THE EFFECTS OF FEEDFORWARD AUDIO SELF-MODELLING ON READING FLUENCY, COMPREHENSION, AND READER SELF-PERCEPTION

By

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ABSTRACT

The purpose of this study is to offer an additional strategy and teaching tool for emergent readers in secondary educational settings. The intervention being utilized is feedforward audio self-modelling (FFASM). Since the 1970s, studies have shown video self-modelling (VSM) to be an effective tool in improving behaviour. It is a strength-based technique used to increase skills in children and youth with or without disabilities. Although it has gained a solid evidence base, it is not common in educational settings (Collier et al., 2012). There have been numerous studies on its effectiveness in various settings, on a variety of skills, with participants of different ages. A problem area in middle school regarding reading is the lack of effective response to intervention (RTI) strategies that increase students' motivation, fluency, and comprehension. Albert Bandura's work on modelling is the theoretical foundation upon which VSM is built. In addition to Bandura, Peter Dowrick has been researching VSM for over 30 years. His work on self-modelling theory and the ability for humans to imagine future situations adds to the theoretical explanation for the overall effectiveness of VSM. This study is the first to use FFASM to increase reading achievement through an online setting. This study used a single-subject experimental design to examine the effects of feedforward audio self-modelling on reading fluency, comprehension, and reader self-perception. Results of the study indicate that FFASM may have a positive effect on reading fluency and comprehension. It may have the potential to assist all learners, not just emergent readers. In addition, the study was mainly viewed favourably by participants and parents. Future research in this area should consider including a vocabulary component.

Keywords: video self-modelling, reading, comprehension, feedforward audio self-modelling

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Chapter 1 Introduction

The Broad Issue of Literacy at the National Level

Reading is one of the most widely studied topics in the field of education. There are few educational topics, if any, that have been researched as extensively as reading. Thousands upon thousands of research studies from small sample sizes to cross-country meta-analyses exist. Even with the plethora of studies, the most effective method for teaching students to read is an issue of debate, especially for emergent readers. Despite the vast number of studies and countless interventions, there remain many grade-school students and adults who cannot read at a level that allows them to participate in school and society fully. Teaching students to read remains an ongoing issue for schools (Atkinson, Wilhite, Frey & Williams, 2002). As the world becomes more technologically advanced, the demand for a highly-skilled, literate labour force has never been greater (Snow et al., 1998; Bos & Vaughn., 2020). A quick google search of Canada's literacy rate will return a statistic of 99% (Canada Adult Literacy Rate, 2014). If the goal is 100% literacy, Canada appears to be doing exceptionally well as a literate society. Unfortunately, that statistic is misleading. For a person to be considered literate, the only requirement is an ability to read *or* write a simple sentence (Canada Adult Literacy Rate, 2014). For example, *I eat fruit* is considered a simple sentence. Most people would agree that a higher literacy rate should be expected and achieved after twelve years of formal education. This begs the question; what level of reading is an acceptable benchmark for people to accomplish to be productive, informed, and contributing members of society?

In the International Adult Literacy and Skills Survey (IALSS) conducted by Statistics Canada (2003), literacy levels were categorized using a five-point scale; level five being the

highest and level one the lowest (Frontier College Summary, 2003). At level one, for example, a person has trouble decoding and understanding a basic text. Rootman and Ronson (2005) offered an example of a parent unable to understand simple instructions on a medicine bottle for a sick child. Level two literacy is being able to read simple materials but not read well enough to contribute and benefit from society when literacy is a barrier (Frontier College Summary, 2003). A person at level two literacy has difficulty reading written instructions to perform a new job or skill. Level three literacy is necessary for high school graduation and is considered by most developed nations as an acceptable level to participate in society adequately. Levels four and five refer to people with strong literacy skills and can succeed in challenging reading situations.

Based on the results from the IALSS, approximately 42% of Canadians aged 16-65 are below a level 3 literacy level. Thus, nearly half of Canada does not have the literacy skills necessary to receive a high school diploma or engage in community matters. According to Jamieson (2006), we are still a long way from achieving an acceptable literacy level nationwide. Given the consequences of not achieving a high literacy level, provincial education systems consistently have student literacy rates on their radar.

Implications/Manifestations of Low Literacy

Low literacy levels have numerous negative effects on society, communities, and individual lives. There is a strong correlation between literacy skills and health outcomes (Seccomb et al., 2005). Adults with low literacy levels are less likely to have a family physician and, as a result, may find it difficult to obtain medical care. One reason for this could be that they lack the communication skills necessary to advocate for a family doctor. Rootman and Ronson (2005) also correlated low literacy with increased use of emergency rooms. When people do not

have access to a family doctor, one could conclude that they wait until health problems become unmanageable and then resort to the emergency room.

Another correlate of low literacy levels is individual income. Just as low literacy skills are correlated with lower wages, higher literacy skills are correlated with increased wages. Those with higher literacy are further sought after by employers as they are more employable. A report published by Statistics Canada (Heisz et al., 2016) revealed that an individual's literacy level is positively correlated with income. In addition, of the Canadians who fall into levels one and two literacy, the majority are more likely to stay unemployed for more extended periods than individuals with higher literacy levels (Desjardins et al., 2005). Furthermore, once young adults with low literacy leave school and enter the workforce, they are far less likely to enter postsecondary education or enjoy meaningful, long-term jobs and careers (Slavin et al., 2008).

Low skills in reading and writing have been correlated with the likelihood of having involvement with the criminal justice system (Drakeford, 2002; O'Cummings et al., 2010). The Correctional Service of Canada has reported that most offenders in their facilities have not completed a level of education greater than tenth grade (Correctional Service of Canada, 2009). In summary, low literacy dramatically impacts communities and individuals with regard to poor health, decreased wages, and susceptibility to entering the criminal justice system.

Literacy on a Provincial Level

In Canada, each province is responsible for its education system and curriculum implementation. Low literacy in adults does not just happen spontaneously or randomly. It is often identifiable early in grade school and can lead to difficulties in adulthood (Edmonds et al., 2009). The issue of low literacy in Canada has received critical attention, especially when national and provincial scores are compared. For example, the most recent Programme for

International Student Assessment (PISA) scores showed Manitoba ranked second last among Canadian provinces in reading literacy (O'Grady et al., 2016). PISA's reading assessment is based on a students' ability to purposely comprehend and reflect on what they have read in addition to their capability to engage positively in society (Schleicher et al., 2009). In Manitoba, it was also reported that approximately 40% of grade three students do not achieve an acceptable level of reading comprehension (Province of Manitoba Education, 2016). Similarly, in the United States, only 34% of grade 4 and grade 8 students are reading at or above grade level (National Center for Education Statistics, 2011). Educators should be very concerned about these statistics as they underscore an even more important issue; what lies ahead for our future generations with regard to employability, individual well-being, advancing society, and socio-economics? These statistics should be equally concerning for parents, educators and other citizens. Educators influence literacy instruction and achievement, so they must be proactive in solving this issue.

Manifestations of Low Literacy at the Provincial Level

Middle school (MS) students who struggle with reading are at a greater risk of dropping out of school (Steinberg & Almeida, 2004). Statistics Canada (2009) reports that in 2009 9.3% of girls and 12.4% of boys dropped out of high school in Manitoba. Based on these statistics, Manitoba has one of the highest dropout rates in the country. This emphasizes the need for additional literacy interventions in schools in Manitoba and across the country. Scammacca et al. (2015) found that reading interventions in middle school had a more significant effect than interventions in high school. This stresses the need to support students as early as possible. One practice that could be implemented is a more effective response to intervention (RTI) strategy in middle schools to help support students who are still emergent readers.

Emergent Readers in Middle School

RTI is a multi-tiered framework of instruction and assessment. Students that struggle in specific academic areas are provided with explicit instruction to improve skill deficits. Instruction may be delivered to a whole class, small group, or individual. Whole class, small group and individual instructional methods are also referred to as tier-one, tier-two, and tier-three. RTI typically starts with tier-one, whole class instruction and assessment. It is in tier-one where students are screened on specific academic skills. Students identified as 'at risk' are given targeted, small group, tier-two, instruction to improve skills. Students that do not respond to tier-two academic interventions will be provided with an individualized, tier-three intervention (Fuchs et al., 2010). A key component of RTI is monitoring student progress to determine if interventions are effective. Progress is determined by administering short curriculum-based measurement (CBM) probes. CBM probes measure specific skills such as phonological awareness, letter identification, reading fluency, and comprehension. Small group and individual instruction have typically taken place outside the general classroom (Ferri, 2012).

When emergent readers enter middle school, an RTI model is often absent, and students are not offered any form of reading instruction (Edmonds et al., 2009). Students who are most likely to be behind in reading live in poverty, are English language learners (ELL), and students with learning disabilities (Snow et al., 1998). Literacy achievement gaps widen as students progress through the educational system, making literacy deficits all the more noticeable. Stanovich (2009) refers to this as the Matthew Effect, stating, "the rich get richer, and the poor get poorer." Proficient, motivated readers have more exposure to practice, vocabulary, and situations to practice reading fluently. Consequently, literate students become increasingly skilled, leaving emergent readers to continue to struggle. This, in turn, widens the gap and they

fall even further behind. Allington (2014) supports Stanovich's view but attributes the widening gap to volume reading or the amount of time a student reads.

Numerous studies have been conducted on the RTI model in the elementary grades. Although there has been substantial research on teaching young students to read, there is far less evidence of effective interventions in the middle school grades (Vaughn et al., (2010). According to Edmonds et al. (2009), if reading deficits are not addressed, they will become permanent and result in a lifetime of low literacy. Most middle school educators would agree that there is plenty of room for growth with regard to literacy instruction in an attempt to help emergent readers. However, implementing strategies to move these students forward can meet several obstacles. Many middle school educators will purposely bypass teaching reading by modifying content, instruction and assessment (Schoenbach et al., 2009). For example, teachers will summarize complicated texts or read the texts aloud to students. While these are effective strategies in assisting students in accessing the curriculum, there remains the need for explicit reading instruction. In some cases, the range of literacy skills becomes so great that it is not unusual for students in the same class to have literacy grade-level equivalency scores that are several grade levels apart.

Specific Research Problem

Effective literacy strategies are required for middle school students who are still learning to read. When students with low literacy reach middle school, they often are disengaged readers (Guthrie & Davis, 2003). Consequently, a successful intervention must not only build student self-efficacy in reading, but it must also be efficient, increase motivation, and improve reading fluency and comprehension. Substantial evidence supports that students who struggle with reading require explicit instructions to make gains (Kamil et al., 2008). With an effective literacy

intervention, middle school students may be able to increase their self-efficacy regarding reading and improve academically. Based on the characteristics of secondary schools and gaps in literacy instruction, a successful reading intervention should address three areas: (1) suitable as an efficient, potential RTI intervention, (2) student motivation and self-perception and (3) reading fluency and comprehension.

Time and efficiency

Middle school environments pose challenges in delivering interventions to students as the logistics are different from elementary school. In elementary school settings, students are primarily with their homeroom teacher and in the same classroom for most of each day. Prewet et al. (2012) found that differences between elementary schools and middle schools included: (a) scheduling conflicts, (b) absence of testing and screening, (c) increasingly complicated curricula, and (d) the absence of tools to assess and monitor student progress. Middle school students are constantly changing classrooms and subjects throughout the day. This can often interfere with the implementation of a reading intervention.

Furthermore, the teachers expected to facilitate the intervention are also challenged in that they may be contending with large class sizes and busy schedules. To date, there are few RTI middle school literacy intervention studies on student reading achievement (Kamil et al., 2008). Unfortunately, many reading interventions deployed through RTI have had minimal success for secondary students who are still learning to read (Vaughn et al., 2010). Consequently, there is a need for effective and efficient reading interventions for middle school students.

Motivation and self-efficacy

Middle school teachers spend a great deal of time and effort trying to influence student motivation with regard to academics (McKenna et al., 1995). Many RTI middle school literacy

interventions likely fail to improve student motivation (Brozo, 2009). Increasing self-efficacy and motivation will most likely lead to increased academic achievement. According to Stanovich (2000), motivation and engagement with reading are two of emergent readers' most significant challenges. While some interventions produce gains, teachers will not continue to implement them if they or their students find them time-consuming or challenging to implement. When students who have low self-efficacy in reading enter middle school, they often show a sharper decline in intrinsic motivation compared to their peers who are proficient readers (Harter et al., 1992). This supports the claim that a successful reading intervention needs to increase motivation and reader self-perception.

Reading fluency

Oral reading fluency is associated with successful reading in secondary school (Spencer & Manis, 2010). Similarly, students who are still learning to read almost always have low reading fluency. A study by Gamse et al. (2008) found that less than five minutes a day was focused on reading fluency of primary classes observed. The number likely approaches zero as students move to higher grades. Most middle school instruction focuses more on literary analysis, content, and comprehension without addressing any other reading components (Kelley et al., 2010). Since some middle school students may no longer be taught to read and may lack fundamental literacy skills to access the increasingly complicated content areas, much of the information that students are expected to learn may become unattainable (Englert et al., 2005). There are a variety of effective oral reading fluency practices that can be used in whole class (Paige, 2011), small group settings (Begeny et al., 2009) and with individuals (Freeze, 2006). In addition, oral reading fluency has a significant correlation to reading comprehension (Greenwood et al., 2003). Many studies stress the importance of reading fluency, and the

significant effects fluency interventions have on reading comprehension (Denton et al., 2011; Therrien, 2004).

Video Self-Modelling

Video self-modelling (VSM) was first used to modify student behaviour but has started to make its way into academics. VSM most often involves video editing to remove all errors, prompts, and adult support (Buggey & Ogle, 2012). Traditionally, VSM has been used more like a sports highlight reel to increase the frequency and duration of skills students already possess. For example, a student that can raise their hand to answer questions and has demonstrated the ability to do so, but does it infrequently, could use VSM to increase the likelihood of displaying the target behaviour. The applications for VSM interventions in educational settings are limitless. Another option, feedforward video self-modelling (FFVSM), involves taking skills that a person currently has and reconfiguring those skills in a new order to teach a new skill. It could also result in increased speed or efficiency with the skill. Both VSM and FFVSM can be used to show the observer a positive performance and, as a result, increase self-efficacy (Dowrick, 2012). The significant difference between VSM and FFVSM is in VSM; the person already demonstrated the target skill. In FFVSM, the person has not demonstrated the target skill but possesses the sub-skills to achieve it. VSM has been used to increase a number of target behaviours in various settings. More recently, VSM has been used to teach transitions for students with autism in educational settings (Cihak et al., 2010). Videos were created through role-play and practiced for different segments of a transition where the students showed difficulty. The videos were made when the students were calm and ready to learn. Video segments were then edited to demonstrate an error free, fluid scene of the students transitioning. Results were overwhelmingly positive, and

target behaviours were achieved quickly and maintained. As well, students and teachers both viewed the intervention favourably.

More recently, VSM has started to make its way into academics, particularly in reading. There are distinct advantages to VSM interventions. First, the video only needs to be prepared once. After the video is made, students can watch it until they reach a level of mastery. Second, students likely will feel less stigmatized as they practice using the video as a model for their behaviour in the classroom or outside of school because they do not need to be removed from the classroom or their peers. They can actively listen and watch from their desk using headphones and work at their own pace. This is in contrast to other reading interventions that may remove students from the general classroom for significant blocks of time. Third, VSM holds promise as a strategy to increase reading fluency, motivation and comprehension that can be efficiently delivered in schools employing the RTI framework.

FFVSM Background

In academics, FFVSM has primarily been used for improving reading fluency by video recording a student echo reading with a researcher who is off-screen. The unedited video shows just the student reading but contains the audio recording of both the student and researcher. Afterwards, the video is edited to remove all errors and researcher prompts. What remains is the student appearing to read the text fluently and accurately. While the student is seen speaking, the words they are supposedly reading cannot be seen on the screen. This flaw can be remedied by matching the audio recording to the written text on the video. Instead of videotaping the student echo reading the text with a teacher, the echo reading is audiotaped. After the audio has been edited, it is added to the text on the video. What remains is the student listening to themselves read the words on the screen. This type of self-modelling is referred to as feedforward audio self-

modelling (FFASM). Only one other study has examined the effects of FFASM to increase speaking, and it was done with an individual with selective mutism (Blum et al., 1998).

Purpose/Need/Rationale

The purpose of this study was to combine evidence-based literacy practices with feedforward audio-self modelling (FFVAM) as part of a tier-three middle school RTI intervention to increase student reading fluency, comprehension and reader self-perception. An additional purpose is to demonstrate how effective FFASM can be used to improve student reading achievement. Going forward, FFASM may be used as a teaching strategy for emergent readers.

Participants in this research study will echo read with the researcher on specific reading fluency tasks. Responses will be audio recorded and edited afterward to produce a fluid, error-free reading fluency demonstration. There is a growing evidence base that both VSM and reading fluency interventions can significantly affect student achievement (Dowrick et al., 2006; Robson et al., 2015; Montgomerie et al., 2014). However, one must consider that, to date, there have been few studies on the effects of both these interventions used in tandem. Further, VSM continues to be an uncommon strategy in schools to increase behaviour and academic achievement (Montgomerie et al., 2014). In this intervention, a slightly different form of FFVSM will be examined. It will entail a combination of feedforward audio self-modelling (FFASM) played overwritten text on video. In other words, students will not see themselves on the video as in previous VSM studies. What they will see are the words from the text, and they will hear their voice reading.

The researcher is interested in conducting a study that combines the learning technique of FFASM and evidence-based reading fluency strategies to increase student self-efficacy in the

area of reading and to increase overall reading achievement. The following question will be answered:

1. What is the effectiveness of FFASM on reading fluency, comprehension and reader self-perception?

Three critical areas associated with middle school students who are still learning to read are discussed in Chapter 2. In addition, the theoretical basis for video self-modelling will be addressed as it relates to middle school literacy support, reader motivation, and reading fluency. The methods of the study will be covered in Chapter 3. The results will be reported in Chapter 4 and the discussion in Chapter 5.

Chapter 2 Literature Review

According to well-documented statistics on middle and secondary school reading levels, far too many students are not achieving the skills necessary to succeed in grade school, post-secondary education and the workplace (Kamil et al., 2008; Slavin et al., 2008). As children and adolescents progress through each grade, opportunities to remediate reading deficiencies diminish, along with student motivation (Edmonds et al., 2009; Guthrie & Davis., 2003). Feedforward audio self-modelling (FFASM) may be an essential piece of the puzzle in addressing three fundamental issues with regard to middle school literacy achievement: (1) improving current RTI model interventions, (2) increasing student motivation, and (3) improving reading fluency and comprehension (Robson et al., 2015). This literature review will focus on the themes above and how video self-modelling (VSM) can contribute to their success. The first theme of middle school RTI model interventions will be examined, specifically concerning the implications and challenges for reading interventions. Second, the areas of motivation and self-efficacy will be analyzed with regard to reading for middle school students. Third, effective fluency interventions will be scrutinized and included as possible strategies implemented in middle schools. Fourth, a genealogical critique will examine the theoretical roots of video self-modelling and explain why and how it may be an effective teaching and learning tool. Different aspects of Bandura's social cognitive theory (1986) will be discussed, specifically the areas that relate closely to VSM. Fifth, VSM interventions with reading fluency will be investigated along with limitations and future possibilities. Lastly, the significance of adding an effective reading intervention will be discussed as it relates to inclusive education practices.

Response to Intervention in Middle School

The current state of RTI research includes practices that have been primarily conducted in elementary school settings (Ciullo et al., 2016). Kethley (2005) suggested that middle-school literacy interventions could be the last chance to teach emergent readers to read. Most people who have transitioned through the education system recognize that middle school and high school are very different environments and come with other challenges. When compared to elementary school, Eccles et al. (1993) described middle school as having less personal attention, larger class sizes, greater academic content and teachers who are subject-area specialists. Furthermore, a common issue in delivering reading interventions in secondary schools includes scheduling conflicts and attendance problems (Kamil et al., 2008). It is more challenging for teachers in middle school to get to know students on a personal level because they instruct a large number of students. An intervention synthesis by Edmonds et al. (2009) found that older emergent readers are typically not supported, further widening the achievement gap in reading.

RTI explained

Response to Intervention (RTI) is an educational framework where classroom teachers and learning support educators work as a team to identify students who are not having their educational needs met in the current classroom setting. Their primary goal is to recognize learning deficits and provide appropriate interventions (Vaughn & Fuchs, 2003). An RTI model consists of intervention tiers. The first is tier-one, the general classroom consisting of quality instruction and curriculum delivered to all students. It is in tier-one that students are screened for additional academic interventions. At tier-two, students whose educational needs are not being met in tier-one work in small groups, either inside or outside the classroom, to remedy their skill deficits. When students are not making appropriate gains in tiers one and two, they are given an

individualized tier-three intervention. The objective of tier-two and tier-three interventions is to maintain or "push" students into the tier-one classroom with their peers. Students who benefit from tier-two and three supports also benefit from whole class, tier-one instruction. One of the ultimate goals of inclusive education is to have such a strong tier-one that there is little need for tier-two or tier-three. Brozo (2009) argues that an effective RTI model is only as strong as its tier-one, and more times than not, tier-one is a weak spot in a school's support system. A common infographic that represents RTI can be seen in figure 1. In addition, figure 2 shows a basic cycle of assessment for RTI. The assessment process first screens students for skill deficits and determines which students need additional tiered instruction. Teachers closely monitor improvements to determine which instruction is the most beneficial for the student (Fuchs et al., 2010).

Figure 1

RTI Intervention Tiers

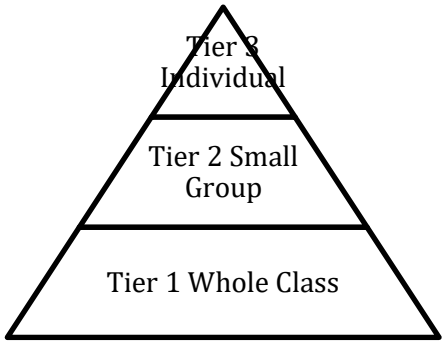
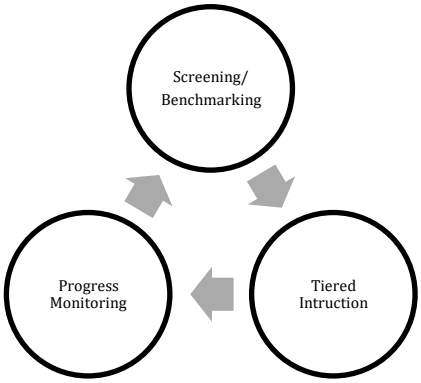


Figure 2

RTI Assessment and Progress Monitoring



Note. Figures 1 and 2 were created by the researcher using Microsoft Word

RTI and accountability

RTI models have been gaining momentum in middle and high schools in the United States (Scammacca et al., 2015). This can be attributed to national and district programs of

accountability (Deshler et al., 2007). Accountability frequently appears in the literature to motivate effective and efficient literacy RTI models (Vaughn et al., 2010).

In Manitoba, this accountability is incorporated through the Public Schools Act (2021). Section 41(4) reads, “Every school board shall provide or make provision for education in Grades I to XII inclusive for all resident persons who have the right to attend school.” In other words, if students are still learning to read, they require an inclusive, effective, and respectful intervention.

Manitoba’s philosophy of inclusion is closely aligned with Universal Design for Learning (UDL). UDL plans for all students to increase the chances of having access to a meaningful education (Supporting Inclusive Schools, 2014). While all school divisions in Manitoba are expected to provide educational opportunities for all students, the service delivery model chosen varies. While no two schools are the same, many divisions and schools use varying service models to meet the needs of their students best. Under its core philosophy, UDL involves supporting all students regardless of ability. In educational terms, it is an effective tier-one with no to minimal need for tier-two and three interventions. Holding schools and divisions accountable for student success is assumed to increase educators' motivation for finding and implementing reading interventions. Due to increased levels of accountability and urgency, there is a growing body of research on secondary school reading interventions. Slavin et al. (2008) express the urgent need to assist emergent readers in secondary school. In particular, they need help with increasingly complicated readings to succeed beyond high school at college or university and in the workplace.

Benefits

Research on secondary school reading interventions shows that most emergent readers improve with reading interventions (Edmonds et al., 2009). Studies suggest that middle school literacy interventions that incorporate specific objectives and explicit instruction effectively raise the reading levels of emergent readers. A meta-analysis of literacy interventions in the middle grades found them effective (Scammacca et al., 2007). Furthermore, the results from a meta-analysis showed that middle and secondary school literacy interventions have a solid evidence base that supports the idea that students still learning to read can improve when given specific interventions (Scammacca et al., 2015). In a research synthesis of reading comprehension interventions with middle school students with learning disabilities (LD) over the past 30 years, Solis et al. (2012) found most strategies were associated with identifying the main idea or involved a summarization strategy. Summarization strategies could include graphic organizers, mnemonics or sequencing. Finding important information and retelling are vital skills used in middle school across core subject areas. Crucial academic skills such as summarization can then be generalized to other subject areas to increase opportunities for academic success. In addition, Solis et al. (2012) found explicit instruction, which included modelling strategies, feedback, and opportunities for practice, were present throughout the body of research examined. A consistent finding in the literature is that students benefit from focusing on reading curricular content or high-interest reading passages. Whereas students commonly reading about childish topics may lose motivation and interest. Likely, the most crucial factor in delivering a middle school and high school RTI model is how it makes students feel. Do students feel stigmatized? Are they publicly removed from a classroom with their peers to read? Are they embarrassed to be part of the intervention? Does the intervention increase or decrease their motivation?

RTI Critique

On the surface, RTI appears to be an effective model to ensure that all students are learning. It is a similar intervention to vision screening in schools where students that have trouble seeing are given glasses. It would be challenging to develop an argument against vision screening in schools as there is no denying the benefits of seeing. However, Ferri (2012) argues that several hidden consequences can result from implementing the RTI model. First, RTI is just another way to give students a label. Second, as mentioned earlier, students from low socio-economic backgrounds, ELLs, and students with learning disabilities are most likely to be behind in reading. When an RTI screening test is administered, these students are most likely to comprise the group needing intensive supports. The hidden, damaging message is that students from these groups do not belong in the tier-one classroom. Third**,** when teachers refer students to tier-two interventions, they may perceive that they do not have to change or differentiate their instruction. While the instruments for screening vision ability are well established, screening for reading brings new challenges and unintended consequences.

One common screening method and RTI progress monitoring tool used in the United States is Dynamic Indicators of Basic Early Literacy Skills (DIBELS). These curriculum-based measurement tools can put a lot of pressure on students and teachers. As a result, teachers will teach to the test and focus on speed reading rather than meaning making and connections. Reading for understanding is greater than the sum of its measurable components; phonemic awareness, phonics, fluency, vocabulary, and comprehension. DIBELs and other screening and CBM measures can boil down reading to boring subskills that do not consider student interest and motivation (Goodman, 2006).

Challenges

While secondary reading interventions are effective when using explicit objectives (Scammacca et al., 2007), they fail to consider student motivation and social validity. Studies that examined reading intervention methods used in secondary schools for emergent readers with a learning disability (LD) were often not evidence-based (Swanson, 2008; Ciullo et al., 2016). This is concerning because the students needing the most support are given intervention strategies not based on sound research. And this likely results in minimal gains for the students. Guthrie and Davis (2003) explain a common misconception of MS teachers; that the students entering their classrooms have already been taught to read in elementary school. When students arrive in middle school, there is a switch from learning basic skills to learning content (Deshler et al., 2006). This stresses the urgency that educators need to be implementing efficient evidence-based reading strategies.

Research conducted in middle and secondary schools poses new challenges. Literacy supports administered in secondary schools were increasingly difficult for reasons such as attrition and frequent scheduling changes (Vaughn et al., 2010). Fuchs et al. (2010) go as far as to say that researchers prefer not to conduct research in middle and high schools because of the challenges associated with scheduling, student motivation and poor behaviour. One economical solution to these challenges is to use various forms of technology to differentiate instruction and allow students to learn in the same classroom as their peers.

Technology

With the increase of technology in schools, one solution has been to take advantage of computers and tablets to deliver reading instruction. Reading interventions are often costly and time-consuming depending on school resources, primarily if they are implemented one-on-one

with a trained teacher. Providing reading interventions through computers or tablets alleviates these obstacles. However, a best-evidence synthesis by Slavin et al. (2008) found that computer-assisted instruction (CAI) has minimal effect on student reading achievement. While students may be more engaged using technology and feel less self-conscious, these interventions have not proven effective. Consequently, this stresses the need for more effective strategies that use technology. VSM, when combined with reading, may be an effective intervention in an RTI support model that uses existing technology in schools.

Limitations

Numerous limitations emerge from the research literature around middle school and high school literacy RTI model interventions. First, many studies are conducted using small sample sizes. Small sample sizes are more likely to report larger effect sizes (Slavin et al., 2008). Large effect sizes can overgeneralize findings and overestimate their effectiveness. Even though a study with a small sample size has statistically significant results, they should be used with caution. The literature synthesis by Slavin et al. (2008) found very few studies with large sample sizes in middle and secondary schools with regard to literacy remediation. However, it is not unusual for a tier-two or tier-three intervention to have a small sample size since instructions in those tiers most often include small groups of students or individuals.

A second limitation was that the majority of interventions were studied for a short duration. The majority of reading interventions included in the meta-analysis were administered for less than two months. A persistent statistic demonstrates that brief interventions usually show larger effect sizes than interventions that continue for extended periods (Elbaum et al., 2000). Again, similar to the limitation of small sample size, interventions administered over a short amount of time can misleadingly indicate higher effects. A third limitation is how pre and post-

assessments are completed. A crucial factor in examining studies is whether or not the measurement tools are standardized, or researcher made. Findings have found that researcher measurement tools produce a significantly stronger effect size than standardized measures (Scammacca et al., 2007). This does not indicate the intervention was unsuccessful. On the contrary, it demonstrates that students learned what they were intended to know. However, standardized measures show more generalizable gains and transferable skills to new situations, which is ideal for most interventions. Overall, generalizable and transferable skills are the goal.

Example Study

Vaughn et al. (2010) conducted a yearlong tier-one and tier-two literacy intervention. Each grade six teacher of a core subject was given professional development on strategies to improve vocabulary, word identification, and comprehension for the tier-one intervention. The primary objective of tier-one professional development is to improve teaching methods for all students. At its core, this is an inclusive education strategy that allows all students to learn in the same environment as their peers. This echoes Brozo's (2009) stance that an RTI intervention model is only as strong at its tier-one. At the tier-two level, students were taught word study, vocabulary, fluency and comprehension in groups of 10-15 using some of the same instructional practices as in tier-one, only with more intensity. A control group and a treatment group were used to determine the relative effects of a tier-one and tier-two intervention. Results showed interesting findings; the tier two group size, treatment duration, and more intensive instruction did not translate into improved reading achievement. Fuchs et al. (2010) were disappointed in these findings. Vaughn et al. (2010) suggest that it may be illogical to expect 50 minutes per day on a reading intervention to shrink the literacy gap for emergent readers. This is discouraging because if 50 minutes a day is not enough to bring emergent readers up to an appropriate level, it

is safe to say that most schools do not have the resources to offer anything close to that duration, given the number of students behind in reading. Most schools would not have the personnel resources to deliver interventions to small groups of students for 50 minutes per day on top of their regular course load.

Social validity

An essential aspect of any intervention is how students feel about it, or in other words, its social validity. Social validity is defined by Luiselli and Reed (2011, p. 139) as "the acceptability of and satisfaction with intervention procedures, usually assessed by soliciting opinions from the people who receive and implement them." In other words, participants in the research study are asked how they felt about the procedures. Positive feelings from researchers, teachers, parents and students indicate high social validity. However, for a literacy intervention to be successful, it should be viewed positively by both educators and students. If thought otherwise, teachers will not likely implement it, and it certainly will not motivate students. In the vast majority of secondary school RTI literacy interventions, social validity was never a consideration, and if it was, there were no reports to confirm it.

The future of RTI

Much research is required on the components of effective RTI models in secondary schools. Interestingly, none of the above reading intervention studies addressed a crucial factor in academic achievement, the element of motivation. Increasing student motivation is vital to improving literacy achievement. Motivation may be an essential component of achieving reading success as it is in other areas as well. It does not take long for MS students to realize they lack the reading skills to engage successfully with the increasingly challenging content of secondary schools. It is this realization that fosters feelings of self-doubt, inadequacy and disengagement.

Motivation

It is not unusual for MS students to feel unmotivated with reading. Academic motivation is an area where middle school teachers continuously try to influence students (McKenna et al., 1995). Guthrie and Davis (2003) support the need to increase student intrinsic motivation in reading and re-engage unmotivated readers in schools. Teachers intuitively know that motivated students are easier to teach than unmotivated students and often perform better academically. Weak MS readers lack intrinsic motivation to read and self-efficacy (Guthrie & Davis, 2003). According to Goldstein and Naglieri (2011), "self-efficacy refers to the beliefs that individuals have about their capabilities to complete a particular task successfully" (p. 131). As a result of low self-efficacy in reading, emergent readers in MS feel academically excluded (Anderman, 1999). Not surprisingly, most people lack motivation and self-efficacy in areas where they do not have the skill set to succeed (Applegate & Applegate, 2010). Students who are still learning to read that have not had many successful reading experiences will lose motivation to read because they may feel that success is unattainable.

Furthermore, students who have weak reading skills may often self-handicap rather than put in the effort to improve (Guthrie & Davis, 2003). A typical example is a student who disrupts the class before or during a reading situation where they may appear to fail in the eyes of their peers. It is in this way that the student protects their self-worth (Guthrie & Davis, 2003). There is a lack of interventions that consider student motivation, and the need remains to keep MS students engaged with literacy while simultaneously increasing their reading skills.

Change in Practice

There is often a sudden change in instructional practice from elementary to MS (Guthrie & Davis, 2003). Standard methods include unrelatable curriculum material, lack of purpose and

intimidating reading passages. Many students entering MS as emergent readers have low motivation to read, and their intrinsic motivation may continue to decrease. Wigfield et al. (1991) attribute the loss of student motivation to the values of the schools and their teachers. For example, teachers and schools which place greater emphasis on test marks and performance will see lower levels of intrinsic motivation. Wigfield et al. (1998) differentiate between task goals and performance goals in school settings. Task goals can be defined as taking risks, allowing for student voice, and emphasizing deep understanding. When teachers use task goals, students adjust their motivation to come from within themselves. Motivation from within is known as intrinsic motivation and is driven by genuine enjoyment and curiosity. Emphasis placed on task orientation can increase a student's self-efficacy (Guthrie & Davis, 2003). Students become motivated to learn about new things.

On the contrary, when schools stress performance goals, it extinguishes students' intrinsic motivation by placing extrinsic rewards in test marks and student comparison. Extrinsic motivation is driven by outside influences such as test marks, praise and tangible rewards. In this type of environment, students are increasingly worried about making mistakes (Roeser et al., 1996). A typical example of a performance-based environment would be for students to be concerned about reading aloud in front of an audience of their peers for fear of making a mistake and becoming humiliated.

Increasing Intrinsic Motivation

Proven, evidence-based teaching methods can be used to increase students' intrinsic motivation to read. Ivey (1999) showed interesting findings on the motivation of MS readers. The study demonstrated that the students' sense of purpose, the connection to their personal lives, and the type of material greatly influenced motivation. Guthrie and Davis (2003) suggested

starting with an area of student interest to create a successful reading experience and expand to related topics. Guthrie and Davis (2003) argue that reading strategies will transfer to new reading situations as students experience more success. This increase of positive reading experiences is known as *success expansion*.

A low technological method that can increase student motivation and performance is to self-graph their progress and improvement (Harris et al., 1994). Self-graphing is visually appealing for students and can increase motivation (Menzies et al., 2009). One reading program, Precision Reading (Freeze, 2006), has successfully incorporated graphing to increase student motivation and self-efficacy with reading fluency and motivation. Graphing fluency typically involves a student reading a passage for a short time, such as one minute. A teacher counts the number of words the student read correctly. Then, the student graphs that number on a bar graph. As the student re-reads the passage on later days, the number of words read correctly increases. The student has a vivid, colourful graph that shows their improvement. This improvement demonstrates to the student that they are capable of improving, and increased motivation follows.

Students need to come to school every day feeling they are good at something and have opportunities for success. Before emergent readers even enter middle school, they often have a negative self-concept in reading. This concept is difficult for teachers to change. Most studies on middle school literacy interventions do not measure or consider self-efficacy, motivation and social validity.

Motivation is an invisible and dynamic component in becoming a successful reader. Students who are motivated to read, read more. Increasing reading volume is one of the best ways to become a better reader (Allington, 2014). According to the National Reading Panel (2000), five main sub-skills are required to become a proficient reader: phonemic awareness,

phonological awareness, fluency, vocabulary, and comprehension. But the National Reading Panel (2000) also acknowledged that student and teacher motivation is rarely considered when researching phonemic and phonological awareness instruction. While the end goal is comprehension, it is challenging to increase comprehension without focusing on reading fluency. Unfortunately, reading fluency is a critical element of reading instruction often neglected in elementary and secondary school settings.

Fluency

Fluency is a critical component of reading and is often not a priority in middle and secondary schools. Hasbrouck and Glaser (2012) define fluency as "reasonably accurate reading, at an appropriate rate, with suitable expression, that leads to accurate and deep comprehension and motivation to read" (p. 13). Oral reading fluency is a significant predictor of successful reading in secondary schools (Spencer & Manis, 2010). Rasinski et al. (2017) advocate putting more research efforts into effective fluency intervention strategies for middle and high school. A void exists in fluency instruction in individual, group settings and teacher guides (Allington, 1983).

The most significant benefit of strong reading fluency is its association with increased comprehension (Greenwood et al., 2003; Powell & Gadke, 2018). This connection between fluency and reading comprehension can be traced back to the research conducted by LaBerge and Samuels (1974). They developed the theory of automaticity, which at its core suggests that when readers automatically recognize written words, they are better able to comprehend what they have read. Over time, as a reader becomes more fluent, less cognitive attention needs to be put toward decoding, and more mental resources can focus on meaning and understanding. A

more recent study on fluency by the National Reading Panel (2000) also determined reading fluency as a necessary component to comprehend written text.

Sufficient fluency instruction and practice are often absent in reading instruction (National Reading Panel, 2000) and are usually not deemed necessary in schools (Gamse et al., 2008). A possible reason for this may be that some reading specialists consider fluency as not being essential to literacy instruction (Cassidy & Grote-Garcia, 2014). This is concerning given that the relationship between reading fluency and comprehension is so strong.

Middle School Focus

Most middle school instruction focuses on literary analysis and content (Lesaux et al., 2010) without any direct, explicit teaching of reading (Kelley et al., 2010). As students progress through the grades, curriculum content becomes more complex, and weakness in reading becomes increasingly exacerbated (Swanson & Hoskyn, 2001). When students fail to become fluent readers, the achievement gap grows between strong and weak readers (Stanovich, 2009). Rasinski et al. (2011) argue that many students with poor reading comprehension also have poor reading fluency. There is a greater emphasis on comprehension interventions in secondary settings than fluency, even though they are tightly intertwined (Powell & Gadke, 2018). It is common for emergent readers to never achieve appropriate fluency with texts read in the classroom (Allington, 2002). This can be attributed to a one-and-done method of teaching that places more emphasis on content than skill. For students to increase their reading fluency, they need to practice using proven, evidence-based fluency methods.

Fluency Methods

Given the importance of reading fluency, the question remains, how can educators improve their students' reading fluency? There exist several fluency methods that can be easily

administered as a whole class (Paige, 2011), in small groups (Begeny et al., 2009) and individual settings (Freeze, 2006). This is important because reading interventions that can be easily implemented will more likely be attempted and maintained. There are several evidence-based fluency strategies proven to be effective in increasing student reading achievement. Three evidence-based methods of improving fluency are repeated readings (RR), assisted readings, and echo reading. Rasinski et al. (2017) convey the importance of repeated readings, assisted readings, and encouraging varying reading opportunities are necessary to improve reading achievement.

Repeated Readings. Repeated reading is a method that involves a student reading the same passage a number of times. According to Hawkins et al. (2011) and Therrien (2004), research has demonstrated positive effects when reading passages three or four times. Hawkins et al. (2011) advise that less repeated readings may be more efficient for secondary students because they are expected to read and digest vast quantities of reading material. However, it may be beneficial to focus the readings around big ideas and enduring understandings and give opportunities for students to read passages until they reach an appropriate level of automaticity and fluency. It can be argued that students should be allowed to re-read the passage as many times as they need to gain appropriate levels of fluency. In FFASM, there is no limit to the number of times students can access their passage.

Assisted Readings. Rasinki et al. (2017) state that teachers, adults and classmates can model fluent reading. These fluency models can be viewed in multiple ways; videos, in-person, audio recording, or another form of CAI. Assisted reading is when a student reads a text passage while simultaneously listening to a proficient reading of the text modeled by a stronger reader (Rasinski et al., 2017). The goal is for the emergent reader to align their reading with the fluent

model. In essence, the fluent reader is guiding and scaffolding as the passage is read and re-read. Assisted reading is also known as listening passage preview. According to Begeny et al. (2009), listening passage preview is an effective method of increasing student fluency. Typically, listening passage preview involves the student attempting to read at the same rate as the fluent model before trying to read independently (Daly & Martens, 1994). For example, the student could listen to a successful model while simultaneously following along in the text. Afterwards, the procedure could be repeated, except this time, the student reads aloud, doing their best to keep up with the model. Another type of assisted reading that is sometimes used with students is choral reading. This involves the entire class or group reading a passage at the same time. Paige (2011) suggests choral reading can assist emergent readers because, while attempting to read the passage, they are given feedback by their stronger reading peers. This strategy could be used in any tier. In the case of FFASM, as the student reads the words in the video, they are supported by their own audio recording, which has been edited to be fluent and error-free. Rasinski et al. (2017) remind educators that, with the increase of technology, assisted readings using technology to show written text with the audio of a fluent reader have created new possibilities in schools and classrooms. Assisted reading interventions have been shown to significantly improve reading fluency and reading skills (Rasinski et al., 2011).

Echo Reading. Echo reading is defined by an expert model fluently reading a short phrase or sentence, followed by the student repeating. Heckelman (1986) first referred to this echoing technique as part of his neurological imprint method. The model and student continue the process until the passage is complete. It is critical to note that the student should be paying attention to the words spoken by following with their finger underneath the words when the model reads them and when they re-read the sentence independently. This technique addresses a

common obstacle with emergent readers, sporadic eye movements. Sliding their finger under the words helps keep focus on the words (Heckelman, 1986). Despite the strong evidence surrounding fluency interventions, there still exist limitations in reading fluency research.

Fluency Study Limitations

Denton et al. (2011) revealed that reading fluency and comprehension have weaker effect sizes in middle school than in elementary school. Their study resulted in effect sizes between 0.5 and 0.6 in middle schools, whereas studies conducted in elementary schools on student fluency and comprehension found effect sizes between 0.79 and 0.84 (Hosp & Fuchs, 2005). Even though effect sizes are smaller for middle school students, it does not mean they are ineffective. Effect sizes of 0.5 and 0.6 are still significant, given that the duration of fluency measures is often shorter than other reading intervention measures. Given the importance of reading fluency and the current lack of support for emergent readers in secondary school, more research on fluency interventions is required (Powell & Gadke, 2018). Likely, the most common method to improve reading fluency is repeated readings. However, Rasinski et al. (2017) caution that over-use of this method could decrease student motivation. Street (2016) also warns of the practice of boiling down reading to basic subskills such as fluency and phonics. The autonomous model of literacy treats reading skills independently of social context, and this model forces western views of literacy onto other cultures and populations (Street, 2006). He argues that learning to read always takes place in unique contexts and that social interaction is necessary to activate cognition. Barton and Hamilton (2012) expand on this by stating that everyday literary situations are repeated in familiar contexts such as school and community. Literacy is a social practice and without meaningful context, reading interventions may not be effective. In the context of some fluency interventions, the social practice may be isolating or disconnected from

the student's classroom. Barton and Hamilton (2012) also add that most people read to achieve a goal, and there exists context and motivation. Fluency interventions often lack context and motivation because what the student is reading does not relate to their life or school study.

How an intervention is administered can determine its success. For example, Powell and Gadke (2018) administered a fluency intervention during the students' study hall or physical education period. The justification for this was because they did not want to infringe on any academic instructional time. However, physical education class may have been an enjoyable class for the students, decreasing their motivation and enjoyment of the intervention. Attempts must be made to administer interventions when students would like to be there and minimize further stigmatization. If an intervention separates students from their peers or removes them from enjoyable activities, it may decrease motivation.

Future of Middle School Fluency

Given the number of students in middle school who are still learning to read, the need for a fluency intervention is paramount. The lack of motivation emergent readers have to engage with literacy is worrisome. The strategies discussed in the motivation section are a good place to start with regard to engagement. Still, the need remains for an effective middle school RTI intervention that increases student motivation, fluency and comprehension.

Perhaps if fluency interventions incorporated the strategies used by Guthrie and Davis (2003), they would be more effective. If they were conducted individually, in pairs or groups, or as a whole class, it would give students opportunities for multiple readings instead of one and done readings that are commonplace in most secondary school settings. Rasinski et al. (2011) advocate for increased evidence-based fluency interventions that use meaningful and engaging readings to motivate students. Future reading interventions in middle school should also focus on

extracting meaning from the text and making meaningful connections (Denton et al., 2011). Guthrie and Davis (2003) and Rasinski et al. (2017) both support the use of authentic and meaningful reading opportunities in varying situations for various purposes. When students read more, they have increased opportunities to practice and implement reading skills they learned or acquired naturally. Higher reading volume usually translates into stronger readers, particularly in base reading skills such as phonological awareness, reading fluency and comprehension (Rasinski et al., 2011). The need remains for an easy-to-implement RTI intervention that increases student motivation and fluency.

Precision Reading. Precision reading is an inexpensive remedial reading program that has successfully increased reading fluency, comprehension, and student motivation (Freeze, 2006). In addition, it takes little time to implement and has high social validity, being rated favourably by both students and teachers. It is an inclusive reading program in the sense that it requires little time outside the general classroom, and it uses curriculum-based passages, so students are not further distanced from their academics. Through discussions with teachers and students, Freeze (2006) states that students do not appreciate being removed from the class for stigmatizing instruction that separates them from their peers.

Precision Reading uses the fluency strategies of repeated readings to increase fluency and comprehension. Reading passages are integrated into the general classroom curriculum for students to improve their reading and content knowledge. The program tracks words correct per minute (WCPM) through repeated readings on a graph for ten days. Once students achieve an appropriate rate of fluency, usually around 120 WCPM, they begin to work on comprehension strategies. Each session is accurately graphed based on WCPM and visually demonstrates fluency progress to students, teachers, and parents. Curriculum-based passages are made more

accessible by increasing font size, line spacing, margins, etc., to make the text look more achievable (Freeze, 2006).

Studies on Precision Reading (Freeze, 2000; Freeze, 2002c) have shown that students who participate in sessions continually throughout an academic year show more significant improvement in their reading. For example, students who received over 130 sessions improved 2.5-grade levels on a standardized reading test. Gains declined with the decrease in the number of sessions, and more sessions of Precision Reading resulted in more significant improvements. Furthermore, post-intervention interviews revealed that students' motivation and self-esteem increased (Freeze, 2000). While there is no panacea to remedial reading, interventions must be consistently delivered until a level is achieved that allows general classroom instruction to take over.

Precision Reading solves the issues of delivering an RTI model in secondary settings as it requires little time outside the general classroom. It also gives students multiple opportunities to re-read high-interest, curriculum-based passages to increase fluency, comprehension and classroom engagement. The visual graphs display student growth in reading fluency and consequently show students that they can improve, thus, resulting in increased motivation and self-efficacy. FFASM can work as a delivery model to administer some of the strategies in Precision Reading.

Video Self-Modelling (VSM)

If all students were successful in school, there would not be a need to implement new academic interventions and strategies. Each year, educators try to meet the educational needs of every student. Other interventions need to be explored if students are not making appropriate academic gains in the tier-one classroom. Given the importance of literacy, a logical first step for

VSM into academics is reading. VSM is a prime example of an alternative intervention that can help students succeed in inclusive classrooms.

Benefits of VSM

There are numerous benefits of using VSM in educational settings to teach behaviours and skills. First, VSM studies that reported on social validity had numerous positives. Participants, parents and educators viewed it favourably (Hitchcock et al., 2003). Second, most educators felt it was effective and easy to implement (Prater et al., 2012). Third, it gave the observer an accurate representation of completing the target behaviour (Dowrick, 2012). Fourth, it instilled a belief in the participant that they could reproduce the behaviour, which resulted in increased motivation and self-efficacy (Dowrick, 2012). It can also increase a viewer's self-efficacy by showing they are capable of achieving the target behaviour. This supports Guthrie and Davis's (2003) view that motivation for reading should be intrinsic. VSM modelling creates intrinsic motivation because observers will reproduce the skill because they can for a specific reason. Fifth, skills learned through VSM may transfer to other settings and situations without the use of reinforcements (Losinski et al., 2016). When a person sees quick improvement, it motivates the student to use the behaviour in similar or new situations in the future (Robson et al., 2015). Some examples include selective mutism (Blum et al., 1998) and classroom cooperation (Hitchcock et al., 2003). Sixth, in comparison to other interventions, it takes little of a person's time after the initial video recording takes place (Kehle et al., 2002).

Types of VSM

There are two forms of video self-modelling; positive self-review (PSR) and feedforward video self-modelling (FFVSM). Peter Dowrick (2012) defines positive self-review as "rarely achieved skills that are selected to promote more consistent performance" (pg. 34). Positive self-

review is similar to a sports highlight reel where only the best performances are included. In an educational setting, a skill such as hand raising would be compiled in a video that shows the student consistently raising their hand in class. Dowrick (2012) defines feedforward video self-modelling as "component behaviours (in the repertoire) that are reconfigured to produce a new skill or level of performance" (pg. 215). Feedforward modelling focuses on the future, free of mistakes. For FFVSM to be effective and successful, the target skill needs to be in the student's zone of proximal development (Dowrick, 2012; Vygotsky, 1980). In other words, it is the individual's next step in learning, not several steps ahead. It is strength-based and the opposite of feedback because it shows the viewer the end goal (Hitchcock et al., 2003). Feedback is given when the student watches the video. VSM can be traced back to the early works of Albert Bandura's social cognitive theory (Bandura, 1977) as a foundation.

Social Cognitive Theory

The social cognitive theory, developed by Albert Bandura, a Canadian psychologist, helps explain the theoretical roots of VSM and why it is effective. The social cognitive theory holds two important tenets; most behaviour is learned by observing others, and people go through a mental process between observing a model and imitating the model (Bandura, 1977). His theory also states that after watching and modelling a behaviour, feedback may be intentionally administered or through naturally occurring rewards or punishments (Bandura, 1977).

Types of Models

According to Bandura (1986), observers can learn behaviours through three different models; the first is live modelling, where an observer views the model in real life. Common examples of models include parents, siblings, classmates and friends. Until nearly 50 years ago,

live modelling would have been the primary source of social learning. However, with the rise of television, video games, movies and the internet, other forms of modelling have greatly influenced behaviour. Albert Bandura refers to this second type of modelling as symbolic modelling (Bandura, 1986). The third and least influential is verbal description. This occurs when a person is given spoken instructions or prompts to behave in a certain way or demonstrate the skill. The vast majority of people would rather be shown what to do instead of told what to do. Verbal persuasion has the smallest leverage on human behaviour compared to live and symbolic modelling. VSM focuses on symbolic modelling, assuming that much of human behaviour can be learned through this medium. One of the benefits of learning through symbolic modelling is that behaviours and skills can be viewed repeatedly, helping to ingrain the skills in the viewers' minds for future use.

Consequences. After an observer imitates a model, they may receive a consequence. Consequences that directly affect a person are called enactive consequences. Before Albert Bandura's social learning theory, this was the way it was believed most people learned (Bandura, 1986). However, Bandura noted that observers could learn behaviours by seeing a model receive a consequence and then adjust their behaviour. Bandura calls these vicarious consequences. Thus, a consequence received by a model alters an observer's behaviour (Bandura, 1986). For example, if a student sees another student being laughed at by their classmates for making a mistake reading aloud in class, the observer has received a *vicarious consequence*. This will likely result in the observing student adjusting their behaviour, in this case, lowering the likelihood they will agree to read aloud in class.

Cognitive Factors. According to Bandura (1986), just because an observer sees a model does not mean they will imitate them. There are four cognitive factors that an observer must

meet for imitation to occur. First, the model must have the attention of the observer. A significant amount of behaviour goes unnoticed to observers and will not be imitated at a later time. For example, struggling readers need to be explicitly taught how to read fluently. Some people become fluent readers naturally through parent, teacher and sibling modelling. Others may have had few people in their lives modelling fluent reading, or it was simply not noticed naturally by the observer. Specific model attributes will gain an observer's attention, such as the similarity between a model and observer, model status and level of performance. For example, a person is more likely to imitate a model if they look like the observer, have a high status, like an older sibling or celebrity, or the task is interesting to the observer. Retention is the second factor.

The behaviour needs to be memorized through cognitive rehearsal, wherein a person practices the behaviour through visualization. Bandura (1986) states that after a behaviour has been observed and put to memory, there may not always be opportunities or the motivation to reproduce the behaviour right away, so a person may go through a cognitive rehearsal. Cognitive rehearsal is effective with athletes, vocational tasks and conceptual challenges (Bandura, 1986). It strengthens behaviour but not as well as physical practice. There is scientific evidence that supports the idea that cognitive rehearsal can increase a person’s ability to model the rehearsed task (Bandura and Jeffrey, 1973).

Nevertheless, the rehearsal needs to be accurate to be effective (Bandura, 1986). If behaviour is rehearsed inaccurately, it will negatively affect future performance. Reproduction is the last factor and arguably the most critical. Since reproduction involves action on the part of the observer, the observer must possess the necessary skills and self-efficacy to reproduce the behaviour. Moreover, they must be motivated to produce the behaviour. Motivations can vary from reinforcement to goal attainment (Bandura, 1986). VSM assumes that an observer viewing

themself in a video will have increased attention compared to a video displaying a model resembling the observer.

Bandura was very interested in aggression and consequences. Through his research, he learned that observers who viewed aggressive behaviour were more likely to act aggressively, contingent upon whether or not the aggressive behaviours were punished or rewarded. Thus, if observers saw people behaving aggressively and not being punished, they would be more inclined to act aggressively. This is also known as response disinhibition, where people act in a way they know is inappropriate but continue to do so simply because others are getting away with it (Bandura, 1986). Another modelling effect is response inhibition, in which an observer's actions are affected by future consequences (Bandura, 1986). For example, a student who is late for class might be tempted to run down the halls but will resist the temptation because of possible future consequences such as a disciplinary measure or accident. Response facilitation occurs when an observer sees a model being reinforced for specific behaviour and is more likely to demonstrate that behaviour as a result. For example, a student may observe another student being praised by the teacher for reading aloud in class. As a result, the observing student will be more likely to read aloud in class if they possess the skills to do so. Lastly, observational learning occurs when an observer learns something new by watching a model (Bandura, 1986). An example of this is a person learning new words by observing someone else use them.

Self-Efficacy Theory

A significant component of social cognitive theory is self-efficacy theory, and it has a strong influence on motivation. It states that people will not imitate behaviour if they do not believe they can do so. Individuals with high-self efficacy are highly motivated and put in more effort (Bandura, 1977). They are also more likely to persist when faced with challenges in the

domain in which self-efficacy exists. It is not surprising that students who have difficulties with reading have low self-efficacy in reading.

Similarly, most people lack the motivation to perform tasks in areas where they feel inadequate. High self-efficacy transfers to similar situations, and people with high self-efficacy will put more effort into imitating a particular behaviour than people with less (Bandura, 1977). Bandura (1977) defines self-efficacy expectation as "the conviction that one can successfully execute the behaviour required to produce the outcomes" (p. 193). Bandura (1977) defines outcome expectancy as "a person's estimate that a given behaviour will lead to certain outcomes" (p. 193). Before a behaviour is executed, an individual can expect an efficacy expectation and an outcome expectation. For example, if a student wants to read in front of the class successfully, they need to have the self-efficacy to recognize the words on the page and read fluently. After those behaviours are executed, their outcome expectancy is to return to their desk with their self-worth intact. Therefore, people will act to demonstrate their skillset and expect a particular outcome for that behaviour (Bandura, 1977).

Efficacy Judgements. Four areas will affect a person's efficacy judgement. The first is past experiences. Were they positive or negative? Were there punishments or rewards? These will influence a person's self-efficacy in that situation. For example, an emergent reader in middle school has likely had several negative experiences with reading. As a result, their self-efficacy has been lowered. The second is vicarious experiences, which are experiences affected by the experiences of others. If a person sees someone else being successful, they will have increased self-efficacy if they possess the prerequisite skills. For example, if a middle school student is in a competitive, performance-based classroom, similar to the one described by Guthrie and Davis (2003), then their self-efficacy likely would be reduced. VSM fits in with

Albert Bandura's self-efficacy theory because it gives the observer a vicarious experience with themself as a model being successful. The third is verbal persuasion in the form of encouragement or discouragement from a teacher, parent, sibling or peer. The fourth is physiological feedback, where a person's self-efficacy is affected by their body's response to the situation (Bandura, 1977). For example, a student that feels anxious when put into situations where their reading performance could be judged would have decreased self-efficacy because of their bodily response. Overall, self-efficacy is a significant component required for achievement.

Neurocognitive Theories

Dowrick (2012) states two areas in neurological studies help explain why video self-modelling works; mirror neurons and mental time travel. Mirror neurons fire when a person is performing an action and when the same person views someone else perform the action. For example, mirror neurons will fire in a person when they are reading. The same neurons will fire when that person witnesses someone else reading. However, mirror neurons will only fire when the observer sees the purpose of reaching the goal and if the observer has the skill set to achieve the goal (Dowrick, 2012). For example, if a student views a model fluently reading a story, the student will be attentive, but mirror neurons may or may not fire depending on the student's prerequisite skills to reproduce the same skill. Mental time travel, the second neurocognitive theory, is the ability to imagine future situations (Dowrick, 2012).

An example of this could be when a person observes someone use a particular spoken phrase in a situation through live or symbolic modelling. The person will then imagine a future situation or go through a cognitive rehearsal, using the exact phrase. Even though the person has never used it before, they now have the ability and self-efficacy to use it in the future. Mental time travel is essentially the same as cognitive self-rehearsal described by Bandura (1986).

Self-Model Theory. Dowrick's (2012) self-model theory builds upon Banduras' discussion on cognitive rehearsal. In self-model theory, any learning experiences made through observation, the observer will make a cognitive self-model simulation for future behaviour. Learning will only happen if, after observing a behaviour or skill, the observer creates a future self-image using current skills. Depending on the event, humans will use a cognitive response hierarchy which is influenced by self-efficacy (Dowrick, 2012). In the case of feedforward video self-modelling, students observing themselves in adaptable behaviour reading a passage will create a future self-image of themselves reading.

VSM First Reports

The first reports of VSM date back to 1970. Researchers used VSM to change one boy's inappropriate behaviour during his stay at an asthma treatment centre. The researchers had the boy role-play appropriate behaviours and inappropriate behaviours while being video recorded. After the boy watched himself acting appropriately, his behaviours changed for the better over the next two weeks. After two weeks, he watched the inappropriate behaviours on a video. Consequently, his behaviours reverted to his old ways. The last video they showed him was the appropriate behaviours again, and his behaviours stayed improved for several months after the researchers left. While generalizations cannot be drawn from one study involving one participant, it did suggest that it might be an effective intervention with inappropriate behaviours (Creer & Miklich, 1970).

VSM Meta-Analyses

In a meta-analysis of VSM (Hitchcock et al., 2003) used in school-based settings, results showed moderate to strong effects. The analysis included 18 studies and used 129 students; 58 labelled as disabled and 71 labelled as academically low. Students ranged from preschool to high

school. Nine studies were completed in general classrooms, seven self-contained classrooms, and two in both. The 18 studies included reading fluency, disruptive behaviour, language responses and classroom compliance. The range of target behaviours in the studies examined in the meta-analysis was quite broad. The studies differed in sample sizes, experimental design and measurement tools. Consequently, it is difficult to draw definitive conclusions from these results. It is however reassuring that VSM has been used successfully in various K-12 settings.

A VSM literature review by Prater et al. (2012) examined studies of the effects of VSM on academic performance. Eight studies were examined, which included reading fluency, on-task behaviour, written language, reading comprehension, arithmetic and letter identification. The overall results showed that VSM had a positive effect on students' overall academic performance.

To date, there has only been a handful of studies that investigated the effects of VSM on reading achievement. Historically, VSM has primarily been used to improve behaviours in various settings. There has been an increase in VSM to enhance academic skills in students with LD or students who are academically behind their peers. A literature review by Buggey and Ogle (2012) noted that since 1970, studies on VSM had been steadily increasing each decade. Since the first VSM study, roughly 200 studies have been conducted on VSM with various settings and participants (Hitchcock et al., 2003). The reason for this can be attributed to several factors. First, the results from studies are overwhelmingly positive given the short duration and the ease of implementation. Second, video and audio technologies are ubiquitous in the sense that there is now a video camera in almost everyone's pocket and free software to create and edit VSM videos. With the invention of smartphones, tablets, compact laptops, etc., most people today have access to a video camera or recording device at their fingertips and editing technology has

become much easier to use with programs such as Movie Maker and iMovie. At present, the literature and research evidence surrounding FFVSM and its effects on reading fluency is in its infancy.

VSM and Reading Fluency

Little research has been done on the effects of feedforward video self-modelling with regard to reading fluency. One of the goals of VSM is to lead and motivate the student towards new reading opportunities. Reading volume and reading in different contexts strongly correlate to fluency and understanding (Allington, 2014). In other words, when students choose to read more, this will lead to reading in different contexts and for other purposes. Studies that have been done in this area share similar procedures, challenges and limitations. There have been a few studies that combined FFVSM as an additional component to a literacy intervention. An early study on the effects of VSM on reading fluency by Dowrick et al. (2006) compared the effects of FFVSM as a supplemental intervention combined with a reading tutoring intervention known as Actual Communication Empowerment (ACE). Wu et al. (2018) also studied the supplemental effects of FFVSM when added to a small group fluency intervention. The study results by Dowrick et al. (2006) showed that FFVSM produced significant gains in student reading fluency. Still, Wu et al. (2018) did not arrive at similar findings, reporting minimal effect size. That being said, the studies explored different literacy intervention techniques, and Wu et al. (2018) used an alternating baseline treatment. Given the resources needed to implement reading interventions, it may be more feasible to use FFVSM as a stand-alone strategy rather than combine it with other interventions.

Robson et al. (2015) studied the effects of feedforward video self-modelling as a stand-alone intervention. Using VSM to increase reading achievement in emergent readers adds an

additional time commitment to educators' increasingly heavy workload. Robson et al. (2015) suggest using VSM as an independent intervention because it significantly lowers the number of resources necessary to improve student reading achievement. The less time and energy needed to implement an intervention, the more likely educators will be willing and able to implement it within their practice.

Participants. Participants in many of the studies shared numerous characteristics and attributes. In four of the studies, the sample sizes were 10 (Dowrick et al., 2006), 4 (Montgomerie et al., 2014), 11 (Robson et al., 2015), and 3 (Wu et al., 2018). In these studies, all students were at the elementary level, between 6 and 10 years of age. Their teachers identified students as having low reading fluency. Given the ease at which fluency screening can be administered, identifying students for a VSM intervention is relatively straightforward. Classroom teachers can quickly identify students who have challenges with reading fluency and reading motivation.

Intervention/Procedure. All VSM intervention studies follow a similar procedure. They begin by having a classroom teacher identify students who are at least a year or more behind in reading. Fuchs et al. (2010) recommended that teachers choose students in secondary settings for academic interventions since skill deficits are often apparent. This is more efficient because it saves time screening a whole class. Next, baseline fluency and comprehension assessments are administered to establish a base level. After baseline assessments are completed, the creation of the reading video begins. Robson et al. (2015) created the videos using an iPad and a tripod for stability. To make the VSM videos, the researcher and the participant echo read 1-2 sentences at a time (Wu et al., 2018; Dowrick et al., 2006; Robson et al., 2015). If the participant made an error such as a mispronunciation or lengthy pause, the researcher modelled the sentence correctly

until the participant read it accurately. Once the entire passage had been read correctly, the researcher then edited out the errors and researcher prompts. What remained was the student accurately and fluently reading the passage. To create the videos, Wu et al. (2018) used two free iPad applications. Using both applications, Wu et al. (2018) was able to edit and trim the videos and add text, comments and background music. A critical component of the potential of FFVSM in schools is that it can be implemented with free software and existing school technology.

In each VSM reading fluency intervention, students watched an edited video of themselves fluently reading a difficult passage. Students were able to watch their video daily or a few times each week. During the Robson et al. (2015) study, participants watched the video six times over two weeks. One limitation of the FFVSM studies to date has been that students could not see the words they were reading on the video screen.

Experimental Design. The experimental design choice for VSM researchers appears to be a type of multiple baseline. Wu et al. (2018) used a multiple baseline design with alternating treatments. Out of the three studies examined, Wu et al. (2018) was the only researcher who used alternating treatment. Dowrick et al. (2006) and Hitchcock et al. (2003) both cautioned against the use of alternating treatment design because effects can transfer from one treatment to another. To help decrease the chance of carry-over effects, Wu et al. (2018) conducted only one VSM procedure a day. At the end of the study, Wu et al. (2018) again warned of possible carry-over effects. Reading skills can be learned one day and not used until days after. This fits in with Bandura's Social Cognitive Theory, where an observer will internalize a behaviour and create a cognitive rehearsal and use it at an appropriate time in the future.

Testing. Most VSM fluency studies examined used standardized pre/post-tests to determine the statistical significance of the intervention. Robson et al. (2015) used the Neale

Analysis of Reading Ability (NARA). Wu et al. (2018) used AIMSweb reading probes (Pearson, 2012) to locate instructional level and administer baseline assessments. Two of the studies (Dowrick et al., 2006; Robson et al., 2015) measured the effects FFVSM had on reader self-perception in addition to fluency. Robson et al. (2015) used an adapted version of the Henk and Melnick (1995) survey but presented it using emoticons. Dowrick et al. (2006) measured reader motivation using the Young Children's Academic (Intrinsic) Motivation Inventory (Reading Subscale). Throughout the Robson et al. (2015) study, intervention probes were used using the Science Research Associates Reading Laboratory (SRA). These probes were plotted on the multiple baseline assessment. Dowrick et al. (2006) conducted two CBM probes every session to diminish inconsistent results, adopting the midpoint as an individual data point. A consistent probe used in VSM multiple baseline designs are curriculum-based measures (CBM). They are an effective measuring tool because they are grounded in research and are responsive to academic improvements (Fuchs, Fuchs, Hosp & Jenkins, 2001)

Interobserver Agreement. When data is being collected on humans through observation, errors are more likely to occur due to human error and subjectivity (Alberto & Troutman, 2013). Researchers will get another person to record data to help remedy a potential flaw in a study's data. After both parties have recorded, they will be compared, and a percent will be derived to determine interobserver agreement (IOA). Most researchers that use IOA will aspire for approximately 90% agreement (Alberto & Troutman, 2013). To ensure fidelity and accuracy of reading probes, Wu et al. (2018) used IOA for about 1/3 of intervention sessions. The researcher disclosed a limitation that no IOA was done on any of the baseline sessions, which may have affected the results. Dowrick et al. (2006) vouch for CBM probes being dependable with 95% accuracy. A possible solution to accurately determine IOA is to audio

record sessions. This would allow another researcher to assess the reading probes to ensure accuracy. IOA increases the reliability of the data being correct. When there is tangible data, it is not as necessary to have another person be present when data is collected. Conversely, when the data is being derived from observations, there is no chance of going back to check if the data is accurate. Whereas for tangible data, it is possible to go back and recheck (Alberto & Troutman, 2013).

If observations are recorded, there is less need to have an actual observer present to observe the target behaviour in real-time because it is possible to go back and listen to the recordings. For example, a VSM study researcher could audio record each reading probe for the entire study. Afterwards, an independent party such as another researcher knowledgeable about the target criteria could assess the probe. This will increase accuracy and IOA and will not require another person to be present during the intervention. There exist important experimental measuring tools to assess the accuracy of an intervention. Despite the validity of standardized measures and IOA, there are still limitations in VSM fluency studies.

Limitations. There is much to still discover about VSM; for both its potential and its limitations. One success of VSM may also depend on the observer's comfort with viewing themselves. In the Robson (2013) study, it was noted that one student was self-conscious about viewing the video on a desktop computer in the classroom because other students could see. Feedforward audio self-modelling solves this issue because the student is only heard.

With regard to sound, headphones can be worn to listen. In past studies, the majority of VSM videos were not shown in the vicinity of other students. That being said, no subjects expressed being uncomfortable seeing themselves on video. Montgomerie et al. (2014) noted that some of the videos were choppy due to editing difficulties, which could have hindered the

effectiveness of the intervention. If the video is shaky or challenging to watch, it would likely distract the observer from the target behaviour or skill.

An additional limitation is that many studies have not been replicated (Losinski et al., 2016). Even though several studies have shown the effectiveness of VSM, most studies have small sample sizes and no long-term studies of retained skills. Another limitation is that it primarily focuses on rote learning skills in behaviour and academics. However, rote learning skills could give students additional skills to stay in inclusive settings and access deeper learning opportunities. Wu et al. (2018) suggested it may be beneficial to study different ways in which videos could be made more quickly. Wu et al. (2018) and Robson et al. (2015) needed approximately one hour to create one video. This is valuable time for a classroom teacher or learning support teacher to use VSM as an intervention, especially if it is to be used as an ongoing intervention. Dorwrick et al. (2006) noted from discussions with educators that they rarely have time to learn and implement new technology, despite evidence that an intervention is effective.

In the fluency study by Powell and Gadke (2018), the student was only required to read the passage twice, which was not enough to achieve appropriate levels of automaticity. With the FFVSM approach, a student can read and listen to the passage as many times as they like, furthering the likelihood of achieving automaticity and freeing up their working memory to attend to comprehension. Dowrick et al. (2006) admits VSM videos have a service life for moving students ahead in reading. Once the student knows all the words and can read the passage fluently, the properties of FFVSM cease to operate. Additionally, reading videos can be revisited for review or entertainment purposes.

Delimitations. The delimitations of VSM are that one must have access to a video camera and editing software. However, as technology becomes increasingly ubiquitous, this limit is fading. It is not unusual for a school to have multiple iPads and other electronic recording devices used for various educational purposes. Most educators would require some technical training to learn how to edit videos efficiently. Also, some people may not want to be videotaped. Robson et al. (2015) stated it was difficult for teachers to notice a difference in student attitude because of the short duration of the intervention. Some were unsure if gains were maintained because a maintenance probe was not given.

Conclusion

Strengthening of tier-one – additional tools for inclusion. Teachers continue to face numerous challenges in their attempt to teach middle years students to read. Unfortunately, many middle school students are still learning to read when they leave elementary school, and explicit instruction in foundational reading skills rarely happens in middle school. When students lack the self-efficacy to read the complex content of middle school curriculum, their motivation naturally decreases. These students require explicit instruction to make gains. Dowrick et al. (2006) states the purpose of FFVSM is for the student to catch up so that general classroom, tier-one instruction can be sufficient in moving the student forward. A common attribute among emergent readers is low reading fluency and motivation. Fortunately, when combined with VSM, evidence-based fluency strategies can be used to increase skills and motivation. With so many students reading below grade level, an obvious solution is strengthening tier-one literacy practices.

Furthermore, given the large percentage of students requiring literacy support, interventions need to be easy to administer and be effective (Burns et al., 2005). FFASM is just a

tiny piece of the RTI puzzle. VSM is relatively easy to implement once the video has been made. It does not come with a financial cost, as most schools already have the technology in place. There are many applications for VSM in schools to support inclusive educational practices. If permitted, reading videos could also be emailed to parents upon request. FFVSM combines the evidence-based fluency practices of repeated readings and listening passage preview.

In contrast to traditional assisted reading instruction, where the model is a skilled reader such as a parent or teacher, it is the student themselves. Based on observational learning theory and model similarity, the student should have increased attention on the model. Once again, VSM has been shown to increase student self-efficacy and skill acquisition, along with being another tool to support inclusive instructional practices. Students can also take videos home with them to view over weekends and holidays to practice the behaviour or retain information (Prater et al., 2012)

Gaps in the Literature

There exist several gaps in the literature around VSM, reading fluency and emergent readers in middle school. First, fluency interventions are underutilized in middle school despite their correlation to comprehension. Second, the scheduling of middle schools makes it increasingly challenging to implement an RTI model. FFVSM helps solve this issue because it takes relatively little time outside of the general classroom. Third, in all of the VSM fluency interventions to date, the video has shown the student reading, but the text was not displayed. Therefore, keeping the audio portion of the reading passage and combining it with the passage text could increase word recognition. Blum et al. (1998) referred to this as audio feedforward. They also noted that creating an audio model is much quicker and easier because it requires far less editing. The third chapter will describe a study that attempts to fill the crevices, using a

mixed-method design but quantitatively weighted. The study will investigate the effects of feedforward audio self-modelling on reading fluency, comprehension and reader self-perception.

Chapter 3 Methods

This study aimed to provide educators with an additional intervention, strategy, and teaching tool to use with emergent readers. The strategy used feedforward audio self-modelling (FFASM) to increase student reading fluency, reader self-perception and comprehension. Simply, the purpose of this project was to determine if FFASM is an effective strategy for emergent readers in middle school. Due to the COVID-19 pandemic, the study was conducted online through Zoom.

Stance of the Researcher

In my ten years as a middle school classroom teacher, I had yet to experience most students with a reading level at or above grade level. Every year there were numerous students who not only struggled with reading but whose overall academic performance was negatively affected by their low literacy skills. I was sure this was the case for many classroom teachers across the province. When students enter middle school, there is a significant change in literacy instruction in which the focus is on reading to learn as opposed to learning to read. Unfortunately, many students are still developing their reading skills when they enter middle school and do not receive the support they require. This educational experience with emergent readers is not unusual. It is the norm. A lack of experience and knowledge on how to support and include students that are still learning to read sparked my search for answers. I decided to return to university to receive my post-baccalaureate in inclusive education to learn new strategies to increase student academic achievement in my class. Those classes taught me the importance of modelling behaviour and thought processes, which inevitably led me to VSM. I believe that all students can learn to read and achieve academically with explicit quality instruction and appropriate supports. FFASM is one method that I think can be used to increase student

achievement in inclusive classrooms. Once my research proposal was approved by Education Nursing Research Ethics Board (ENREB) (see Appendix A), I began the following study procedures.

Pre-Study (May-September)

As part of the research proposal, a timeline (see appendix B) was created to illustrate the steps of the study. First, I sent emails (see appendix C) to Canadian Homeschool Associations and posted ads on Kijiji (see appendix D) in various cities across Canada. If homeschool associations were interested, they forwarded the study poster (see appendix E) to their members. Parents that were interested contacted me directly through my university email. If they wanted to participate, a parent letter (see Appendix F), parent consent form (see Appendix G), student letter (see Appendix H), and assent form (see Appendix I) were sent to them. As soon as the consent and assent forms were signed, the study procedures were able to begin. A total of three participants signed up for the study within two weeks.

Participant Population

The participant population for this study shared many of the characteristics of other FFVSM studies, except for the age of participants. The participant population for this study were middle school students (grades 4-8) who were part of a Canadian Homeschool Association or attended school in person in Canada. For this study, fourth and fifth-grade students were included in middle school as they have more instructional similarities than students in primary grades (Kamil et al., 2008). The study was open to students interested in improving their reading fluency and comprehension in E.L.A, social studies, or science. Parents completed a short survey (see appendix J), and participants completed a short interview (see appendix K) at the end of the study to determine the perceived effectiveness of the intervention.

Measurement Tools

Student progress was measured using Acadience™ Reading, previously known as DIBELS (Dynamic Indicators of Basic Early Literacy Skills). It is a standardized, research-based student monitoring system for grades K-6. Assessments are efficient to administer and can accurately identify fluency and comprehension gaps in students. For this study, two Acadience™ reading measures were used; oral reading fluency (ORF) and ORF retell. ORF alone is usually a strong predictor of student reading achievement and comprehension. ORF retell is an additional quick comprehension probe that can increase the reliability of determining and measuring student reading achievement and progress. Student scores are compared to benchmark levels to determine if students require intervention (Good III et al., 2018).

Oral reading fluency (ORF). ORF is measured based on the number of correct words read in one minute. Errors consist of skipped words, words read out of order, substitutions, mispronounced words, and pauses or hesitations of three seconds. Students read a passage, and the researcher records the score on a separate form. The Acadience™ Reading manual states that an ORF instructional level is determined by students reading with a minimum of 90% accuracy and reading at least 20 correct words in grade one, 40 in grade two, and 50 or above in grades three to six. Students with an instructional level far below their grade level should be given a weekly ORF probe to measure progress. Progress monitoring is graphed to display progress visually. After students read for one minute, they are asked to retell what they read (Good III et al., 2018).

ORF retell. The ORF retell measure is included as part of the ORF measure. It also serves to remind students that the purpose of reading is comprehension, not just to read as fast as possible. After students read the ORF passage for one minute, they are given one minute to retell

what they read. The quality of their response is recorded using the Acadienc™ retell rubric. When the student retells the passage, the test administrator counts the number of words by sliding their pen across numbers on the assessment page. Words are not counted if students go off on a tangent or repeat answers (Good III et al., 2018).

Acadience ™ Reading reliability. The validity, reliability, and passage difficulty of grade-level ORF passages are stated in the Acadience ™ Reading Technical Manual (Good III et al., 2013). Data was collected by using alternate form reliability of the ORF passages. The combined studies concluded with coefficients above 0.9 which demonstrates high reliability when making intervention decisions for individual students. Two-week alternate form reliability on three passage groups showed coefficients above 0.95 in ORF words correct in grades 1-5 and above 0.76 in ORF accuracy in grades 1-5. The reliability of ORF retell scores is less robust than the ORF measures. This is due to the increased subjectivity with which responses are recorded, such as estimating the number of words used in the retell and determining the number of specific details given. For ORF retell, two-week alternate form reliability was between 0.65 and 0.81 for grades 2-5 for three passage groups with sample sizes ranging between 20-30. Samples were unavailable for grades one and six. Inter-rater reliability was extremely high for ORF accuracy and passage retell. The two measures indicate when people are trained appropriately to administer the test, their results are the same. The sample population for each grade was approximately 25 students. Reliability coefficients for Acadience™ Reading ORF and ORF retell are high. Trained educators that use Acadience ™ Reading measurements can be assured that they are reliable. Their reliability increases as assessment probes are repeated (Good III et al., 2013)

Acadience ™ reading validity. Validity measures for Acadience™ Reading were compared to The Group Reading Assessment and Diagnostic Evaluation (GRADE™) published by Pearson Assessments. ORF words correct and accuracy had moderately strong predictive validity with coefficients ranging from 0.47 to 0.8. Predictive validity for ORF is stronger in lower grades and decreases as students get older. ORF retell had predictive validity above 0.5, and validity increased with student age. The reading composite score has strong predictive validity in determining GRADE™ results with coefficients above 0.7 (Good III et al., 2013).

Gathering Baseline Data.

September. All participants began the study in September 2020. Acadience™ Reading Survey was used to gather three baseline measures for ORF and ORF retell to determine instructional level. Next, students completed a researcher-made sentence recall (see appendix L) to determine the length and complexity of sentences to be used in the reading videos. Baseline data were recorded for each participant (see Appendix M). Once baseline data and instructional levels had been gathered for each participant, the creation of the reading video began.

Creating the Video

September. The researcher followed the same steps for each session (see Appendix N). Based on the advice of Guthrie and Davis (2003) to use interesting text and Freeze (2006) to use remedial passages related to curriculum, the FFASM reading passage attempted to be related to curriculum content or a subject of interest. The participant and the researcher each viewed the reading passage through the share screen function on Zoom. The researcher turned on the Zoom recording feature, and the student read the passage individually for one minute to determine a fluency baseline. Immediately after, the participant retold the passage as much as they could to determine a retell baseline. The researcher graphed the correct number of words on a shared

graph (see Appendix O). To create the video, the researcher read one sentence or phrase at a time with expression and the participant repeated. Sentences or phrases were chunked into meaningful parts to maintain a natural rhythm. If the participant made any errors such as long pauses or a mispronunciation, the researcher would repeat the sentence or phrase. This continued throughout the passage until completion. The participant and the researcher echo read the entire passage, which was between 250 and 350 words which never took longer than 10 minutes. After the Zoom session, the researcher copied and pasted the paragraphs from Microsoft Word into iMovie slides. There was approximately one paragraph per iMovie slide. In total, there were between 6 and 10 slides. The Zoom audio recording was uploaded onto an audio editing program called Wavepad. The researcher used this program to edit out all prompts, miscues and researcher read portions. All that remained was the participant reading the passage fluently and accurately. In the final product, the student was able to hear themselves read and see the words simultaneously. Watching the video of themselves reading combines the fluency strategies of repeated readings and assisted reading. Once a FFASM video was made for each participant, the intervention phase of the study began.

2-3 days after the initial recording, the video was shared with the parent using a private Google Drive link. On the consent form, parents had the option to request a copy of each video. The purpose of sending the video to the parent's device was to give them extra opportunities to watch their video.

Practice and Progress Monitoring Sessions

September-November. Each progress monitoring session follows the same steps (see Appendix P). Participants began each session by watching their FFASM video through the Zoom platform. Before the student watched the video, the researcher reminded participants to pay

attention to the words as they heard them. Participants then read the same passage that was on the video for one minute out loud. The researcher graphed the number of words they read correctly in one minute. The graphing served two purposes. Firstly, to determine if watching the FFASM video effectively increased student fluency for a specific reading passage. Second, to motivate students to continue with the intervention as even the smallest gains were noticeable and demonstrate ongoing improvement. After participants read the video reading passage, they retold the passage for one minute, and it was scored using the Acadience™ ORF retell rubric. Immediately after, students completed one Acadience™ CBM reading fluency measure that they had never seen before. They read the fluency measure for exactly one minute. Immediately afterward, participants retold the passage for a maximum of one minute. Again, the Acadience™ ORF retell rubric was used to score their response. The purpose of the cold reads on fluency was to determine if there were transferable and generalizable gains. As mentioned previously, researcher-made test measures create larger effect sizes than standardized measures. Any improvements will therefore be more significant if measured using standardized tests. All participant data for the progress monitoring sessions were recorded individually (see appendix Q). In addition, notes (see Appendix R) were taken during each session on participant attitude and any noteworthy incidences such as poor internet connection.

There was a total of five intervention sessions for the first phase. Intervention sessions were conducted 3-4 times per week, either during weekday evenings or on weekends. After the five sessions were completed, a new high-interest/curriculum reading passage was used to create a new FFASM video. The above procedures were repeated three more times for a total of four FFASM videos and 20 interventions sessions. A recommendation for future study by Wu et al. (2018) suggested creating additional videos to create more successful reading experiences as a

possibility to increase student self-efficacy. Most of the FFVSM studies only created one video per student. This study wanted to examine the effects of additional intervention sessions to observe whether gains continue or plateau and to judge whether students lost interest in the process. All one-minute ORF readings and retell responses were audio-recorded using the Zoom recording feature to ensure accurate scoring. Once a precise score had been established, the audio recording was permanently deleted.

Post Intervention

Once the intervention finished, parents completed a short perception survey, and students participated in a brief interview with the researcher to assess social validity and perceived effectiveness. Approximately one month after the last intervention session, participants completed three more ORF and ORF retell measures at the same instructional level as the baseline and intervention measures. Results were recorded on a post-intervention recording sheet (see Appendix S). Post-intervention scores were compared to the baseline to determine overall gains in fluency and comprehension.

Design Procedure

This study used a single-subject experimental design. The effects of feedforward audio self-modelling (FFASM) on ORF and ORF retell were measured for each participant. Most FFVSM studies have used multiple baselines across participant research models to determine effectiveness. Alberto and Troutman (2013) suggest using a single-subject experimental design when administering a specific intervention to an individual. In single-subject designs, baseline data on the dependent variable is gathered and compared to repeated treatment data. In this study, the dependent variables are fluency and comprehension. The independent variable or

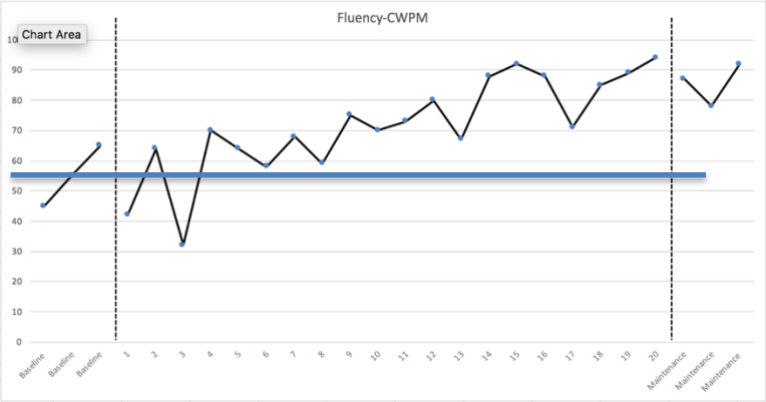
treatment is the FFASM reading videos. In this type of experimental design, each subject's data is only compared to themselves.

Data Analysis

The study data was analyzed using visual analysis. Ma (2006) developed a data analysis tool called Points Exceeding the Median (PEM) to determine the effectiveness of a treatment phase when comparing baseline data points. PEM is similar to the data analysis tool called Percentage of Nonoverlapping Data Points (PND). The difference between PEM and PND is that PND compares the intervention data points to the highest baseline score, and PEM compares the intervention data points to the median baseline score (Lenz, 2013). The idea behind PEM was that if the intervention was effective, the majority of all of the intervention data points would trend in the desired direction. Scruggs and Mastropieri (1998) described results using PND methods as 90% of the data points above the median baseline to be very effective, 80% exceeding that median baseline as effective, 50%-70% as questionable, and 50% and below as ineffective. PEM involves taking the median data point during baseline data collection and determining the number of data points above that line in the intervention and maintenance phase. In the case of this study, three baseline data points were recorded. Twenty intervention data points followed this, and then three maintenance data points were conducted one month after the last intervention session. ORF fluency and ORF retell measures were plotted and displayed similar to figure 3.

Figure 3

Example of plotted fluency measures



Note. This example was created by the researcher using Microsoft Excel

Qualitative Data and Social Validity

Qualitative data was collected at the end of the intervention phase through a participant interview and parental survey. Student interviews and parent surveys were examined for the perceived effectiveness of the study. Social validity measures are often absent in studies even though they can add rich explanations to quantitative data.

Data Storage

Participant information was kept using data codes and was stored in a separate location from tests, interview transcripts, and reading videos. Each participant was given a number at the start of the study. Each survey, interview, ORF measure and video, contained no identifying information, only the participant's number. Personal data from each participant collected included name and grade level. Electronic data was stored on an external hard drive that was password protected. The hard drive and all other tests and research documents were stored in a locked file cabinet in the researcher’s home.

The videos created had the student's voice only. Although it is likely for the participant's voice to be identifiable, the content is not private or sensitive. The participants were simply reading a grade-level reading passage, which positively represents the student's future reading abilities. Data (interviews, surveys, tests, videos) will be kept for ten years and then destroyed. Data may be used for the researcher's PhD. There will be no identifiable participant data present on any files.

Potential Risks to subjects

The researcher kept all documentation confidential. The only audio files that remained were the edited/error-free videos. All miscues and errors were immediately deleted. Intervention sessions were held to under 15 minutes to minimize boredom, anxiety and loss of free time at home. There was a chance a student may become frustrated if they do not see or feel gains in their reading.

Ethical Issues

Minimization of potential risks

There were minimal potential risks associated with this study. If the intervention did not benefit the participant, they would be left with a video of themselves fluently and accurately reading a passage above their current level.

Costs to Subjects

There were no monetary costs associated with this study. There was, however, a modest time commitment for the students participating in the study. The potential benefits for participating in this study were increased motivation to read, increased self-efficacy in reading, increased reading fluency and comprehension. There was no financial burden to participate in the study, and no compensation was given.

The results were reported and analyzed in Chapter 4 to determine the impact of the intervention on reading fluency, comprehension and reader self-perception. Furthermore, student interviews were examined to extract themes of social validity and efficacy. A discussion occurs in Chapter 5 to explain the results, limitations, and recommendations for future study.

Chapter 4 Results

Three subjects participated in the study. As stated in chapter 3, the researcher recruited participants through Kijiji advertisements in Canada and Canadian Homeschool associations. All participants were in grades 4-8 and began the study procedures in September 2020. The study took place entirely online through Zoom during preorganized times in the evenings and weekends. The study used a mix of quantitative and qualitative measures to determine the effectiveness of the intervention. The quantitative measurements were oral reading fluency (ORF) and ORF retell. The qualitative measures were a participant interview and parent survey.

Oral Reading Fluency (ORF)

Participant one was a grade seven student. The researcher determined an instructional baseline, and she scored an average of 81 words correct per minute (WCPM) on three standardized reading passages at her instructional level. For the 20 intervention phase passages, participant one had an average of 94 WCPM. Participant one's maintenance average was 101 WCPM which represented almost a 25% increase in words per minute read on the same standardized reading level. Using PEM to measure the effectiveness of the intervention, participant one had 17 data points above the median baseline measurement, representing an 85% effect.

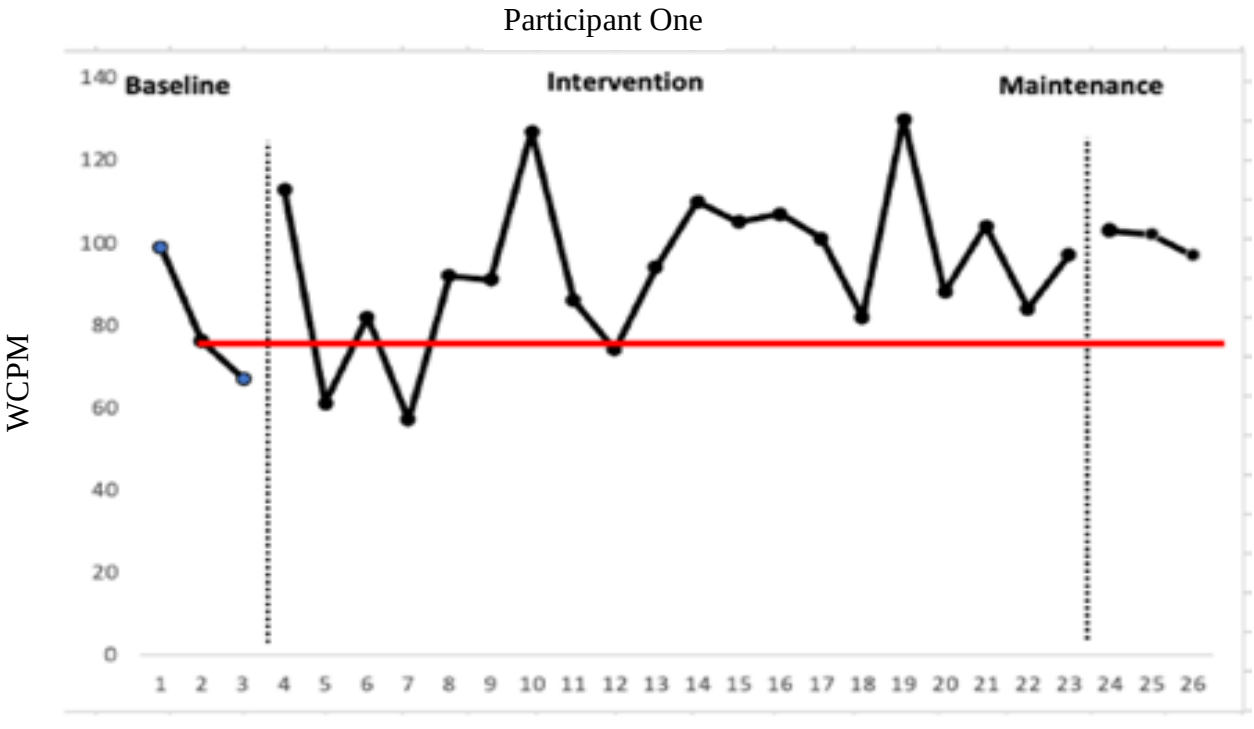
Participant two was a grade four student. An instructional baseline was determined, and she scored an average of 81 WCPM on three standardized reading passages. For the 20 intervention phase passages, participant two had an average of 83 WCPM. Participant two's maintenance average was 87 WCPM, representing almost a 7% increase in words per minute read on the same standardized reading level. Using PEM to measure the effectiveness of the

intervention, participant two had 10 data points above the median baseline measurement, representing a 50% effect.

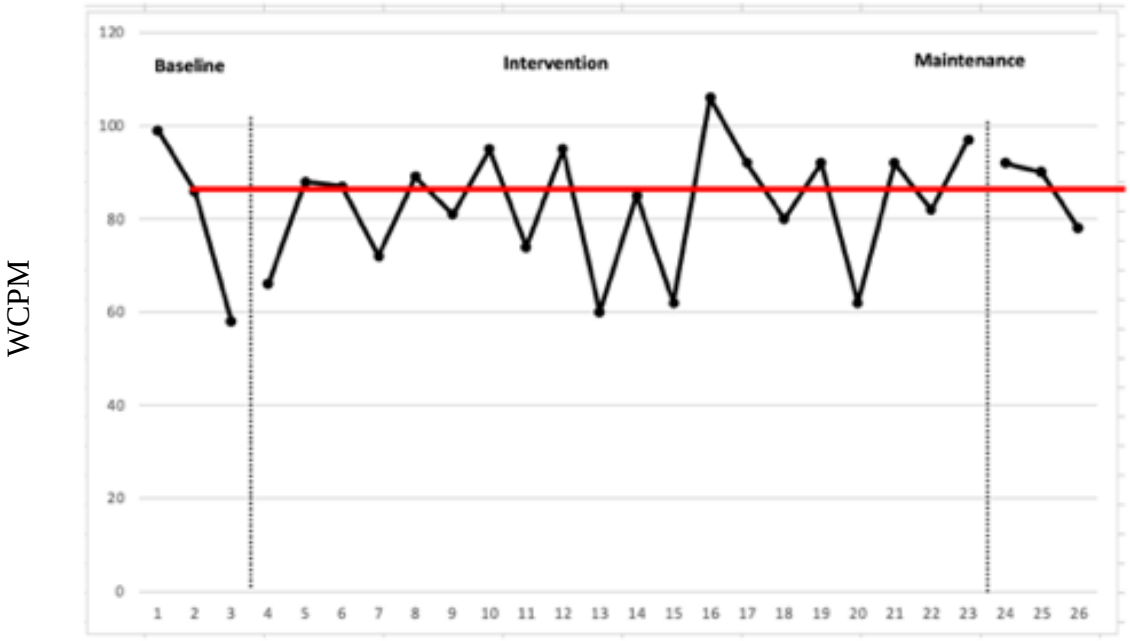
Participant three was a grade four student participating in remote learning during the day through his school division. The researcher determined an instructional baseline, and he scored an average of 138 WCPM on three standardized reading passages at his instructional level. For the 20 intervention phase passages, participant three had an average of 146 WCPM. Participant three's maintenance average was 139 WCPM, representing less than a 1% increase in words per minute read on the same standardized reading level. Using PEM to measure the effectiveness of the intervention, participant two had 16 data points above the median baseline measurement, representing an 80% effect. Figure 4 displays the correct words per minute for each participant for the study's baseline, intervention, and maintenance phase. Table 1 shows the mean average WCPM for each participant during each phase of the intervention. Table 2 shows the percentage of data points exceeding the median for baseline to intervention and baseline to maintenance.

Figure 4

Words correct per minute for each participant before, during, and after the intervention



Participant Two



Participant Three

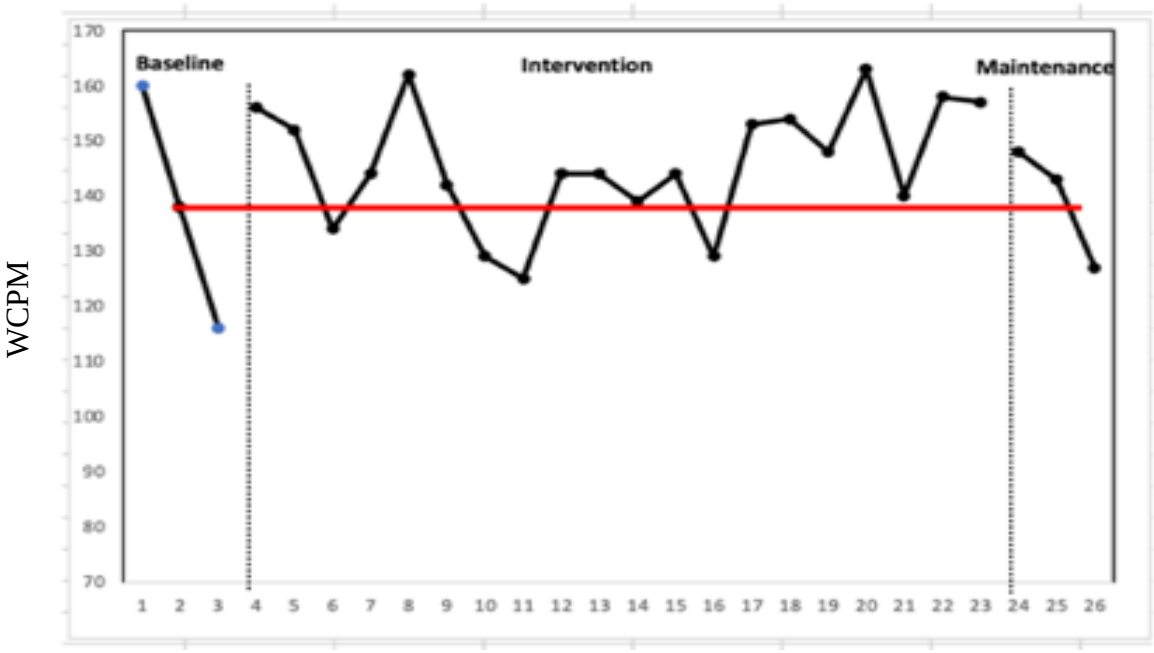


Table 1

Mean words correct per minute before, during, and post-intervention

Correct Words Per Minute

	Baseline	Intervention	Maintenance	Increase	+/- %
Participant 1	81	94	101	20	+ 25%
Participant 2	81	83	87	6	+ 7%
Participant 3	138	146	139	1	+ 1%

Table 2

Percentage of data points exceeding the median for ORF

Percentage of Data Points Exceeding the Median

	Maintenance to Intervention	Maintenance to Baseline
Participant One	85%	100%
Participant Two	50%	66%
Participant Three	80%	66%

Video Repeated Readings

All participants' WCPM on each of their video readings increased to various degrees. This supports previous studies that show fluency improves with repeated readings (LaBerge & Samuels, 1974). Table 3 displays the percentage increase from the number of words correct per minute from baseline to best reading. Participants showed more significant gains based on how complex the passage was during the baseline reading session.

Participant one's baseline readings varied depending on unfamiliar vocabulary and sentence complexity. Video one and video four baseline scores were 80 WCPM and 73 WCPM, respectively, resulting in a significant improvement from baseline to the highest reading. During initial readings for videos number one and four, participant one had to sound out numerous unfamiliar words resulting in a lower amount of WCPM. After she watched her FFASM video, the new vocabulary words became automatic. The more complex the passage, the more significant the FFASM video and repeated readings had on WCPM.

Participant two's baseline WCPM for videos 1,2,3 and 4 were 69, 63, 65, and 101, respectively. Her first three baseline readings were choppy because she had to sound out and reread many words in the passages. Her repeated readings became more automatic and fluent after watching her FFASM video for each passage. She more than doubled her WCPM from baseline to best reading for all videos.

Participant three began the study as a proficient reader and decoder. He read with natural expression and paused appropriately at punctuation. After errors on initial readings, participant three instantly corrected mispronounced words in subsequent readings after the feedback from the reading video. Participant three's baseline scores for WCPM were relatively high, so there was not much room for any improvement. This explains why participant three's increase from baseline to best reading was low.

Table 3

Repeated Readings Correct Words Per Minute Increase - Baseline to Highest Reading

Participant One

	Baseline	Best Reading	+/- %
Video # 1	80	144	+ 80%
Video # 2	113	148	+ 31%
Video # 3	109	135	+ 24%
Video # 4	73	143	+ 96%

Participant Two

	Baseline	Best Reading	+/- %
Video # 1	69	171	148%
Video # 2	63	133	111%
Video # 3	65	141	117%
Video # 4	101	161	59%

Participant Three

	Baseline	Best Reading	+/- %
Video # 1	123	137	+11%
Video # 2	130	154	+18%
Video # 3	147	164	+12%
Video # 4	134	177	+32%

ORF Retell

Participant one scored an average of 28 words per passage on the same three standardized reading passages completed for the oral reading fluency measure. For the 20 intervention phase passages, participant one had an average of 47 words per passage for retell. Participant one's maintenance average was 57 words per passage, representing almost a 104% increase in retell words on the same standardized reading level. Using PEM to measure the effectiveness of the intervention on ORF retell, participant one had 17 data points above the median baseline measurement, representing an 85% effect.

Participant two scored an average of 45 words per passage on the same three standardized reading passages completed for the oral reading fluency measure. For the 20 intervention phase passages, participant two had an average of 30 words per passage for retell. Participant two's maintenance average was 42 words per passage. Representing almost a 7% decrease in retell words on the same standardized reading level. Using PEM to measure the effectiveness of the

intervention on ORF retell, participant two had one data point above the median baseline measurement, representing a 5% effect.

Participant three scored an average of 17 words per passage on the same three standardized reading passages completed for the oral reading fluency measure. For the 20 intervention phase passages, participant three had an average of 29 words per passage for retell. Participant three's maintenance average was 39 words per passage. Representing almost a 129% increase in retell words on the same standardized reading level. Using PEM to measure the effectiveness of the intervention on ORF retell, participant three had 16 data points above the median baseline measurement, representing an 80% effect. Figure 5 displays the number of words used to retell each passage during the baseline, intervention, and maintenance phases. Table 4 shows the mean ORF retell score using the number of words used to retell the passage. Table 5 displays the percentage of intervention data points exceeding the median for ORF retell from baseline to intervention and baseline to maintenance. Table 6 displays the number of words used to retell the repeated reading video passage for each participant from baseline to best retell

Table 4

Mean ORF Retell Score – Number of words used to retell the passage

	Baseline	Intervention	Maintenance	Increase	+/- %
Participant 1	28	47	57	29	+ 104%
Participant 2	45	30	42	-3	- 7%
Participant 3	17	29	39	22	+ 129%

Table 5

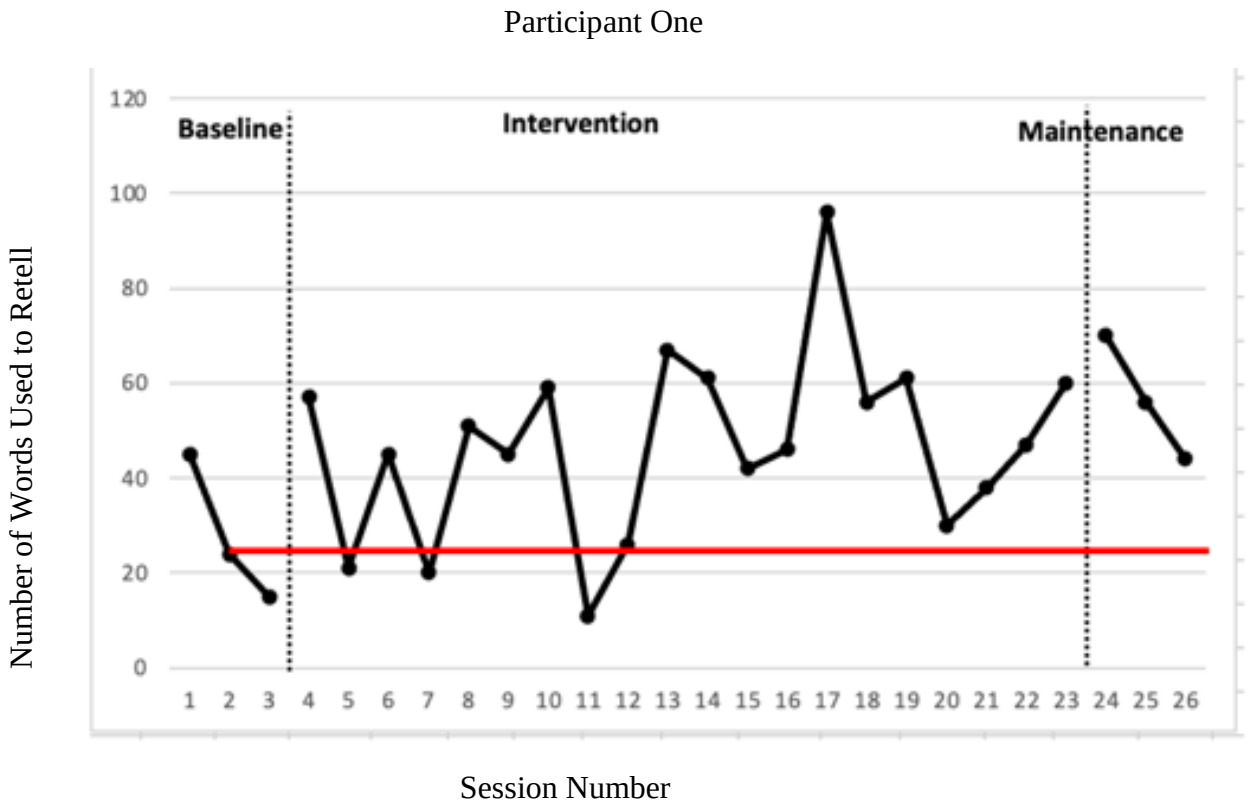
Percentage of Data Points Exceeding the Median for ORF Retell

Percentage of Data Points Exceeding the Median

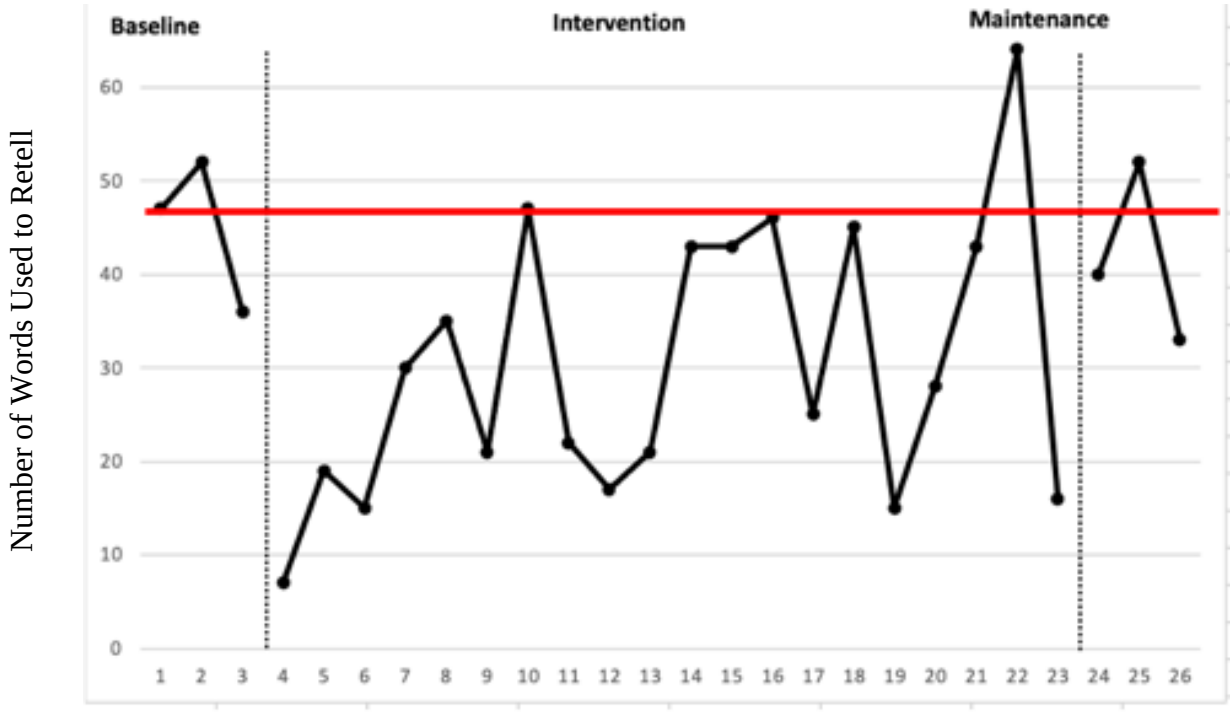
	Maintenance to Intervention	Maintenance to Baseline
Participant One	85%	100%
Participant Two	5%	33%
Participant Three	80%	66%

Figure 5

Number of words used to retell each passage during baseline, intervention, and maintenance phases



Participant Two



Participant Three

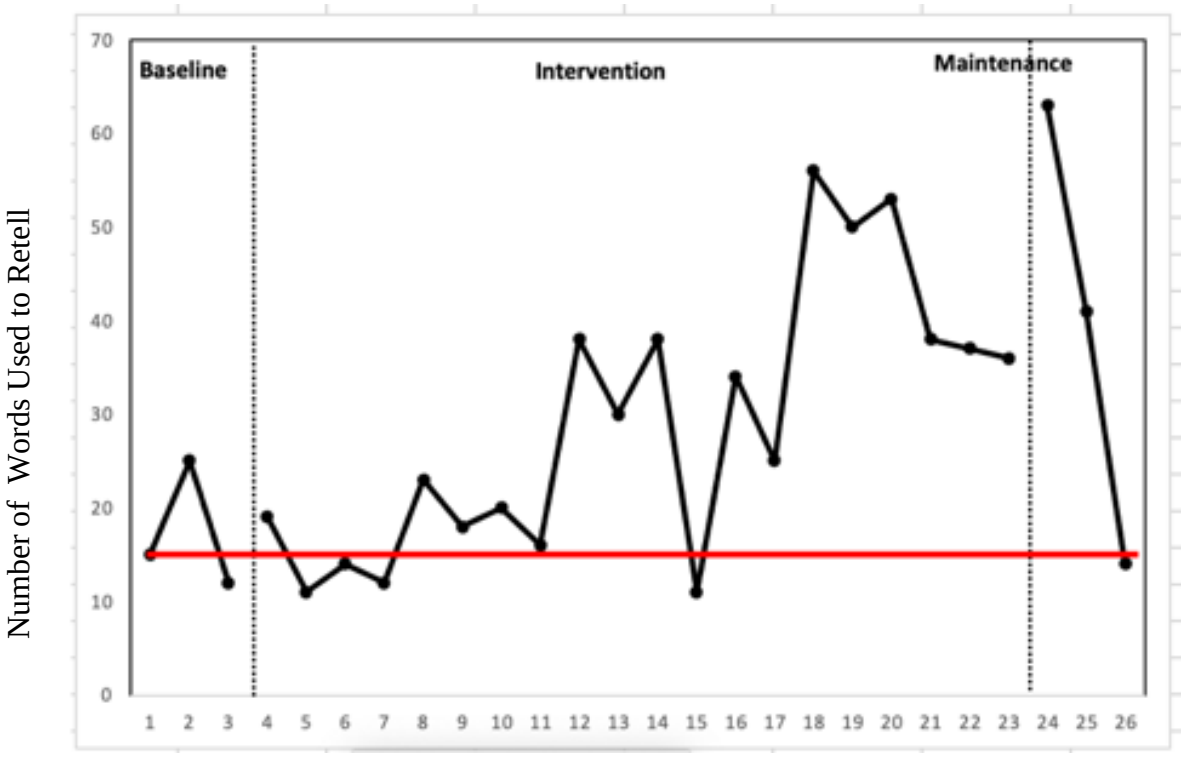


Table 6

Repeated Readings Number of Words Used to Retell Video Passage - Baseline to Highest Reading

Participant One

	Baseline	Best Retell	+/- %
Video # 1	18	35	+ 94%
Video # 2	53	117	+121 %
Video # 3	25	65	+ 160%
Video # 4	16	64	+ 200%

Participant Two

	Baseline	Best Retell	+/- %
Video # 1	41	74	+ 80%
Video # 2	24	35	+ 46%
Video # 3	24	18	- 25 %
Video # 4	19	50	+ 163%

Participant Three

	Baseline	Best Retell	+/- %
Video # 1	6	24	+ 200%
Video # 2	19	42	+ 121%
Video # 3	23	33	+ 43%
Video # 4	47	54	+ 15%

Student Interview and Parent Survey

All students answered seven questions after the last intervention session. The interview only took a few minutes to complete. Table 7 displays the responses for each participant. Participant one said she somewhat enjoyed participating in the study but did not like to hear her voice in the reading videos. She also said she did not enjoy watching her reading videos, and she also said she did not think watching the videos helped her improve her reading abilities. Participant one did not view her reading videos on her own time or show the reading videos to anyone else. However, participant one did say that the repeated readings of the same passage helped and even attributed the readings to a successful test at school on the same topic as one of the reading passages.

Participant two enjoyed participating in the study. She liked how she had a choice of topic and how she could see her progress with the bar graph. She thought that watching her reading video made her a better reader. Like participant one, she did not view her reading video on her own time or show it to anyone else. Participant three also enjoyed taking part in the study

and liked everything about it. He enjoyed watching his reading videos and felt that it made him a better reader. Participant three watched his video once, on his own time with a parent.

All parents felt their child was more confident reading aloud at the end of the study. After participants completed the study, the responses by parents for oral reading engagement were neutral, agree, and strongly agree. All parents said their child's reading fluency had increased since the beginning of the study. As for whether the FFASM helped their child become a better reader, two parents said yes, and one was unsure. The comment for the unsure choice stated she did not know whether it was the repetition of reading the same passage repeatedly or if the self-modelling helped. All parents said the study was not challenging to do in the home, and all said the study was a positive experience. Table 8 displays the responses from a parent for each participant.

Table 7

Student Interview

	Did you enjoy participating in the study?	What did you enjoy about it?	Did you enjoy watching your reading videos?	Do you think watching your reading video made you a better reader?	Did you watch your reading video on your own time?	Did you show your reading video to anyone else?
Participant One	Somewhat	I didn't like to hear my own voice	No	Not Really	No	No
Participant Two	Yes	Choosing my topic and bar graph	Kind of. I thought I could have done better	Yes. It made it easier to read.	No	No
Participant Three	Yes	Everything	Yes	Yes	No	No

Table 8

Parent Survey

	My child is more confident reading aloud	My child is more engaged in oral reading activities	My child's reading fluency has increased	FFASM helped my child become a better reader	Would you use FFASM with your child if you were given assistance?	Study was difficult to do in the home
Participant One	Agree	Neutral	Yes	Not Sure	Not Sure	Strongly Disagree
Participant Two	Strongly Agree	Strongly Agree	Yes	Yes	Yes	Strongly Disagree
Participant Three	Agree	Agree	Yes	Yes	Yes	Disagree

Time

The researcher noted session lengths after each session. All participants spent a similar amount of time in total. The baseline session for each participant was roughly 15 minutes. The 24 reading sessions were always between 8 and 10 minutes. Participants completed the final maintenance measure in under 10 minutes. In total, participants spent around 4 hours, give or take 15 minutes.

Chapter 5 Discussion

Literacy continues to be on the radar of governments, school divisions, and parents. There exist numerous effects of low reading ability, such as adverse health outcomes (Rootman & Ronson, 2015), low income (Heisz et al., 2016) and increased probability of entering the criminal justice system (O'Cummings et al., 2010). Low reading ability in adults persists from their elementary and middle school years. Numerous students are still learning to read when they enter middle school. However, interventions and effective instructional practices are often absent to support students who are still emergent readers.

The purpose of this study was to combine evidence-based literacy practices with FFVAM as part of a middle school RTI support model to increase student reading fluency, comprehension and reader self-perception.

ORF

All participants' reading fluency increased when reading the same passage repeatedly. This supports the findings by Hawkins et al. (2011) that fluency increases due to repeated readings. The more complex the initial reading passage was for the participant, the more they improved their ORF and ORF retell scores.

Participant one had the most remarkable improvement in their ORF scores. When calculating PEM, participant one had 17/20 data points exceeding the median baseline point resulting in an effect size of 0.85, which is effective according to Scruggs and Mastropieri (1998). There was not a significant amount of time between baseline measurements and intervention measurements. ORF ability does not increase instantly and requires time to show improvement. The data points below the baseline median were all in the first half of the intervention session. It is worth noting that the last 11 data points of the intervention phase and

the three maintenance data points were all above the median baseline, resulting in 100% effectiveness when using PEM.

Participant two only had ten intervention data points exceeding the median resulting in an effect size of 0.5, which is ineffective. These results were disappointing since participant two was the most enthusiastic and positive about the study. Participant two also demonstrated the most significant increase in WCPM for the repeated reading passages. Participant two had 2/3 maintenance data points above the median, which does show modest improvement. While participant two demonstrated significant improvement in repeated reading passages, the improvement did not generalize to new reading situations.

Participant three had 16 intervention data points above the median resulting in an effective size of 0.8, which is effective. He had 2/3 maintenance data points above the median, showing an effect size of 0.66, which is questionably effective. Even though participant three began the study as a fluent reader, his fluency level increased throughout the study. All participants' average levels increased from baseline to maintenance. The research by Edmonds et al. (2009) on reading interventions in secondary school settings found that most emergent readers will improve when given explicit, evidence-based instruction.

All participants had their schooling disrupted by the Covid-19 pandemic and, as a result, had a significant break from in-person education. The study began at the same time participants returned to school, either in person or remotely. Participant three started the study with high reading fluency on grade-level material but had challenges retelling and comprehending what he had read. Even though participant three was a fluent reader, he still improved his overall reading fluency on standardized reading passages. When participants had difficulty pronouncing an unfamiliar word during the baseline video reading, they accurately read the word in subsequent

readings after hearing the FFASM video. When participants heard themselves read the word they previously had difficulty pronouncing, they retained the pronunciation and read the word accurately in all later readings. Participant two did not have the same improvement as participants one and three. Participant two only had 10 points above the median. One possible reason could be that they had an outlier during the baseline reading sessions that skewed the results.

ORF Retell

All participants were not accustomed to retelling what they read as a comprehension practice. Participants' ORF retell scores were almost always proportional to their ORF score. As such, if participants read more words, they were naturally able to retell more about the passage or story. These results support Powell and Gadke's (2018) findings that comprehension improves with fluency.

Participant one had 17 intervention data points above the maintenance median, suggesting an effect of 0.85 or a moderate effect. Similar to participant one's ORF results, the last 12 intervention data points were above the median. As well, their three maintenance ORF data points were above the median with an effect of 1.0, indicating strong effectiveness.

Participant two had only one intervention data point above the median, suggesting an effect of 0.05 or a negative impact. It is unlikely that the FFASM would have a negative impact on participants' retell and comprehension. The intervention data points suggest an increasing trend. However, the baseline ORF retell data points were much higher than the initial intervention data points.

Participant three had 16 intervention data points above the baseline median resulting in an effect of 0.8 or a moderate effect. Similar to participant one, most of the intervention data

points below the median baseline occurred in the first half of the intervention phase. If the first four intervention data points were removed, this would have resulted in a 95% increase.

When students are asked to retell a passage, they focus on meaning and are expected to summarize. The likely explanation is the practice of retelling and summarizing rather than FFASM. A study by Wilson et al. (1985) found that the practice of retelling had a significant impact on student comprehension when compared to a control group. Since participant three was already a fluent reader, the practice of retelling likely lead to the increased comprehension score.

Reader Self-Perception (interviews and surveys)

All participants said they enjoyed or somewhat enjoyed being a part of the study. But because they participated in 26 sessions, there were occasions when students were tired, unmotivated, or in a negative mood. When participants were unmotivated to participate, there was often a decline in their ORF and ORF retell data points. Participants two and three both thought that the reading videos improved their reading level. Participant one said the reading videos did not help, but the repeated readings did. All student participants felt that their reading level improved due to the study. Parents thought the study we easy to conduct at home and appreciated the flexible scheduling. Participant two enjoyed how she was able to choose her topic. This response supports Ivey's (1999) research that students' motivation will increase when content is connected to their personal lives. Student choice also complements Barton and Hamilton's (2012) stance on the importance of being connected to literacy in various situations. Guthrie and Davis (2003) and Rasisnki et al. (2017) suggest that students have many meaningful reading opportunities. FFVSM, combined with choice, helps students connect to reading while creating successful reading experiences.

Limitations and Recommendations for Future Research

There were some limitations to the study. First, as with other video self-modelling reading fluency studies, the small participant population does not generalize results to larger populations. The second limitation has to do with the small number of baseline data points. Researchers can collect more baseline data points to ensure an accurate and reliable baseline. For example, participant two's maintenance data points began significantly higher when compared to the beginning of the intervention phase, suggesting an inaccurate baseline. Intervention data points were low, suggesting that the maintenance data points may have been outliers. The third limitation was that the method only focused on repeated readings and ORF retell. Another key component of reading is vocabulary (National Reading Panel, 2000). However, this study aimed to complement classroom instruction by focusing on fluency, and teachers would teach the vocabulary of the passage in the classroom. The fourth limitation was that the participants in this study were not all emergent readers. The fifth limitation is that the study was not conducted in a school setting due to Covid. As a result, the procedures may not generalize to a school setting.

There are a few recommendations for future study that may lead to better outcomes for FFASM. First, future studies may decide to gather more maintenance data points to determine a more accurate baseline and take the average of the data points. Second, researchers should not include intervention data points that occur in the first couple of weeks of the intervention. Recording intervention data points before FFASM has a chance to affect ORF could lower effect sizes. Third, future studies could include participants in the creation of the videos. For example, students could edit the audio after being taught how to do it by the researcher or teacher. Fourth, explicit vocabulary instruction should be considered, especially if the intervention does not match classroom content. Fifth, future research may also want to consider FFASM in various

contexts and how it relates to Barton and Hamilton's (2012) view on the importance of being literate in different and everchanging contexts. To date, studies examining FFVSM and FFASM have been primarily conducted in educational contexts. Sixth, it was highly beneficial to audio record each reading and retell because it allowed for accurate recording. Some studies use interobserver agreement (IOA) to record accurate data, but this can be time-consuming and requires additional trained researchers. Alberto and Troutman (2013) say most researchers aim for an IOA of 90%, but researchers will likely achieve greater accuracy by audio recording data points. Seventh, passages could be drawn from classroom materials ahead of instruction. This would give students exposure to the topic and vocabulary before being introduced to it in the tier-one classroom. As a result, students may have more self-efficacy and confidence going into the new unit of study. Eighth, future studies may include conducting a similar study but in a school setting. For example, there could be short single withdrawals from the class to record the reading video with the researcher. The rest of the study could be done in the classroom with the student listening to their reading video with headphones. Listening to the reading videos with headphones allows students to feel less stigmatized because they are essentially practicing in a private setting. Ninth, future studies may examine passage difficulty for reading videos using a readability index. Tenth, if participants in future studies are all in the same class or school, multiple staggered baselines may lower external variables. Eleventh, future research may want to conduct a similar study during a non-instructional period such as the summer holiday. Twelfth, participants could be differentiated as grade-level readers or readers several years behind. Thirteenth, a more sophisticated measure of comprehension could be used in future studies in addition to the Acadience™ rubric and word count. Components that could be included are

setting, characters, sequence of events, and intended audience. FFASM is an inexpensive, efficient, tier-three intervention that requires minimal time outside the tier-one classroom.

Conclusion

Four conclusions can be drawn from the study. The first conclusion is that, in this case, repeated readings/retell improve fluency and comprehension on the same passage and may generalize to new reading passages. The second conclusion is that giving students opportunities to reread texts until mastery can lead to increased self-efficacy and motivation. The third conclusion is that FFASM can increase the rate at which a student masters a reading passage. The fourth conclusion is that FFASM can be efficient and effective in improving reading fluency and comprehension for some students. Based on these findings, teachers should consider building in opportunities for students to reread curriculum-based passages regularly. Also, it would be beneficial for students to have the chance to retell what they read on numerous occasions. Many students are still learning to read when they enter middle school. Educators should consider the evidence-based practices of repeated readings and retell in their tiered instructional practices. Students that require tier-three additional instruction to achieve gains may need FFASM to increase their reading level. FFASM may be an effective tool to support emergent readers as they develop their reading skills.

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Appendices

Appendix A
Study Approval

UNIVERSITY OF MANITOBA | Research Ethics and Compliance

Human Ethics
208-194 Dafoe Road
Winnipeg, MB
Canada R3T 2N2
Phone +204-474-7122
Email: humanethics@umanitoba.ca

PROTOCOL APPROVAL

TO: **Eric Riediger** **(Advisor: Rick Freeze)**
Principal Investigator

FROM: **Zana Lutfiyya, Chair**
Education/Nursing Research Ethics Board (ENREB)

Re: **Protocol #E2019:085 (HS23198)**
The Effects of Feed Forward Audio Self-Modeling on Reading Fluency, Comprehension, and Reader Self-Perception for English Language Learners

Effective: November 27, 2019 **Expiry:** November 27 2020

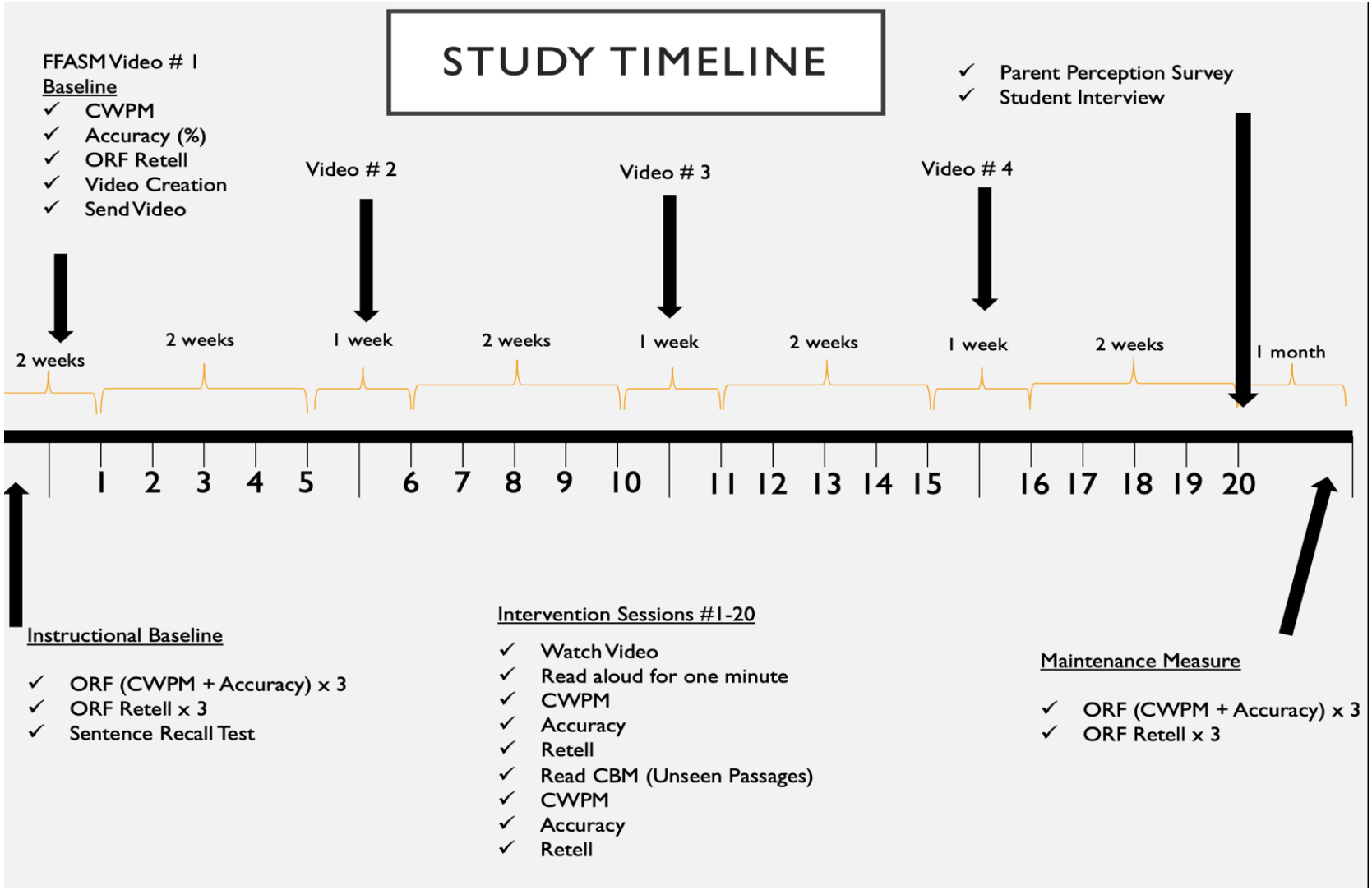
Education/Nursing Research Ethics Board (ENREB) has reviewed and approved the above research. ENREB is constituted and operates in accordance with the current *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*.

This approval is subject to the following conditions:

1. Approval is granted for the research and purposes described in the application only.
2. Any modification to the research or research materials must be submitted to ENREB for approval before implementation.
3. Any deviations to the research or adverse events must be submitted to ENREB as soon as possible.
4. This approval is valid for one year only and a Renewal Request must be submitted and approved by the above expiry date.
5. A Study Closure form must be submitted to ENREB when the research is complete or terminated.
6. The University of Manitoba may request to review research documentation from this project to demonstrate compliance with this approved protocol and the University of Manitoba *Ethics of Research Involving Humans*.

Funded Protocols:
- **Please e-mail a copy of this Approval, identifying the related UM Project Number, to the Research Grants Officer at researchgrants@umanitoba.ca**

Appendix B
Study Timeline



Appendix C
Homeschool Association Email

Dear (Name Withheld),

My name is Eric Riediger and I'm a graduate student at the University of Manitoba. I'm interested in conducting a small reading study. The study will be conducted entirely online through an online learning platform such as Zoom.

This study is open to any student in grades 4-8 that is interested in improving their reading fluency and/or comprehension.

Students must have consistent access to the following 1) laptop, desktop, or tablet 2) working microphone (built in is fine) 3) and a reliable internet connection.

If you think some of your members may interested in participating, please forward the attached poster.

Please click on the link below to see an example of the main part of the study.

(link withheld)

If you have any questions, please feel free to ask.

Best Regards,

Eric Riediger

University of Manitoba Graduate Student
Faculty of Education

Appendix D
Kijiji Post

Ad Title: Participants Needed for a Reading Study!

Description:

Is your child in grade 4-8 and interested in becoming a stronger reader?

Please see the attached poster for more information

Appendix E will be attached to the add as a photo

Appendix E
Study Poster

Participants Needed for a Reading Study!

Is your child in grade 4-8? Are they interested in improving their reading fluency and comprehension using an accelerated learning strategy?

Participation

6 hours over 4 months

15 minutes per session

Online using Zoom

Flexible Scheduling

Scan here to view an example

Please Contact:
umriedie@myumanitoba.ca

This study has been approved by the University of Manitoba's Research Ethics Board.

Appendix F
Letter to Parent

Dear Parent,

Introduction/Purpose

My name is Eric Riediger and I am a graduate student in the Faculty of Education at the University of Manitoba. My research interest is helping students become stronger readers using an accelerated learning technique called feed forward audio self-modeling. My intent is for this research to add to the growing body of knowledge around video self-modeling as a tool to increase student reading achievement. The primary objective of the study is to increase student reading fluency, comprehension and reader self-perception. My research intends to answer the following question:

What are the effects of feed forward audio self-modeling on reading fluency, comprehension, and reader self-perception?

Feed forward audio self-modeling is an accelerated learning technique and teaching tool that focuses on future skills that a person is currently unable to do. It combines skills that a person already has and puts them together in a specific order to produce a new skill. In the case of this study, the new skill will be becoming a more fluent reader. Students will read a text passage with the researcher while being audio recorded. The audio recording will then be edited to remove all errors, prompts and supports. What will remain is the student reading fluently. The audio will then be placed on a still video with the text from the reading passage. Please enter the following link into your web browser to view an example.

(link withheld)

I am writing you to ask permission to conduct this study with you and your child if you fit the inclusion criteria. If you agree, the study procedures described below will begin.

Study Procedures

Participation from you and your child in this study will last for approximately four months.

This online study requires a minimum of three student participants and will accept a maximum of five student participants. The first five signed consent forms received that meet the inclusion criteria will be in the study.

Inclusion Criteria. The study is open to any student in grades 4-8 that is interested in improving their English reading fluency and comprehension.

The following procedures will occur during this study:

a) Collection of baseline data by me on participant's reading fluency, comprehension, sentence recall ability and reader self-perception. This should take approximately 40 minutes and can be done during an agreed upon time with the classroom teacher, lunch, or before/after school.

b) Creation of the feed forward audio self-modeling video. Students will have a choice between two curriculum-based passages. This portion should take approximately 15 minutes to complete.

c) Students will meet with the researcher through an online platform every second day for two weeks. Students will (1) watch and read their video, (2) read one passage measuring fluency and comprehension. Each session should take approximately 10 minutes.

d) steps (b) and (c) will repeat three more times

e) The students will complete a short interview with the researcher at the conclusion of the study to share their thoughts about the learning method. In addition, you will complete a short survey about the learning strategy and whether you noticed any changes in the student's reading ability.

f) Approximately one month after the last reading session, data for reading fluency, comprehension, and reader-self-perception will be collected again.

In total, the time expectation for students will be approximately 6 hours over the course of 4 months.

All reading fluency and retell measures will be audio recorded to ensure accurate assessments. Once measures are accurately determined, the audio files will be permanently deleted.

Ethics

This study has been approved by the Education and Nursing Research Ethics Board (ENREB) at the University of Manitoba. There are minimal anticipated risks or harm associated with this study. All participation is entirely voluntary, and participants are free to withdraw at any time without explanation or consequence. In the event that you would like to stop participating you can inform me or my advisor.

Confidentiality

Participant information will be kept strictly confidential by number coding all documents. All interviews, tests, and files will not have any identifying information on them except an assigned number. All records will be kept in a locked secure area and only my faculty advisor and I will have access to these records. If any participant study records need to be sent or copied, names and all other identifying information will be removed. No information revealing any personal information such as names, addresses, email addresses, and telephone numbers will be linked to assessments and interviews. At the conclusion of the study, all participant reading videos will be permanently deleted. Collected data including fluency and comprehension tests, surveys, notes and interviews will be kept for a duration of ten years after the study has completed and may be used to inform future PhD work. Even though participant data will be kept strictly confidential,

participation in this study may be determined by other students, teachers, and/or the school principal. The results from this study may be presented at educational conferences or published as an article or journal. Again, on any publications, there would be no identifiable information, such as name of school, names of participants, telephone numbers, and emails.

Should you have any questions or concerns, please don't hesitate to contact me. I can be reached at my email account umriedie@myumanitoba.ca, or my cellular phone at (# withheld). If any concerns or complaints arise that you do not feel comfortable bringing to my attention, you may contact my thesis advisor, Dr. Rick Freeze at rick.freeze@umanitoba.ca or the University of Manitoba's Human Ethics Coordinator at humanethics@umanitoba.ca

I am very excited at the possibility of conducting this research with you. Thank you in advance for your consideration.

Sincerely,

Eric Riediger
University of Manitoba Masters of Education Student

Appendix G
Parent Consent Form

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

This research has been approved by the [Education and Nursing Research Ethics Board]. **If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Coordinator at 204-474-7122 or humanethics@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.**

I have read the information sheet and I am aware of what this study involves.

I understand the study procedures and what is expected from me and my child

I understand that I am free to withdraw participation at any time without penalty or consequence. Data from the study cannot be removed 3 months after the first session.

I understand that my son/daughter needs reliable access to a computer (laptop, desktop, tablet), working microphone (built in is fine) and reliable internet access.

I understand that I will need to arrange agreed upon times with the researcher to conduct the study.

I understand that I will be required to complete a short survey at the conclusion of the study regarding my child's reading skills.

I understand that participant data will be kept strictly confidential but there are limits to the confidentiality of this study.

I understand that when completed, this thesis will be accessible through the library at the University of Manitoba which is standard protocol for graduate theses.
I understand that all collected data including fluency and comprehension tests, surveys, notes and interviews will be stored in a locked file cabinet for a duration of ten years after the study has completed and may be used to inform future PhD work. Students' reading videos will be permanently deleted at the conclusion of the study. After ten years has elapsed, all raw data will be destroyed. Electronic files will be permanently deleted and paper files will be shredded. At the conclusion of the study, participant identifying information will be deleted.

I understand that researcher's supervisor will have access to all data collected, but may choose not to view it.

I understand that if I have any concerns or complaints regarding this study I can contact the researcher's supervisor, Dr. Rick Freeze rick.freeze@umanitoba.ca or the University of Manitoba's Human Ethics Coordinator at humanethics@umanitoba.ca

My signature below indicates that I will participate in this study and allow my son/daughter to participate in the study. Please scan and email the consent form to umriedie@myumanitoba.ca or phone (# withheld) to arrange pick up.

_____ _____

Name Signature

_____

Date

If you would like to receive a summary of the results of the study, please provide your email address below.

_____

Appendix H
Information letter to Student

Dear (Student)

Introduction/Purpose

My name is Eric Riediger and I am a graduate student in the Faculty of Education at the University of Manitoba. I'm studying ways to make students stronger readers using an accelerated learning technique called feed forward audio self-modeling.

Click the link to see an example.

(link withheld)

I am writing you to ask if you are interested in participating in this research study. There may or may not be direct benefit to you from participating in this study. We hope the information learned from this study will benefit other people to become better readers in the future. If you do not want participate, you do not have to, even if your parents want you to. If you choose to participate, the study procedures described below will begin. All the results of your tests and answers to interview questions will be kept strictly confidential.

Study Procedures

This study involves you making reading videos similar to the one in the link above.

You will meet with me every second day using an online learning platform for about three months.

Each session will last only 10 minutes. However, the first and last session will be approximately 30 minutes.

You will need to do a few tests but they won't take long.

In total, the time expectation for you will be about 6 hours over 4 months.

The reading videos that you make will not be shared with anyone but you and your parents.

All tests that you do will be kept confidential.

Your name will not be on any documents.

You will need one of your parent's permission to participate in the study.

If at any time you want to stop participating in the study, just tell your parent, or me.

If you choose to stop participating in the study before 3 months has passed since the first session, all your tests and information will be permanently deleted.

If you have any questions, you can ask your parent or me.

Sincerely,

Eric Riediger

University of Manitoba Masters of Education Student

Appendix I
Student Assent Form

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

This research has been approved by the [Education and Nursing Research Ethics Board]. **If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Coordinator at 204-474-7122 or humanethics@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.**

I understand the information sheet and I discussed it with my parents.

I understand the study procedures and what is expected.

I understand that I can stop participating at any time without getting in trouble. Data from the study cannot be removed after 3 months has passed from the first session.

I understand that if I don't want to participate, I don't have to, even if my parents want me to.

I understand that the researcher's supervisor will have access to all data collected, but may choose not to view it.

I understand that if I have any concerns or complaints regarding this study I can contact the researcher's supervisor, Dr. Rick Freeze rick.freeze@umanitoba.ca or the University of Manitoba's Human Ethics Coordinator at humanethics@umanitoba.ca

My signature below indicates that I will participate in this study. Please scan and email the consent form to umriedie@myumanitoba.ca or phone (# withheld) to arrange pick up.

_____
Name

_____
Signature

_____
Date

Appendix J
Parent Perception Survey

Student name: (use code number) Date:

Please highlight the response that best matches your perception of the above named student.

1. Your child is more confident reading aloud after the study was completed.

Strongly disagree Disagree Neutral Agree Strongly Agree

2. Your child is more engaged in oral reading activities after the study was completed.

Strongly disagree Disagree Neutral Agree Strongly Agree

3. Your child's reading fluency has increased.

Yes No Not Sure

4. Do you think the feed forward audio self-modelling helped your child become a better reader?

Yes No Not Sure

5. Would you use feed forward audio self-modelling with your child if you were given assistance with creating the content?

Yes No Not Sure

Comment:

6. The study was difficult to do in the home.

Strongly disagree Disagree Neutral Agree Strongly Agree

Additional Comments:

(Adapted from: Edl, 2007 and Robson et al., 2015)

Appendix K
Student Interview Form

1) Did you enjoy participating in this study? Yes No

Comment:

2) What did you enjoy about it?

3) Did you enjoy watching your reading video? Yes No

4) Do you think watching your reading video made you a better reader?

Yes No Comment:

5) Did you watch your reading video on your own time? Yes No

6) How often did you watch the video?

7) Did you show your reading video to anyone else? Yes No

Additional Comments:

Appendix L
Sentence Recall Test

Code: Date:

Instructions: Please repeat the following words and phrases after I say them.

He eats pizza.	/3
He eats cheese pizza.	/4
He likes pizza and vegetables.	/5
He likes to eat cheese pizza.	/6
She likes vegetables, fruit, beans, and soup.	/7
She plays basketball and soccer with her friends.	/8
He likes to eat cheese pizza at the restaurant.	/9
She likes to play sports with her friends at school.	/10
He likes to eat pizza at the restaurant with his family.	/11
He did his homework at recess and she studied for the test.	/12
She took her phone to get fixed after she noticed it was broken.	/13
She finished her homework because she really wanted to do well on the test.	/14
They drove in the car for a long time, but they still were not there.	/15
Even though he did not play well, he practiced a lot for the next basketball game.	/16

Highest number of consecutive words read correctly 

Appendix M
Baseline Date Recording Sheet

Baseline							
Student Code		Date					
	CWPM	Accuracy	Retell				
ORF Passage # 1 Level:							
ORF Passage # 2 Level:							
ORF Passage # 3 Level:							
	Maximum Number of Words			Able to repeat multisyllabic words			
Sentence Recall Test				Yes No			
Notes:							

Appendix N
Feed Forward Audio Self-Modeling Video Steps

1) In consultation with the student, find/modify or create a high interest curriculum-based reading passage between 250 and 350 words. Give students a choice between two curriculum-based passages. For example, Ancient Rome or Electricity.

Determine passage baseline for participant

2) Have participant read passage aloud for one minute

3) Record correct words per minute and accuracy

4) Participant retells passage for one minute

5) Record response on rubric

6) Participant graphs correct words per minute

Note: to ensure more accurate scoring, audio tape readings and responses to compare to researcher scores. Delete immediately after confirming participant's scores.

Create FFASM Video

7) The researcher and the participant should each see the reading passage on the screen

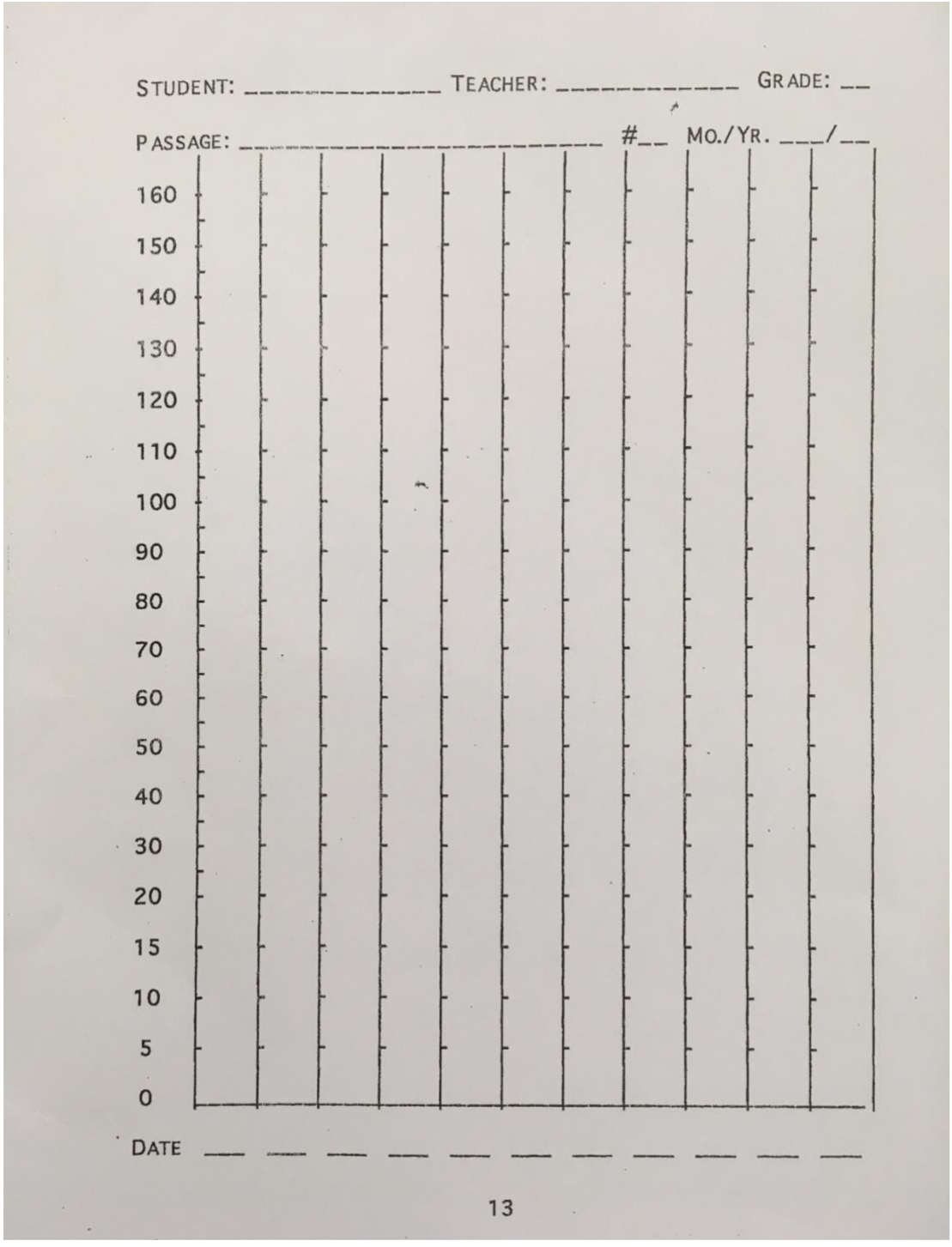
8) Script: "Today we are going to read about_____. We are going to read it together one sentence at a time. I'm going to read the sentence first. While I'm reading it, I want you to slide your underneath the words on your sheet. After I finish reading the sentence, I would like you to read the same sentence aloud. If you make a mistake or have trouble with a word, we will reread the sentence."

9) Choral read the entire passage

10) Edit out all errors, prompts, and supports.

11) Send FFASM video to student/parent or guardian

Appendix O
Repeated Readings Graph



Freeze (2001b)

Appendix P
Practice and Progress Monitoring Session Steps

1) Have student watch their feed forward audio self-modeling video

Note: Remind students to pay attention to the words and follow along with their finger if they have trouble focusing

2) Have students read aloud the passage on their computer screen for one minute. Record the number of correct words per minute and accuracy score.

3) Have students graph their score using the annotate feature on the learning platform.

4) Have students complete CBM reading measure fluency for one minute

5) Record number of correct words read as well as accuracy (%)

6) Oral reading fluency retell for one minute

7) Record response on rubric

Note: to ensure more accurate scoring, audio tape readings and responses to compare to researcher scores. Delete immediately after confirming participant's scores.

Appendix Q
Participant Data Form

Student #						Oral Reading Fluency and Retell Measures			
Session	Date	CWPM	Accuracy	Retell		Passage Name	CWPM	Accuracy	Retell
Baseline									
1									
2									
3									
4									
5									
Baseline									
6									
7									
8									
9									
10									
Baseline									
11									
12									
13									
14									
15									
Baseline									
16									
17									
18									
19									
20									

Appendix R
Participant Session Notes

Student #	

Session	Date	Notes
Baseline		A = + o - Comments:
1		
2		
3		
4		
5		
Baseline		
6		
7		
8		
9		
10		
Baseline		
11		
12		
13		
14		
15		
Baseline		
16		
17		
18		
19		
20		

Appendix S
Post Study Maintenance Data

Maintenance							
Student Code		Date					
	CWPM	Accuracy	Retell			Score	
ORF Passage # 1 Level:							
ORF Passage # 2 Level:							
ORF Passage # 3 Level:							
Notes:							