**Righting Reading in Middle School:  Readable English Helps Underperforming Adolescent Readers**

**Abstract**

This study measured the effectiveness of Readable English, a reading fluency and comprehension program, on underperforming sixth, seventh, and eighth grade rural, American English-speaking students over the course of one school year. Students were randomly assigned to either the intervention condition ($n = 167$) or the typical practice condition ($n = 177$). Middle school students in the intervention condition scored statistically significantly higher than students in the typical practice condition on measures of EasyCBM CCSS Comprehension (partial $\eta^2$ effect size [ES] = 0.10 [moderate]), EasyCBM Passage Reading Fluency (PRF) rate (ES = 0.18 [large]), EasyCBM PRF reading accuracy (ES= 0.08 [moderate]), WRMT-3 Oral Reading Fluency (ES = 0.13 [approaching large]), and WRMT-3 Passage Comprehension (ES = 0.25 [large]).  Moderate grade level growth in measures of oral reading fluency led to extensive growth of reading comprehension skills. The eyewatering cost estimates to accelerate reading remediation (Pan & Sass, 2020) per middle school student and the paucity of research-proven interventions require innovating ways to combine and leverage the benefits of technology and intensive, effective curriculum instruction. Implications for using Readable English as an accelerated remediation tool to close reading gaps for underperforming middle school students are discussed.

**Introduction**

Middle school students are expected to read and comprehend increasingly complex, subject specific text to acquire knowledge. Whereas the instructional focus during the elementary years is on reading fluency, oral text comprehension and the mechanics of

reading comprehension, middle school students must read and learn through text comprehension (Language and Reading Research Consortium, 2015; Swanson et al., 2017). Simply put, around fourth grade students shift from learning-to-read to reading-to-learn core curriculum. Middle school students are exposed to content specific vocabulary and complex syntax in a variety of text from which they are expected to be able to learn tremendous amounts of new information (Carnegie Council on Advancing Adolescent Literacy, 2010). Both individual state and Common Core State Standards integrate literacy standards across all content areas with the expectation that exposure to complex text across the curriculum will lead to students building content specific knowledge bases (schema) and that their reading ability will continually increase (Swanson et al., 2017).

**Students need to read to succeed**

Despite the expectation that sixth, seventh, and eighth grade students have learned to read proficiently and can read complex, content specific text to learn new material, the 2022 National Assessment of Educational Progress (NAEP) reports that only 31% of eighth graders scored in the proficient or advanced reading range (National Center for Education Statistics). Most American eighth graders cannot fully access content specific curriculum because they have not developed the requisite reading skills to transition from learning-to-read to reading-to-learn new information. The reality is that about 70% of middle school students need reading remediation to successfully read grade level curriculum.

Over the last thirty years we have learned what effective reading instruction should include for beginning readers (Ehri, 2015; International Dyslexia Association, 2018), and using response-to-intervention (RTI) models, schools have worked toward preventing reading difficulties. Yet despite requiring the use of research-based interventions, most students are entering middle school unable to

proficiently read grade level content (National Center for Education Statistics, 2022). Whether the reading interventions used in earlier grades are inadequately implemented (Campbell, 2020; Jansson, 2020) or they are not targeted to the students' specific reading skills deficits (Cain & Barnes, 2017; Clemens et al., 2017), the result is that many students come to middle school with a variety of reading problems that limit their ability to read and comprehend new information.(Fletcher et al., 2019; Wanzek et al., 2011).

In typically developing sixth, seventh, and eighth grade readers, reading rate (i.e., the number of words read correctly per minute [WCPM]) begins to level off, as comprehension and vocabulary knowledge rapidly expands in proficient readers (Tighe & Schatschneider, 2016). The reading fluency trajectory is steepest in first through third grades and continues to increase more slowly through grade six. Annual increases in reading rate slow dramatically in seventh grade, as other literacy skills expand. Proficient readers encounter increasingly complex and curriculum specific text, expanding their exposure to, and knowledge of, rare words and academic vocabulary (Stanovich, 2009). This rapidly expanding lexicon co-develops with schemas to which learners attach new information, and the theory is that exposure to complex, content specific text will cause students to build knowledge (National Governors Association Center for Best Practices and the Council of Chief State School Officers, 2010).

However, because non-proficient adolescent readers cannot read as much text as their proficient peers, they do not share equal access to core curriculum. Reading less text, failing to fully comprehend the curriculum, and subsequently not building the expansive vocabulary and knowledge bases of their more literate peers, students with reading difficulties fall further behind each year (Silverman et al., 2013; Solis et al, 2014). Once students are off-track, if their reading skills deficits are not effectively remediated their reading

difficulties begin compounding (Cain & Oakhill, 2011; Stanovich, 2009), and as adolescent readers age the opportunity to bring them to proficiency decreases (Edmonds et al., 2009; Solis et al., 2014; Wanzek et al., 2013).

Building and strengthening middle school students' reading skills is a complex problem that requires explicit instruction that middle grades teachers have neither the training nor skills to provide (International Dyslexia Association, 2019; Wanzek et al., 2011). There is relatively little research regarding the effectiveness of adolescent reading interventions outside special education settings (Boudah, 2018; Wanzek et al., 2011; Solis et al., 2014; Swanson et al., 2017). Studies of adolescent reading interventions used within special education settings tend to rely on researcher-developed reading outcome measures rather than standardized assessments, most are of short intervention duration, and normative progress to determine whether reading deficit gaps are being closed is often not reported (Lovett et al., 2021; Scammacca et al., 2016; Wanzek et al., 2011; Wanzek et al., 2013).

**Middle school reading remediation**

Effective remediation of reading deficits of adolescent readers is complex and rarely effective (Lovett et al., 2021). Middle school English Language Arts (ELA) teachers need effective multiple component reading programs that meet a continuum of student needs (Edmonds et al., 2009; Fogarty et al., 2019) in both the physical and virtual classroom. New methods of instruction must be conceived that integrate what has already been learned about teaching reading to adolescents, and the efficacy of these interventions must be researched. Students with below average reading skills need substantial reading practice to catch up. Cross curricular reading instruction is the only way most students have enough reading practice to gain the full spectrum of reading skills they need to become skilled readers and writers, yet non-proficient readers need additional supports to be able to read and comprehend core content.

Teaching reading is difficult and technical (Moats, 2020), and remediating reading skills of adolescent students requires the identification and implementation of effective multiple component reading programs (Lesgold & Welch-Ross, 2012; Calhoon et al., 2010). Teachers must have access to and be able to implement sustainable instructional practices. That means reading programs should be easy to understand and to teach, and it is crucial programs be implemented with fidelity (Fogarty et al., 2014). Reading should be taught systematically and explicitly, and practice reading must be an ongoing process of continuous improvement (International Dyslexia Association, 2019). Reading instruction and practice must be embedded throughout the student curriculum to appropriately support reading growth and to remediate skills deficits as they are discovered. It is critically important that reading programs be instructionally sustainable because interventions that are not intuitive or that require considerable deciphering by the teacher are unlikely to be used.

**Most beneficial reading skills components**

Research on middle school reading instruction has tended to focus on the importance of types of teacher instruction (i.e., structured, scaffolded, spiral, explicit, rigorous, delivery fidelity) and the social-emotional aspects of adolescent learning (i.e., goal setting, emotional security, engagement, metacognition, peer-mediated group work, etc.). Effective instruction of which specific literacy skills components are most beneficial for middle school students is less well researched. Research continues to focus on the early literacy components and the most effective combination of instruction and component for elementary students. Clearly, automaticity deficits of lower-level linguistic components (vowels and consonants [phonology], syllables, spelling [orthography], grammatical endings [syntax], meaningful word parts [morphological awareness]) directly impact higher level fluency and

comprehension components (Moats, 2020). Adolescent readers struggle to understand increasingly complex text when they have even moderate word level reading deficits. In the classroom we see students with poor internal word representations having difficulty differentiating similar vowel sounds, misusing similar sounding words, incorrectly reading simple blends, and struggling to learn word meanings (Moats, 2020). In middle school these difficulties become compounded by an abandonment of attempts at accurate word reading as adolescents move to context-based word guessing (Moats, 2020).

Several key studies and meta-analyses across decades provide significant evidence of what components are critically important for improving adolescent reading skills. Edmonds et al. (2009), in a metanalysis of reading interventions from 1994-2004 found that instruction in comprehension strategy had a large effect on reading comprehension, but did not significantly impact word recognition, fluency, or word reading. Word study interventions only showed small to moderate effects on comprehension, and fluency instruction alone had no effect on comprehension (Edmonds et al., 2009). None of the 29 interventions included in the metanalysis specifically taught both linguistic skills and comprehension strategy (Edmonds et al., 2009), and it is the combined explicit instruction of both linguistics skills and comprehension that have proved potent in other studies.

For example, Lovett et al. (2000) found that instruction in syllabic segmentation and decoding strategies not only led to increased decoding skills, but also improved students passage reading comprehension *without direct comprehension instruction*. Calhoon et al. (2005) compared two programs that taught both phonics and comprehension skills and found that the program that focused heavily on word level reading skills greatly outperformed the program focused on comprehension skills in measures of

passage comprehension, word identification and word attack (2005). Interestingly, reading fluency growth for both condition groups was not significantly different (Calhoon et al., 2005).

In a 2010 follow-up study, Calhoon et al. designed the Reading Achievement Multi-Modular Program (RAMP-UP) to instruct students in four modular components (linguistics skills, spelling, reading, and comprehension) and measured the impact of the combination of components taught in various concentrations. Their findings show that concentrated instruction first on linguistics skills and spelling and then adding fluency and reading comprehension strategy instruction provided the best benefit for middle school students with reading disabilities. Later studies, using various other reading interventions, also show that linguistics skills instruction combined with reading comprehension strategy instruction are much more effective for adolescent and adult readers with varying reading abilities than comprehension strategy instruction alone (Wanzek et al., 2013; Fogarty et al., 2014; Tighe & Schatschneider, 2016; Swanson et al, 2017; Clemens et al., 2017). Why linguistics component instruction substantially improves reading comprehension outcomes above comprehension strategy instruction alone may be attributable partly to the unique nature of the English language.

**English is difficult to read**

Reading is a complex task that requires many parts of the brain to work together and there are many places for things to go awry. Students have varied learning needs that can be difficult to detect and meet, and English has adopted many foreign words and encompasses a vast vocabulary with deep orthography and rich morphology which makes learning to read and write English much more difficult than more phonetically transparent languages like Spanish or Finnish (Seymour, 2003; Caravolas et al., 2013). The

adoption of foreign words has enlarged the English vocabulary and greatly muddled spelling/decoding rules (Stockwell & Minkova, 2001; Ziegler et al., 2010), and many adopted words are quite common and phonologically opaque. A sixth grader could conceivably read, for example, an *anonymous* (Greek) *cartoon* (Italian) about a *klutz* (Yiddish) on *safari* (Arabic), swatting *mosquitos* (Spanish) and eating *hamburgers* (German) with *ketchup* (Japanese) and having *chocolate* (Nahuatl) *cookies* (Dutch) for *dessert* (French). Borrowing from ten different languages, this hypothetical scenario includes common English loan words and their various anglicized spelling idiosyncrasies (Oxford English Dictionary, n.d.).

In addition to having words difficult to decode, English includes many compound words. The generative nature of a morphologically rich compounding language like English means new words are created spontaneously daily and the meaning must be intuited from speech or text. For instance, it would be difficult for someone who has never worked in an office with an open layout to fully understand a story about a "prairie dogging" co-worker in a "cube farm." Similarly, few people need a "doghouse" for their "housedog."

These examples of loan words and compound words are meant to highlight the difficulties inherent in perfecting Perfetti's "Golden Triangle" of reading skills: fluency, vocabulary, and comprehension (2010). To comprehend text the reader must be able to read the words on the page fluently, contextualize the meaning of the words, and draw meaning from both the text and background knowledge. A vast network of underlying literacy skills works together to build the reading fluency, vocabulary, and comprehension that a typically developing adolescent reader has by sixth grade. Students' basic reading comprehension skills are advanced through activities involving critical thinking, problem-solving, knowledge building, and other creative processes. Middle school teachers and

English Language Arts programs are geared to help students extend reading comprehension skills rather than reading fluency skills. In the same way that literacy instruction shifts from learning text comprehension to learning *through* text comprehension, the teachers' roles shift from reading instruction to content delivery.

**Promoting Educational Equity and Preventing School Dropout**

While literacy needs continue to expand across content areas in middle school, recent NAEP data highlight that literacy proficiency scores of students in rural settings are lower than students in urban settings and scores of students who receive free or reduced-price lunch are lower than those not eligible for free or reduced lunch (2022). All the students in this study live in rural areas, and a large percentage qualify for free or reduced lunch, placing these study participants into two subgroups known to be at risk for underperformance. Academic performance of many students struggling to meet the increasing demands of complex text in middle school plateaus and the performance gap increases (Boudah, 2018; Edmonds et al., 2009; National Center for Education Statistics, 2019). Underperforming middle school readers, frustrated by their inability to "get the job done," have an increased risk of dropping out of school (Rumberger et al., 2017). In fact, the Annie E. Casey Foundation reported a decade ago that underperforming third grade readers are four times more likely to quit school than their reading proficient peers (Hernandez, 2012).

Fortunately, programs that provide research-proven instruction for the complex reading needs of non-proficient readers, particularly direct instruction and cognitive strategies instruction (Hattie, 2009) have a good chance of preventing school dropout (Rumberger et al, 2017). The Institute of Education Sciences (IES) recommends in *Preventing Dropout in Secondary Schools* (2017) that schools "Provide intensive, individualized support to students who have fallen off track and face significant challenges to

success" (p. 20). The IES recommendation is based on metanalytic data showing strong evidence that instructional strategies providing "intensive, individualized support" are highly effective. These reports and articles support commonly acknowledged best instructional practices that most schools were unable to adequately implement even before the pandemic.

Emerging pandemic research highlights the uneven reading gains or losses experienced by students of different demographics (Dorn, 2020; Pan & Sass, 2020). While elementary students are regaining some lost academic ground, middle school students' reading growth continues to stagnate and students with below average reading skills are accumulating year-on-year learning loss (Kuhfeld & Lewis, 2022). The eyewatering cost estimates to accelerate reading remediation (Pan & Sass, 2020) per middle school student and the paucity of research-proven interventions with which to do so necessitate innovating ways to combine and leverage the benefits of technology and intensive, effective curriculum instruction.

**Study Aims and Hypotheses**

Readable English is a relatively new reading program that appears to bridge high-quality literacy curriculum and educational technology to foster reading fluency and comprehension. The explicit instruction of linguistics components and comprehension strategy skills used in the Readable English program is shown to best benefit adolescent readers. Its instructional design should meet the unique needs of middle school teachers and adolescent students, but the program has not been previously rigorously researched. This study ($N = 344$) uniquely contributes to the body of research on remediation of adolescent reading deficits by evaluating program performance of students in grades six through eight using standardized assessments and measuring normative progress. This action research study was possible because neighboring school districts planned to implement Readable English at their elementary and

middle schools over a two-year period. This provided a naturalistic teaching environment to examine whether Readable English helped students improve reading fluency and reading comprehension skills more effectively than students in the typical practice condition.

## Methods

**Research Design**

*Teachers and School Setting*

This action research study was possible because three neighboring school districts planned to implement Readable English at their elementary and middle schools over a two-year period. Seventeen teachers at four schools in rural Indiana participated. All middle school students in District One participated in only the Readable English treatment condition. All District Two middle school students participated in the typical practice condition; and District Three middle school students were randomly assigned to either the Readable English intervention or the typical practice condition. Because districts were phasing in instruction over two years, teachers in District Three were able to choose whether to adopt Readable English or continue to teach the typical practice instruction during year one.

While random assignment of teachers to condition would have been preferred, randomly assigning teachers to either condition might have had a demoralizing effect during an already stressful school year. Allowing early and late adopters of  Readable English at the middle schools was beneficial to District Three because it provided an opportunity for all teachers to receive training and become knowledgeable of the program, and teachers who chose to implement Readable English in year two had the opportunity to observe

peers' and students' responses to the new program. Administrators felt it that phased in implementation would be an essential support for teachers, and a way to get buy-in for the districts' new reading initiative. Special education teachers followed the research design and either provided Readable English intervention instruction or typical practice instruction to students depending on their assigned treatment condition.

***Student Participants.***

Enrolment for the three districts ranged from 1,551 to 5,947 students, with between 51.8% and 63.2% of students eligible to receive free-reduced price lunch (Kids Count Data Center, 2022). Less than 1% of students at these schools had limited English Proficiency (LEP) and none were included in the study. Students were randomly assigned to ELA classes in either the intervention condition ($n = 167$) or the typical practice condition ($n = 177$). No online or hybrid learning classes were included in this study. Student demographics are described in Table 1. [Table 1 near here]

Table 1. *Descriptive Student Demographics by Condition*

| Variable | Intervention (N = 167) | | Typical practice (N = 177) | |
|---|---|---|---|---|
| | N | % | N | % |
| Gender | | | | |
| Female | 70 | 41.9 | 56 | 31.6 |
| Male | 97 | 58.1 | 121 | 68.4 |
| Ethnicity | | | | |
| Asian | 1 | 0.6 | 1 | 0.6 |
| Hispanic or Latino | 9 | 5.4 | 1 | 0.6 |
| Black or African American | 4 | 2.4 | 2 | 1.1 |
| White | 153 | 91.6 | 173 | 97.7 |
| Identified for Special Education | 100 | 59.8 | 139 | 78.5 |

***Teacher Training and Implementation Fidelity***

Teachers in the intervention condition and teachers in both practice conditions in District Three received two days of Readable English training prior to implementation. Teachers in the typical practice condition had already been trained and had been using Amplify English Language Arts (Amplify ELA) for at least the prior three years. District level instructional coaches monitored implementation fidelity of teachers in the typical practice condition and helped assess students. Each teacher in the treatment condition

met weekly with their assigned Readable English reading coach hired by the district. Readable English coaches monitored lesson planning and implementation and offered advice on whole and small group teaching techniques and use of specific program components.

### Data Collection and Study Length

This intervention study began after Fall benchmarking in mid-October 2020 and concluded with Spring testing in mid-April 2021. Individually administered assessments were conducted during the schools' regularly scheduled Fall and Spring testing windows and were administered by school personnel trained and supervised by the research team's psychometrician. Due to school closures caused by COVID and weather events, students received an average of 63 hours of the originally planned 90 intervention instructional hours over a 14-week period during regular ELA instruction.

## Description of Condition Groups

### Intervention condition

Readable English uses a three-part process to make English words completely phonetic. Letters that are not pronounced are greyed out, and pronunciation breaks are indicated with a dot between word parts. Letters that do not make their standard sound are marked with a glyph that denotes pronunciation. Figure 1 shows an example of the Readable English mark-up from the company website [Figure 1 near here]. Readable English is used both to remediate lower and upper-level reading skills and to provide individualized scaffolding for grade level text across the curriculum vis-à-vis the conversion tool. [Video of Readable English program overview near here][Video example of the conversion tool in action near here]

**Figure 1** *Example word with the Readable English mark-up*



Example of Readable English mark-up. Readable English© (2020). Reprinted with permission.

Video Overview of Readable English



https://www.youtube.com/watch?v=a8XuGm2AKIE

During Phase One instruction (lasting four to six weeks), students learn the 21 glyph sounds and names through kinesthetic learning activities and games. Each lesson teaches students three glyphs. Each glyph has a cartoon character that coincides with a video, a catchy song, and a body movement to help students learn the sound the glyph symbolizes. The instruction is rooted in the tenets of Structured Literacy, but the animation and game show feel of the program is meant to appeal to a wide range of student ages in the same way Sponge Bob attracts kindergarteners and college students alike. Rigorous practice of phonics and phonemic skills for decoding words and pseudowords is integrated into drills and games during the initial phase.

Teachers follow a scripted lesson; and each lesson plan includes a slide deck, worksheets, and an interactive game to reinforce learning. All materials are available online for students and teachers, but the teacher may also choose to print out any of the program materials. For example, board games can be played online by up to four students using animated rolling dice and moveable game pieces or the board can be printed out and played in small group workstations. Online worksheets provide immediate student feedback on right and wrong answers, and students can redo worksheets to master linguistics skills. Individual student progress is displayed on the teacher dashboard. Each lesson could be taught whole group using an electronic whiteboard, but small group instruction is recommended. Students in this study received a combination of whole and small group instruction.

During Phase Two (six to twelve weeks) instructional focus shifts to word level reciprocal processes like decoding (reading words aloud) and encoding (spelling) are practiced together to strengthen associations. Reading processes like syntax (word usage), morphemic analysis (examining words parts to intuit meaning), and semantics (meaning) are practiced, building multidirectional

language supports. This phase of the program is taught in small groups with immediate teacher feedback on decoding, spelling, and examination of multisyllable words. Students begin with word reading and move to reading connected text and passages.

Teachers are provided scripted lessons that coincide with slide decks and online worksheets for each lesson in the lesson plan. Initially, students begin reading individual words with complex blends before moving into multisyllable words in similar word families. Practice reading at students' independent reading level in either the Practice Modules or the ReadWorks Modules helps build reading fluency and confidence. Passages from either module can be assigned to the students or the students can choose passages of interest at their reading level. Multiple choice comprehension quizzes at the end of each passage record students' successes on the teachers' student progress dashboard. Student dashboards show individual progress, word reading volume, and badges for reading goals met.

During Phase Two students may begin using the conversion tool to read grade level curriculum. The conversion tool allows teachers and students to mark-up existing district grade level curriculum materials, including texts used in project-based learning activities. Students use the conversion tool to scaffold text to their individual learning needs by choosing what text to convert (e.g., essays, books, stories, project directions) and then choosing how much assistance they need. Teachers can convert text and assign it to students in the program's eReader feature. Spelling and vocabulary words can be assigned to the class's vocabulary/spelling list.

When reading converted text online, students can click on a word to obtain a definition, hear the word read aloud, translate the word into one of 40 other languages, or add it to their personal vocabulary list. Students can turn the mark-up completely off and click only on the words with which they need help, or they can click to turn the mark-up off the words they know well, leaving new or

unfamiliar words marked-up. Using settings, students can change the background color, text color, font size, letter and word spacing. The flexibility of the conversion tool and eReader, combined with the ability to cut and paste any text or upload a wide variety of file types (e.g., Word documents, PNG, Tiff, HTML, TXT, TIFF, PDF) for conversion helps support student autonomy.

Phase Three (ten plus weeks) and Phase Four (ten plus weeks) focus on integration of fluency skills with reading comprehension, writing, and vocabulary building. While teachers initially convert class curriculum materials into the Readable English mark-up to make text quickly and easily readable, students are taught to use the conversion tool so they can take control of their own learning. Because all students in the classes in the intervention condition learned and used Readable English, social stigma was averted; and all students were supported at their individual reading level. Teachers and students equated use of the conversion tool with technological supports like enlarging font sizes on computer screens. After completing essential skills training in Phases One and Two, teachers used the conversion tool and reading comprehension framework from Phase Three layered over existing grade level ELA projects and Amplify ELA curriculum.

Multiple component reading skills remediation is robust, including explicit and direct instruction and practice of a variety of language structures and techniques used to build vocabulary knowledge and increase verbal reasoning skills. Both the intervention and typical practice conditions include reading comprehension activities such as summarizing, comprehension monitoring, the making, checking, and updating of predictions, connecting new information to existing knowledge, using visualization, and guided inference making.

While robust program curriculum is designed to strengthen foundational reading skills multidirectionally to support students with a wide range of reading skills deficits, the real power of Readable English lies with the conversion tool. I was keen to examine the effectiveness of this flexible combination of tailored student reading supports and remediation in a naturalistic environment. Theoretically, the program gives students the opportunity to self-actualize their learning by choosing what and how to read. By making English much easier to read, students should gain much more reading practice across a variety of content, and they no longer need to rely on guessing strategies to read unfamiliar words. Teachers can use the conversion tool to source materials from programs, textbooks, websites, and favorite projects. The intervention program offers an individualized approach to reading remediation while keeping students with significant reading skills deficits in the general education classroom receiving grade level curriculum instruction. The ability to provide intensive, targeted reading instruction to students without pulling them out of class avoids social stigma for the student and requires fewer specialized reading teachers that districts struggle to find and fund.

*Typical Practice Condition*

Students in the typical practice condition also received 45 minutes of instruction per day during ELA time following the district grade level scope and sequence and nominally using Amplify ELA. All schools had been using Amplify ELA for at least three years, and teachers had previously received program training and ongoing professional development to build program capacity. Amplify ELA provides both summative and formative assessments, along with a 100-day lesson plan guide, and teachers can monitor student progress from an online teacher dashboard. Amplify ELA is a multiple component program designed to build comprehension and writing skills through reading, class discussions, and digital experiences.

The four engagement principles upon which Amplify ELA is built include: empowering students to become critical thinkers, providing opportunities and supports for all students to work "up," supporting feedback systems that develop strengths, and engaging multiple modalities, especially collaboration (Sabin, no date). In actual practice teachers blended curriculum available in Amplify ELA with externally sourced texts and favorite projects. Teachers in both practice conditions sought to engage and connect with students during the pandemic, but grade level curriculum planning for the typical practice condition appeared to be very loose. District level instructional coaches monitored ELA instruction in the typical practice group and confirmed appropriate instruction was given, but no lesson pacing guides were available for researcher review. Because lesson plans are also built into Amplify ELA teachers may simply have been following the scripted lessons they had taught for the previous three years.

**Measures**

All students were assessed with EasyCBM grade level reading benchmarks in the Fall, Winter, and Spring using the Common Core State Standards (CCSS) Basic Reading and Passage Reading Fluency tests (University of Oregon, 2008). The CCSS Basic Reading is an online, group administered, 25-item, multiple choice test that measures comprehension skills of informational and nonfiction text. Internal consistency (Cronbach's alpha of .87) and median split-half reliability (.76 and .83) were high across all grade level measures (Guerreiro, Alonzo, & Tindal, 2014).

Passage Reading Fluency is an individually administered assessment measuring student reading rate and accuracy on a grade level passage. Reading rate is calculated as the total number of words read in 60-seconds minus the number of words read incorrectly to get a count of Words read Correctly per Minute (WCPM). Reading accuracy is the number of words read correctly divided by the

total number of words read to obtain a percentage of words read correctly. Teachers can look at an individual student's performance to compare to nationally normed student performance in percentile points at each test administration point during the year. Because we wanted to know how these students are doing compared to themselves across the school year, we analyzed the raw scores rather than normed percentiles. Internal consistency (Cronbach's alpha of .95) and median split-half reliability (.92 and .98) for alternate forms were high across all three grade levels (Alonzo & Anderson, 2018).

Students with a wide range of reading abilities were included in this study, and teachers and administrators wanted to consider individual student progress, as well as group level growth. While researchers necessarily need group sizes large enough for adequate statistical power to make reasonable conclusions of data analyses, teachers and administrators must consider reading test results of each student and combine that with background information from each individual. In short, teachers look at individual student progress, while administrators and researchers examine large groups of students to see if progress has been made. The teachers and administrators involved in this action research used the study results to determine whether and which students benefitted from Readable English. For students reading near grade level, normed grade level benchmark reading assessments gave enough data for teachers and administrators to determine reading comprehension and fluency growth.  EasyCBM is an easy assessment to  monitor student reading growth across the school year.

EasyCBM was used also as a screener to identify students who may have reading difficulties. Reading skills growth of students reading well-below grade level would have been less discernable. Consequently, students who scored at or below the 30th percentile on either the CCSS Basic Reading or the Passage Reading Fluency were additionally assessed with the Woodcock Reading Mastery

Tests, Third Edition (WRMT-3) on measures of Passage Comprehension and Oral Reading Fluency. The 30th percentile was chosen as a cut-off point to capture the reading growth of students reading far enough below grade level whose skills growth might not be measurable using grade level benchmarks. Ideally all students would have been assessed with the WRMT-3, but that was not possible given the available research resources of time and qualified assessors. When determining allocation of student instructional time, consideration was given to whether greater benefit would be provided by reading instruction or by additional assessment of students screened as reading near grade level. Ultimately, administrators must make instructional decisions for the best benefit of the teachers and students. Educational researchers provide guidance but should respect those decisions and accurately report on the results.

The WRMT-3 is a battery of individually administered, standardized reading skills tests for students in pre-kindergarten to grade 12. Both the Passage Comprehension and Oral Reading Fluency subtests show high alternate form reliability (Cronbach's alpha of .95 both) and median split-half reliability ranging from .91 to .84 for ORF and .83 to .95 for PC. Subtests have grade-specific start points and items are increasingly difficult until meeting the discontinue rule. Measurement was limited to these two subtests to limit student testing time. Administrators and teachers used student data to evaluate student progress by percentile and grade level growth. District school psychologists and I evaluated individual student reading growth using standard scores and group gains using growth scale values. Schools used these data to inform instruction and to evaluate the reading growth and skills deficits for future Response-to-Intervention (RTI) placement.

**Data Analysis Procedures**

*Power Analyses*

Study design included *a priori* power analysis to determine sample sizes requisite to detect medium effect sizes at α = .05 using G*Power 3.1.9.7 (Faul, F. et al., 2009). A minimum of 105 participants per grade level were needed to detect moderate effect sizes with significance of α = 0.05. Observed statistical power for the combined group of students was very high for all measures (α > 0.90).

### Attrition Analysis

Participant attrition diminished grade level sample sizes for individually administered, standardized Woodcock Reading Mastery Tests, Third Edition (WRMT-3), reducing the power to observe individual grade level differences with confidence.  Of the 402 students who began the study, 347 (86.3%) completed both pre- and posttesting. Comparisons of pre-test scores of the 55 attritors in the Readable English and typical practice conditions showed no significant differences in any pretest variables between themselves and those who completed the study. Attritors were evenly split along gender lines (27 boys and 28 girls), but more eighth grade students (*n* = 26) left than did sixth (*n* = 10) or seventh (*n* = 19) graders.

### Condition Group Comparisons and Analysis Rationale

Study data were analyzed using IMB SPSS version 26. To determine whether condition groups differed before the study began, intraclass correlations and independent samples *t*-tests were used to examine potential pre-test skills differences between conditions. Intraclass correlations (ICC) of all pre-test measures to teacher group and condition group was acceptable at ICC = 0.023 (α ≤ .001; 95% Confidence Intervals lower bound = 0.000 and upper bound = 0.027) $F(170, 680) = 3.446$. An ICC < 0.2 means pre-test scores of students grouped within each class between condition groups demonstrate adequate variation in prior

knowledge to detect a treatment effect (NIH Collaboratory, 2020).

      *T*-tests comparisons showed beginning of the year differences between condition groups for both comprehension measures (see Table 2). Therefore, analysis of covariance (ANCOVA) was used to examine potential group effects on mean changes in reading skills scores while controlling for influences on pre-treatment group differences. Follow-up *post hoc* analyses examined any findings of significant group effect. CCSS Passage Comprehension and WRMT-3 Passage Comprehension pre-test scores are used to assess prior knowledge as a covariate in the model.  However, *t*-tests comparisons of pre-test Passage Reading Fluency scores showed  differences between condition groups were not statistically significant (see Table 2) and, therefore, they were not entered into the model as covariates. Model covariates analyzed included condition group, grade level, special education eligibility, and gender. [Table 2 near here]

Table 2. *T-Test Comparisons of Pretest Measures Between Condition Groups*

| Variable | Welch's T-test | | |
|---|---|---|---|
| | *t* | *df* | *p* |
| CCSS Raw Score | -2.18 | 342 | .030 |
| WCPM | 0.08 | 342 | .904 |
| Accuracy percentage | -1.89 | 342 | .059 |
| PC Standard Score | -3.36 | 174 | <.001 |
| PC Growth Scale Value | -3.72 | 174 | <.001 |
| PC Grade Equivalent | -3.73 | 174 | <.001 |
| ORF Standard Score | -1.29 | 174 | .099 |
| ORF Growth Scale Value | -1.50 | 174 | .137 |
| ORF Grade Equivalent | -0.62 | 174 | .533 |

*Note*. CCSS = Common Core State Standards Basic Reading comprehension; WCPM = Words read Correctly Per Minute (reading rate); PC = Passage Comprehension; ORF = Oral Reading Fluency
Differences between condition groups in reading comprehension pre-test measures are statistically significant and are entered in the ANCOVA model as a variable of reading comprehension prior knowledge. There were no statistically significant differences in fluency measures, so they will be excluded as variables in the ANCOVA model.

Partial eta squared effect sizes for ANCOVA were calculated and reported to better understand the nature of any statistically significant findings. Using Levine and Hullett's (2002) recommendation, effect sizes are defined as follows: $\eta^2 \geq 0.01$ small or no effect, $\eta^2 \geq 0.06$ medium effect, $\eta^2 \geq 0.14$ large effect. To guard against the potential threat to internal validity *post hoc* power analyses were conducted to rule out low statistical power (Onwuegbuzie, A., & Leech, N., 2004). Age-based growth scale values (GSV) were used to examine pre- and posttest reading changes across grade levels. Standard scores indicate a student's standings relative to a group with inherent alternate form variation, but GSV are calculated using Item Response Theory (IRT) on an equal interval scale with forms A and B calibrated and equated jointly. Using IRT allows very accurate comparisons of change and measurement of growth wherever they occur on the scale. This method is the most accurate way to examine student achievement from multiple grade levels (Woodcock, R. W., 2011).

***Pretest Differences and the Need for ANCOVA.*** More boys than girls participated in both conditions, particularly in the typical practice condition. Neither treatment condition was racially diverse, reflecting the general population demographic of a predominantly white rural Indiana. Independent samples' *t*-tests indicated that treatment condition groups' beginning of the year scores were similar for reading fluency measures. However, the typical practice condition group scored significantly higher on reading comprehension measures (i.e., EasyCBM CCSS reading comprehension and WRMT-3 Passage Comprehension). Mean standard scores for students in both the intervention and control conditions were below 85 in both reading comprehension and oral reading fluency, indicating clinically significant reading deficits in both areas (see Table 3). These pretest differences between condition

groups indicated that ANCOVA analyses would be most appropriate to determine what factors might have influenced outcomes.

[Table 3 near here]

Table 3. *Pre-test, Posttest, and Change Means of Reading Skills Assessments*

| Reading Skills Assessment | Pre-test *Mean* (*SD*) | | Posttest *Mean* (*SD*) | | Change *Mean* (*SD*) | |
|---|---|---|---|---|---|---|
| | Readable English | Typical Practice | Readable English | Typical Practice | Readable English | Typical Practice |
| EasyCBM Grade Level Benchmarks | ($n$ = 167) | ($n$ = 177) | ($n$ = 167) | ($n$ = 177) | ($n$ = 167) | ($n$ = 177) |
| Passage Reading Fluency | | | | | | |
| Words Correct Per Minute | 128.32 (44.46) | 127.75 (43.57) | 148.48 (54.49) | 129.75 (43.98) | 20.16 (20.28) | 1.99 (16.81) |
| Accuracy Percentage | 96.00 (5.20) | 96.92 (3.75) | 97.93 (2.45) | 96.54 (4.22) | 1.93 (3.64) | -0.38 (3.48) |
| Passage Comprehension | | | | | | |
| Raw Score Correct Answers | 16.05 (5.56) | 17.30 (5.03) | 18.46 (4.68) | 16.29 (5.17) | 2.40 (4.62) | -1.01 (4.31) |
| | Readable English | Typical Practice | Readable English | Typical Practice | Readable English | Typical Practice |
| Woodcock Reading Mastery Tests, 3rd Ed. | ($n$ = 87) | ($n$ = 89) | ($n$ = 87) | ($n$ = 89) | ($n$ = 87) | ($n$ = 89) |
| Oral Reading Fluency | | | | | | |
| Growth Scale Value | 495.70 (17.69) | 499.38 (14.89) | 501.06 (16.68) | 499.58 (14.36) | 5.36 (5.90) | 0.20 (7.18) |
| Grade Equivalent | 4.12 (2.20) | 4.30 (1.68) | 4.79 (2.49) | 4.36 (2.16) | 0.67 (0.91) | 0.06 (1.27) |
| Standard Score | 81.82 (12.51) | 84.01 (9.89) | 84.15 (12.74) | 82.51 (10.35) | 2.33 (4.61) | -1.51 (5.46) |
| Passage Comprehension | | | | | | |
| Growth Scale Value | 496.48 (13.38) | 504.34 (14.55) | 510.78 (13.39) | 504.03 (14.78) | 14.30 (10.64) | -0.30 (11.76) |
| Grade Equivalent | 3.88 (1.32) | 4.90 (2.19) | 5.81 (2.22) | 4.79 (2.13) | 1.93 (1.60) | -0.11 (1.70) |
| Standard Score | 76.26 (8.95) | 81.73 (12.29) | 85.10 (11.83) | 78.96 (12.44) | 8.84 (8.61) | -2.78 (10.11) |

Note: Only students who scored at or below the 30th percentile on either EasyCBM reading fluency or comprehension benchmarks were assessed with the Woodcock Reading Mastery Tests, 3rd Edition.

**Students with Reading Difficulties**

All students were screened with EasyCBM reading benchmarks and roughly half of the students in the study were assessed with the WRMT-3 (52% of intervention condition and 50% of typical practice condition) because they scored at or below the 30th percentile in reading fluency and/or comprehension. Grade equivalent means show student participants in the intervention group working at grade equivalent 4.1 in WRMT-3 Oral Reading Fluency and at grade equivalent 3.9 in Passage Comprehension. Students in the typical practice condition had a mean grade equivalent of 4.3 in Oral Reading Fluency and a mean 4.9 in Passage Comprehension. Recalling that actual grade placement of participating students ranged from sixth to eighth grade means students generally were working below grade level. Mean pretest standard scores between76 and 84 also indicated students in both condition groups began with below average oral reading fluency and comprehension skills (descriptive categories corresponding to Standard Scores are available in Table 4). Together these results depict students with reading fluency and comprehension deficits falling further behind each year.

Table 4. *Descriptive Categories Corresponding to Standard Scores and Standard Deviations from the Mean*

| Descriptive Category | Standard Score Range | Standard Deviations from the Mean |
|---|---|---|
| Well Below Average | 69 and below | -2.1 and below |
| Below Average | 70 – 84 | -2.0 to -1.1 |
| Average | 85 – 115 | -1.0 to 1.0 |
| Above Average | 116 – 130 | 1.1 to 2.0 |
| Well Above Average | 131 and above | 2.1 and above |

**Effect of Readable English Intervention on EasyCBM Reading Benchmark Scores**

Results of ANCOVA show that students in the intervention condition significantly outperformed the typical practice group on all EasyCBM fluency and comprehension measures (see Table 5). Reading accuracy of students in the intervention group improved nearly 2% ($m =$ 1.9%), while students in the typical practice condition lost ground ( = -0.4%) as text complexity increased across the school year (see Figure 2). There was a moderate effect size ($\eta_p^2 = 0.08$) in reading accuracy, with a small effect in favor of special education eligible students ($\eta_p^2 = 0.02$). Students did not receive pull-out services for special education that would have given them extra reading practice. However, students receiving special education services had the most room to grow because they were farther behind than their non-eligible peers. Grade level and gender were not significant variables in the model. [Table 5 near here] [Figure 2 near here]

**Figure 2** *Mean Change in EasyCBM Passage Reading Accuracy Measured in Percentage of Words Read Correctly Per Minute*
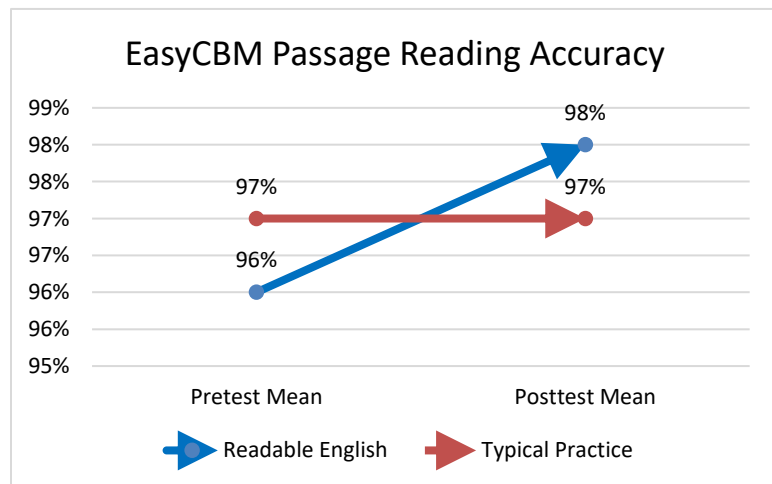
Table 5. *ANCOVA of EasyCBM Reading Skills Growth Controlling for Treatment Condition, Grade Level, Gender, Special Education Eligibility, and Prior Knowledge\**

| Reading Skill Assessment Covariate | $F(df)$ | P value | Partial $\eta^2$ |
|---|---|---|---|
| **EasyCBM PRF Accuracy** | | | |
| Condition Group | 30.59 (1, 339) | <.001 | 0.08 |
| Grade Level | 0.77 (1, 339) | .381 | 0.00 |
| Special Education Eligibility | 5.32 (1, 339) | .022 | 0.02 |
| Gender | 0.29 (1, 339) | .591 | 0.00 |
| **EasyCBM PRF WCPM** | | | |
| Condition Group | 73.57 (1, 339) | <.001 | 0.18 |
| Grade Level | 24.81 (1, 339) | <.001 | 0.07 |
| Special Education Eligibility | 3.91 (1, 339) | .049 | 0.01 |
| Gender | 4.46 (1, 339) | .036 | 0.01 |
| **EasyCBM CCSS PC Raw Score** | | | |
| Condition Group | 35.71 (1, 338) | <.001 | 0.10 |
| Grade Level | 0.63 (1, 338) | .427 | 0.00 |
| Special Education Eligibility | 5.08( 1, 338) | .025 | 0.02 |
| Gender | 0.05 (1, 338) | .830 | 0.00 |
| BOY CCSS PC Score | 101.86 (1, 338) | <.001 | 0.23 |

Note. \*CCSS Passage Comprehension pre-test scores are used to assess prior knowledge as a covariate in the model because *t*-tests comparisons showed beginning of the year differences between treatment conditions for that comprehension measure. However, *t*-tests comparisons of pre-test Passage Reading Fluency scores showed treatment conditions were not statistically significant and, therefore, they were not entered into the model as covariates.

PRF = Passage Reading Fluency; WCPM = Words Correct per Minute; CCSS = Common Core State Standards; PC = Passage Comprehension; BOY = Beginning-of-Year. Partial eta squared effect sizes are defined as follows: $\eta_p^2 \geq 0.01$ small or no effect, $\eta_p^2 \geq 0.06$ medium effect, $\eta_p^2 \geq 0.14$ large effect (Levine & Hullett, 2002).

Mean reading rate increased 20 words correct per minute (WCPM) in the Readable English group compared to 2 WCPM in the typical practice group (see Figure 3). ANCOVA results indicated that all variables in the model were statistically significant, with small effects in gender and special education eligibility ($\eta_p^2 = 0.01$), a moderate effect of grade level ($\eta_p^2 = 0.07$), and a large effect in favor of the intervention group ($\eta_p^2 = 0.18$). Grade level effects for reading rate are expected as lower grades typically gain more WCPM than upper grades as reading rate levels off and text complexity increases. These results indicate that instruction in Readable English accounts for approximately 8% of reading accuracy and 18% of reading rate growth when controlled for grade level, special education status, and gender. [Figure 3 near here]

**Figure 3**  *Mean Change in EasyCBM Passage Reading Rate Measured by the Number of Words Read Correctly per Minute.*
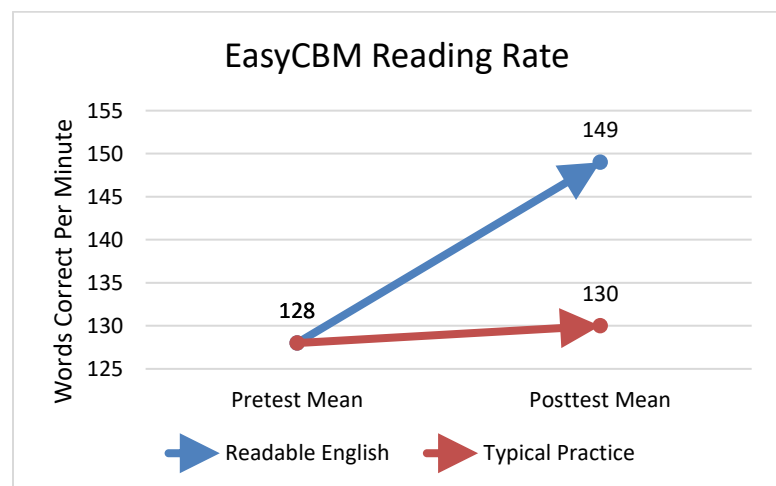


Students receiving Readable English instruction showed moderate improvements on the EasyCBM CCSS Passage Comprehension (*mean* = 2.4 raw score) while students in the typical practice condition lost ground  (*mean* = -1.0 raw score) (see

Figure 4). That statistically significant finding indicates that 10% of the improvement in reading comprehension in the intervention condition can be attributed to Readable English instruction ($\eta_p^2 = 0.10$). Special education eligibility status had a small effect size ($\eta_p^2 = 0.02$) in the model. Grade level and gender were not significant variables, but prior knowledge measures by pre-test CCSS Passage Comprehension scores had a large effect ($\eta^2 = 0.23$). Condition groups did not share equal pre-test means, and the intervention group had more room to grow because they had lower mean scores than the typical practice condition. Neither group posttest mean approached the 25 raw score points maximum, so ceiling effects that might limit the mean growth of the typical practice group are unlikely. *Post hoc* linear regression analysis shows that EasyCBM reading rate growth explains 31% of the growth of EasyCBM CCSS Passage Comprehension (($F(2,341) = 78.678$, $p < .001$, adj $R^2 = 0.312$). Remarkably, WRMT-3 Oral Reading Fluency accounts for 37% of the WRMT-3 Passage Comprehension growth (($F(2,171) = 51.123$, $p < .001$, adj $R^2 = 0.367$). For students who received Readable English instruction, remediation of basic linguistics components supporting fluency had a huge impact on improving student reading comprehension. [Figure 4 near here]

**Figure 4** *Mean Raw Score Change in EasyCBM CCSS Basic Reading Comprehension*
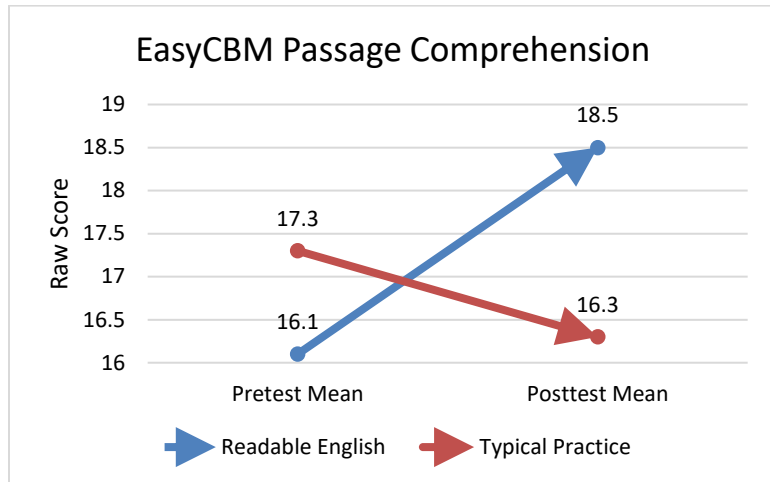


**Effect of Readable English Instruction on WRMT-3 Scores**

Tables Six and Seven report ANCOVA results for these same measures that are strong enough to support the conclusion that students in the intervention condition made significant, meaningful gains in Oral Reading Fluency (ORF) and Passage Comprehension compared to the typical practice condition. Data have been reported as standard scores, grade equivalencies, and growth scale values to meet the needs of a variety of readers who may approach this research study with differing perspectives. [Table 6 near here]

**Table 6** *ANCOVA of WRMT-3 Oral Reading Fluency Skills Growth Controlling for Treatment Condition, Grade Level, Gender,*

*Special Education Eligibility, and Prior Knowledge\**

| Reading Skill Measure Covariate | $F(1, 171)$ | P value | Partial $\eta^2$ |
|---|---|---|---|
| ORF Growth Scale Value | | | |
| Condition Group | 24.45 | <.001 | .13 |
| Grade Level | 6.73 | .010 | .04 |
| Special Education Eligibility | 6.28 | .013 | .04 |
| Gender | 0.14 | .706 | .00 |
| ORF Grade Equivalent | | | |
| Condition Group | 14.04 | <.001 | .08 |
| Grade Level | 0.04 | .834 | .00 |
| Special Education Eligibility | 22.18 | <.001 | .12 |
| Gender | 1.52 | .219 | .01 |
| ORF Standard Score | | | |
| Condition Group | 23.56 | <.001 | .12 |
| Grade Level | 4.12 | .044 | .02 |
| Special Education Eligibility | 11.18 | .001 | .06 |
| Gender | 0.05 | .826 | .00 |

Note. ORF = Oral Reading Fluency

**Table 7** *ANCOVA of WRMT-3 Passage Comprehension Skills Growth Controlling for Treatment Condition, Grade Level, Gender,*

*Special Education Eligibility, and Prior Knowledge\**

| Reading Skill Measure<br>    Covariate | $F(1, 171)$ | P value | Partial $\eta^2$ |
|---|---|---|---|
| PC Growth Scale Value | | | |
|    Condition Group | 57.24 | <.001 | .25 |
|    Grade Level | 1.51 | .221 | .01 |
|    Special Education Eligibility | 1.62 | .205 | .01 |
|    Gender | 0.71 | .400 | .00 |
|    BOY PC Growth Scale Value | 28.51 | <.001 | .14 |
| PC Grade Equivalent | | | |
|    Condition Group | 54.00 | <.001 | .24 |
|    Grade Level | 1.57 | .213 | .01 |
|    Special Education Eligibility | 1.00 | .318 | .01 |
|    Gender | 0.03 | .860 | .00 |
|    BOY PC Grade Equivalent | 7.55 | .007 | .04 |
| PC Standard Score | | | |
|    Condition Group | 53.53 | <.001 | .24 |
|    Grade Level | 0.03 | .869 | .00 |
|    Special Education Eligibility | 2.62 | .108 | .02 |
|    Gender | 0.10 | .748 | .00 |
|    BOY PC Standard Score | 10.18 | .002 | .06 |

Note. *Passage Comprehension pre-test scores are used to assess prior knowledge as a covariate in the model because *t*-tests comparisons showed statistically significant differences between treatment conditions for that measure. However, *t*-tests comparisons of pre-test Oral Reading Fluency scores showed treatment conditions were not statistically significant and, therefore, they were not entered into the model as covariates.

PC = Passage Comprehension.

*Growth Scale Values.* Growth scale values provide the most accurate measure when comparing groups with multiple grade levels; and this level of statistical accuracy is prioritized by researchers. The intervention group ($M\Delta$ = 5.4 GSV) outperformed the typical practice condition ($M\Delta$ = 0.2 GSV) in Oral Reading Fluency growth scale values with a moderate effect size ($\eta_p^2$ = 0.13) (see Figure 5). Gender was not a significant variable in the model, but grade level and special education status were statistically significant with small effect sizes. These results parallel the EasyCBM fluency findings and are expected developmentally because reading rate slows across middle school grade levels. Students eligible for special education services also had a little farther to grow than non-eligible peers. [Figure 5 near here]

**Figure 5** *Mean Change in WRMT-3 Oral Reading Fluency Measured by Growth Scale Values*
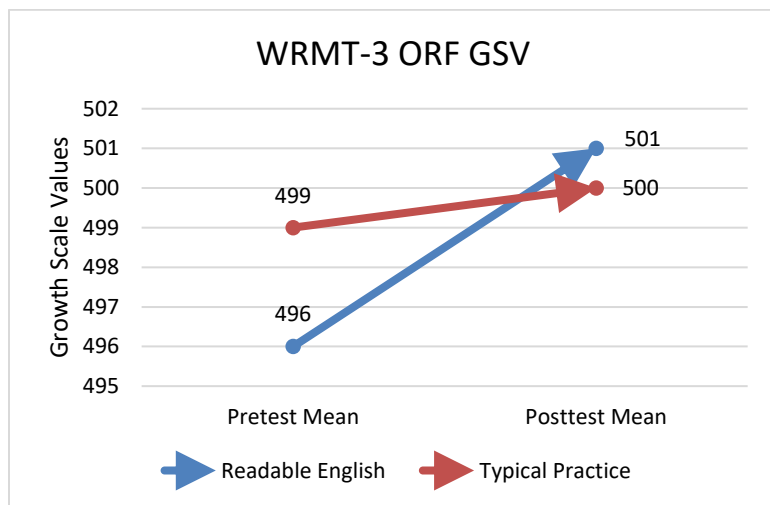


The most interesting findings from this study comes from the passage comprehension growth experienced by the Readable English intervention group. Students in the intervention condition had meaningful gains in reading comprehension ($M\Delta$ = 14.3 GSV)

compared to small learning loss in the typical practice condition ($M\Delta = -0.3$) (see Figure 6). Passage Comprehension pre-test scores used as a measure of prior knowledge was a significant variable in the model and produced a large effect size ($\eta_p^2 = 0.14$). Grade level, gender, and special education status were not statistically significant variables. Receiving Readable English intervention accounts for 25% of the reading comprehension growth of students in the intervention condition with those students who were most behind in prior knowledge benefitting more than their peers with higher pre-test comprehension scores. [Figure 6 near here]

**Figure 6** *Mean Change in WRMT-3 Passage Reading Comprehension Measured in Growth Scale Values*



*WRMT-3 Comprehension GSV*
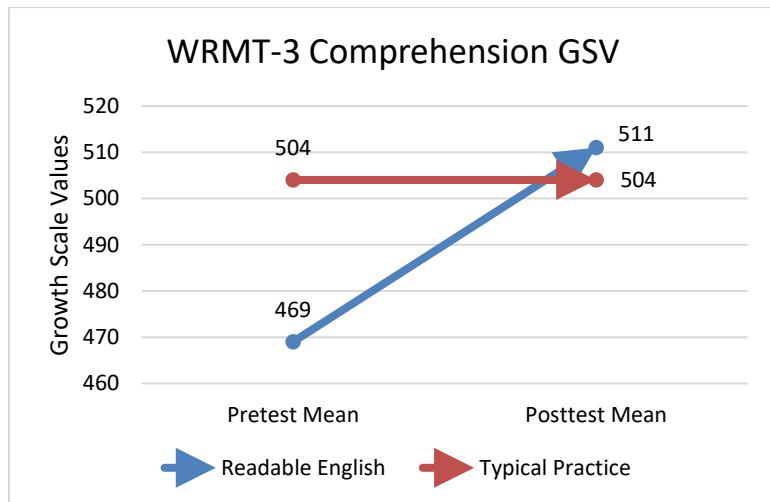
*Grade Equivalents.* Teachers tend to examine student growth through grade equivalency. Teachers often ask, "How many grade levels did this student grow in reading fluency or comprehension?" or "On what grade level is s/he reading?" The WRMT-3 provides grade equivalents to answer just these sorts of questions. The Oral Reading Fluency test data show that students in the

Readable English condition grew about seven months compared to less than one month of growth in the typical practice condition (see Figure 7). As with the ANCOVA of growth scale values grade level, gender, and special education status were not significant variables in the analysis of oral reading fluency scores changes, but prior knowledge was statistically significant with a small effect size. [Figure 7 near here]

**Figure 7**  *Mean Change in WRMT-3 Oral Reading Fluency Measured in Grade Equivalents*
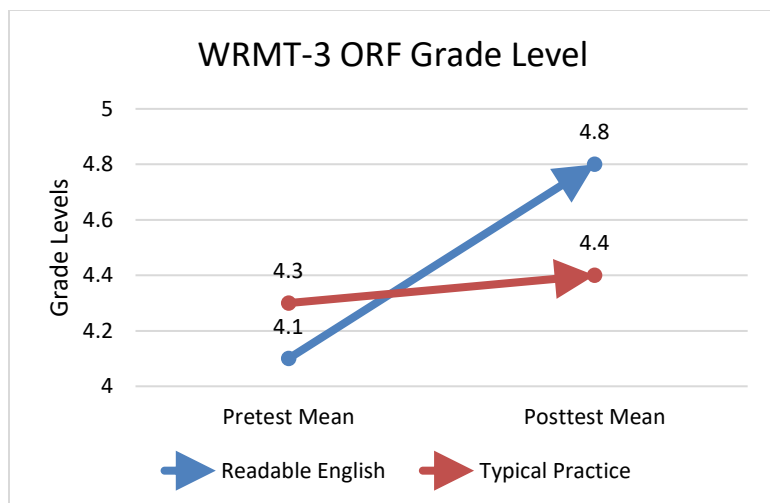


*Note*. Each tenth of a grade level equals one month of growth.

Among the most surprising results of this study is the large grade level growth in reading comprehension of the students who received Readable English instruction. Students in the intervention condition grew a mean 1.9 grades or (19 months growth) in passage comprehension, while the typical practice group showed a mean loss of -0.1 grades (1 month loss) (see Figure 8). Receiving Readable English instruction accounted for 24% of the passage comprehension growth. Prior knowledge was a significant variable in

the model ($\eta_p^2 = 0.04$) with a small effect size, but grade level, gender, and special education status were not significant variables.[Figure 8 near here]

**Figure 8**  *Mean Change in WRMT-3 Passage Reading Comprehension Measured in Grade Equivalents*
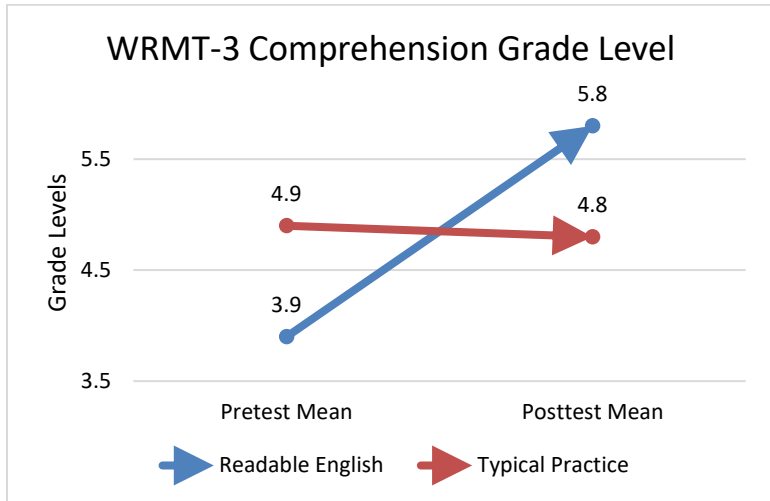


*Note*. Each tenth of a grade level equals one month of growth.

       *Standard Scores.* School psychologists use standard scores to interpret reading skills abilities of students who may be at risk academically due to a reading disability. Students in the Readable English intervention condition improved standard score growth in WRMT-3 oral reading fluency measures ($M\Delta = 2.3$), but the typical practice group showed a net learning loss ($M\Delta = -1.5$) (see Figure 9). While Gender was not a significant variable, grade level had a small effect, and special education eligibility had a moderate effect on oral reading fluency. Receiving Readable English instruction accounted for 25% of the posttest growth in standard scores. [Figure 9 near here]

**Figure 9** *Mean Change in WRMT-3 Oral Reading Fluency Measured in Standard Scores*
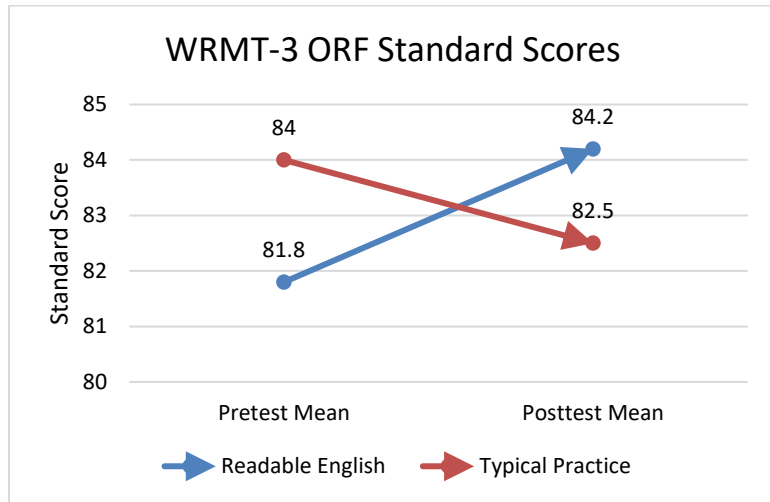


Changes in posttest standard scores showed that students in the typical practice condition lost ground in passage comprehension ($M\Delta = -2.8$), while students in the intervention condition showed meaningful growth ($M\Delta = 8.8$) (see Figure 10). This large effect size means Readable English instruction accounted for 24% of students' growth in passage comprehension, while lower prior knowledge accounted for 6% of the variation in posttest passage comprehension scores. Grade level, gender, and special education status were not statistically significant variables. [Figure 10 near here]

**Figure 10** *Mean Change in WRMT-3 Passage Reading Comprehension Measured in Standard Scores*



WRMT-3 Comprehension Standard Scores
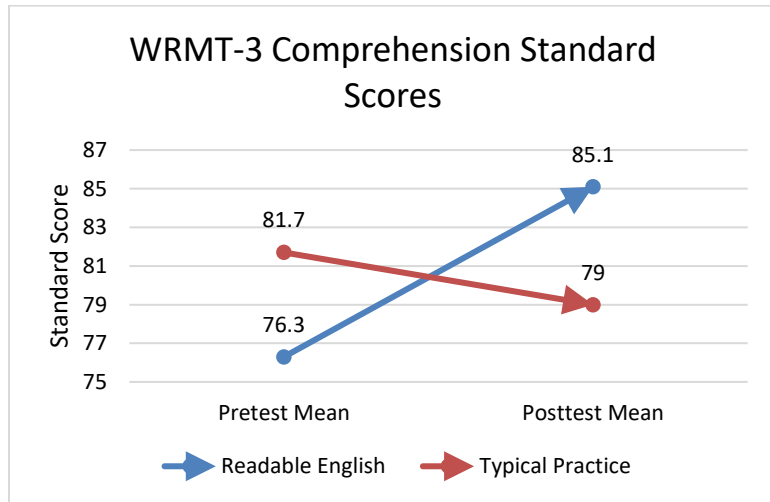
**Discussion**

Educational equity begins with assuring students become proficient readers who can thrive in an environment in which they must read proficiently to learn new information. Creating that environment means using sustainable, research-proven reading curriculum and instruction designed to support the wide array of literacy skills of students in the physical and virtual classroom. To meet the evolving reading needs of students, spiral reading instruction must support developing reading skills so that continued reading fluency growth leads to increased vocabulary knowledge and reading comprehension. Reading programs should be educationally sustainable across multiple platforms used in schools and be able to support students with differing needs across grade levels. Teachers must have access to intensive, targeted reading interventions that support students at their current reading ability level

and help them develop the requisite skills to become proficient, skillful readers. A continuous, forward path of reading skills instruction using on-grade level reading material in the core curriculum helps all students improve their reading and can keep many from needing pull-out remedial instruction.

Readable English is built upon research-proven instructional techniques, and should be a highly effective way to help students become proficient readers, but is it? On the surface, Readable English checks a lot of boxes on the instructional programs wish list. It is an instructionally sustainable program for helping students with a spectrum of reading deficits become proficient readers. The program is specifically designed for full cross-curricular integration, so students receive reading support in classes beyond English Language Arts. The conversion tool makes reading English easier by making the entire language phonetic, and it provides highly individualized support for students as they build reading skills while reading core content. Students with reading deficits can become skilled readers without extensive missed class time for pull-out remediation. Using the conversion tool, students can take control of their own learning by reading text in ways that best support them as their reading skills improve.

Findings from this study show that students in the intervention condition experienced strong reading fluency and reading comprehension gains, compelling evidence that Readable English does help students read better. Students receiving Readable English significantly outgrew students in the control group on all measures of reading accuracy, rate, fluency, and comprehension. Moderate growth in oral reading accuracy, reading rate and general fluency skills led to extensive growth of reading comprehension skills. Students in both conditions had group pre-test mean standard scores rating them at "below average" for both Oral Reading Fluency and Passage Comprehension. Posttesting showed students in the typical practice condition lost ground on both measures, while

students in the intervention condition rose to "average" on Passage Comprehension ($m = 85.1$) and nearly climbed out of the "below average" classification on Oral Reading Fluency ($m = 84.1$). It is the intervention group's averaged 1.9 grade levels of reading comprehension growth on the WRMT-3 Passage Comprehension subtest which is particularly impressive compared to the typical practice groups' lack of growth. The comprehension gains students in the intervention condition experienced are consistent with findings from Solis et al., (2014), Calhoon (2005; 2010), Boudah (2018), and Lovett et al. (2021) showing that remediation of fluency skills fosters increased reading comprehension.

What makes Readable English such an effective intervention for adolescent students? Explicit instruction of linguistics skills components with comprehension strategy instruction that has shown promise with other interventions probably accounts for most of the improvement in students' reading skills. However, Readable English is very easy for teachers to implement with fidelity. The lessons are scripted and structured so that teachers and students can follow along without downtime learning new routines or figuring out what the lesson plan means. Because all of the program components, including training videos, eReader, lesson slide decks, lesson plans, and the conversion tool means teacher and students can login from anywhere and access materials. The program can be taught whole group on a Smart Board and in small group settings with online or printed materials. When teaching the reading lesson is the easiest path for the teacher, implementation fidelity should dramatically improve, lost instructional time should be minimized.

The Readable English program's inherent educational sustainability is one reason for its effectiveness. Another reason it is effective is because students can quickly learn to read using the conversion tool. When students can pick text that interests them, they

are more motivated to read, and that increased practice makes them better readers. Improved reading skills lead to increased motivation and a desire to read more, starting a cycle of improvement.

A major goal for classes in the intervention condition group was to get students to a place where they felt comfortable converting text from subjects beyond ELA into the Readable English mark-up. There were very few instances where students used the conversion tool for math, science, or social studies classes during this study. Using the extra support Readable English could have provided students in those classes was a missed opportunity. Had there been fewer school interruptions students would have received the planned 90-hours of Readable English instruction students would have been coached to use the conversion tool across the curriculum, and much more reading practice and growth would have occurred for students in the intervention condition group.

While there were no qualitative measures, there were anecdotal student and teacher evaluations of Readable English use in middle school. After the study concluded I visited several classes and talked with teachers and students about their reading experiences using Readable English. Some teachers disliked the immature graphics that seem targeted for earlier grades students, but most were favorable of the intervention itself. Students grudgingly admitted that the program helped them learn to read better but reported that they still did not like to read. However, ALL students had a book with them that they were reading independently, and they were excited to tell me about their books and why they chose them.

I was particularly struck by an often-voiced response that students were able to read their book because the conversion tool helped them pronounce and understand the vocabulary. The novels they showed me were on or above grade level and included a mix of fiction and nonfiction texts. One student was reading a biography of a motorcycle racer because he and his dad build motorcycles

together. Another student talked about choosing *They Both Die at the End* and how he related to using an app to make friends. It was exciting to sit with students who admittedly "hate to read" who were talking over each other trying to convince their classmates to read their chosen book. I was heartened to hear the connections they were making from their books to their experiences and content they learned in school. Readable English provided enough support that below average readers were able to read to explore and learn new things, which is a foundational goal of education. Using the conversion tool across all content areas for multiple years could spark a learning explosion for these students. Homeschool and online students could benefit from Readable English because it is effective and easy-to-use. The conversion tool is now available across devises as a Chrome browser extension, dramatically expanding text readability of email, websites,  online textbooks, menus-anything encountered in print online.

## Conclusion

In a pandemic year typified by learning loss (Moscoviz & Evands, 2022), students who received Readable English instruction closed reading gaps. Research study findings demonstrated that students experienced significant grade level reading growth. Moderate effects of WRMT-3 Oral Reading Fluency and large effects of Passage Comprehension show that the Readable English program is highly effective for students at different reading development stages and with differing reading proficiency levels. Collectively, the data show that Readable English is a strong reading program able to close reading gaps and grow students to grade level reading proficiency. Educational equity will not be possible until all students become proficient readers able to fully access core curriculum in schools, and highly effective reading programs such as Readable English are critical to achieving that goal. Readable English uniquely leverages technology to help teachers deliver better instruction and help students build content knowledge. Readable English is a

uniquely effective tool to accelerate remediation of multiple grade levels of students having compounded reading skills deficits who have been left even farther behind during the pandemic.

When estimates for remediating just 30% of pandemic learning losses range from $800 to $3,800 per student (Pan & Sass, 2020), Readable English provides a realistic, cost-effective, solution to accelerate middle school reading remediation at a fraction of those estimates. Two of the most important features of the program are that it has proven to be highly effective for these middle school students, and it is easy to implement with fidelity. Well-designed and easy to use means the program is educationally sustainable and teachers are likely to use it daily as it is designed. Readable English supports and scaffolds reading across the curriculum through the conversion tool. The entire reading program is located online, is easily accessible, and includes scripted lesson plans. Teachers do not need to store textbooks or lug home a bookbag of teacher materials for weekend lesson planning. Students willingly engage with Readable English lessons, which is both crucial for successful learning and often difficult to get from adolescents who have historically struggled with reading. The combination of these factors makes Readable English a unique and viable instructional option for middle schools looking for solutions to the current national reading crisis.

## Study Strengths, Limitations and Future Research

Strengths of this study include having robust sample sizes, comparable treatment and control groups, and a moderate amount of intervention instruction time. Using both normative grade level benchmarks and standardized reading assessments allowed for close comparisons of groups to determine whether substantial reading skills improvements occurred. Using growth scale values to examine

combined grade levels of students provided statistical strength and precision to analyses. Having the ability to consider grade level growth of students who most need to close reading gaps is another critically important study element.

Participant attrition and educational disruptions during the pandemic were limiting factors for this study. Nevertheless, major reading fluency and comprehension progress resulted. Staff reassignments and teacher fatigue undoubtedly had an unquantified impact on both condition groups and was not measured. Future studies should include a teacher survey to better measure teacher engagement, attitude, and concerns regarding instruction. Lost instructional time significantly reduced planned instruction. Though students in the Readable English group outperformed students in the typical practice condition we cannot predict the slope of what increased instructional time might mean for reading fluency and comprehension growth. Though attrition analysis indicated that the students who did not complete the study were not significantly different from the participants, smaller sample sizes diminished the statistical power and viability of grade level analyses.

This study is limited to native English speaking sixth, seventh, and eighth graders in the rural American Midwest. Future effectiveness studies should be conducted in other school settings (e.g., urban, suburban, or Native American tribal schools, other English-speaking countries) and should include multilingual learners. Multiyear longitudinal studies following the students who use Readable English across multiple content areas would be important. Students using Readable English in all subject areas as assistive technology should have tremendous reading skills and content area knowledge growth, but this hypothesis needs to be evaluated. Longer time in the intervention would include additional vocabulary and comprehension building activities and measuring the efficacy of those instructional activities is also vital. This study represents a first step into understanding the effectiveness of Readable English,

and additional studies examining various aspects of this program would be valuable. Readable English has exciting potential to help English-speaking students become skillful readers.

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Table 1. *Descriptive Student Demographics by Condition*

| Variable | Intervention (N = 167) | | Typical practice (N = 177) | |
|---|---|---|---|---|
| | N | % | N | % |
| Gender | | | | |
| Female | 70 | 41.9 | 56 | 31.6 |
| Male | 97 | 58.1 | 121 | 68.4 |
| Ethnicity | | | | |
| Asian | 1 | 0.6 | 1 | 0.6 |
| Hispanic or Latino | 9 | 5.4 | 1 | 0.6 |
| Black or African American | 4 | 2.4 | 2 | 1.1 |
| White | 153 | 91.6 | 173 | 97.7 |
| Identified for Special Education | 100 | 59.8 | 139 | 78.5 |

Table 2. *T-Test Comparisons of Pretest Measures Between Condition Groups*

| Variable | Welch's T-test | | |
|---|---|---|---|
| | *t* | *df* | *p* |
| CCSS Raw Score | -2.18 | 342 | .030 |
| WCPM | 0.08 | 342 | .904 |
| Accuracy percentage | -1.89 | 342 | .059 |
| PC Standard Score | -3.36 | 174 | <.001 |
| PC Growth Scale Value | -3.72 | 174 | <.001 |
| PC Grade Equivalent | -3.73 | 174 | <.001 |
| ORF Standard Score | -1.29 | 174 | .099 |
| ORF Growth Scale Value | -1.50 | 174 | .137 |
| ORF Grade Equivalent | -0.62 | 174 | .533 |

*Note*. CCSS = Common Core State Standards Basic Reading comprehension; WCPM = Words read Correctly Per Minute (reading rate); PC = Passage Comprehension; ORF = Oral Reading Fluency
Differences between condition groups in reading comprehension pre-test measures are statistically significant and are entered in the ANCOVA model as a variable of reading comprehension prior knowledge. There were no statistically significant differences in fluency measures, so they will be excluded as variables in the ANCOVA model.

Table 3. *Pre-test, Posttest, and Change Means of Reading Skills Assessments*

| Reading Skills Assessment | Pre-test *Mean* (*SD*) | | Posttest *Mean* (*SD*) | | Change *Mean* (*SD*) | |
|---|---|---|---|---|---|---|
| | Readable English | Typical Practice | Readable English | Typical Practice | Readable English | Typical Practice |
| EasyCBM Grade Level Benchmarks | (*n* = 167) | (*n* = 177) | (*n* = 167) | (*n* = 177) | (*n* = 167) | (*n* = 177) |
| Passage Reading Fluency | | | | | | |
| Words Correct Per Minute | 128.32 (44.46) | 127.75 (43.57) | 148.48 (54.49) | 129.75 (43.98) | 20.16 (20.28) | 1.99 (16.81) |
| Accuracy Percentage | 96.00 (5.20) | 96.92 (3.75) | 97.93 (2.45) | 96.54 (4.22) | 1.93 (3.64) | -0.38 (3.48) |
| Passage Comprehension | | | | | | |
| Raw Score Correct Answers | 16.05 (5.56) | 17.30 (5.03) | 18.46 (4.68) | 16.29 (5.17) | 2.40 (4.62) | -1.01 (4.31) |
| | Readable English | Typical Practice | Readable English | Typical Practice | Readable English | Typical Practice |
| Woodcock Reading Mastery Tests, 3rd Ed. | (*n* = 87) | (*n* = 89) | (*n* = 87) | (*n* = 89) | (*n* = 87) | (*n* = 89) |
| Oral Reading Fluency | | | | | | |
| Growth Scale Value | 495.70 (17.69) | 499.38 (14.89) | 501.06 (16.68) | 499.58 (14.36) | 5.36 (5.90) | 0.20 (7.18) |
| Grade Equivalent | 4.12 (2.20) | 4.30 (1.68) | 4.79 (2.49) | 4.36 (2.16) | 0.67 (0.91) | 0.06 (1.27) |
| Standard Score | 81.82 (12.51) | 84.01 (9.89) | 84.15 (12.74) | 82.51 (10.35) | 2.33 (4.61) | -1.51 (5.46) |
| Passage Comprehension | | | | | | |
| Growth Scale Value | 496.48 (13.38) | 504.34 (14.55) | 510.78 (13.39) | 504.03 (14.78) | 14.30 (10.64) | -0.30 (11.76) |
| Grade Equivalent | 3.88 (1.32) | 4.90 (2.19) | 5.81 (2.22) | 4.79 (2.13) | 1.93 (1.60) | -0.11 (1.70) |
| Standard Score | 76.26 (8.95) | 81.73 (12.29) | 85.10 (11.83) | 78.96 (12.44) | 8.84 (8.61) | -2.78 (10.11) |

Note: Only students who scored at or below the 30th percentile on either EasyCBM reading fluency or comprehension benchmarks were assessed with the Woodcock Reading Mastery Tests, 3rd Edition.

Table 4. *Descriptive Categories Corresponding to Standard Scores and Standard Deviations from the Mean*

| Descriptive Category | Standard Score Range | Standard Deviations from the Mean |
|---|---|---|
| Well Below Average | 69 and below | -2.1 and below |
| Below Average | 70 – 84 | -2.0 to -1.1 |
| Average | 85 – 115 | -1.0 to 1.0 |
| Above Average | 116 – 130 | 1.1 to 2.0 |
| Well Above Average | 131 and above | 2.1 and above |

Table 5. *ANCOVA of EasyCBM Reading Skills Growth Controlling for Treatment Condition,*

*Grade Level, Gender, Special Education Eligibility, and Prior Knowledge\**

| Reading Skill Assessment Covariate | *F*(*df*) | *P value* | *Partial η²* |
|---|---|---|---|
| **EasyCBM PRF Accuracy** | | | |
| Condition Group | 30.59 (1, 339) | <.001 | 0.08 |
| Grade Level | 0.77 (1, 339) | .381 | 0.00 |
| Special Education Eligibility | 5.32 (1, 339) | .022 | 0.02 |
| Gender | 0.29 (1, 339) | .591 | 0.00 |
| **EasyCBM PRF WCPM** | | | |
| Condition Group | 73.57 (1, 339) | <.001 | 0.18 |
| Grade Level | 24.81 (1, 339) | <.001 | 0.07 |
| Special Education Eligibility | 3.91 (1, 339) | .049 | 0.01 |
| Gender | 4.46 (1, 339) | .036 | 0.01 |
| **EasyCBM CCSS PC Raw Score** | | | |
| Condition Group | 35.71 (1, 338) | <.001 | 0.10 |
| Grade Level | 0.63 (1, 338) | .427 | 0.00 |
| Special Education Eligibility | 5.08( 1, 338) | .025 | 0.02 |
| Gender | 0.05 (1, 338) | .830 | 0.00 |
| BOY CCSS PC Score | 101.86 (1, 338) | <.001 | 0.23 |

Note. *CCSS Passage Comprehension pre-test scores are used to assess prior knowledge as a covariate in the model because *t*-tests comparisons showed beginning of the year differences between treatment conditions for that comprehension measure. However, *t*-tests comparisons of pre-test Passage Reading Fluency scores showed treatment conditions were not statistically significant and, therefore, they were not entered into the model as covariates.
PRF = Passage Reading Fluency; WCPM = Words Correct per Minute; CCSS = Common Core State Standards; PC = Passage Comprehension; BOY = Beginning-of-Year. Partial eta squared effect sizes are defined as follows: $\eta_p^2 \geq 0.01$ small or no effect, $\eta_p^2 \geq 0.06$ medium effect, $\eta_p^2 \geq 0.14$ large effect (Levine & Hullett, 2002).

Table 6. *ANCOVA of WRMT-3 Reading Skills Growth Controlling for Treatment Condition, Grade Level, Gender, Special Education Eligibility, and Prior Knowledge\**

| Reading Skill Measure Covariate | $F(1, 171)$ | P value | Partial $\eta^2$ |
|---|---|---|---|
| ORF Growth Scale Value | | | |
| Condition Group | 24.45 | <.001 | .13 |
| Grade Level | 6.73 | .010 | .04 |
| Special Education Eligibility | 6.28 | .013 | .04 |
| Gender | 0.14 | .706 | .00 |
| ORF Grade Equivalent | | | |
| Condition Group | 14.04 | <.001 | .08 |
| Grade Level | 0.04 | .834 | .00 |
| Special Education Eligibility | 22.18 | <.001 | .12 |
| Gender | 1.52 | .219 | .01 |
| ORF Standard Score | | | |
| Condition Group | 23.56 | <.001 | .12 |
| Grade Level | 4.12 | .044 | .02 |
| Special Education Eligibility | 11.18 | .001 | .06 |
| Gender | 0.05 | .826 | .00 |
| PC Growth Scale Value | $F(1, 170)$ | P value | Partial $\eta^2$ |
| Condition Group | 57.24 | <.001 | .25 |
| Grade Level | 1.51 | .221 | .01 |
| Special Education Eligibility | 1.62 | .205 | .01 |
| Gender | 0.71 | .400 | .00 |
| BOY PC Growth Scale Value | 28.51 | <.001 | .14 |
| PC Grade Equivalent | | | |
| Condition Group | 54.00 | <.001 | .24 |
| Grade Level | 1.57 | .213 | .01 |
| Special Education Eligibility | 1.00 | .318 | .01 |
| Gender | 0.03 | .860 | .00 |
| BOY PC Grade Equivalent | 7.55 | .007 | .04 |
| PC Standard Score | | | |
| Condition Group | 53.53 | <.001 | .24 |
| Grade Level | 0.03 | .869 | .00 |
| Special Education Eligibility | 2.62 | .108 | .02 |
| Gender | 0.10 | .748 | .00 |
| BOY PC Standard Score | 10.18 | .002 | .06 |

Note. *Passage Comprehension pre-test scores are used to assess prior knowledge as a covariate in the model because *t*-tests comparisons showed statistically significant differences between treatment conditions for that measure. However, *t*-tests comparisons of pre-test Oral Reading Fluency scores showed treatment conditions were not statistically significant and, therefore, they were not entered into the model as covariates.
ORF = Oral Reading Fluency; PC = Passage Comprehension.

**Figure 1**

*Example word with the Readable English mark-up*

**Figure 2**

*Mean Change in EasyCBM Passage Reading Accuracy Measured in Percentage of Words*
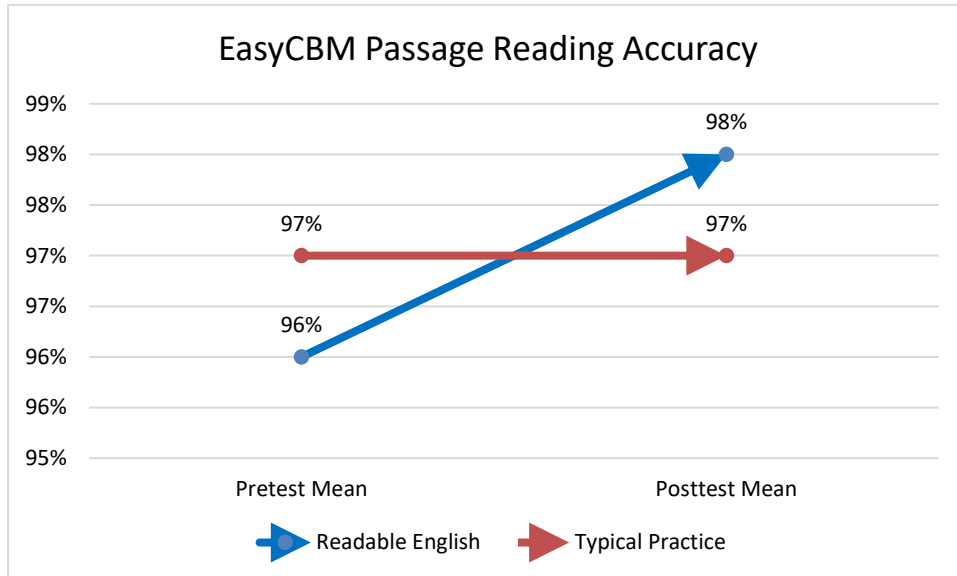
*Read Correctly Per Minute*

**Figure 3**

*Mean Change in EasyCBM Passage Reading Rate Measured by the Number of Words Read*
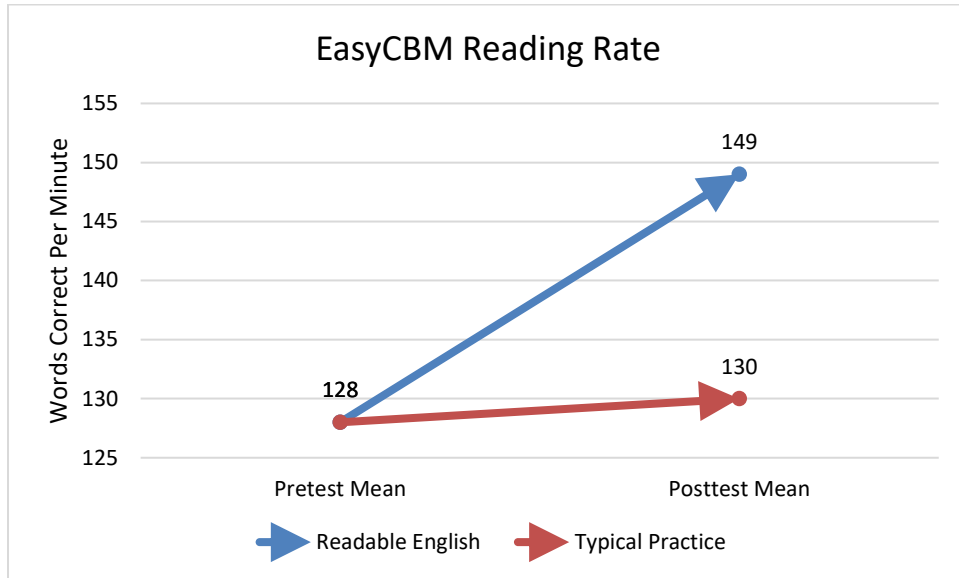
*Correctly per Minute.*

**Figure 4**

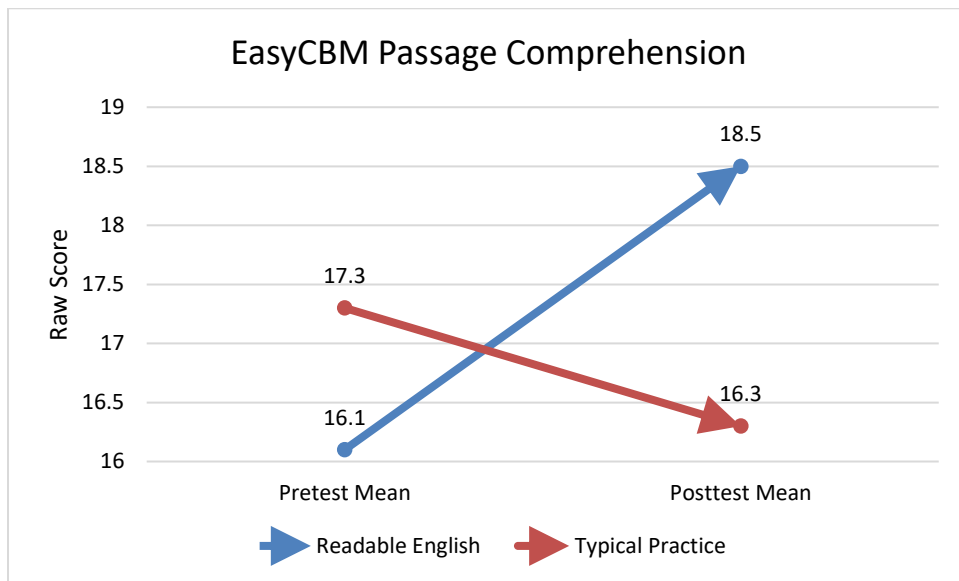*Mean Raw Score Change in EasyCBM CCSS Basic Reading Comprehension*



EasyCBM Passage Comprehension

**Figure 5**

*Mean Change in WRMT-3 Oral Reading Fluency Measured by Growth Scale Values*
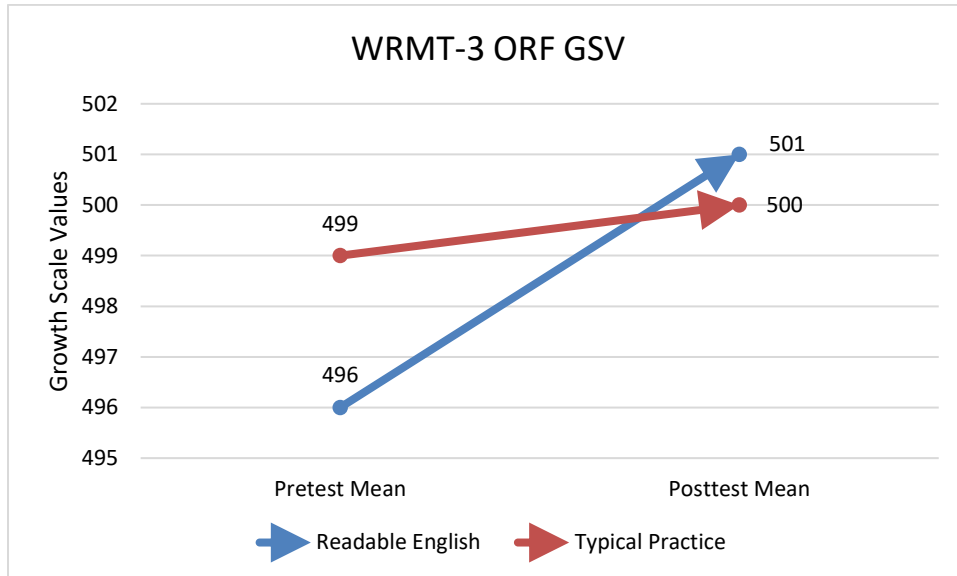
**Figure 6**

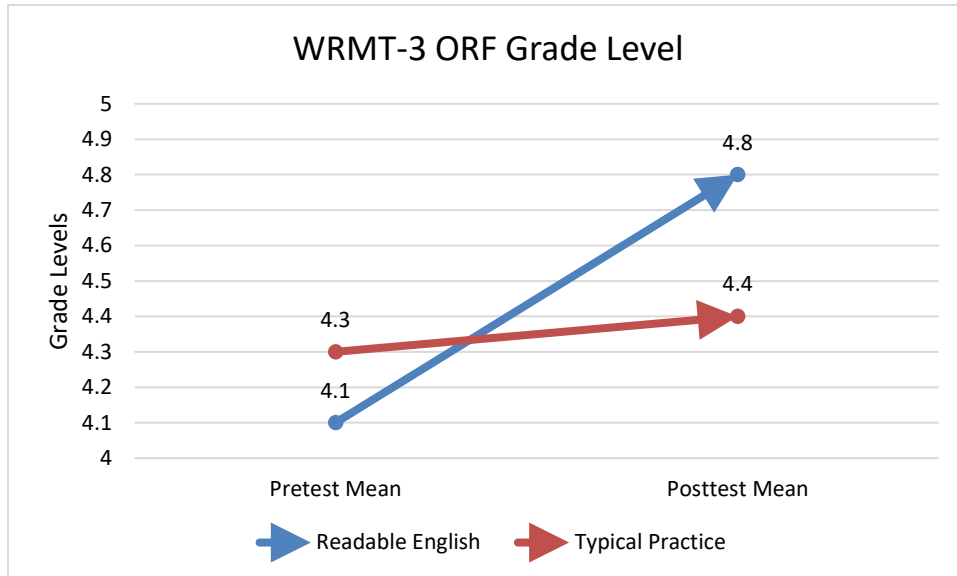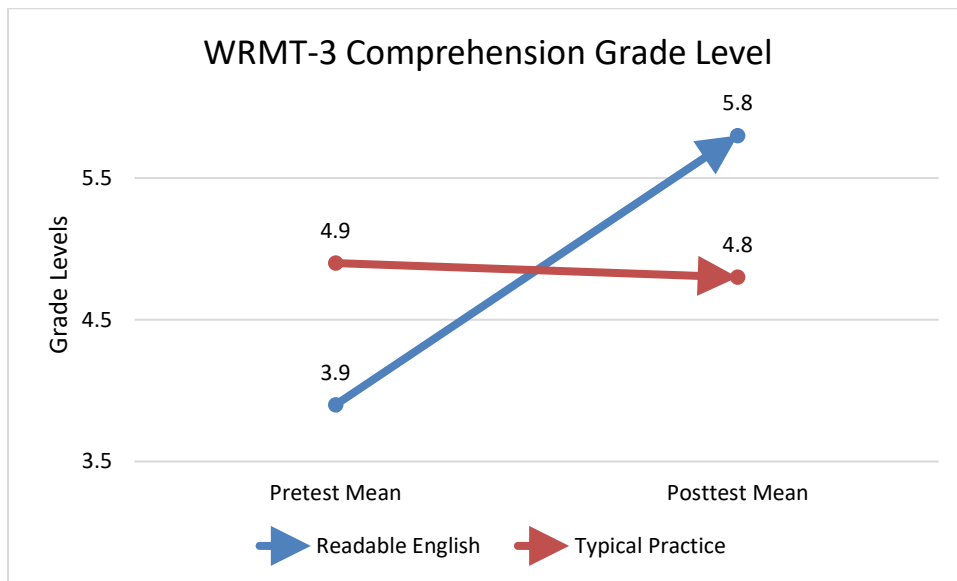*Mean Change in WRMT-3 Passage Reading Comprehension Measured in Growth Scale*

*Values*
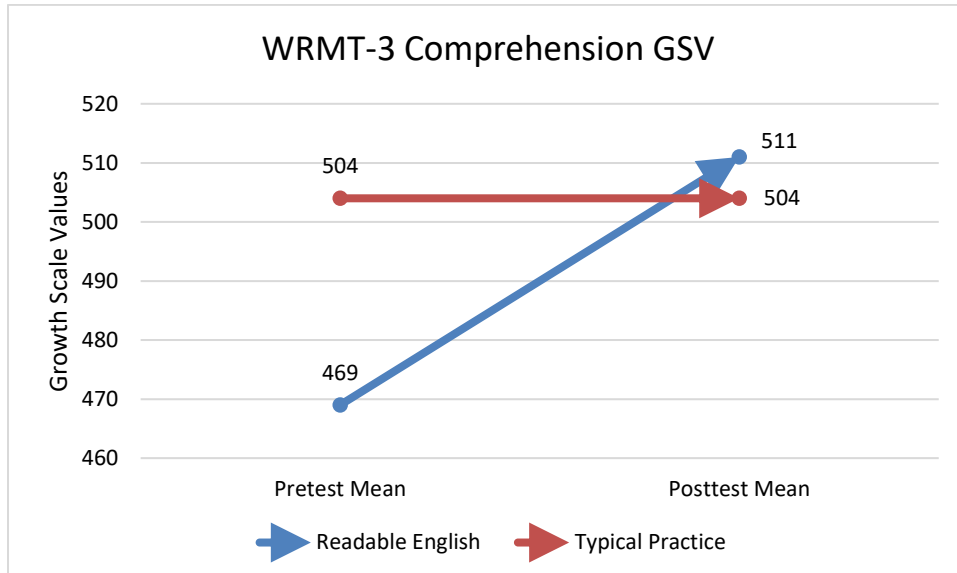
**Figure 7**

*Mean Change in WRMT-3 Oral Reading Fluency Measured in Grade Equivalents*



*Note*. Each tenth of a grade level equals one month of growth.

**Figure 8**

*Mean Change in WRMT-3 Passage Reading Comprehension Measured in Grade Equivalents*



*Note.* Each tenth of a grade level equals one month of growth.

**Figure 9**

*Mean Change in WRMT-3 Oral Reading Fluency Measured in Standard Scores*

**Figure 10**

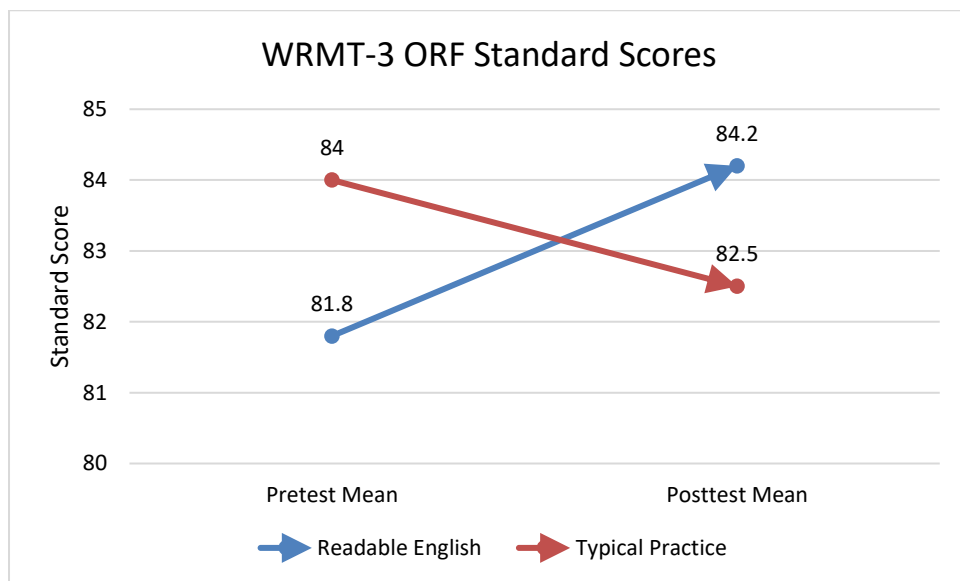*Mean Change in WRMT-3 Passage Reading Comprehension Measured in Standard Scores*