension interventions have focused on main ideas and their closely related counterpart summarization such as Cloze Analysis of Texts with Structure (Williams, Kao, Pao, Ordynans, Atkins, Cheng, & DeBonis, 2016), Passport to Literacy (Wanzek, Petscher, Otaiba, Rivas, Jones, Kent, ... Mehta, 2017), Summary Street (Wade-Stein & Kintsch, 2004), and Intelligent Tutoring System for the Structure Strategy (Wijekumar, Meyer, & Lei, 2013; Wijekumar et al., 2014).

1 | SIGNIFICANCE OF READING

The lack of reading comprehension skills at elementary grade levels have been linked to overall academic failure for the children and places students at risk for deleterious outcomes throughout life (Lyon, 2001). Reports show that 75% of students who drop out of school have reading problems (McCardle & Chhabra, 2004). It has also been estimated that 50% of adults with substance abuse problems or those receiving welfare are functionally illiterate (Lyon, 2001). These facts provide a compelling case for the need to seek solutions to the vexing problems related to reading. Focusing on upper elementary grade reading and seeking solutions that work for all students has the potential to mitigate the consequences from these societal problems.

The good news is that numerous solutions have been developed and tested with promising results. The basic foundational skills of reading have been carefully modeled and used to develop theoretical frameworks (e.g., Perfetti & Stafura, 2014). Sound evidence-based practices to improve reading have been synthesized and presented through the What Works Clearinghouse (WWC) practice guides (e.g., Kamil, Borman, Dole, Kral, Salinger, & Torgesen, 2008). A recent practice guide on reading in K-3 summarized research evidence in support of four broad guidelines related to alphabetic principle, letter sound knowledge, decoding, vocabulary, inferencing, and comprehension skills (Foorman et al., 2016). An important element highlighted by Shanahan (2010) is that the end goal of these foundational activities (e.g., decoding, vocabulary) is comprehension of the text. As students progress through elementary grades, reading assessments focus on these basic building blocks of reading, and reading comprehension is frequently measured by asking students to identify main ideas and generate summaries.

Unfortunately, these resources have failed to make a notable shift in the reading outcomes for students in upper elementary grade levels as there has been no significant change in student reading performance in the past decade with 63–65% of students continuing to read below proficient levels (National Assessment of Academic Progress [NAEP], 2017). Students with individualized education plans and those scoring below the 25th percentile on the reading tests are in greater jeopardy if sound evidence-based solutions are not provided to them. Getting to the root cause of this problem may help us identify solutions.

2 | READING COMPREHENSION AND SIGNIFICANCE OF A MAIN IDEA

Comprehension is the ultimate goal of reading and readers must be able to understand the transmitted knowledge to form their own mental representation of the text. Theoretical frameworks for reading comprehension including the construction integration model (van Dijk & Kintsch, 1983), text structure model (Meyer, 1975), landscape model (van den Broek, 2005), and the more recent Reading Systems Framework (Perfetti & Stafura, 2014) focus on reading comprehension as being influenced by the student's ability to select important ideas while reading and form a coherent mental representation of text.

Since it is not efficient or feasible to store all the information from a text in memory using a list structure, there is a universal understanding that the gist or main idea of a text serves as a root node of memory or schema. The gist prioritizes the more important information from the text and logically connects the ideas together (Meyer, 1975). Thus, the task of generating a main idea requires the learner to first select important ideas while reading and then to create a coherent memory representation showing the logical connections between the ideas. This main idea serves as a foundation for integration of ideas and connecting ideas in long-term memory. Meyer, Brandt, and Bluth (1980) found that skilled readers are able to generate main idea from a text and perform better on reading comprehension and inference tasks.

3 | READING COMPREHENSION INTERVENTIONS

Due to the importance of main ideas and summaries in reading comprehension, numerous interventions have been developed to promote the development of these skills (e.g., Franzke, Kintsch, Caccamise, Johnson, & Dooley, 2005;

Gajria & Salvia, 1992; Jitendra, Hoppes, & Xin, 2000; Mason, 2013; Rogevich & Perrin, 2008). Shanahan (2005) synthesized research on comprehension and reported that summarization is one of the important techniques for improving reading comprehension. Kamil, Borman, Dole, Kral, Salinger, and Torgesen, (2008) presented a Practice Guide recommending the use of direct and explicit comprehension strategy instruction to improve reading. Shanahan et al. (2010) published a practice guide stating that reading comprehension strategies were important and provided an example of using a main idea and text structure knowledge to promote comprehension. Research on the text structure approach delivered by teachers has been effective in helping students to generate main ideas (Meyer, Middlemiss, Theodorou, Brezinski, McDougall, & Bartlett, 2002; Williams, Stafford, Lauer, Hall, & Pollini, 2009). More recently, there is evidence that a web-based intelligent tutoring system is an effective vehicle to improve student understanding and use of a text-structure based main idea and summary writing intervention (Wijekumar, Meyer, & Lei, 2012; Wijekumar et al., 2014; Wijekumar, Meyer, & Lei, 2017).

4 | READING COMPREHENSION STANDARDS AND MATERIALS

The significance of the main idea is evident in all state standards of reading comprehension and information presented in textbooks. The Texas Educational Knowledge and Skills (TEKS, 2019) standards focus on main/key ideas for reading at all grade levels and the ability to summarize is a key response skill for all grade levels. The Common Core State Standards (CCSS) also place a strong emphasis on main ideas and the ability to summarize text at all grade levels. The CCSS also promotes synthesis between texts using summarization.

Most reading textbooks focus some portion of instruction to teaching main idea and summarization (e.g., Beerwinkle et al., 2018; Edmonds, et al., 2009; Pressley, Johnson, Symons, McGoldrick, & Kurita, 1989). A recent textbook analysis showed that main ideas and summaries were part of all textbooks reviewed (Beerwinkle et al., 2018). These textbooks and curricula resources are a prominent part of instruction in most classrooms and provide insight into the types of strategies used to scaffold students in learning about selecting important ideas, generating main ideas, and creating summaries. It is unlikely that teachers would venture completely outside the scope and sequence of lessons and strategies presented within the textbook. However, teachers also rarely use only the textbook and its ancillary materials and instead use a combination of materials gathered from professional developments, district purchased programs, other teachers, and the Internet. Because of the variety of materials that teachers incorporate into instruction, the review of curricular materials teachers use is warranted in the analysis of factors contributing to the poor performance of children on main idea and summary tasks.

5 | ASSESSMENT OF READING AND TEXAS STANDARDIZED TEST RESULTS

It has been theorized and empirically validated that better readers are able to summarize and generate main ideas effectively and efficiently (Meyer, Brandt, & Bluth, 1980; Pressley, Johnson, Symons, McGoldrick, and Kurita, 1989; Shanahan, 2005), thus, assessment instruments frequently use them as measures of comprehension. Main idea and/or summary generation are two constructs frequently measured in assessments of reading comprehension (e.g., Common Core Partnership for Assessment of Readiness for College and Careers (PARCC) test, NAEP (2017), and State of Texas Assessment of Academic Readiness (STAAR). Within the Common Core State Standards students perform a generative task of writing main ideas for passages and synthesize multiple source texts to form a coherent representation about the topic. Within the STAAR test, students perform a receptive main idea and summary task in the form of multiple-choice questions at the paragraph or passage level.

In Texas, where this study was conducted, both fourth- and fifth-grade students show poor results on the main idea and summary questions on the state standardized reading test despite scoring reasonably well on vocabulary

and other constructs, such as inferencing and paraphrasing measured by the test (Texas Education Agency [TEA], 2017). The 2016 and 2017 reading scores from Grades 4 and 5 on the STAAR, the annual standardized assessment in Texas, were analyzed to study the patterns of student performance on foundational reading constructs. The STAAR test was first implemented in 2012 and includes assessments for reading, mathematics, science, social studies, English I, English II, Algebra I, biology, and U.S. history. Students in Grades 3 through 8 are assessed in reading and mathematics every year.

An independent review of the 2015 STAAR tests used the Kolen, Zang, and Hansen (1996; KZH) procedure to calculate the internal consistency reliability estimates and overall and conditional standard error of measurement (SEM). The KZH projected reliability of Grade 3–8 STAAR reading fell between 0.890 and 0.914 with a KZH projected SEM ranging from 2.68–2.96 (Human Resources Research Organization, 2016). The 2016 Grade 4 STAAR reading subtest had 44 questions and the Grade 5 subtest had 46 questions. The 2017 Grade 4 STAAR reading subtest had 36 questions and the Grade 5 had 38 questions. The STAAR released tests provide codes identifying the reading constructs measured by each question (e.g., main idea). The large-scale dataset was acquired from the TEA with student level identifiers masked to ensure anonymity.

Unfortunately, a review of state-wide data from the STAAR reading test shows that Grade 4 and 5 students who perform well on vocabulary questions appear to struggle with the main idea and summary questions (TEA, 2016, 2017). Figures 1 and 2 shows the graphs of student performance in Grades 4 and 5. For both 2016 and 2017,

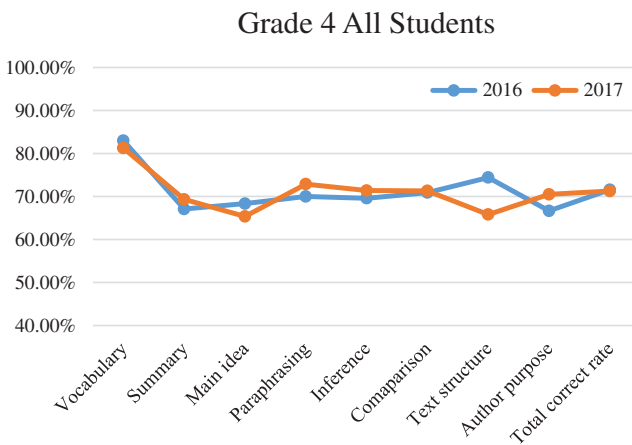


FIGURE 1 Statewide Grade 4 Student Performance on Reading Tasks for 2016 and 2017 [Colour figure can be viewed at wileyonlinelibrary.com]

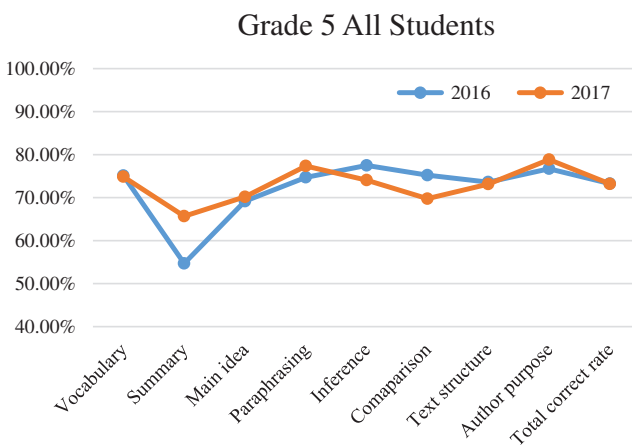


FIGURE 2 Statewide Grade 5 Student Performance on Reading Tasks for 2016 and 2017 [Colour figure can be viewed at wileyonlinelibrary.com]

student performance on main idea and summary questions was statistically significantly lower than the vocabulary questions and other reading constructs, such as text structure and paraphrasing. The pattern that emerges from this review shows that upper elementary grade students continue to struggle with these important main idea and summary skills. Struggling readers and children with IEPs score lower on these constructs than their counterparts. Figures 3 and 4 present data about Grade 4 and 5 students with IEPs and students scoring below the 25% percentile on the same test.

It is evident from reviewing the figures that student performance on vocabulary questions hovers around 75–80% while the main idea and summary scores are the lowest, ranging from approximately 65%–70%. Scores on all other constructs measured were slightly higher than those for the main idea and summary. We also conducted a series of paired t-tests comparing 2016–2017 Grades 4 and 5 student performance on main idea and summary questions with vocabulary, text structure, and comparison questions. The results are summarized in Table 1, showing that in the majority of cases, students performed significantly lower on main idea and summary questions than they did on vocabulary, text structure, and comparison questions ($p < .05$). The main idea and summary questions used were identified by the test developers as measuring those constructs. The passages used in the STAAR test reflect both narrative and expository texts.

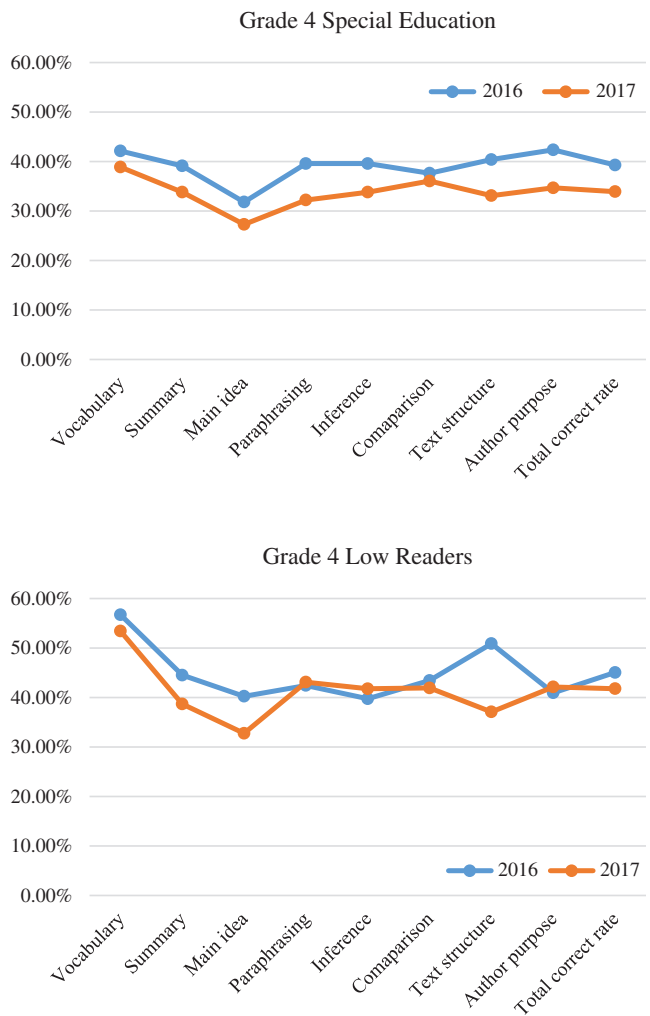


FIGURE 3 Special Education and 25% Percentile Grade 4 Student Performance on Reading Tasks for 2016 and 2017 [Colour figure can be viewed at wileyonlinelibrary.com]

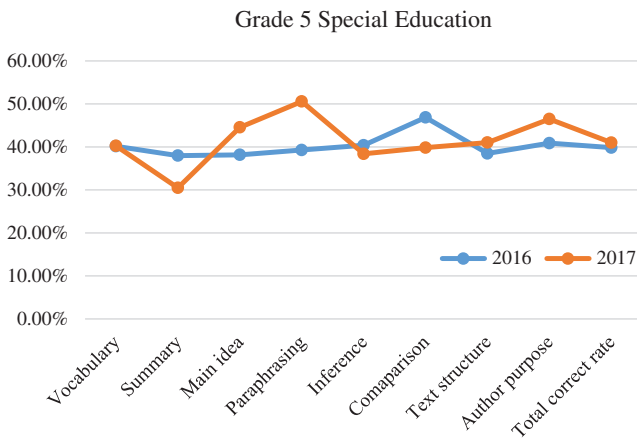
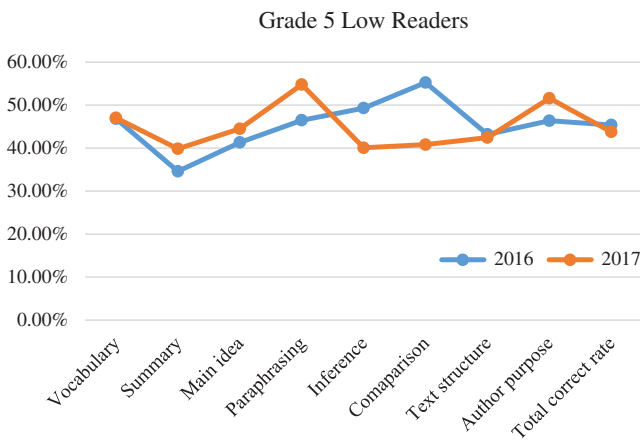


FIGURE 4 Special Education and 25% Percentile Grade 5 Student Performance on Reading Tasks for 2016 and 2017 [Colour figure can be viewed at wileyonlinelibrary.com]



6 | CURRENT STUDY

Due to the significance of the main idea skill in the comprehension of text and poor performance of elementary grade students on this important construct, it is imperative that factors contributing to these outcomes be studied. Theoretically and empirically, student reading comprehension outcomes are linked to student factors (e.g., cognitive and metacognitive; Perfetti & Stafura, 2014; Shanahan, 2010), teacher practices (e.g., knowledge and efficacy; Chiu et al., 2012; Pressley, Wharton-McDonald, Mistretta-Hampston, & Echevarria, 1998), teacher knowledge (Binks-Cantrell, Washburn, Joshi, & Hougen, 2012; Chiu et al., 2012; Connor, Son, Hindman, & Morrison, 2005; Joshi & Aaron, 2012; Piasta, Connor, Fishman, & Morrison, 2009), and numerous complex contextual factors such as socio-economic status (SES), and language background of students (Aaron, Joshi, Gooden, & Bentum, 2008). In the hallmark study on the “Peter Effect,” Binks-Cantrell et al. (2012) explained that teachers cannot provide effective instruction in areas, such as basic language constructs essential for early reading success, when they do not understand such constructs themselves. In the research reported here, we extend the Peter Effect to teacher knowledge about main ideas and instructional strategies (teacher practices) used to teach children how to write main ideas and summaries in response to narrative and expository texts.

Utilizing the Peter Effect study as a framework, we sought to understand elementary grade teachers’ instructional strategies related to main idea and summary tasks and what skills the teachers possessed in those constructs. Research questions guiding this analysis are: (a) What instructional materials and strategies are used by elementary

TABLE 1 Performance of main idea and summary questions versus other major question categories on STAAR

	Paired t-test values	Significance	Conclusion
2016 grade 4 at the district			
Vocabulary vs. main idea	12.96	***	Vocabulary > main idea
Text structure vs. main idea	4.07	***	Text structure > main idea
Comparison vs. main idea	2.17	*	Comparison > main idea
Vocabulary vs. summary	13.18	***	Vocabulary > summary
Text structure vs. summary	5.5	***	Text structure > summary
Comparison vs. summary	3.84	***	Comparison > summary
2016 grade 5 at the district			
Vocabulary vs. main idea	2.21	*	Vocabulary > main idea
Text structure vs. main idea	1.79		Text structure = main idea
Comparison vs. main idea	1.65		Comparison = main idea
Vocabulary vs. summary	6.83	***	Vocabulary > summary
Text structure vs. summary	6.21	***	Text structure > summary
Comparison vs. summary	5.74	***	Comparison > summary
2017 grade 4 at the district			
Vocabulary vs. main idea	10.51	***	Vocabulary > main idea
Text structure vs. main idea	-0.65		Text structure = main idea
Comparison vs. main idea	4.71	***	Comparison = main idea
Vocabulary vs. summary	7.7	***	Vocabulary > summary
Text structure vs. summary	-1.36		Text structure = summary
Comparison vs. summary	2.83	**	Comparison > summary
2017 grade 5 at the district			
Vocabulary vs. main idea	4.41	***	Vocabulary > main idea
Text structure vs. main idea	2.38	*	Text structure > main idea
Comparison vs. main idea	0.54		Comparison = main idea
Vocabulary vs. summary	4.34	***	Vocabulary > summary
Text structure vs. summary	2.55	**	Text structure > summary
Comparison vs. summary	1.29		Comparison = summary
2016 grade 4 state-wide			
Vocabulary vs. main idea	195.85	***	Vocabulary > main idea
Text structure vs. main idea	76.04	***	Text structure > main idea
Comparison vs. main idea	31.04	***	Comparison > main idea
Vocabulary vs. summary	168.72	***	Vocabulary > summary
Text structure vs. summary	77.4	***	Text structure > summary
Comparison vs. summary	37.85	***	Comparison > summary
2016 grade 5 state-wide			
Vocabulary vs. main idea	94.37	***	Vocabulary > main idea
Text structure vs. main idea	70.71	***	Text structure > main idea
Comparison vs. main idea	68.57	***	Comparison > main idea
Vocabulary vs. summary	170.22	***	Vocabulary > summary

(Continues)

TABLE 1 (Continued)

	Paired t-test values	Significance	Conclusion
Text structure vs. summary	158.82	***	Text structure > summary
Comparison vs. summary	155.51	***	Comparison > summary
2017 grade 4 state-wide			
Vocabulary vs. main idea	176.47	***	Vocabulary > main idea
Text structure vs. main idea	4.99	***	Text structure > main idea
Comparison vs. main idea	67.29	***	Comparison > main idea
Vocabulary vs. summary	112.73	***	Vocabulary > summary
Text structure vs. summary	-32.15	***	Text structure < summary
Comparison vs. summary	18.48	***	Comparison > summary
2017 grade 5 state-wide			
Vocabulary vs. main idea	54.55	***	Vocabulary > main idea
Text structure vs. main idea	36.13	***	Text structure > main idea
Comparison vs. main idea	-4.99	***	Comparison < main idea
Vocabulary vs. summary	77.5	***	Vocabulary > summary
Text structure vs. summary	64.96	***	Text structure > summary
Comparison vs. summary	34.25	***	Comparison > summary

* $p < .05$ ** $p < .01$ *** $p < .001$.

grade teachers to teach reading comprehension? And (b) How accurate elementary grade teachers are in generating the main idea from a science current events text?

7 | METHOD

This study uses teacher surveys and data from scored teacher main idea generative tasks. Our goal was to document and describe teacher instructional practices in reading comprehension and teacher knowledge related to main idea generation.

7.1 | Participants and setting

The 155 participating teachers were recruited from twelve elementary schools within one large school district in Texas. The district signed a memorandum of understanding to participate in this study. All teachers were recruited through presentations from the authors and consented to participate. The schools served economically and culturally diverse groups of students with over 70% of students eligible for a free or reduced-price lunch, more than 80% were Hispanic, and more than 50% of students were classified as Spanish speaking English language learners. The schools expended approximately \$10,000 per pupil, on average, for educational expenses (TEA, 2019). The average passing rate on the reading task on the state end-of-year assessment for the participating schools was 72% for fourth-grade and 74% for fifth-grade students. Approximately 21% of students at both grade levels failed to make adequate progress on reading scores from the previous two years.

Participating teachers had an average 12.4 years of teaching experience with approximately 22% with earned master's degrees and 100% with earned bachelor's degrees. Of the teacher participants, 31% taught third grade, 26% taught fourth grade, 28% taught fifth grade, and 14% taught special education.

7.2 | Measures

7.2.1 | Teacher survey

Teachers completed a survey of instructional practices during a preliminary meeting with all the teachers. The survey included 15 open ended questions. There were five demographics questions (e.g., number of years teaching, highest degree) and ten questions about reading instruction practices (e.g., reading comprehension strategies used, reading materials used, computer tools used, types of text structures taught, and frequency of teaching text structures). If teachers reported using multiple strategies, we report each one separately in the count. Items reported by only one teacher and not having WWC review were grouped together into a category called "Other." If the reported item was reviewed by the WWC and the review showed any positive effect (even if results met evidence standards with reservations), we reported it in the appropriate table. The survey is presented in Appendix A.

7.2.2 | Teacher generated main idea

Teachers were asked to read a passage and write the main idea of the passage. Teachers were given a science-based current events passage about hurricane Harvey and its impact on the Houston area. The article was retrieved from the National Public Radio website. It had 1,131 words with a title that had the signal word "reasons" embedded. The article had three subheadings presenting the three causes for the flooding reported as the flat landscape, aging infrastructure, and the over development of the land. The webfx.com tool (WebFX, 2018 (N.D.)) was used to generate readability statistics on the passage and reported a Flesch Kincaid average grade level of 10 stating that the text should be easily understood by 15 to 16-year-olds. After reading the passage, teachers were asked to complete a lesson guide that included writing the main idea for the passage.

The main idea generated by each teacher was scored by two trained raters using an eight-point scale for competence (lowest = 1, highest = 8). The raters were research analysts who were trained by the first author using a scoring manual and 30 sample main idea samples. During three training sessions, the raters received instructions about scoring as well as a series of scoring rules. Each rater then scored ten protocols and interrater reliability (IRR) was calculated. Discrepancies were reviewed and resolved. IRR was calculated by dividing number of exact match by total protocols scored. IRR, after training, was 98% and when the final teacher responses were scored and verified by the first author, IRR was 94%.

7.3 | Procedures

Teachers attending a preliminary orientation after their schools agreed to participate and completed the survey at this meeting. Approximately three weeks after the initial session, teachers were provided one full-day professional development about the reading comprehension strategy using five text structures: comparison, problem and solution, cause and effect, sequence, and description. During professional development, teachers were given instruction about how to plan their lessons using a customized text structure instructional guide. The professional development included an orientation to the five text structures, signal words associated with each of the text structures, and the benefit of using text structures to support main idea and summary writing. The professional development leaders modeled how to read and identify signal words within the text that point to text structure, how to generate a main idea, and how to write a summary of the text. Transforming the important ideas to form a main idea in their own words was also part of the professional development session. The group practiced the tasks for four hours together after the instructional model was completed. The leaders also demonstrated how to complete the provided lesson guide for a chosen reading passage. At the conclusion of the session, teachers completed the planning guide for the Houston flooding article, including writing the main idea, and submitted the guides to the research team.

7.4 | Data analysis

SAS[®] 9.4 software was used to generate descriptive statistics from the teacher surveys, to teacher demographics, reading materials used, reading comprehension strategies used, computer tools used, frequency of teaching text structures, and types of text structures taught.

8 | RESULTS

8.1 | Reading comprehension instructional methods

On the survey, the most prevalent instructional strategy teachers reported using was focused on asking students to generate summaries, but without providing specific instructions for generating them. Approximately 48% of teachers reported using summaries to promote comprehension. Twenty-eight percent of respondents

TABLE 2 *Reading comprehension strategies used in participating classrooms*

Reading comprehension method	Number	Percentage (n = 155)	WWC	National Reading Panel
Summary	75	48.39	x	x
Other	72	46.45		
Main idea	44	28.39	x	x
Inference	43	27.74	x	x
Cause and effect	27	17.42	x	x
Questioning	20	12.90	x	x
Visualize	13	8.39	x	x
Hashtag	10	6.45		
DMR/ Diana Ramirez	10	6.45		
Graphic organizer	10	6.45	x	x
Beginning middle end	9	5.81		
Prediction	9	5.81	x	x
Plot	9	5.81	x	x
Comparison	7	4.52	x	x
Somebody wanted but so then	6	3.87		
Text features	5	3.23		x
Problem and solution	5	3.23	x	x
Author's purpose	4	2.58		
Fact and opinion	4	2.58		
GOP- genre organization purpose	4	2.58		
Caveman talk	4	2.58		
Check for understanding	3	1.94	x	x
Anchor charts	3	1.94		
Vocabulary	3	1.94	x	x
Text structure	2	1.29	x	x

Note: WWC = Recognized by What Works Clearinghouse, 2019.

TABLE 3 Reading Materials and Resources Teachers Reported Utilizing

Reading materials use in class	Number	Percentage (n = 155)	Material type	Supported by research
Commercial products				
STAAR master	27	17.42	T	
Storyworks	26	16.77	R	
Motivation (mentoring Minds)	23	14.84	T	
Gayle fuller/ step up to TEKS	20	12.90	T	
Readworks*	16	10.32	R	
Forde-Ferrier	15	9.68	T	
Countdown (really great Reading co)	12	7.74	T	x
Epic	12	7.74	R	
Herman method	8	5.16	I	
Kamico	7	4.52	T	
i-station	5	3.23	D	
Lone star	4	2.58	C	
A-Z reading	3	1.94	R	
Coach	3	1.94	C, T	
Neuhaus*	3	1.94	I	x
Rally	3	1.94	C, T	
STAAR ready	3	1.94	C, T	
Appetizers	2	1.29	NC	
Classkick	2	1.29	In	
Lead4ward	2	1.29	PD	
Super teacher worksheets	2	1.29	C	
General products				
Other	59	38.06	NC	
Books	53	34.19	R	
Teachers pay teachers	19	12.26	C, I, in, R, T	
STAAR type passages	11	7.10	T	
Leveled readers	7	4.52	R	
Mentor text	7	4.52	R	
Articles	6	3.87	R	
Graphic organizers	6	3.87	C	
Technology	6	3.87	NC	
Online resources	5	3.23	NC	
Task cards	5	3.23	In	
Passages	4	2.58	R	
Anchor charts	3	1.94	In	
Workbooks	3	1.94	NC	
Teacher created materials	3	1.94	C	
Journals	2	1.29	NC	

Notes: C = Curriculum Materials, D = Digital resources, I = Intervention, In = Instructional support, NC = Not clear, PD = Professional development, R = Reading materials, T = Test prep; *Indicates a non-profit organization.

TABLE 4 Computer tools used in Language Arts classrooms

Computer tool	Number	Percentage (n = 155)	Material type	Commercial	WWCextent of evidence
i-station	96	61.94	C	x	
Other	47	30.32			
Education galaxy	27	17.42	T	x	
Seesaw	13	8.39	In	x	
EPIC	11	7.10	R	x	
Spelling City	10	6.45	In	x	
Accelerated reader (AR)	7	4.52	In	x	Small
Kahoot	7	4.52	In	x	
Lexia	4	2.58	C	x	Small

Note: n = 155; C = Curriculum Materials, D = Digital resources, I = Intervention, In = Instructional support, PD = Professional development, R = Reading materials, T = Test prep, WWC=What Works Clearinghouse, 2019.

Types of text structures	Number	Percentage (n = 155)
Other	43	27.74
Cause and effect	39	25.16
Problem and solution	26	16.77
Sequence	26	16.77
Comparison	25	16.13
n/a / none	20	12.90
Description	16	10.32
Main idea	13	8.39
Text features	9	5.81
Beginning middle end	5	3.23
Summary	4	2.58
Genre	4	2.58
All	3	1.94
Details	3	1.94
Fact and opinion	2	1.29

TABLE 5 Types of text structures taught

reported using main ideas and 27% reported using inference tasks. Ten respondents (6%) also reported using hashtags (a note-taking strategy) and graphic organizers. Some teachers (3–5%) reported using strategies such as beginning-middle-end (students include details from the beginning, middle, and end of a text to create a summary), somebody-wanted-but-so-then (a fiction summary strategy), and caveman talk (using short cave man like phrases to summarize a text). The least reported strategies (2%) were checks for understanding, anchor charts, vocabulary instruction, and text structures. Nearly half of respondents (46%) listed an instructional method that only they used, which was classified as Other. See Table 2 for complete results. Of the instructional methods teachers reported using, 14 of 24 (58%) are recognized by WWC as having some evidence. There were 15 of 24 (62%) reported practices that are recommended by the National Reading Panel as being effective instructional methods for teaching reading.

TABLE 6 *Frequency of text structure instruction in classrooms*

Frequency reported	Number	Percentage(n = 155)
Daily	33	21.29
Unclear/blank/n/a	23	14.84
1-2 times a week	13	8.39
2-3 days per week	4	2.58
Based on curriculum	4	2.58
During non-fiction	4	2.58
Every story	4	2.58
During reading	3	1.94
Often	3	1.94
When teaching text features	2	1.29
When needed	2	1.29
With genre	2	1.29

8.2 | Reading instruction materials and resources

An analysis of the teacher surveys shows that most reported materials used were singular instances reported by only one teacher (classified as Other; 38%). A third of teacher respondents use books (34%) for reading comprehension instruction. More than 20 teachers reported using STAAR Master (17%; ECS Learning Systems, N.D.), Storyworks (17%; Scholastic, 2018), and Motivation (13%; Mentoring Minds, 2019) to teach reading comprehension. All three of these resources are commercial products that report to be aligned with Texas standards and assessments but were created independent of the Texas Education Agency and are not supported by research. Two of the resources (5%) teachers reported using have research indicating the materials have a positive impact on student outcomes. See Table 3 for complete results.

8.3 | Computer tools

Teachers were asked what computer-related work they included in the teaching of reading and language arts. More than half of teachers reported using Istation (62%), a web-based software tool that uses “adventurous, game-like activities” with nationally normed Istation’s Indicators of Progress (Mathes, Torgesen, & Herron, 2016). The WWC does not report any reviews of the Istation for reading. The next most often reported computer tool was Other (30%), representing tools reported by only one teacher. The extent of evidence recognized by WWC for two of the nine computer tools reported is small. The other seven are not recognized. See Table 4 for complete results.

8.4 | Text structures

The most frequently reported type of text structure used was Other (28%; singular instances reported for each item). After that, cause and effect (25%) was the most commonly reported text structure, followed by problem and solution, sequence, and comparison (all were 17%). Details and fact/opinion were the least commonly reported (< 2%; See Table 5). Most teachers (21%) reported teaching text structures daily and 8% reported teaching text structures once or twice a week (See Table 6). Seven percent of respondents reported using text structures when the textbook scope and sequence recommended it, but did not report frequency of usage.

8.5 | Teacher identified Main idea

The average score for accurately identifying the main idea following professional development was 5.8 (SD = 2.2) on a scale of 1–8. Over 72% (n = 111) of participating teachers generated a main idea that focused on the three causes and effect related to the flooding found in the text. Approximately half of the 72% (n = 40) also presented the solutions to match the causes for the flooding. More than 80% of those who wrote an acceptable main idea with cause and effect (n = 90) wrote sentences directly from the passage, neither attributing the text to the author nor writing it in their own words, both of which were modeled during professional development. Of the 28% (n = 43) of participating teachers who did not score at least a four on the main idea task, 90% (n = 39) wrote a few words noting the name of the hurricane without any additional acknowledgement about the causes, effects, and solutions clearly signaled in the article.

9 | DISCUSSION

Due to the importance of reading to our society and the significance of main ideas in comprehension, our focus in this study was to use the “Peter Effect” framework (Binks-Cantrell, et al., 2012) to document elementary grade teachers’ instructional strategies related to reading tasks and what skills the teachers possessed in generating main ideas. The results of the teacher surveys show that classroom instruction and instructional materials are frequently not evidence-based. Even when evidence-based practices, such as summarizing, are employed, they are not scaffolded effectively for fourth and fifth grade learners. The STAAR test results presented in Figures 1–4 show a pattern of poor performance on main idea and summarization tasks with fourth and fifth grade students.

Nearly half of participating teachers reported using summarizing and nearly a third reported using main idea generation as strategies to improve students reading comprehension. Both are evidence-based practices reported by the WWC. Unfortunately, the data from the STAAR assessments show that the instruction is not effective for main idea and summary tasks. These results may be explained by the strategies employed to teach children how to summarize or generate a main idea.

Instructional practices reported by the teachers were varied and about a third of them lacked empirical evidence. For example, writing main ideas using the hashtags technique (i.e., #wolfhuffspigsdie), beginning-middle-end summary format, and somebody-wanted-but-so summaries for fiction have no empirical evidence from research databases and have not been reviewed by the WWC or other reviewing agencies. Informal conversations with teachers showed that the strategies (e.g., caveman talk) were presented to them during professional development sessions organized by their school district. These practices may provide students with a method of condensing sentences but do not focus student attention on main idea or how ideas are connected within the text. The technique also focuses on single word answers instead of main ideas that are written in sentence format and encompassing more information from the text.

Only 5% of the instructional materials reported had research to support their use. This means that the large majority of materials teachers are employing are not expected to have a positive impact. While we may value giving teachers agency of choice, our results indicate such freedom is not resulting in choices that are most likely to lead to student achievement given that nearly all curricular choices reported have no evidence to support their use. What might influence teachers to choose materials without some evidence that it would benefit their students? Future research should address this question, but one factor may be that most of the reported materials (95%) are from for-profit companies. Another factor affecting the choice of instructional materials is that teachers are not the primary decision makers regarding the curriculum. The curricula, materials, and professional development products are selected by school district administrators. Regional educational agencies within each state also provide access to such interventions through a portfolio of professional development offerings to schools. Future research should focus on the decision-making and vetting processes for the purchase of curricula materials and professional development. One-off responses were grouped together under “other” and was the most or second most common group in

each query. This may mean that the curriculum and strategies are not chosen and implemented in a systematic manner across schools or districts.

Approximately 50% of the instructional approaches reported by the teachers were found in previously reported textbook analyses (Beerwinkle et al., 2018). Specifically, summarizing, main idea generation, inferencing, graphic organizers and reading it again as well as questioning were used in the textbooks reviewed by Beerwinkle et al. (2018). One important note about the use of these strategies is that the strategies were not presented regularly and systematically within the textbooks. Instead, the scope and sequence of the lessons spiraled through these strategies at intervals of six to eight weeks without enough time for students to gain adequate practice before moving on to another concept. That means children received instruction about generating main ideas once every six to eight weeks with little regular practice on this important skill.

Teacher performance on main idea tasks was promising with the majority of teachers being able to generate a good main idea. Unfortunately, teacher knowledge about such an important construct should be at full mastery to be able to teach it to students. The “Peter Effect” states that teachers cannot teach what they have not mastered themselves. Thus, the 72% accurate main idea performance by participating teachers shows there is still work to be done in improving teacher knowledge in this foundational reading comprehension skill. Professional development leaders modeled summarizing the text to create a main idea. Yet, more than 90 teachers copied directly from the text without putting the text into their own words. This shows that the teachers are engaging in knowledge retelling rather than knowledge transformation as shown in the PD session (Scardamalia & Bereiter, 2006). If such a process was modeled to students, it could perpetuate the problem of students selecting ideas but not generating and synthesizing the connection between ideas. The question of why teachers copy the text should be explored in future studies.

10 | LIMITATIONS

There are limitations to this research related to the generalizability of the findings as well as the data sources and analytic approaches used. We note that the teachers represent 12 schools within a diverse and low-SES community and findings are not generalizable beyond this population. The teacher surveys are self-reported data, which contain inherent potential bias and were not corroborated by observations in classrooms (Northrup, 1997). Open ended questions lead to disparate responses. In our survey “other” (an indication that an item was reported by only one teacher) was the most common or second most common response and none of those categorized under “other” were evidence-based approaches. A closed ended list may provide more consistent responses, but may also be leading to participants.

Example responses on the survey were provided in some instances to help orient teachers to the nature of the response being requested. For example, “What types of reading comprehension methods do you use in the classroom? (e.g., summarize).” The most common response to this question was the example provided, summarize (48%). Providing the example may have skewed responses.

11 | CONCLUSION

This study indicates that teachers most often use materials to teach reading comprehension with no evidence to support their use and just over half of the instructional strategies they use are recognized as having some evidence to support their use. While about three quarters of teachers were able to write a correct main idea, most of them copied the text verbatim when doing so. Additionally, as noted in the “Peter Effect”, it should be expected that all upper elementary school teachers could write an accurate main idea, especially after having been taught to do so. This study indicates upper elementary grade students in this study are not being served appropriately. Choosing to most often employ strategies and materials without evidence is irresponsible and such choices need to be understood so

they can be mitigated, allowing student growth to be prioritized. The “Peter Effect” related to teacher knowledge about main ideas tells us that there is much work yet to be done.

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APPENDIX A

Teacher survey of language arts practices

Dear Teacher,

We are gathering information from each participating teacher so that we can carefully create the software and teacher professional development materials. Please answer the following questions based on your own classroom practices. Thank you for your input on this important project.

1. Demographic information
 - a. School Name: _____ Grade: _____
 - b. Years of teaching: _____ Highest Degree: _____ (e.g., BS)
 - c. Degree earned from: _____ (University or College Name)
2. What Language Arts (LA) textbooks do you use?
3. What other reading materials do you use in your classroom? (other than textbooks)
4. Please give us examples of books that your students usually like to read?
5. How do you organize your LA period? (e.g., whole group, small group)
6. Do you do any work on the computer related to LA, if yes, please tell us what it is?
7. What types of reading comprehension methods do you use in the classroom? (e.g., summarize)
8. Do you teach text structure during LA? How often?
9. If you do teach text structure, what types of text structure do you present?
10. How much time each week do you devote to text structure?
11. Please give us a brief background about the typical students in your classroom so that we can take your needs into consideration while developing the materials for this project.

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