THE EFFECTS OF WILSON READING SYSTEM ON UPPER ELEMNTARY SCHOOL STUDENTS WITH A LEARNING DISABILITY IN READING FLUENCY

by

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Schools throughout the United States struggle to meet the needs of students with a deficit in reading. Experimental research showing the effectiveness of the Wilson Reading System is lacking enough evidence. This study examined the effectiveness of a seven-week intervention with the Wilson Reading System implemented in an elementary school in a rural county in a state in the southeast United States. The study included six students with learning disabilities in reading fluency. A quasi-experimental pretest-posttest research design was used to determine the effectiveness of the Wilson Reading System on students with learning disabilities in reading fluency. This was done by examining the differences in reading performance following the completion of seven weeks of intervention using the Wilson Reading System. The Dynamic Indicators of Basic Early Literacy Skills assessment was used to measure the differences in reading performance before and throughout the intervention. A t-test analysis was used with student's Dynamic Indicators of Basic Early Literacy Skills scores from the pretest and posttest. The study showed a statistical difference for many students on several measures ($p<.05$). Based on expected rate of improvement as set by Dynamic Indicators of Basic Early Literacy Skills, three students exceeded Rate of Improvement for Oral Reading Fluency Accuracy and Fluency,

five students exceeded Rate of Improvement for Nonsense Word Fluency Correct Letter Sounds, and three students exceeded Rate of Improvement for Nonsense Word Fluency Whole Words Read. These findings suggest that the results of most students show success with the Wilson Reading System, although other factors may impact student progression in the program. This study contributes to positive educational changes as it shows the limited information gained by short-term intervention programs and brings to light the extensive effort needed to address reading deficits for students with learning disabilities in reading fluency.

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LIST OF ABBREVIATIONS

CLS	Correct Letter Sounds ……	18
DAZE	DIBELS multiple-choice cloze task …….……..	5
DIBELS	Dynamic Indicators of Basic Early Literacy Skills ……	5
NWF	Nonsense Word Fluency……..……..	3
ORF	Oral Reading Fluency……	3
WADE	Wilson Assessment of Decoding and Encoding……	3
WCPM	Words Correct Per Minute ……	18
WRS	Wilson Reading System…….	1
WJ-III	Woodcock Johnson-III……	9
WWR	Whole Words Read……..	18

Chapter 1

Introduction

Reading is an important skill that all students must have to become effective and productive members of society. Unfortunately, the literacy skills of 56% of students in grades four through twelve are below proficiency (National Center for Education Statistics, 2009). When a student doesn't have the necessary skills needed to read, it not only affects their reading but also their behavior and performance in other academic areas. Reading is an area where many students struggle, but if a student doesn't gain the skills needed to read it can ultimately impact their ability to become successful in adulthood. In fact, thirty-two million adults in the United States cannot read (National Center for Education Statistics, 2009). The impact that illiteracy has on adults can be detrimental to not only their lives but their families as well. Adults with low literacy skills have a higher rate of unemployment and earn lower wages than the national average (National Council for Adult Learning, 2015). Also, children with parents with low literacy skills have a 72 percent change of also having low literacy skills (Hulten & Ramey, 2018).

Because of such overwhelming statistics, many school districts are focusing on how to help students become proficient readers by third grade as this is typically the last year that foundational reading skills are taught. When students enter fourth grade, they are commonly expected to use reading to learn content. If students are lacking the skills needed to read, then they will continue to become further and further behind. The Wilson Reading System (WRS) is expected to help students fill the gaps needed to become successful readers. Although the WRS claims to help students, only one study met evidence standards based on What Works Clearinghouse. This study showed that the WRS might have a positive effect on alphabetic knowledge and no distinct effects on fluency and comprehension. The What Works

Clearinghouse base their standards of quality of research by screening studies based on their relevance to the topic, the quality of the outcome measures, and the adequacy of data reported. (Mathematica Policy Research, 2010).

According to the National Reading Panel there are five fundamental areas of reading instruction: phonics, phonemic awareness, fluency, vocabulary, and comprehension (Child Development and Behavior Branch, 2017). Students who are having difficulty with reading need explicit systematic multisensory instruction in these areas to help them become successful readers. WRS is a program intended to help struggling readers reach grade level proficiency. It also teaches the structure of language systematically using tapping of sounds as a multisensory approach to reading. The purpose of WRS is to help readers improve their skills when they haven't been successful with other methods (Wilson Language Training, 2018).

Barbara and Edward Wilson originally developed the Wilson Language Training over thirty years ago (Wilson Language Training, 2018). Barbara spent several years in a public school in Massachusetts as a special educator. She was trained in the Orton-Gillingham approach to literacy and worked at Massachusetts General Hospital's Language Disorders Unit. She worked there for five years with adults with dyslexia. This journey inspired her to create the Wilson Language Training. Barbara Wilson spent her time in the 1980s and 1990s adjusting the program to help it work in classrooms across the United States and it has now grown to be one of the most popular literacy programs available (Wilson Language Training, 2018). In 1988, Barbara and Edward Wilson published the first edition of the WRS. In 2019, the WRS fourth edition was published for the first six steps of WRS (Wilson Language Training, 2018).

Before students begin the program, a trained instructor evaluates a student's skills using the Wilson Assessment of Decoding and Encoding (WADE) (Wilson Language Training, 2018).

Students are then taught in a small group with other students who have similar skills. The teacher writes lesson plans based on specific Wilson guidelines and student needs. The program uses a sound tapping system as a part of their multisensory approach to teaching reading. Students are expected to break apart words and blend the sounds by tapping the sounds with their fingers and thumb. A lesson for students usually lasts forty-five to sixty minutes as the instructor needs to cover ten skill areas in each teaching session. Each lesson included letter-sound recognition, spelling, and reading comprehension. The lessons build skills in a specific order over twelve units.

This research study will examine the effects of the WRS on students identified with learning disabilities in reading fluency. This research study will address how the Wilson Reading System affects the reading fluency scores on assessments such as oral reading fluency (ORF) measures and nonsense word reading fluency (NWF) measures for students with learning disabilities in reading fluency. Based on literature reviewed and previous researcher's experiences with implementing Wilson Reading Systems, it was expected that the results would show positive accelerated growth on the assessments given to the students.

Chapter 2

Literature Review

The following research studies used the Wilson Reading System to examine the effectiveness of the intervention on student's oral reading fluency skills. The information was organized through a table analysis of each study within this literature review. Four research studies were identified and used in this literature review. Each analysis included participant information, duration of the intervention, results, and discussion of further research needed and putting into this information into practice. Literature selected for this review was limited because of the use of studies needing to include students with learning disabilities or struggling reads to determine effectiveness on oral reading fluency skills.

Wilson Reading System's Impact on Third-Grade DIBELS Scores

Bowe (2016) examined reading instruction at an urban elementary school in Washington D.C. with a school population of five-hundred students in grades pre-kindergarten through eighth grade. The seventy-five students in this study all performed below proficiency the previous year. The demographics of the population consisted of 72% African American, 14% Hispanic, 10% European American, and 4% other. 22% of students were ELL students, 18% had learning disabilities, and 99% received free and reduced lunch. In this study, 56% of students were female and 44% male (Bowe, 2016). The author also discussed the skills students learned over three days a week for forty-five minutes with a trained reading specialist. The participants were in nine groups with eight or nine students in each group.

Bowe investigated the effectiveness of the Wilson Reading Program over eight weeks with seventy-five third-grade students. The research was completed using a quasi-experimental pretest and posttest design. The students were first given the Dynamic Indicators of Basic Early

Literacy Skills (DIBELS) assessments. They then participated in eight weeks of WRS. Finally, they were given the DIBELS assessment again to see if the students had made any improvement. Reading proficiency levels were based on student DIBLES composite score which is a combination of scores of oral reading fluency and the DAZE (DIBELS multiple-choice cloze task) comprehension assessment, which is a maze comprehension task. The DAZE has students read a passage silently with some missing words and the students must choose the correct word to make the story make sense.

The results indicated that there was an increase in students' DIBELS composite score after completing the eight weeks of intervention although it was only a slight change. Average DIBELS composite scores on the pretest were 27.92 and 31.58 on the posttest. The DIBLES composite score is calculated using multiple measures and is compared to DIBLES norms. This indicated that WRS helped to improve students' DIBELS composite score (Bowe, 2016).

The research showed slight gender difference in ORF. Females scored an average of 28.05 on the pretest and 31.3 on the posttest which is a difference of 3.25 of growth. Males averaged 27.82 on the pretest and 31.81 on the posttest, indicating a difference in growth of 3.99 (Bowe, 2016).

The effects of Wilson Reading System and Guided Reading on the Reading Achievement of Students with Learning Disabilities

Ricci (2001) evaluated the results of using WRS or a guided reading program on the reading achievement of students with learning disabilities. This study was conducted in a self-contained classroom of sixteen students with different disabilities and varying reading abilities. The school district was in southern New Jersey with rural and urban populations. This school

district had a high population of low socioeconomic status. The school where this study took place served students in pre-kindergarten through fifth-grade. Four hundred sixty-four students attended the school with 51% being eligible for free and reduced lunch. Students in this study were second and third-grade students. Students were placed in four groups of four students.

Students completed the DIBELS measures as a pre-assessment, including ORF and NWF measures. Based on these scores, students were placed into either guided reading groups or Wilson reading groups three to four times a week for six weeks of intervention. After completion, students were given the DIBELS measures again as a posttest. For nonsense word fluency, three of the students in the guided reading groups made gains on their post-assessment, one remained the same, and the other three decreased. There was an average decrease of 4.25 points for the guided reading group. For the Wilson reading groups, six students increased, one remained the same, and one student decreased on the post-test. There was an average increase of 6 points on the post-test. On whole words read, four students in the guided reading group made positive gains, one remained the same, and three students decreased on the post-test. There was an average increase of .75 points. In the Wilson reading group, three students made massive gains, four students remained the same, and one student decreased on the nonsense word fluency measure. There was an average increase of 1.3 points.

On oral reading fluency, the guided reading group had five students make positive gains, two students remained the same, and one student decreased on the post-test. There was an average increase of 7.8%. For the Wilson reading group, five students made increases, one student remained the same, and two students decreased in the post-test. There was an average increase of 4.6% (Ricci, 2011).

In the discussion, the author mentioned the importance of phonological awareness for student reading. She also discussed the skewed results of the guided reading group for nonsense words due to one student's medical condition. She made note that even with taking this score out of the equation the students in the WRS intervention still made more gains than the students in the guided reading intervention. Based on this study, Wilson reading helped to improve student's skills for decoding and phonological awareness while guided reading intervention appeared to help students with reading fluency skills. The author also gave recommendations for students with difficulties. She recommended that students who lack phonologic awareness and decoding skills would benefit most from Wilson reading and students who are stronger readers benefit more from guided reading in the repeated readings and reading level mobility.

Initial Effects of Wilson Reading System on Student Reading and Spelling Achievement

Ashby (2013) examined the effects of the Wilson Reading System on reading and spelling achievement. Forty-three struggling readers in grades second through twelfth grade participated in this study (Ashby, 2013). Twenty-six students were male, and seventeen students were female. The school district was in a large southwestern urban area. The students were at least two grade levels behind in reading. Students received twenty hours of instruction over one month. Students were evaluated using the Woodcock Johnson-III before and after the intensive instruction. The purpose of the study was to gain more information about the initial gains of reading skills. The authors discussed the importance of learning to read. They also discussed the importance of finding appropriate interventions for students who need this help learning to read. This district was a large urban district that served fifty thousand five hundred fifty students in one hundred twenty-five schools. The school consisted of 61% Hispanic/Latino students, 24% white, 6% black, 4% native America, 3% Asian American, and 3% multicultural. In the student

population, 70% of students received free or reduced lunch. Special educators in this district selected students to participate in the intervention. The teachers attempted to select students with disabilities in reading only.

Student performance was measured using the Woodcock-Johnson III by trained special educators. They were also instructed by teachers receiving their certification in Wilson, so they were heavily observed and monitored for appropriate teaching. The results included pretest and posttest data using standard scores (Ashby, 2013). For letter word identification, students averaged 78.14 on the pretest and 79.12 on the post-test. Word attack skills averaged 84.67 on the pretest and 87.28 on the posttest. Reading fluency skills averaged 77 on the pretest and 76.57 on the posttest. Basic reading skills averaged 79.51 on the pretest and 81.47 on the post-test. Letter word identification showed a slightly greater score on the posttest. Word attack skills were significantly greater on the posttest. Reading fluency skills were not greater than the pretest. Basic reading skills were significantly greater on the posttest.

The author explained that it was hypothesized that students would show a significant increase in all skills except for reading fluency. The study found growth on pseudoword reading and basic reading, but not regular word reading or reading fluency. The authors believed that students did well on pseudoword skills because it was directly targeted in the Wilson reading program. The authors also noted a distinction in student achievement at different grade levels. Some grades did well with real words while most did best with pseudowords. They also discussed that reading fluency did not increase as the intervention lasted only one month.

Correlations and Predictive Ability of Oral Reading Fluency and the Wilson Reading System on End of Year Assessments

Zilinski (2010) addressed the importance of making effective instructional decisions for students with learning disabilities to ensure they can succeed academically. This study measured the effectiveness of the Wilson Reading Program based on oral reading fluency measures and measures on the Woodcock-Johnson Test of Achievement-Third Edition (WJ-III).

The author discussed how reading has been a great concern in education for many years and how important it is for students. Zielinski (2010) also discussed the importance of measuring student progress to help educators make informed decisions about students' reading. This study included fifty-one students in a private school for students with learning disabilities. Of the students that were involved, 73% were male. The school served students grade one through eleven in an urban area in Pennsylvania. Students must have previously been identified as having a learning disability to attend this school.

Oral reading fluency was measured using AIMS web leveled passages, which are very similar to the DIBELS ORF passages. This was conducted three times a year. The third AIMS web assessment was used as the school's end of year assessment for reading fluency. The assessor was a master's level certified school psychologist who received specific training in benchmark and curriculum-based measure through graduate school and AIMS web training (Zielinski, 2010). The WJ-III was conducted using standardized measures by the examiner or a clinical psychologist/school psychologist intern. This assessment was used to determine the students overall reading ability before and after participation in the Wilson Reading System Students participated in the Wilson Reading System as a supplement to their core reading

instruction during the 2008-2009 school year although the author did not tell how often the students participated in the program.

The results of this study were grouped based on the level the students participated in during WRS intervention (Zielinski, 2010). When comparing student's AIMS web oral ready fluency assessment beginning of year raw score to the end of the year raw score, students in level 2-4 averaged 10% improvement, levels 5-6 averaged 16% improvement, and levels 7-8 averaged 24% improvement. On the WJ-III students in levels 2-4 scored an average of 481.80 on the broad reading cluster for the pretest and a 492.87 for the post-test. Levels 5-6 scored 481.95 on the pretest and 490.77 on the posttest. Levels 7-8 scored 502.92 on the pretest and 514.85 on the posttest. Basic reading skills also improved according to the WJ-III basic reading scores. From levels 2-4, they scored an average of 481.47 on the pretest and 495.80 on the posttest. Levels 5-6 scored 481.08 on the pretest and 491.31 on the post-test. Levels 7-8 scored 504.54 on the pretest and 514.95 on the post-test.

The author discussed his reason for using oral reading fluency as the choice of measuring progress based on literature he cited. His reason for using ORF was that the literature indicated that it was the best measure for measuring students' progress in reading. The author did not expect the results he got, but he recognized that it is still valuable information about the effectiveness of this program. Oral reading fluency was the highest area of students improved. The author discussed how reading fluency is not as important as students continue into upper-grade levels. There was a great and positive correlation between the level of Wilson and the scores of WJ-III. Many other studies completed showed significant improvement in reading achievement on the WJ-III while this study did not show the same results (Ashby, 2013; Bowe,

2016; Ricci, 2011). They discuss that it is possible that the levels of the WRS do not correlate well with the way the WJ-III evaluates decoding skills.

Conclusion

This literature review summarized and addressed research studies involving WRS with struggling readers on oral reading fluency skills. Overall, each study showed that the WRS intervention had similar impacts on students. The findings from these articles suggest that WRS helped students improve their decoding skills including struggling readers and students with learning disabilities in reading. Students vastly improved in nonsense word fluency but not always in oral reading fluency. Several studies compared students in WRS intervention groups to control groups; students completing the intervention showed significantly higher growth in their literacy skills compared to control group students.

Bowe's article uses a composite score and DAZE score. Using a composite score to track progress of students reading abilities is difficult to do as the composite score range changes by grade level and depending on the time of year. This makes it difficult to compare across grade levels and cannot provide an accurate measure to show growth across grade levels (Dynamic Measurement Group, Inc., 2016). The DAZE score used in the study monitored students' reading comprehension skills, so it is irrelevant regarding the research done in this study.

Ricci's article used students with varying reading abilities. Although the title suggests that the students had learning disabilities, it is noted in the article that the participants had a variety of disabilities. The article did not state what disabilities the participants had making it difficult to determine effectiveness based on a disability area.

Ashby's article used students across several grade levels. The participants included students in second through twelfth grade. The wide range of ages in participants places question on how the intervention affected different age groups.

Zilinski's article indicated that students in the study participated in the WRS intervention during the 2008-2009 school year. The study did not indicate how often students participated in the intervention. Therefore, it is difficult to determine the frequency or duration of the intervention for this study.

Although there were limitations to these studies, including short intervention time and frequency of the intervention, there is plenty of information learned from the studies. Although some articles do not provide strong evidence of major impact on students' reading skills, they show significant differences in students' reading fluency and accuracy. The studies that were implemented over longer periods of time seemed to show even greater differences in students' reading skills. Despite such results, there remains a lack of research involving the WRS program on the impact on oral reading fluency skills for students with learning disabilities. There is very limited research on how WRS impacts students with learning disabilities in reading fluency. Further research is needed in this area to help determine the impact on students with fluency deficits.

Statement of Purpose

This research study determines the effectiveness of the WRS for upper elementary school student with an identified learning disability in reading fluency based on DIBELS oral reading fluency and nonsense word fluency measures.

Research Question

How does the Wilson Reading System impact oral reading fluency skills and nonsense word fluency skills for students with learning disabilities in reading fluency?

Chapter 3

Method

Participants

This study took place at a rural elementary school serving students in pre-kindergarten through fifth grade in the southeastern United States. At the time of this study, four hundred ninety-five students attended this school. Seventy-four students at this school qualified for special education services and twenty-four students were deemed eligible for special education category of a learning disability. The school had twenty-four general education classrooms and two special education resource classrooms. This study specifically took place in the two special education resource classrooms. Students were in groups of five to six students. Not all students in the groups were participants in this study.

Six students and their parents agreed for the students to participate in the study. Students ranged in grades third through fifth and ages eight to eleven years old. All students had a learning disability in reading fluency. Three participants were male and three participants were female. All students in this study were Caucasian. Student A was a male age eleven in fifth grade, student B was a female age eight in third grade, student C was a male age nine in third grade, Student D was a female age ten in fourth grade, student E was a female student age ten in fourth grade, and student F is a Caucasian male age eleven in fifth grade. One of the six participants qualify for free or reduced lunch. All guardians gave consent for their child to participate in the study, and the students gave verbal consent prior to conducting the study.

Materials

Materials used for this study were DIBELS Oral Reading Fluency accuracy and fluency and Nonsense Word Fluency correct letter sounds and whole words read. ORF fluency measures

how many correct words a student can read in one minute and ORF accuracy measures the percentage students read correctly out of the total words read in one minute. NWF correct letter sounds measures how many sounds a student can read in one minute when given consonant vowel constant nonsense words. The NWF whole words read measure records the amount of nonsense words a student can blend together to read the word in one minute. This measure is used so students are given words they don't recognize automatically.

DIBELS is a set of specific procedures and measures to assess students' growth in early literacy skills. They were designed to be quick one-minute measurements to help teachers regularly monitor students' development of these skills. Using DIBELS to measure students' progress in oral reading fluency and nonsense word fluency helps to determine the effects of the WRS as these measures are specific to the skills that WRS teaches within its program.

Design and Procedure

This study is a quasi-experimental pretest-posttest research design with additional progress monitoring. This design was chosen to determine how WRS has a direct impact on DIBELS fluency measures for students with learning disabilities in reading fluency. Before students began the intervention, they were assessed using three benchmark measures of oral reading fluency and three benchmark assessments for nonsense word fluency. This determined the baseline score for each student. Students were also progress monitored weekly using the progress monitoring probes for oral reading fluency and nonsense word fluency. After the seven weeks of intervention, students were measured again using benchmark three benchmark assessments for oral reading fluency and nonsense word fluency to measure the progress the students made.

Students were placed into instructional groups based on the level of their reading skills. Reading skill levels were measured by administering the Wilson Assessment of Decoding and Encoding. During the intervention phase, students in each instructional group participated in one lesson per day for four to five days a week for forty-five minutes. During the intervention, there was only one teacher workday in which students participated in four lessons that week. Student attendance averaged 96% of all lessons. Student absences were very rare during the intervention phase.

During the intervention phase, many skills were covered based on the scope and sequence of the WRS. All students started in level 1 as established by WRS protocol. Skills covered included consonant vowel consonant words, double consonants, glued sounds (all, an, am, ang, ing, ong, ung, ank, ink, onk, unk), suffix s, closed syllables with blends, and closed syllable exceptions. Students D, E, and F were able to meet mastery of levels faster than students A, B, and C so they were able to also cover five sounds with suffix s and 3 letter blends with six sounds.

Each lesson consists of three main areas of specific procedures taught every day of the intervention. The first area is word study. Students first participate in a quick drill. During this drill, students are saying the letter or letters and the corresponding sounds. Next, the teacher reviews previously taught skills and teaches new reading concepts. Students then read sets of word cards with previously taught skills and new skills. Students read words from a word list and then chart words individually to monitor students' progress. They then read sentences.

The second area of a lesson is spelling. Students first do a quick drill in reverse. During this drill student are given the sounds and must point to the corresponding letter or letters. The teacher then reviews previously taught spelling concepts and teaches new concepts. Students

practice by completing written word dictations. In this part of the lesson, students write sounds, words, nonsense words, irregular/high-frequency words, and sentences.

In the final block of the lesson, students focus on fluency and comprehension. First, students read a controlled passage using previously taught and new concepts. Students then listen to the teacher read a complex reading passage and answer comprehension questions about the passage.

Treatment fidelity data was obtained using the WRS Program Fidelity Checklist. This checklist observes areas including teacher use of Wilson Academy online supports, trained in WRS, placing and assessing students, following lesson procedures, teacher and students have appropriate materials, student progress is being monitored, and if the teacher is following general lesson procedures. Observations were completed on 4 of the 34 lessons completed with students. A peer observer completed these observations. A percent score was obtained by the formula ____/26 X 100 =____%. The peer observer had previously been trained in the WRS and had obtained a level II certification in the program.

The first observation took place during the fifth lesson and 85% fidelity was observed. The second observation took place during the fourteenth lesson and 92% fidelity was observed. The third observation took place during the twenty second lesson and 88% fidelity observed. The final observation took place during the thirty-first lesson and 96% fidelity was observed. An average of 90.25% reliability was observed demonstrating that the intervention was completed with fidelity ensuring that the results of the assessments were valid.

Measurement of Intervention

To determine the effectiveness of the WRS on students, a rate of improvement (ROI) score was used. DIBELS has set ROI scores based on expected growth on grade level measures. For oral reading fluency, students in this study were measured using first, second, or third grade reading passages depending on the student's skill level. This was determined by the performance of students on grade level passages. If a student could read third grade level passages with at least 90% accuracy, then they were monitored on this level. If they could not read the grade level passages, they were given second grade passages if they could read them with at least 90% accuracy. If the student could not read third or second grade passages with 90% accuracy, they were given first grade level passages to read. First grade passages are as low as DIBLES oral reading fluency measures go. All students were measured using second grade level nonsense word fluency probes as this skill only has first and second grade probes that are very similar. Students A and C were assessed on first grade level ORF probes, students B and F were assessed on second grade level ORF probes, and students D and E were assessed on third grade level probes. The ROI for oral reading fluency accuracy and words correct per minute (WCPM) and nonsense word fluency correct letter sounds (CLS) and whole words read (WWR) are shown in table 1. Three students met the ROI for oral reading fluency and accuracy, five students met the ROI for nonsense word fluency CLS, and 3 students met the ROI for nonsense word fluency WWR. Table 4 displays the student's ROI on each measure.

Table 1

Rate of Improvement Expected Per Week

Grade Level	Oral Reading Fluency Words Correct Per Minute	Oral Reading Fluency Accuracy	Nonsense Word Fluency Correct Letter Sounds	Nonsense Word Fluency Whole Words Read
First	1.31	.66%	N/A	N/A
Second	.97	.19%	.86	.33
Third	.83	.05%	N/A	N/A
First	1.31	.66%	N/A	N/A

Table 2

Measurements

Type of Measure	Use of Measure
Pre/Post Test	Three oral reading fluency and nonsense word fluency Benchmark assessments were given to each student before the intervention and three oral reading fluency and nonsense word fluency benchmark assessments where given after the intervention phase.
Progress Monitoring	One progress monitoring probe for oral reading fluency and nonsense word fluency was given to each student weekly to monitor their improvement per week.

Students' responses to the intervention was also measured by collecting baseline data in the areas of oral reading fluency and nonsense word fluency using DIBELS benchmark and progress monitoring assessments.

Oral reading fluency probes record the amount of words that a student reads correctly and the accuracy percentage that they read with. These measures can assess a student's ability to read on different grade levels. Oral reading fluency measures are important to determine how fast and accuracy a student can read.

Nonsense word fluency probes measure how many correct letter sounds a student can read in one minute and the number of whole nonsense words they can read in one minute. This assessment helps to determine a student's ability to recognize letter sounds and read words they have not memorized as they are not real words. Words on this assessment are two or three letter words.

These measures were recorded by giving the student the probe and the teacher listening and recording the student's responses through the Mclass online assessment application. The online program calculates students' scores based on the input from the teacher and indicates students' percentile ranking amongst students in their same grade level using data collected from across the nation.

Reliability

DIBELS is a well-known and highly used set of probes and procedures to measure the acquisition of early literacy skills. The assessments have been extensively researched to ensure that they are reliable and valid for measuring these skills. Several research studies have proven this assessment to be appropriate for measuring student progress in the areas of reading (Good et al., 2004). The split-half reliability coefficient ranges from .89 to .94 (DIBELS Data System, 2011).

Inter-scorer reliability was measured during this study on four baseline intervention data points used for pre-test data and four intervention points used for progress monitoring data on both ORF measures and NWF measures. Data was collected by both scorers as they observed students reading the measure. The scores were analyzed to determine when the raters computed the same score divided by the amount of opportunities they had to make the same score. Based on the data collected there was a 91% inter-scorer agreement on oral reading fluency measures and an 86% agreement on nonsense word fluency measures. Table 2 shows the data collected through this process.

Table 3

Inter-rater Scores

Oral Reading Fluency		Reliability Score Nonsense Word Fluency	
Reliability Score			
1	53/56	1	40/45
2	39/42	2	32/37
3	11/12	3	18/21
4	23/25	4	16/19
5	55/59	5	53/58
6	27/33	6	56/62
7	14/16	7	21/28
8	59/65	8	48/56
Total Score	281/308= 91%	Total Score	284/329= 86%

Treatment Fidelity

Treatment fidelity data was obtained using the WRS Program Fidelity Checklist. This checklist observes areas including teacher use of Wilson Academy online supports, trained in WRS, placing and assessing students, following lesson procedures, teacher and students have appropriate materials, student progress is being monitored, and if the teacher is following general lesson procedures. Observations were completed on 4 of the 34 lessons completed with students. The observations were completed by a peer observer. A percent score was obtained by the formula ____/26 X 100 =____%. The peer observer had previously been trained in the WRS and had obtained a level II certification in the program.

The first observation took place during the fifth lesson and 85% fidelity was observed. The second observation took place during the fourteenth lesson and 92% fidelity was observed. The third observation took place during the twenty second lesson and 88% fidelity observed. The final observation took place during thirty first lesson and 96% fidelity was observed. An average of 90.25% reliability was observed demonstrating that the intervention was completed with fidelity ensuring that the results of the assessments were valid.

Data Analysis

Three data points were collected before beginning the intervention for the pretest and three data points were collected after completing of the intervention phase for the posttest for each participate in the program in the areas of ORF words correct per minute, ORF accuracy, NWF correct letter sounds, and NWF whole words read. The three data points were averaged to make one mean score for the pretest and one mean score for the posttest. These data points were organized into graphs to compare students' pretest results to the posttest results (figures 1-4).

Progress monitoring probes were given to each participant weekly in the areas of ORF words correct per minute, ORF accuracy, NWF correct letter sounds, and NWF whole words read. This information was analyzed to determine if students met standards of rate of improvement as set by DIBELS. Students' ROI scores were analyzed to determine if students met the expected ROI.

The pretest and posttest data for each area were also averaged for the group to analyze the data through a T-test. The T-test was created by using Microsoft Excel by inputting the pretest and posttest mean score for the group and running data analysis tool using the t-test paired two samples for means. This information helped to determine the *p* value for each area tested to determine if the results were significant and not likely a result of change.

Chapter 4

Results

Data was collected during this study over seven weeks. Students showed the most progress in reading nonsense words. Individual student data collected in this study can be found in Appendix B. Five of six students made progress on their fluency on the oral reading passages, three of six students made progress on their accuracy on oral reading passages, and five of six students made progress on nonsense word correct letter sounds and whole words read. Figures 1 through 4 show the pretest and posttest data for ORF and NWF measures for each participant on each of the four DIBELS measures.

Figure 1

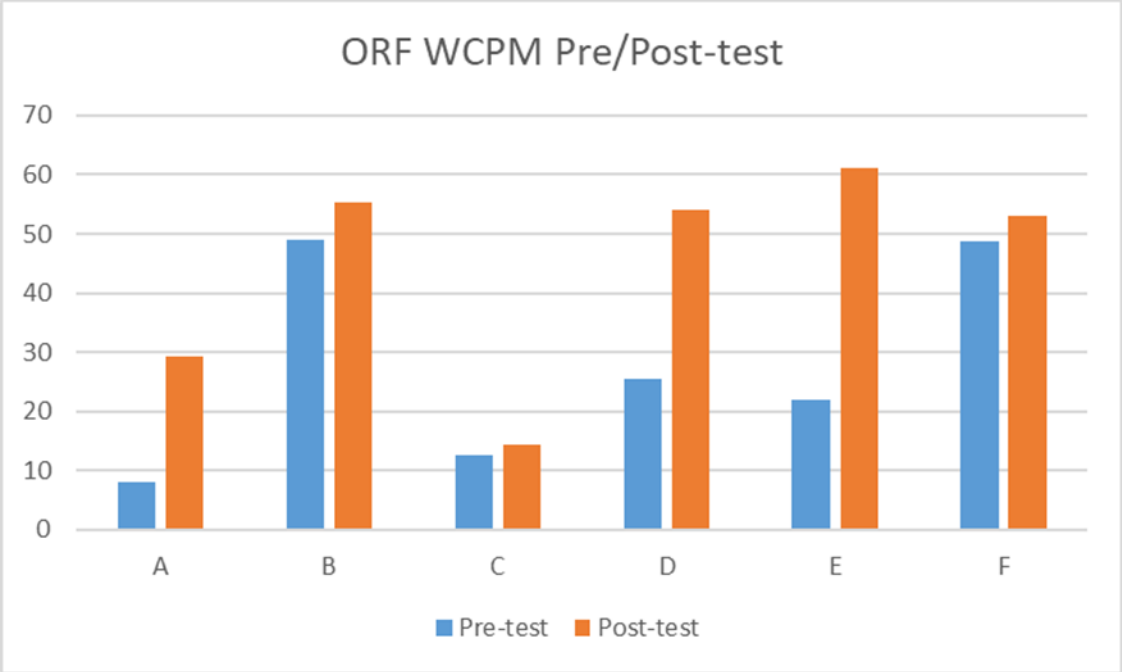


Figure 2

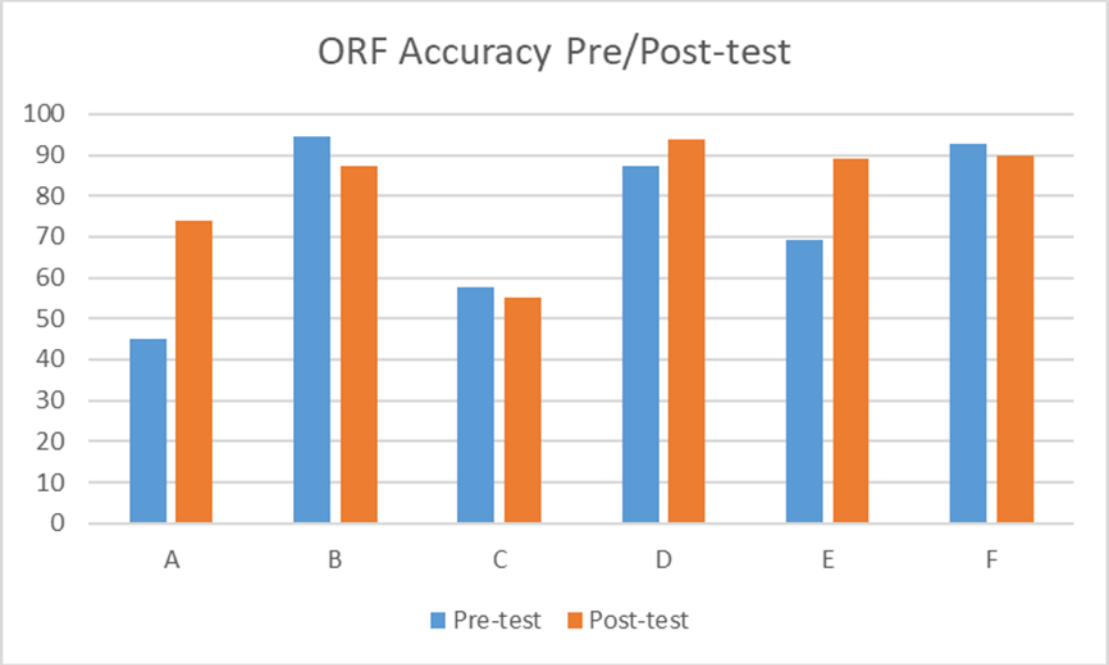


Figure 3

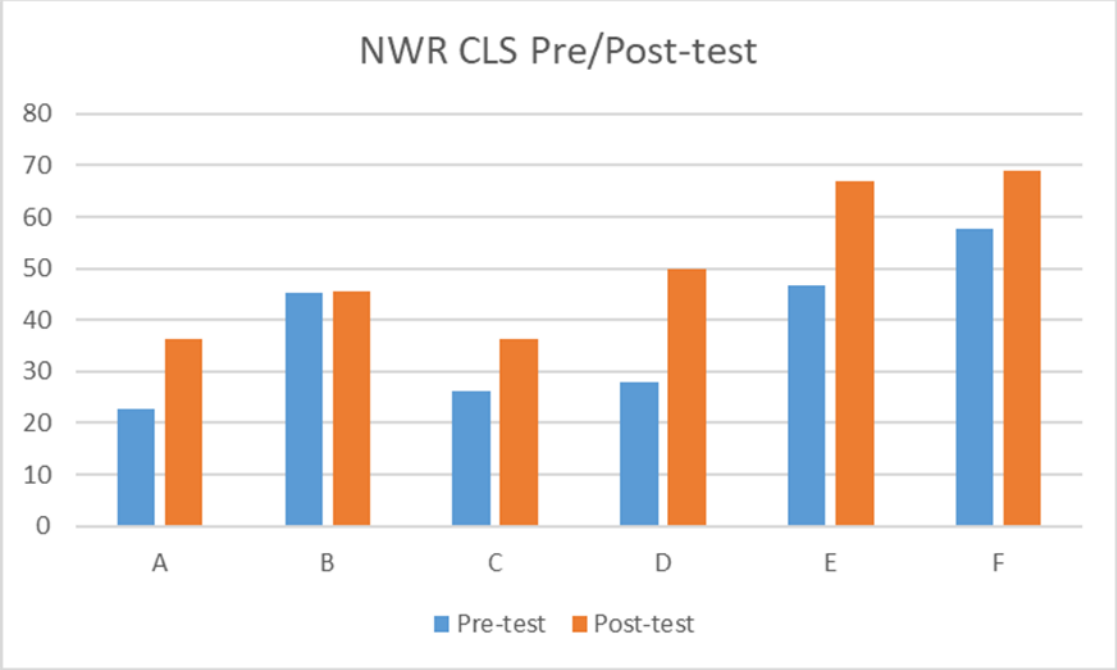
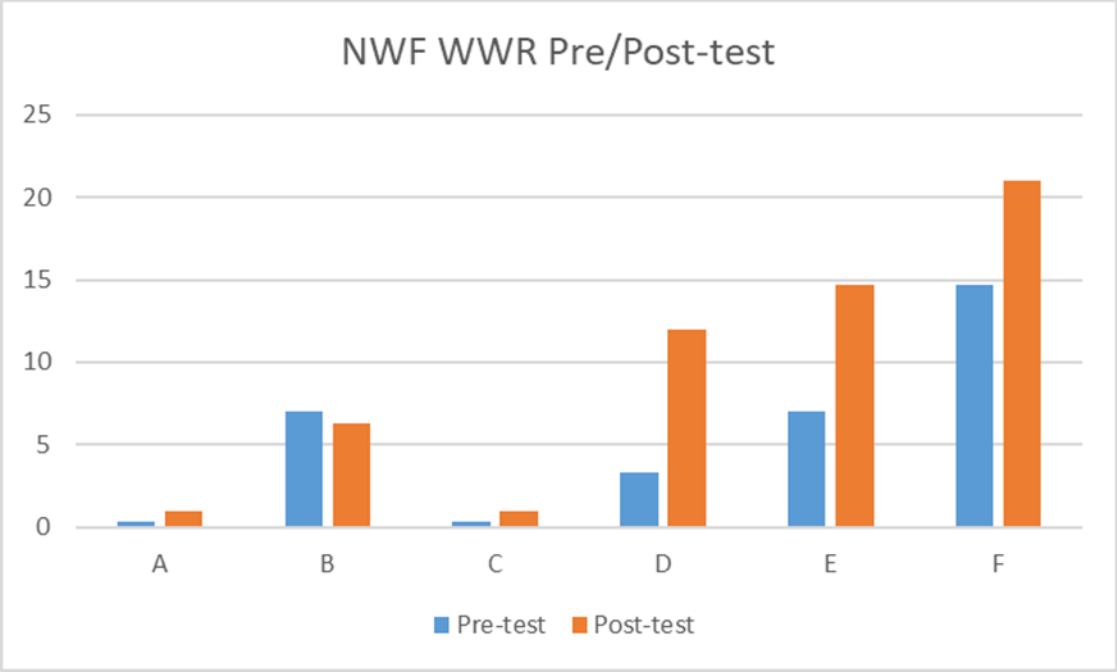


Figure 4



Students averaged an increase of 15 words per minute and 5% accuracy on oral reading fluency measures. They also averaged an increase of 15 correct letter sounds and 4.5 whole words read on nonsense word fluency measures. Table 4 displays the increase or decrease from the pretest to posttest on each measure.

Table 4

Change in Score from Pretest to Posttest

Students	ORF-Fluency	ORF-Accuracy	NWF- Correct Letter Sounds	NWF- Whole Words Read
Student A	+21 WPM *	+20% *	+26 *	+.7
Student B	+5 WPM	-5%	+/-0	-2
Student C	+1 WPM	-5%	+9 *	+.8
Student D	+30 WPM *	+6% *	+24 *	+8
Student E	+33 WPM *	+16% *	+17 *	+10 *
Student F	+/- 0 WPM	-1%	+14 *	+10 *
Group Average	+15 WPM	+5%	+15	+4.5

*Note: * indicates student met or exceeded expected growth*

While many students made progress when taking part in this intervention, to determine the overall effectiveness of the WRS it was also important to look at students' ROI on these measures. All students were assessed using second grade level probes for Nonsense Word Fluency. Students A and C were assessed on first grade level ORF probes, students B and F were assessed on second grade level ORF probes, and students D and E were assessed on third grade level probes. Three students made significant gains on Oral Reading Fluency (ORF) accuracy and fluency, five students made significant gain on Nonsense Word Fluency (NWF) Correct Letter Sounds (CLS), and three students made significant gain on NWF- Whole Words Read (WWR).

Table 5

Student's Rate of Improvement per Week

Student	Oral Reading Fluency Words Correct Per Minute	Oral Reading Fluency Accuracy	Nonsense Word Fluency Correct Letter Sounds	Nonsense Word Fluency Whole Words Read
Student A (First Grade ORF)	3	2.85%	3.71	.1
Student B (Second Grade ORF)	.71	-.71%	0	-.28
Student C (First Grade ORF)	.14	- .71%	1.28	.11
Student D (Third Grade ORF)	4.38	.85%	3.42	1.14
Student E (Third Grade ORF)	4.71	2.28%	2.42	1.42
Student F (Second Grade ORF)	0	-.28%	2	1.42

A paired-sample t-test was used to analysis to compare the pretest and posttest for ORF Fluency, ORF Accuracy, NWF CLS, and NWF WWR. The scores indicated that a significant change was made in all areas assessed. There was a significant difference in the scores for ORF Fluency the pretest (M=8) and posttest (M=29.33 Alpha=P) conditions; t(2)= -17.2938, p=0.0033, ORF accuracy pretest (m=44, Alpha=P) and posttest (m=74, Alpha=P) conditions; t(2)=-22.0095, p=0.0021), NWF CLS pretest (M= 22.66, Alpha=P) and posttest (M=36.33= Alpha=P) conditions; t(2)= -4.5431, p=0.0452), and NWF WWR pretest (M=0.33, Alpha=P) and posttest (M=1, Alpha=P) conditions; t(2)=-4.4650, p=0.0467).Tables 6 through 9 show the results for each measure assessed.

Chapter 5

Discussion

The findings of this study indicate that the Wilson Reading System had a positive effect on oral reading fluency and nonsense word fluency of students with learning disabilities. While the impact was not substantial for all students in the study, some students made growth of up to 20% in oral reading fluency accuracy and increased by up to 33 more words per minute. Also, some could read 10 more nonsense words correctly and 26 correct letter sounds more per minute when it was only expected to read 2.31 more correct letter sounds and 6.02 nonsense words within seven weeks. Considering that this intervention lasted only seven weeks, the growth for some students was significant and five of the six students met ROI in at least one area measured. Also, the t-test determined that ORF WCPM, NWF CLS, and NWF WWR had scores showing a significant difference unlikely to be caused by chance.

Although most students showed growth on at least on measure, student B showed regression of skills or limited progress on the measures. Due to the lack of growth for student B, it is important to note that this student also showed difficulty with attention to task during the intervention. After seven weeks of intervention, the teacher noted attention concerns during the WRS intervention. Upon completing a time on task observation in the classroom setting, it was noted that student B was on task 75% of the time while a peer was on task 90% of the time. This observation indicated that student B may also have attention difficulties that may need to be addressed before he can benefit from the WRS intervention. Many students will benefit from WRS, but it is important to remember that other factors can influence how students respond to the program

The results of this study were similar to the literature reviewed. The studies reviewed showed that most students made growth in nonsense word fluency while only some made

progress with oral reading fluency (Ashby, 2013; Bowe, 2016; Ricci, 2011; Zielinski, 2010). The results of this study were similar as five of six students made improvement on NWF while only three of students make improvement on ORF.

Limitations

Some limitations should be taken into consideration when reviewing this research. One area of limitation is the sample size of the study. Only six students with learning disabilities in reading fluency participated in this study. Considering that there are approximately 6.7 million students receiving special education services (National Center of Educational Statistics, 2018) it is not possible to generalize the findings of this study for all students with learning disabilities in reading fluency. Also, the sample profile for the student population in this study is limiting. All students in this study were Caucasian students living in a rural setting. Only 1 of the 6 students participate in the free and reduced lunch program. Considering the diversity of students with learning disabilities it is important to note the sample profile when reviewing the data from this study.

Upon further review of Wilson standards, the program recommends groups to be no larger 4 students. Due to limited staff members being trained and the high needs of the student population, the groups of students were five or six students. Students A and C showed limited progress in this intervention. It is important to note that the students may have responded better if the intensity was stronger due to having a smaller group size. Lemons et Al. completed research about what would be needed to complete interventions with the level of intensity required for special education services. It was noted in this study that due to the immense amount of resources needed to create an appropriate amount of intensity for all levels of

intervention would be nearly impossible with lack of resources, overpopulated classes, and rapidly increasing teacher turnover (Lemons, et. al., 2018).

A final limitation to this study is the amount of time the intervention took place. Seven weeks of intervention is a very small snapshot of the impact that the WRS could have on students. Having more weeks of intervention data could help to determine a better understanding of the long-term effects of the WRS on student reading ability.

Implications for Future Research

Future research on this topic could investigate the long-term relationship between WRS and DIBELS benchmark assessments. Also, the population of this study showed slower progress in reading, making it even more important to determine the long-term effects on student reading.

Using a larger sample of students as they complete all steps of the program would be a valuable study that would contribute to the information we have about the impact that WRS has on students with learning disabilities in reading fluency. It could provide information to help determine the appropriate level of intervention that the program requires to be effective.

It could also be beneficial to assess the effectiveness of the WRS by using W scores from the Woodcock Johnson-IV. The W score on this assessment can be used to report growth for a student in educational skills such as reading. Typically, the studies the WRS company uses to support its effective is shown through use age/grade equivalencies or standard scores. Having a W score would provide a proper score for student growth in reading.

Researching the impact of intensity would also be beneficial for educational research about the WRS. Comparing students' progress in groups of four or less compared to students in groups of five or six would make for interesting research about the impact of intensity for this

program. This research could determine if ensuring groups are small for the WRS can result in substantial growth for students.

Conclusion

Reading is a complex skill that is difficult for many students with learning difficulties. The lack of pre-reading skills often hinders a student's ability to read. Teachers who work with students with learning disabilities in reading fluency must be aware of the areas of reading that students need to be taught to read. Using DIBELS to assess students' reading skills allows the teacher to have data to make informed decisions about areas of student need. Using the data can help to drive instruction for students that fit their individual needs.

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APPENDIX A: IRB APPROVAL LETTER

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board
4N-64 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** · **www.ecu.edu/ORIC/irb**

IRB Approval Letter

Notification of Exempt Certification

From: Social/Behavioral IRB
To: Ashley Gentry
CC:
Daniel Boudah
Date: 12/18/2018
Re: UMCIRB 18-002605
The Effects of WRS on Upper Elementary School Students with a LD in RF

I am pleased to inform you that your research submission has been certified as exempt on 12/17/2018. This study is eligible for Exempt Certification under category #1.

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

APPENDIX B: ASSENT/CONSENT FORMS

Student Assent Form

I'm a college student at East Carolina University. Right now, I'm trying to learn about how the Wilson Reading Program helps kids to read. I would like to ask you to help me by being in a study, but before I do, I want to explain what will happen if you decide to help me.

I will ask you to read with me daily in the Wilson Reading System program. It will be first thing in the morning. By being in the study, you will help me understand how the Wilson Reading Program helps kids like you read better. This will help you to learn how to read better and more fluently.

Your classmates will not know what you have chosen to work with me. When I tell other people about my study, I will not use your name, and no one will be able to tell who I'm talking about.

Your parents say it's okay for you to be in my study. But if you don't want to be in the study, you don't have to be. What you decide won't make any difference with your grades. I won't be upset, and no one else will be upset, if you don't want to be in the study. If you want to be in the study now but change your mind later, that's okay. You can stop at any time. If there is anything you don't understand you should tell me so I can explain it to you.

You can ask me questions about the study. If you have a question later that you don't think of now, you can call me or ask your parents or teacher to call me or send me an email.
Do you have any questions for me now?
Would you like to be in my study?

Name of Child: _____

Child's Voluntary Response to Participation: ☐ Yes ☐ No

Signature of Researcher: _____ **Date:** _____

Parent Consent Form

Dear Parent/Guardian,

I'm presently working on my Masters of Special Education at East Carolina University. As part of my degree requirements, I am planning an educational research project to take place Bethany Elementary that will help me to learn more about a program we use to help our students learn to read. One of the programs we use is Wilson Reading Systems which is an explicit, systematic, and multisensory way of teaching kids to read. For this study, students will participate in this program and I will track how much progress they make in their reading fluency abilities. The fundamental goal of this research study is to make sure the programs we are using at Bethany are helping meet our student's needs in reading.

As part of this research project, your child will participate in a daily reading lesson over six to eight weeks that will allow me to observe the effectiveness of the program. As this study is for educational research purposes only, the results of students' scores **will not** affect your child's grades.

I am requesting permission from you to use your child's data from Reading 3-D and Mclass in my research study (These are the reading tests all students take at the beginning, middle, and end of the year). Absolutely **NO** student names or other identifiable information will be used in this project. Please understand that your permission is entirely voluntary.

If you have any questions or concerns, please feel free to contact me at school at 336-951-2710 or by emailing me at ahgentry@rock.k12.nc.us. If you have any questions about the rights of your child as a research participant, you may contact *The University and Medical Center Institutional Review Board* at 252-744-2914.

Please detach and return the form below by **11/13/2018**. Thank you for your interest in my educational research study.

Sincerely,
Mrs. Gentry

As the parent or guardian of _____,
(write your child's name)

- ☐ **I grant my permission for Mrs. Gentry to use my child's data in her educational research project regarding reading instruction. I voluntarily consent to Mrs. Gentry using any of the data gathered about my student in her study. I fully understand that the data will not affect my child's grade, will be kept completely confidential, and will be used only for the purposes of her research study.**

- ☐ **I do NOT grant my permission for Mrs. Gentry to use my child's data in her educational research project regarding reading instruction.**

Signature of
Parent/Guardian: _____Date: _____

APPENDIX C: INDIVIDUAL STUDENT DATA

Figure 1.1

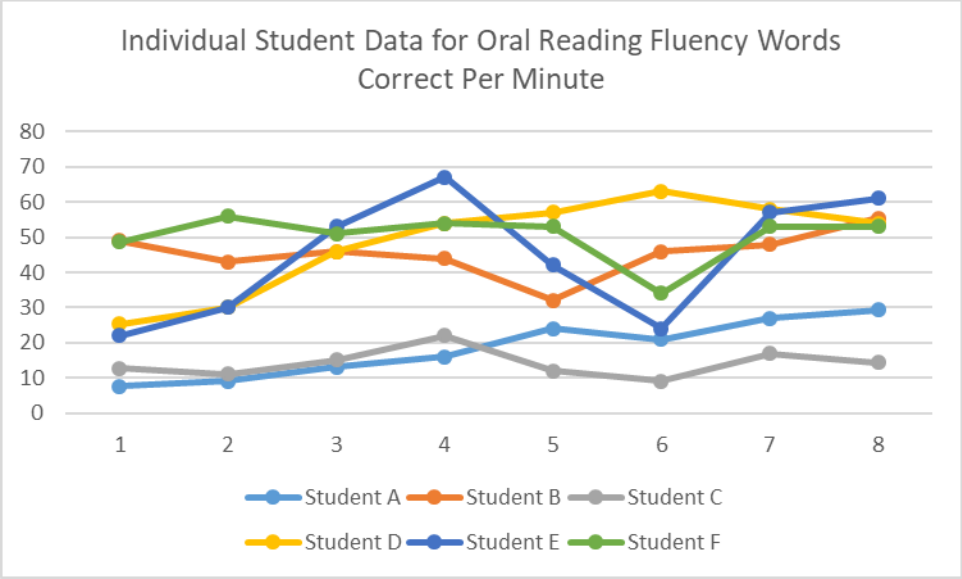

Figure 1.2

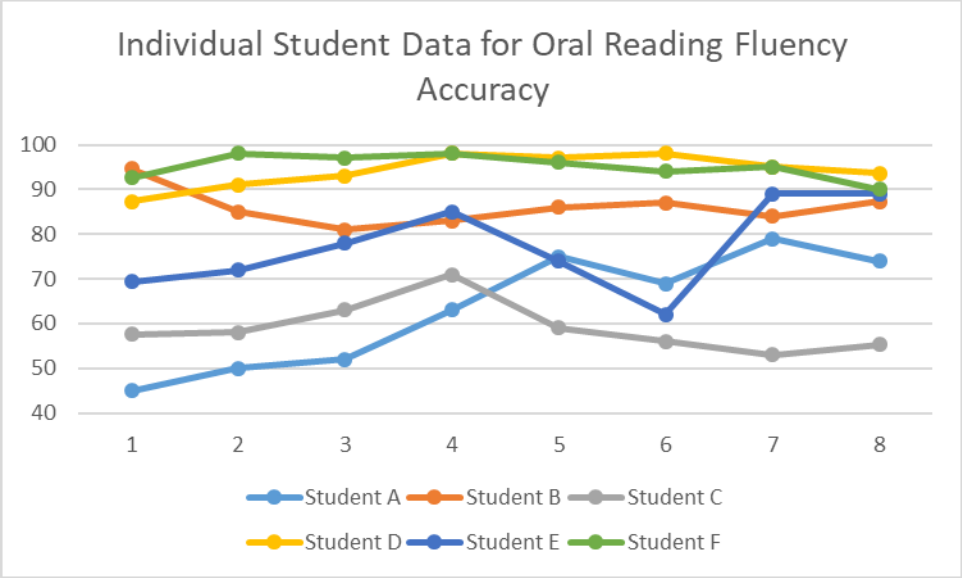

Figure 1.3

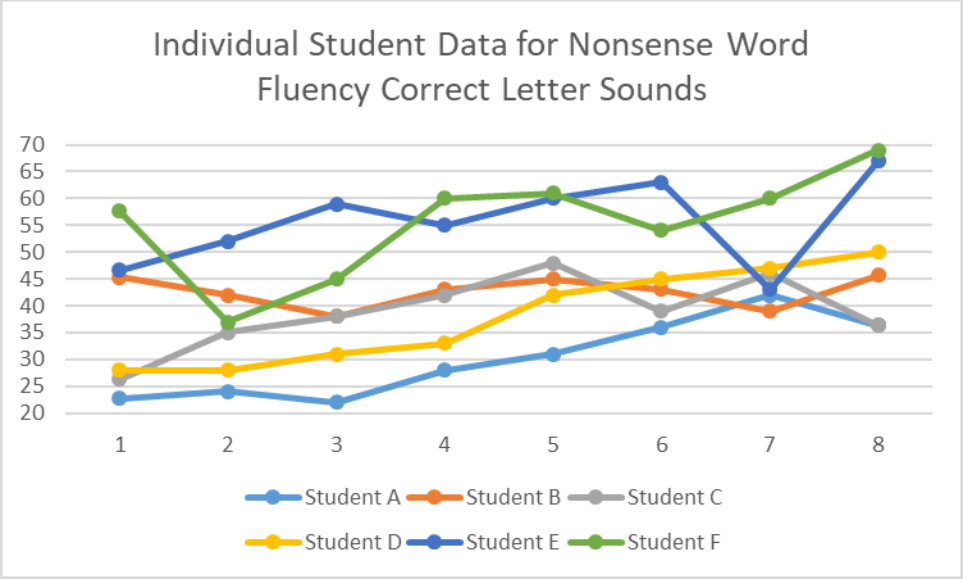

Figure 1.4