

# Applying a Teacher-Designed Response to Intervention to Improve the Reading Among Struggling Third Grade Students

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**Abstract:** This study sought to examine the effects of a teacher-designed, differentiated instructional model on the reading skills (i.e., fluency and vocabulary) of struggling third grade readers. Participants included eight struggling third grade students in the intervention classroom and a comparison group of eight struggling third grade students in a control classroom. Participants completed measures of reading comprehension, vocabulary, and oral reading fluency. Participants in both groups received core reading instruction (i.e., 90 minute instructional block). In addition, participants in the intervention group received an additional 20 minutes of individualized, intensive intervention focused on vocabulary and fluency. This was done one-on-one. Results indicated that the children in the intervention group outperformed those in the control group on summative measures. Implications for individualized instruction in classrooms is provided.

**Keywords:** Fluency, intervention, struggling readers, vocabulary.

## INTRODUCTION

Many elementary students who struggle in reading comprehension continue to have difficulty with foundational reading skills such as word identification, decoding, and fluency (Fletcher *et al.*, 2003). In addition, these students receive less practice in reading than other children (Allington, 2001), and therefore miss opportunities to develop and skillfully apply comprehension strategies (Brown *et al.*, 1986). They also encounter reading material that is too advanced for their skills (Allington, 1984), and may acquire negative attitudes toward reading (Paris & Oka, 1986). Therefore, a number of factors can be hurdles for students who struggle with reading comprehension, and it is important to tailor interventions to the individual needs of students.

In an effort to identify how to help struggling readers, instructional designs for students who demonstrate reading deficits should include instruction that is more explicit and comprehensive, more intensive, and more supportive than most students require (Foorman & Torgesen, 2001). Instruction that utilizes explicit/direct teaching (Carnine *et al.*, 2006), small group instruction (Elbaum *et al.*, 1999), positive emotional support, and repeated practice has led to powerful student outcomes (Lovett *et al.*, 2000; Rashotte *et al.*, 2001).

To provide this type of instruction for struggling readers requires a multi-tiered approach. In line with this, the Individuals with Disabilities Education Improvement Act of 2004 (IDEA, 2004) indicates that educators implement a Responsiveness to Intervention (RTI) approach. The RTI

approach utilizes a multi-tiered model that delineates how services are determined and rendered for students with difficulties (National Joint Committee on Learning Disabilities, 2005). For example, Tier 1 supports high quality instruction and ongoing curriculum based monitoring for all students. Tier 2 incorporates research-based interventions focused specifically on individual student difficulties. These interventions should be delivered with appropriate intensity and utilize a data-based documentation system that reflects continuous monitoring of student performance and progress. Tier 3 integrates special education and related services (i.e., students receive more intensive, systematic and specialized instruction than received from general education alone). This multi-tiered RTI approach can be utilized to provide effective instruction in reading comprehension that is tailored to the unique needs of individual students.

Meeting the unique needs of students is important for success in reading comprehension. In line with this, a crucial element in RTI is to improve academic achievement for all students. However, many schools implement Tiers 2 and 3 independently rather than collaboratively. For example, many school districts depend upon special educators and other support personnel to incorporate research-based interventions and determine how to differentiate instruction. It may be more effective for general education teachers, special education teachers, and support personnel to collaboratively and inclusively provide Tier 2 and even Tier 3 instruction within a classroom setting.

Empirical studies have been conducted that examine the impact of RTI on the reading skills of learners, and have found that implementing multi-tiered instruction improves fluency and other comprehension skills among struggling readers (e.g., McIntosh *et al.*, 2007). However, there is still a need to examine how classroom teachers can effectively design multi-tiered comprehension instruction for others to employ in a way that can positively impact student learning.

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The focus of this study was to examine how to design and implement a classroom-based application of the RTI model with students falling within the bottom quartile in reading comprehension, with a classroom teacher training a paraprofessional and a high school volunteer. Classroom teachers and school district personnel are now reporting that teachers know the “what” of effective reading instruction (i.e., what should be covered, what skills are necessary, and what empirically-supported practices should be implemented). They are now struggling with the “how.” Specifically, how can a teacher take effective, research-based comprehension and RTI practices and make them work in the classroom?

### **DIFFERENTIATED INSTRUCTION**

Research clearly documents that providing individualized instruction is critical for improving student achievement. Differentiated instruction is when teachers adapt instructional practices as needed to fit the varying needs of the learners in their classroom (Tomlinson, 2005). For example, some students may struggle with reading comprehension because of limited vocabulary knowledge, whereas others may struggle because of poor reading fluency skills. Teachers would therefore need to provide extra vocabulary instruction to some students, but extra fluency instruction to others.

To successfully improve achievement using individualized instruction, changes must occur within the classroom. Traditional classroom instruction has involved teacher-directed instruction, such as lecturing; however, this model of instruction does not enable for differentiation of instruction to diverse student learners. Teachers must successfully manage many different aspects of instruction simultaneously, including working with all students during core instructional times, managing the class, and working with small groups of students or individual students needing extra instruction and practice. This is challenging but necessary, because differentiated instruction allows for teachers to meet the needs of all students in the classroom if implemented in a systematic, effective fashion. Part of differentiated instruction also includes teaching students how to think for themselves and how to take the strategies they are using and apply them to their personal lifelong learning. Classroom teachers are often the facilitators who help make this possible (Tomlinson, 2008).

(Hewson & Adrian, 2008) state, “By focusing on individual student progress, we have put excellence within reach of us all” (p. 75). The key to student achievement, regardless of the subject matter, is focusing on individual needs. When educators take into account typical child development but also see their students as individual, separate cases, each of whom needs a variety of instructional techniques, the educator gains insight into each student. In order to individualize a student’s learning program, educators must determine a baseline level of achievement for each student. This indicates that teachers must have access to relevant data, be able to effectively and accurately interpret the data, and then plan for individualized instruction based on the data (e.g., Barneveld, 2008).

### **RESPONSE-TO-INTERVENTION**

In order to achieve successful differentiated instruction, teachers can use Response to Intervention (RTI). RTI is a model that uses scientifically sound practices to intervene with students who are experiencing academic difficulties (Fuchs *et al.*, 2010). Through RTI, three tiers of intervention exist. Throughout all three tiers, progress monitoring tools are used to indicate levels of risk. In some tiers progress monitoring occurs more frequently.

Tier 1 serves as a way to provide scientifically based instruction to all students (Hughes & Dexter, 2013) and is usually implemented by the classroom teacher to the entire class or a larger group of students. Students in this tier of instruction are occasionally progress monitored, such as at five to ten weeks, depending on the student and the skills being focused on. Tier 2 increases the individualization of instruction (often through small group instruction) and includes more frequent progress monitoring. It is considered more intensive than Tier 1 and can be implemented by the regular classroom teacher, trained paraprofessional, reading specialist, and/or school psychologist. If the teacher feels a student needs even more intervention than Tier 2 allows, students are able to move to the Tier 3 intervention. Tier 3 requires instruction that is much more intensive and occurs in individual or very small group settings. The intervention may also be implemented for a longer time period, focusing on one skill at a time. Students in Tier 3 are often in special education programs, with an individualized education plan.

Different states and districts have adopted RTI models in different ways. Some districts have adopted district-wide RTI models (e.g., Callender, 2007). If a district has not adopted a model for student intervention, the classroom teacher must find a way to meet the goals of the students. Even if supports are available (e.g., paraprofessionals, reading specialists), they should not replace Tier Instruction Models. It is possible within a classroom to implement tiers of instruction even if the school has not adopted a model on its own, and doing so has been shown to improve reading among struggling students (Lyon *et al.*, 2004).

In order to help students achieve gains and to decrease gaps in learning, we must look closely at offering students as many small group and/or one-on-one opportunities to learn skills in isolation as possible. Offering such expert tutoring opportunities has been empirically shown to have a direct impact on learning (Allington, 2004; Lyon *et al.*, 2004). Because struggling readers often struggle with basic reading skills such as fluency and decoding (Kirsch *et al.*, 2002), tiered instruction can be an effective method through which teachers can screen and identify the skills a student is struggling with, and then focus on those skills during instruction.

### **READING COMPREHENSION**

The goal of RTI and differentiated instruction is to improve the achievement of students. In particular, reading comprehension is a critical skill that is required for student success in academic and, later on in life, vocational settings (Hagaman & Reid, 2008; Kirsch *et al.*, 2002; Snow, 2002). Reading comprehension refers to the ability to understand

the meaning of the text. It includes cognitive processes such as making inferential connections within the text, and making connections with prior knowledge to construct a coherent understanding of the text (Graesser *et al.*, 1994; Kintsch & van Dijk, 1978; Scholastic, 2008). Therefore, reading comprehension requires understanding, processing, reasoning, and prior knowledge. Within each of these areas are many skills, concepts, and applications for a learner. Because all students learn differently and at different paces, educators are relying on the practice of differentiated instruction to help them achieve positive results for student learning.

Several skills play foundational roles in the success a student experiences with reading comprehension. These include: phonological awareness, automaticity in word recognition, vocabulary, fluency, working memory, and more (e.g., National Reading Panel, 2000; Rapp *et al.*, 2007). The five components of reading in our nation's education spotlight include: phonemic awareness, phonics, vocabulary, fluency and comprehension. These components, labeled "The Big 5", have been found the most instrumental pieces necessary to ensure readers' success (American Institute for Research, 2004). In sum, successful acquisition and use of these skills predicts subsequent reading comprehension. The current study focuses specifically on improving comprehension through fluency and vocabulary instruction. Fluency is being able to read a text accurately, quickly, and utilizing the appropriate prosody (LaBerge & Samuels, 1974; NICHD, 2000). It is also often seen as a necessary "building block" of reading comprehension (Pikulski & Chard, 2005). Vocabulary, which refers to knowledge of words, is also highly related to reading comprehension (Carroll, 1993). Without understanding the meaning of words, it is difficult to fully comprehend what a text is conveying. Thus, individuals who receive instruction geared toward improving vocabulary knowledge demonstrate increased reading comprehension achievement (Beck & McKeown, 1991).

**Fluency.** Within the past decade, the focus on reading fluency as being important for comprehension has gained considerable attention. Reading fluency is important because it builds on decoding skills to form a bridge between decoding and comprehension (Penner-Wilger, 2008). A variety of studies have found corroborating evidence that improving fluency skills can also improve comprehension skills and achievement. This is likely because fluency frees up students' already limited cognitive and attentional resources, such that these resources can then be devoted to comprehension.

For example, when providing elementary-aged students with daily scaffolded oral reading, their overall fluency, pitch, stress and juncture (i.e., prosody), and comprehension all increased (Schwanenflugel *et al.*, 2006; Shaywitz & Shaywitz, 2004). Likewise, engaging seventh grade struggling readers in repeated reading improves their fluency, comprehension, and self-esteem scores (Roundy & Roundy, 2009), especially when such instruction is individualized (Field, 2007).

Taken together, this body of research demonstrates that improving fluency can improve comprehension. However, some studies have found evidence that this does not occur for all readers (Almguer, 2005; Elfrieda & Fisher, n. d.;

Martens, 1997; Osborn, 2007): The link between fluency practice and improved comprehension is often present for skilled readers, but not for struggling readers. Therefore, fluency instruction has a differential impact on comprehension depending upon the skill level of the reader. These differential effects could be a function of intervention duration or the training of the person administering the interaction. However, a highly likely explanation is that struggling readers must receive explicit instruction in the component skills of fluency (i.e., decoding, automaticity, and prosody) before they can become more automatic with reading fluency (Osborn, 2007; Penner-Wilger, 2008).

Another possible reason for this discrepancy is the idea that perhaps training in fluency alone is not enough to improve comprehension skills. As we know, although fluency is correlated with comprehension (Penner-Wilger, 2008; Schwanenflugel *et al.*, 2006; Shaywitz & Shaywitz, 2004), successful comprehension necessitates skill in a variety of other factors, such as background knowledge, inferential skills, decoding, and vocabulary knowledge (e.g., National Reading Panel, 2000; Rapp *et al.*, 2007). Therefore, simply working on improving one skill, such as fluency, may not be enough to improve comprehension. Instead, it is possible that pairing fluency instruction with instruction in another important skill, namely vocabulary, would have a greater impact on comprehension levels. We will now turn to discussing the relations between vocabulary and comprehension, and then discuss the possible combinatorial effects of combining vocabulary instruction with fluency instruction to improve comprehension.

**Vocabulary.** Vocabulary (the knowledge of word meanings) plays a critical role in reading comprehension. (Roberts *et al.* 2008) found that older students with learning disabilities tend to struggle more with the fluency due to the difficulties they encounter with identifying new and unfamiliar words. The authors suggest that students who struggle with learning new words focus on learning skills of how to break apart difficult words into familiar units and use known meanings of smaller parts of the word to learn new vocabulary words. Once words can become more familiar to students, they can begin working on the skills necessary to increasing fluency.

Although students show the ability to decode many words, they still do not necessarily comprehend the meaning of those words because they lack the appropriate background knowledge (Liben & Liben, 2004). (Pransky, 2009) indicates that no matter what their language development, students may come from backgrounds that are more versus less oriented toward literacy. Students from less literacy-oriented communities demonstrate a larger vocabulary gap compared to their peers, often because they are exposed to fewer words and concepts. To help fill in this gap in knowledge and experience, students should be allowed to think about the words they are reading in text, identify these words as they read them, record them and then be given time to learn them and apply them with repeated readings. Teaching students to record words they do not know the meanings of and providing a standard vocabulary list individualizes student learning and empowers students to become their own teachers. In this way, students can self-differentiate

instruction to improve achievement as well as self-efficacy (Tomlinson, 2008).

## COMBINING INSTRUCTION IN VOCABULARY AND FLUENCY

As discussed, instruction on either fluency or vocabulary alone may not be enough to improve comprehension, because successful comprehension requires the execution of a variety of processes (Goldman & Bisanz, 2002; van den Broek, 1994; van den Broek *et al.*, 2002). The primary question of this study is whether combining vocabulary instruction of words that students struggle with, combined with working on students' reading fluency, will improve comprehension. As an added layer, this will be investigated through differentiated instruction using the RTI model, so that the instruction can be individualized to be appropriate for each learner's unique level.

How fluency and vocabulary can interact with each other is an important consideration. For example, (Juel & Deffres 2004) offered an explanation of struggling readers and the concept of "word poverty". Linguistically advantaged students know approximately 20,000 words in first grade, compared to linguistically disadvantaged students who only know 5,000. Students must continue to be exposed to new vocabulary and repeatedly utilize the new vocabulary through repeated reading (which also builds fluency) in order to permanently store the new vocabulary in long-term memory. To support this notion, Lubliner and Scott (2008) offer four basic principles of the nature of word learning: Word learning is multidimensional, words come in different types of packages, word learning is incremental, and students need to develop problem-solving strategies for figuring out unknown words. When considering that word learning is incremental, repeated exposure to a word allows for a student to learn its meaning, become familiar with the word, and apply it to a number of different contexts. When considering that word learning requires students to develop their own problem-solving strategies to figuring out unknown words, it is important that students explicitly practice and learn how to apply the use of dictionaries and other resources, the use of context clues, the use of dissecting words and recognizing the meanings of the base word with and without the affix. In sum, vocabulary instruction involves teaching problem-solving strategies in addition to repetition.

Building fluency and vocabulary skills both require instruction, practice, and repetition. While learning vocabulary during repeated readings, students are able to apply their vocabulary skills, instead of only memorize by rote. Research suggests that encouraging repeated oral reading produces positive effects on word recognition, fluency, and comprehension (National Reading Panel, 2000). Repeated reading on its own cannot be a substitute for vocabulary instruction or the use of comprehension strategies. Repeated reading should be combined with comprehension skills and vocabulary instruction in order to be most effective (Roberts *et al.*, 2008).

In conclusion, repeated reading is not only effective for improving reading fluency, but repeated reading may also

assist learners in developing their vocabulary. And, the combination of repeated reading with fluency should help to improve comprehension. This should especially be the case when instruction is differentiated and provided within the context of an RTI model.

## THE CURRENT STUDY

There is now an impetus (in addition to state mandates) to implement RTI processes within classrooms. In addition, the skills of fluency and vocabulary are critical for successful reading comprehension. Many struggling readers have difficulties with fluency, vocabulary and comprehension, and therefore additional research regarding how classroom teachers, with limited personnel support, could implement differentiated, tiered instruction is needed. Additionally, the effectiveness of such an instructional design on reading skills requires further examination.

The current project sought to examine the effects of combining fluency and vocabulary instruction, within an RTI model, on struggling readers' comprehension and achievement. The research questions for this project included (1) What is the effect of individualized vocabulary instruction and fluency instruction on readers' comprehension skills? And (2) Are there differences in outcomes based on instructional format? First, we hypothesized that individualized vocabulary instruction combined with fluency instruction will help to increase comprehension results or struggling third grade readers. Second, we hypothesized that the performance of students receiving small group, differentiated reading instruction plus individualized reading intervention will differ from students not receiving this type of instructional format.

## MATERIALS AND METHODOLOGY

### Participants

Eight struggling readers in the primary researcher's third grade classroom participated in the intervention. All eight participants (seven boys and one girl) tested below the 25th percentile in fall administration of the Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP) assessment (Northwest Evaluation Association, 2011) (see Tables 1 and 2).

Five of the eight students were identified as having learning disabilities, with one of these also being a second language learner. These five participated in the regular classroom with the inclusion services outlined in Table 1. The other three students were not identified as having a learning disability. Of the three not identified with learning disabilities, two qualified for reading lab services and one qualified for no outside services (see Table 1).

A comparison group, comprised of eight participants in the third grade, was identified. These participants were selected to provide a matched sample, and they therefore had similar scores on the NWEA when compared with the experimental group. This comparison group was in a third grade classroom of the same elementary school as the experimental group. The classroom teacher of the comparison group did not utilize RTI methods in her classroom. The services they received are provided in Table 2.

**Table 1. Experimental group participants and their services.**

Student	Inclusion <sup>1</sup>	Pull Out <sup>2</sup>	Reading Lab <sup>3</sup>	ELL <sup>4</sup>	Speech <sup>5</sup>
A	Yes	No	No	Yes	Yes
B	Yes	No	No	No	No
C	No	No	No	No	No
D	Yes	No	No	No	No
E	Yes	No	No	No	No
F	No	No	No	Yes	No
G	No	No	No	No	No
H	No	No	No	Yes	No

<sup>1</sup>Inclusion: A paraprofessional assisting students on an individualized education plan in the regular classroom. <sup>2</sup>Pull Out: The student is pulled out for special education services during reading instruction, according to their individualized education plan. <sup>3</sup>Reading Lab: The student receives 30 minutes of instruction in a small group setting but does not qualify for inclusion or pull out services. <sup>4</sup>ELL: The student receives 30 minutes of English Language Learner services. <sup>5</sup>Speech: The student receives speech services through an individualized education plan.

**Table 2. Comparison group participants and their services.**

Student	Inclusion <sup>1</sup>	Pull Out <sup>2</sup>	Reading Lab <sup>3</sup>	ELL <sup>4</sup>	Speech <sup>5</sup>
1	No	Yes	No	No	No
2	No	Yes	No	No	No
3	No	No	Yes	No	No
4	No	No	No	No	No
5	No	No	Yes	No	No
6	No	Yes	No	No	Yes
7	No	Yes	No	No	Yes
8	No	No	No	No	No

<sup>1</sup>Inclusion: A paraprofessional assisting students on an individualized education plan in the regular classroom. <sup>2</sup>Pull Out: The student is pulled out for special education services during reading instruction, according to their individualized education plan. <sup>3</sup>Reading Lab: The student receives 30 minutes of instruction in a small group setting but does not qualify for inclusion or pull out services. <sup>4</sup>ELL: The student receives 30 minutes of English Language Learner services. <sup>5</sup>Speech: The student receives speech services through an individualized education plan.

All participants attended school in a district located in a large metropolitan area in the Midwest. The elementary school had a racial makeup that was 2.58% African-American, 4.73% Hispanic, 81.09% White, and 11.60% were of other races (KSDE, 2009). Since the beginning of No Child Left Behind (NCLB; United States Department of Education, 2001) this elementary school has made Adequate Yearly Progress (AYP) each year.

**Measures**

To measure the effects of fluency instruction combined with individual vocabulary instruction, formal and curriculum-based measures were used. To formally assess reading comprehension, the NWEA MAP assessment was given. The Northwest Evaluation Assessment, or Measurement of Academic Progress tests are data driven assessments given in the areas of reading and math and science. The computer driven assessment can be given through the primary version, offered in kindergarten through second grade or the elementary version, offered in grades

three through six. Science is an optional assessment offered. The tests are designed to adapt to the students’ responses. When students answer a question correctly, a more challenging question is offered. When the student misses a problem, a simpler question is given to the student. The test provides detailed and unique data on where each child is on their learning journey. Teachers can utilize the findings from the NWEA to individualize student learning in all areas students have tested. Additionally, Kansas State Assessment reading data were examined as a summative reading measure. According to the Kansas State Department of Education, the Kansas State Assessments were developed to “implement curricular standards and assessments that will improve instruction and encourage student learning” {<http://www.ksde.org/Default.aspx?tabid=2136>}. Kansas State Assessments are administered beginning in third grade and continuing through sixth grade, every year, in elementary grades for the subjects of reading and math. Science is administered in fourth grade.

A curriculum-based measure of reading comprehension was used as well. The Houghton Mifflin Leveled Reading Passages are passages that follow equivalent linguistic complexity and format structures. Students read the passages and then answer reading comprehension questions over the content.

### Procedures

**Daily classroom instruction.** Both the comparison and experimental participants received similar reading instruction during their school days. Students received a 90-minute block of reading instruction time each day. During this 90-minute block, students participated in whole group reading as well as guided reading groups. The curriculum provided to these classrooms was the Houghton Mifflin Reading Program (Houghton Mifflin, 2001). Students were also instructed with the use of novels and trade books during guided reading throughout the school year. Local, state and national standards were the focus in all reading classrooms, regardless of the text the participants were utilizing.

**Experimental group intervention.** In the experimental group, another twenty minutes of daily intervention was provided for the eight experimental participants. This twenty-minute slot of time was allocated specifically for individualized vocabulary building and fluency instruction interventions. The scheduled time for these interventions was within the regular school day, provided primarily by a high school volunteer (hereafter referred to as the instructor), and in her absence (approximately five times during the research phase of the project), a paraprofessional. The format of these 20 minutes of intense, one-on-one instruction was completed in a separate setting from the classroom. The "instructor" removed the student during a non-instructional time of the day. Other students in the room were completing work, projects, individual practice, or working in small groups on individualized skills that needed review or enrichment. In these sessions, the participants orally read passages to attain repeated reading instruction, as well as kept a vocabulary notebook.

To target fluency, the teacher selected the curriculum of Power Reading. Power Reading is a leveled program that offers a variety of passages in each level. These passages are non-illustrated texts, some fiction and some nonfiction. These passages are approximately a page and a half in length and offer ten comprehension questions following each passage. Power Reading does not incorporate a vocabulary section, so the researcher added individualized vocabulary combined with fluency practices to these passages. Participants were given a Power Reading passage, and read the passage out loud. While reading, the instructor marked words on a separate copy of the same passage. The instructor highlighted or underlined words mispronounced, words added, and words deleted. The instructor also marked incorrect prosody the student may have used in his/her reading. While the student read, the instructor timed this read, known as a "first read." The time was labeled and recorded.

Following the first read, the student wrote words he/she did not know the meanings of into a journal, which was in the form of a spiral notebook. Each student had his or her own notebook, which served to individualize instruction.

The instructor pronounced the word correctly and the student repeated the word. The instructor gave the student a sentence, using the word in context to help the student decipher the meaning of the word. The student listened to the word again in the passage and created the meaning of the word in their journal with a picture/symbol. Students repeated each of these words orally to the instructor before and after the reading of the passage.

Further vocabulary instruction was provided based on the words that were included in the vocabulary journal. Also in the notebook, each student made note of his/her mispronounced words from the first reading of the assigned material. The students predicted these meanings and discussed the meanings with their instructor. From instructor-student discussion and guidance and prior to rereading each day, students created pictures or symbols of the meanings of unknown words and recorded them in their notebooks to discuss.

The following day the instructor and student began their time discussing the meaning of the mispronounced words from the first day's reading. The instructor would reread the missed vocabulary words, define them, and then use them in context in sentences. The instructor read the sentence aloud within the week's passage that used the mispronounced vocabulary word, and the student redefined what the word meant within the context of the passage. Students reviewed the picture/symbol they created in their journals. If the word had a prefix or suffix, the word was dissected and the base word and the affix defined separately and then taught together as one word. Students read the vocabulary that had been mispronounced or misunderstood. Much one on one dialogue took place daily with the instructor and the student. Finally, students would reread the same passage to the instructor.

On the third day, the instructor assisted students in creating sentences for the vocabulary words in journals, attempting to use the word in context. Students read the vocabulary mispronounced or misunderstood orally. Students received individual instruction on any missed end marks. Students reread the passage out loud.

The instructor repeated this procedure for a fourth day. On the fifth day, the student reread and reviewed missed vocabulary with the teacher. On this day the instructor timed the student as he/she read the passage out loud. The student marked the final read on the bar graph with a red marker or the instructor recorded the time it took for the student to read the passage. A comprehension quiz was given following the reading. If students were noted with accommodations for state assessments, the researcher used accommodations for this research. The student completed a comprehension quiz on the passage following the second timed read. The first read, second read, and comprehension results were recorded. This intervention was repeated with various passages for each student over a six week time period.

### RESULTS

To address the first research hypothesis regarding the effect of individualized fluency and vocabulary instruction on reading comprehension, scores from fall and spring administration of the formal measures were examined as

well as summative performance on the state assessment in reading. Table 3 illustrates the differences in performance on the formal and curriculum based measure from fall to spring administration for those participants in the intervention group. The information reported under HMLRP (Houghton Mifflin Leveled Reading Passages) corresponds with the guided reading levels set forth by Fountas and Pinnell (1996). The levels KL and MN correspond with 2<sup>nd</sup> grade. Level J corresponds with 1<sup>st</sup> grade.

In September the NWEA range was 8%-23% and in April the NWEA range was 16%-77%. Seven students made gains. The Houghton Mifflin Leveled Reading Passages (HMLRP) range in September was late 2<sup>nd</sup> to early 3<sup>rd</sup>. The April range for HMLRP was from early 3<sup>rd</sup> to 4<sup>th</sup>. Seven out of eight students passed the Kansas State Assessment, according to NCLB requirements.

To address the second research hypothesis regarding group differences in performance between the intervention and comparison groups, scores and growth were compared. Table 4 illustrates the scores on the measures from the

comparison group. Table 4 illustrates growth made by all participants.

The range of September NWEA scores was from 10%-19%. The range of April NWEA scores was from a 12% - 45%, with two students not testing in April and one student making no gains. The HMLRP range in September was from late 1<sup>st</sup> to early 3<sup>rd</sup>. In April, the HMLRP range was from early 3<sup>rd</sup> to late 3<sup>rd</sup>. Kansas State Assessment results revealed three students passing, according to requirements by NCLB, and five students not passing.

Table 5 shows the differences in growth by group membership, intervention (I) and control (C).

Students in the experimental group averaged a 15.8% in September with the NWEA. In spring the average NWEA score for the experimental group was 41.4%. The average for the Kansas State Assessments for the experimental group was 78.8%. The control group averaged 13.5% in September on the NWEA and in spring averaged a 26.5%. The average Kansas State Assessment for the control group was 60.5%.

**Table 3. Performance of the intervention group.**

Student	NWEA MAP		HMLRP				KS State Assessment
	Fall	Spring	Fall		Spring		
			Level	GE	Level	GE	
A	23%	39%	KL	Late 2nd	MN	Early 3rd	72%
B	8%	54%	KL	Late 2nd	MN	Early 3rd	86%
C	17%	51%	J	Early 2nd	QRS	4th	72%
D	17%	60%	KL	Late 2 <sup>nd</sup>	OP	Late 3rd	83%
E	13%	77%	J	Early 2 <sup>nd</sup>	OP	Late 3rd	88%
F	9%	34%	KL	Late 2 <sup>nd</sup>	QRS	4th	80%
G	21%	36%	MN	Early 3 <sup>rd</sup>	QRS	4th	84%
H	19%	16%	MN	Early 3 <sup>rd</sup>	QRS	4th	65%

Note. N=8. HMLRP=Houghton Mifflin Leveled Reading Passages. GE = Grade Equivalency.

**Table 4. Performance of the comparison group.**

Student	NWEA MAP		HMLRP				KS State Assessment
	Fall	Spring	Fall		Spring		
			Level	GE	Level	GE	
1	10%	29%	HI	Late 1st	OP	Late 3rd	63%
2	17%	n/a	KL	Late 2nd	OP	Late 3rd	72%
3	19%	45%	KL	Late 2nd	OP	Late 3rd	73%
4	15%	29%	KL	Late 2 <sup>nd</sup>	MN	Early 3rd	59%
5	10%	27%	KL	Late 2 <sup>nd</sup>	MN	Early 3rd	60%
6	12%	12%	J	Early 2 <sup>nd</sup>	MN	Early 3rd	30%
7	15%	n/a	J	Early 2 <sup>nd</sup>	MN	Early 3rd	55%
8	10%	17%	MN	Early 3 <sup>rd</sup>	MN	Early 3rd	72%

**Table 5. Differences in growth by group membership.**

Student	Group	Growth in NWEA
A	I	13%
B	I	46%
C	I	34%
D	I	42%
E	I	64%
F	I	25%
G	I	15%
H	I	-3%
Group Average		29.5%
1	C	19%
2	C	n/a
3	C	26%
4	C	14%
5	C	17%
6	C	0%
7	C	n/a
8	C	7%
Group Average		16.6%

Note: I=Intervention group, C=Comparison group. n/a = data not available.

When a student scores an 89%-100% on the Kansas State Assessments in reading, the student has scored in the “Exemplary” category. A score of 80-88% shows “Exceeds Standards”; a score of 67-79% shows the student has “Met Standards” and a score of 55-66% tells the child is “Approaching Standards”. A score of 54% and below puts the child at “Academic Warning”. It is the goal of NCLB that every child meets a score of 67% or above in reading in the third grade on the Kansas State Assessments.

T test analyses were completed within groups for the NWEA Fall/Spring scores as well as between groups for NWEA scores and the State Assessment score. Analyses indicated that for within group differences, both the experimental and the control group made statistically significant gains on the NWEA from Fall to Spring. For the experimental group,  $t(7) = 4.02, p = .002, d = 1.43$ . For the control group,  $t(5) = 2.82, p = .02, d = 1.01$ . For between group differences in NWEA scores, the groups did not differ significantly at Fall testing  $t(14) = 1.04, p = .32, d = .52$ . At the spring (post-intervention) administration, the groups’ performance differed significantly  $t(12) = 3.00, p = .01, d = 1.5$  with the experimental group scoring higher than the control group. Finally, comparing scores on the Kansas State Assessment, between group differences were noted ( $t(14) = 3.17, p = .007, d = 1.58$ ) with the experimental group outperforming the control group. Table 6 shows the comparisons of the experimental and control groups.

## DISCUSSION AND CONCLUSION

The goal of this study was to determine if a teacher-designed model of RTI focused on vocabulary and fluency would improve reading comprehension skills of struggling third grader students. Additionally, the differences in performance on measures of reading between the intervention group and a comparison group of similar readers were examined. Although the extant literature provides mixed results regarding the impact of fluency interventions on reading comprehension, the results from this study indicate that providing fluency intervention coupled with vocabulary instruction can lead to improved comprehension. In addition, limited research has been done in the area of teacher implementation of RTI in the classroom, and this study utilized this model with success.

For the students in the intervention group, statistically significant gains were made from fall to spring test administration in the areas of reading comprehension and fluency. Students demonstrated growth in their fluency skills, vocabulary knowledge, and reading comprehension. This indicates that a teacher-designed model of RTI that individualizes instruction and a combined intervention for fluency and vocabulary in small group instruction had a positive impact on the reading comprehension skills of students. This finding is in support of (Callender, 2007) who reported positive effects in terms of student learning from a teacher-implemented RTI approach.

When examining the differences in performance between the intervention group and the comparison group, several key findings were noted. First, all students regardless of group membership started off with similar scores on the NWEA MAP (15.8% for the intervention group and 13.5% for the comparison group). Although all the students in the intervention group started out in the bottom quartile, by the conclusion of the intervention all were considered to be reading on or above grade level. In contrast, only three of the eight in the comparison group were considered to be reading on grade level in the spring. In terms of proficiency on the state assessment in reading, seven of the eight students in the intervention group passed the state assessment with a score that qualified them for “Met Standards” or above. In contrast, only three out of eight students passed the Kansas State Assessments by a score for the “Met Standards” category in the comparison group. These findings support those of (Fuchs *et al.*, 2010), which indicate that individualized instruction, following the RTI model, can have positive effects on the skills of students. Additionally, this approach produced greater gains than typical classroom practice. Differentiated instruction and Response to Intervention are both models that appear to allow students to work at where they are currently achieving and build skills beyond their current level(s).

Within a differentiated instruction model, classroom teachers are able to focus on student weaknesses and strengths in an effort to help students achieve their fullest potential while focusing on lifelong learning skills (Tomlinson, 2008). When educators evaluate where every learner is in their classroom from the moment they arrive into their classrooms, educators will be better equipped to make changes within their current curriculum to meet the needs of every learner. As students become more proficient

**Table 6. Comparison of results of control group and experimental group.**

Variable	Control Group	Experimental Group
Participants	*8 participants (gender unknown)	*8 participants (seven boys; one girl)
Age Range	*Age range is 16 months (March, 2000 – July, 2001)	*Age range is 13 months (June, 2000 to July, 2001)
Number of Participants Making Gains on NWEA	*Four participants made gains on NWEA (two did not take post assessment)	*Seven participants made gains on NWEA
Average Gains on NWEA	*Averaged together NWEA scores increased from 13.5% to 26.5%	*Averaged together NWEA scores increased from 15.8% to 41.4%.
Number of Participants Passing State Assessments	*Three students passed the Kansas State Assessments according to NCLB	*Seven students passed the Kansas State Assessments according to NCLB
Average State Assessment Score	*Average Kansas State Assessment was 78.8%.	*Average Kansas State Assessment was 60.5%.
Increase in Grade Level According to HMLRP	*Six students increased AT LEAST one grade level in reading according to HMLRP	*All students increased AT LEAST one grade level in reading according to HMLRP
Actual Grade Levels at the End of Third Grade	*Three students reading at “late third grade” level in April	*All students reading at “late third grade” or “fourth grade” level in April

with vocabulary, fluency, and comprehension, they can continue to add more skills and/or apply such skills. With reading comprehension it is imperative teachers recognize “The Reading Big 5” (National Research Panel, 2000) with every learner and find where holes in these areas may lie. Evaluating every reader’s phonemic awareness level, phonics level, vocabulary, fluency and comprehension levels prior to preparing curriculum at the start of the school year, teachers will find precisely where to begin with each learner. Once teachers fully implement “The Reading Big 5” in conjunction with differentiated instruction (Tomlinson, 2008), and RTI (Strecker, 2007), students will achieve skills necessary to successful reading comprehension of all texts.

Does vocabulary instruction combined with fluency instruction increase overall reading comprehension? The three component skills of reading fluency include “accuracy of word decoding, automaticity of word recognition, and prosody of oral text reading” (Penner-Wilger, 2008, p. 3). Vocabulary knowledge and fluency seem to parallel one another when seeking to make gains in reading comprehension. When students can decode words automatically and create mental pictures in their minds with automaticity, then students are able to visually comprehend text more effectively. However, if students are not aware of the words they are reading, no mental pictures are created or the student creates the wrong mental picture.

As (Lublimer & Scott 2008) state, using repetition of a word in a variety of texts enable students to understand the meaning of a new word. “Repeating a word supports students’ understanding of its meaning as well as how it can be used in various contexts” (p. 10). When we repeat vocabulary to students within the text they are reading, students will better comprehend the meaning of the word and the text. As students repeat their readings with new vocabulary words embedded within the text, the brain is better equipped to create mental pictures with the repetition provided.

More research combining individualized vocabulary instruction combined with fluency instruction needs to be provided. However, given the one-to-one intervention this research provided, along with individualizing the vocabulary for each of the students, it can be suggested that all eight students increased their comprehension through individualized vocabulary instruction combined with fluency practices. With the one-to-one interventions, more direct student-to-teacher time was allowed for these students to further their lifelong learning skills as they learned to apply the skills of context clues, decoding, and processing skills to learn the meanings of unknown words and ultimately increase comprehension.

As teachers begin to examine the practices in the regular education classroom, it is necessary to look at resources surrounding them in order to make interventions like this one successful. The availability of extra hands is not always readily available in every school setting. This intervention is one that can be implemented to all levels of reading and be utilized with students who fall in the “some” and “few” and “all” categories of RTI (Fuchs *et al.*, 2010) even within the regular classroom setting. As teachers seek this small group or one-on-one time, other literature based activities and programs can be occurring throughout the classroom setting such as literature circles, graphic organization of text with buddies, fluency practicing with a partner, or even silent, independent reading time.

Further examination of the effects of individualized vocabulary instruction combined with fluency instruction is necessary, especially at mid to upper elementary grade levels. At those grades, vocabulary increases in complexity and becomes more challenging for students. More importantly, learning the new vocabulary within context is important, because it enables students to learn lifelong skills they can apply in other reading situations when new vocabulary arises.

With the RTI model of instruction being utilized more often in schools across the nation, vocabulary instruction combined with fluency instruction is an intervention to be closely examined within the regular classroom or the response to intervention model. Small groups of students may benefit greatly from this intervention if their decoding skills and phonics skills are starting to become mastered. All students can benefit from this intervention across the curriculum and subject areas when learning new vocabulary. Giving students more interventions at the right time of their learning is paramount to their reading success. As we begin to focus more on individualized instruction, students will be likely to make significant gains. More studies such as this one would prove informative to educators as schools begin to individualize learning for all students. When students are reading they need to be allowed ample time to examine the text, and recognize, record, and study vocabulary that is unfamiliar to them. Given time, students can then learn the vocabulary effectively, implement it into their reading, repeat their reading until fluency is achieved and then finally comprehend. When students are given strategies to help them learn, educators are teaching students skills and how to engage in their own learning. This all can lead to closing gaps and increasing test scores among bottom quartile learners. Teaching students to engage in their own learning, in this case, furthering individual vocabulary and repeated readings until fluency existed, is teaching students how to comprehend text and become independent readers.

#### CONFLICT OF INTEREST

The authors confirm that this article content has no conflict of interest.

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#### REFERENCES

- Allington, R.L. (1984). Oral reading. In: Pearson, P.D. (Ed.), *Handbook of reading research*. New York: Longman.
- Allington, R.L. (2001). *What really matters for struggling readers: Designing research-based programs*. Boston: Allyn and Bacon.
- Allington, R.L. (2004). Setting the record straight. *Educational Leadership*, 61(6), 22-25.
- Almaguer, I. (2005). Effects of dyad reading instruction on the reading achievement of Hispanic third-grade English language learners. *Bilingual Research Journal*, 29(3), 509-26.
- American Institute for Research (2004). *A closer look at the five essential components of effective reading instruction: A review of scientifically based reading research for teachers*. Naperville, IL: American Institute for Research.
- Beck, I.L., & McKeown, M.G. (1991). Social studies texts are hard to understand: Mediating some of the difficulties. *Language Arts*, 68, 482-90.
- Brown, A.L., Palincsar, A.S. and Purcell, L. (1986). Poor readers: Teach, don't label. In U. Neisser (Ed.). *The school achievement of minority children: New perspectives* (pp. 105-143). Hillsdale, N.J.: Erlbaum.
- Callender, W.A. (2007). The Idaho results-based model: Implementing response to intervention statewide. In: Jimerson, S.R., Burns, M.K., & VanDerHeyden A.M. (Eds.), *Handbook of response to intervention: The science and practice of assessment and intervention* (pp. 331-342). New York: Springer.
- Carnine, D.W., Silbert, J., Kame'enui, E.J., Tarver, S.G., & Jungjohann, K. (2006). *Teaching struggling and at-risk readers: A direct instruction approach*. Upper Saddle River, NJ: Pearson Merrill Prentice Hall.
- Elbaum, B., Vaughn, S., Hughes, M., & Moody, S.W. (1999). Grouping practices and reading outcomes for students with disabilities. *Exceptional Children*, 65(3), 399-415.
- Elfrieda, H.H., & Fisher, C.W. (n. d.). *Text matters in developing fluent reading*. Retrieved from <http://scholar.google.com/scholar?q=Text+Matters+in+Developing+Fluent+Readers&hl=en&um=1&ie=UTF-8&oi=scholar>
- Field, G.B. (2007). The effect of using Renzulli on student achievement: An investigation of internet technology on reading fluency and comprehension. Retrieved from <http://www.gifted.uconn.edu/siegle/Dissertations/Gara%20Field.pdf>
- Foorman, B.R., & Torgesen, J. (2001). Critical elements of classroom and small-group instruction promote reading success in all children. *Learning Disabilities Research and Practice*, 16, 203-12.
- Fountas, I., & Pinnell, G. (1996). *Good first teaching for all children*. Heinemann: Portsmouth, NH.
- Fuchs, D., Fuchs, L., & Stecker, P. (2010). The blurring of special education in a new continuum of general education placements and services. *Exceptional Children*, 76(3), 301-23.
- Goldman, S.R., & Bisanz, G. (2002). Toward a functional analysis of scientific genres: Implications for understanding and learning processes. In: Otero, J., Leon, J.A., & Graesser, A.C. (Eds.), *The psychology of science text comprehension* (pp. 19-50). Mahwah, NJ: Lawrence Erlbaum Associates.
- Graesser, A.C., Singer, M., & Trabasso, T. (1994). Constructing inferences during narrative text comprehension. *Psychological Review*, 101, 371-95.
- Hagaman, J.L., & Reid, R. (2008). The effects of paraphrasing strategy on the reading comprehension of middle school students at risk for failure in reading. *Remedial and Special Education*, 29(4), 222-34.
- Hewson, K., & Adrian, L. (2008, October). Reaching the forgotten 10 percent. *Educational Leadership*, 66(2), 75-76.
- Houghton Mifflin (2001). *Houghton Mifflin Reading*. Houghton Mifflin: Boston, MA.
- Hughes, C., & Dexter, D. (2013). *Response to intervention: A research review*. Retrieved from <http://www.rtinetwork.org/learn/research/researchreview>.
- Juel, C., & Deffes, R. (2004, March). Making words stick. *Educational Leadership*, 61(6), 30-4.
- Kintsch, W. & Van Dijk, T.A. (1978). Toward a model of text comprehension and production. *Psychological Review*, 85(5), 363-94.
- Kirsch, I., de Jong, J., Lafontaine, D., McQueen, J., Mendelovits, J., & Monseur, C. (2002). *Reading for change: Performance and engagement across countries. Results from PISA 2000*. Paris, France: Organization for Economic Co-Operation and Development (OECD). Retrieved from <http://www.oecd.org/dataoecd/43/54/33690904.pdf>.
- LaBerge, D., & Samuels, S.J. (1974). Toward a theory of automatic information processing in reading. *Cognitive Psychologist*, 6, 293-323.
- Liben, D.M., & Liben, M. (2004, March). Our journey to reading success. *Educational Leadership*, 61(6), 58-61.
- Lubliner, S., & Scott, J.A. (2008). The nature of word learning. In: *Nourishing vocabulary: Balancing words and learning* (pp. 7-12). Thousand Oaks, CA: Corwin Press: A Sage Company.
- Lyon, G.R., Fletcher, J.M., Torgesen, J.K., Shaywitz, S.E., & Chhabra, V. (2004, March). Preventing and remediating reading failure: A response to Allington. *Educational Leadership*, 61(6), 86-88.
- Lovett, M.W., Lacerenza, L., & Borden, S.L. (2000). Putting struggling readers on the PHAST track: A program to integrate phonological and strategy-based remedial reading instruction and maximize outcomes. *Journal of Learning Disabilities*, 33(5), 458-76.
- Martens, P. (1997, December). What miscue analysis reveals about word recognition and repeated reading: A view through the "miscue window". *Language Arts*, 74(8), 600-610. Retrieved from ERIC database.
- McIntosh, A.S., Graves, A., Gersten, R. (2007). The effects of response to intervention on literacy development in multiple-language settings. *Learning Disability Quarterly*, 30(3), 197-212.
- National Reading Panel. (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. Washington, DC: U.S. Department of Health and Human Services.

- National Joint Committee on Learning Disabilities. (2005). *Responsiveness to intervention and learning disabilities*. Available from [www.ldonline.org/njclcd](http://www.ldonline.org/njclcd).
- National Reading Panel Report. (2000). Retrieved on from National Reading Panel website: <http://www.nationalreadingpanel.org/Publications/summary.htm>
- Northwest Evaluation Association. (2011). *Measures of academic progress*. Portland, OR: NWEA.
- Osborn, D.F. (2007). *Developing oral reading fluency: Effects of daily use of word walls and daily independent silent reading on oral reading fluency development of second grade students*. Retrieved from <http://www.gifted.uconn.edu/siegle/Dissertations/Gara%20Field.pdf>
- Paris, S.G., & Oka, E.R. (1986). Children and reading strategies: Metacognition and motivation. *Developmental Review*, 6, 25-56.
- Penner-Wilger, M. (2008, February). *Reading fluency: A bridge from decoding to comprehension*. Retrieved from [http://www.autoskill.com/pdf/fluency\\_research.pdf](http://www.autoskill.com/pdf/fluency_research.pdf)
- Pikulski, J.J. & Chard, D.J. (2005). Fluency: Bridge between decoding and reading comprehension. *The Reading Teacher*, 58(6), 510-19.
- Pransky, K. (2009). There's more to see. *Educational Leadership*, 66(7), 74-8.
- Rapp, D.N., van den Broek, P., McMaster, K.L., Kendeou, P., & Espin, C.A. (2007). Higher-order comprehension processes in struggling readers: A perspective for research and intervention. *Scientific Studies of Reading*, 11, 289-312.
- Rashotte, C.A., MacPhee, K., & Torgesen, J.K. (2001). The effectiveness of a group reading instruction program with poor readers in multiple grades. *Learning Disability Quarterly*, 24, 119-34.
- Roberts, G., Torgesen, J.K., Boardman, A., & Scammacca, N. (2008, May). Evidence-based strategies for reading instruction of older students with learning disabilities. *Learning Disabilities Research & Practice*, 23(2), 63-9.
- Roundy, A.R., & Roundy, P.T. (2009). The effect of repeated reading on student fluency: does practice always make perfect? *International Journal of Social Sciences*, 4(1), 54-9.
- Scholastic. (2008). *What is reading comprehension?* Retrieved from <http://lesson-plan-help.suite101.com/print>
- Schwanenflugel, P.J., Kuhn, M.R., Morris, R.D., & Bradley, B.A. (2006). The development of fluent and automatic reading: Precursor to learning from text. Retrieved from <http://drdc.uchicago.edu/community/project.phtml?projectID=60>
- Shaywitz, S.E., & Shaywitz, B.A. (2004, March). Reading disability and the brain. *Educational Leadership*, 61(6), 6-11.
- Snow, C.E. (2002). *Reading for understanding: Toward an R&D Program in reading comprehension*. Santa Monica, CA: RAND.
- Tomlinson, C.A. (2005). This issue: Differentiated Instruction. *Theory into Practice*, 44, 183-4.
- Tomlinson, C.A. (2008). The goals of differentiated instruction. *Educational Leadership*, 66(3), 26-30.
- van den Broek, P. (1994). Comprehension and memory of narrative texts: Inferences and coherence. In: Gernsbacher, M.A. (Ed.), *Handbook of psycholinguistics* (pp. 539-588). San Diego, CA: Academic Press.
- van den Broek, P., Virtue, S., Gaddy, M., Tzeng, Y., & Sung, Y.C. (2002). Comprehension and memory of science texts: Inferential processes and the construction of a mental representation. In: Otero, J., Leon, J.A., & Graesser, A.C. (Eds.), *The psychology of science text comprehension* (pp. 131-154). Mahwah, NJ: LEA.

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