DIFFERENCE IN READING FLUENCY AMONG FIFTH GRADE STUDENTS ATTENDING TRADITIONAL, STEM-RELATED, OR DLI PROGRAMS DURING SOFT SCHOOL CLOSURES

by

Patricia Blanton

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

Liberty University

2021

DIFFERENCE IN READING FLUENCY AMONG FIFTH GRADE STUDENTS ATTENDING TRADITIONAL, STEM-RELATED, OR DLI PROGRAMS DURING SOFT SCHOOL CLOSURES

by Patricia Blanton

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

Liberty University, Lynchburg, VA

2021

APPROVED BY:

Jessica Talada, Ed.D., Committee Chair

Michelle J. Barthlow, Ed.D., Committee Member

ABSTRACT

The purpose of this quantitative causal-comparative study was to raise awareness of the effects of soft school closures on student reading fluency in traditional, Science, Technology, Engineering, and Mathematics (STEM)-related, or Dual Language Immersion (DLI) schools. There is little research on which type of school, whether traditional, (STEM)-related, or (DLI) program is the most effective at helping students retain or improve upon their reading fluency once those students have been in an extended soft school closure. The study used Acadience reading fluency scores from the students' fourth grade mid-year scores as the covariate and their fifth grade mid-year scores as the dependent variable. The independent variable was the type of school program students were enrolled in. The participants were a convenience sample from the same school district and included 434 fifth grade elementary students. The data collected included the type of school students attended and Acadience reading information. An analysis of covariance (ANCOVA) determined the differences between the independent variables. This study resulted in the rejection of the null hypothesis. Type of school did have a significant effect on posttest Acadience fluency scores. It appeared that the DLI group had the highest posttest fluency scores compared to the traditional and STEM-related groups. Recommendations for the future would be to include a larger and more diverse group of students, having the study conducted in more geographical areas, include more grade levels, and include other types of school programs.

Keywords: ANCOVA, DLI, reading fluency, school closure, STEM, STEAM

Dedication

This dissertation is dedicated to my family. Without their love and support, I would have never been able to achieve my dream of becoming a Doctor of Education. They are the people nearest to my heart. Higher education was not something expected of me when I was younger. I am a first-generation college student, so this endeavor has been arduous.

Thank you to my husband, Danny, for supporting me in all my wild endeavors and picking up the slack when I could not. Without his strength, I would not have made it this far. He has made it possible for me to achieve many things throughout our marriage, and he has always been my rock. I appreciate all your hard work, determination, and support.

To my children, never stop believing in yourselves. The two of you are more than I could have ever dreamed was possible. My love for you is immense. The two of you have your own unique qualities, and I would not trade either of you for anything in the world. To my daughter, always remember that I am impressed with your drive and dedication. To my son, you inspire me to take joy in life because you are so full of life and love. You two remind me daily of what is truly important in life. I hope my journey has proven to you that education is important and that nothing can stand in your way.

To my guardian angels, thank you for watching over me and giving me the strength and courage to never give up. It is because of all my family that I was able to complete my doctoral journey.

Acknowledgments

Thank you to my chair, Dr. Talada. I wish to express my sincere gratitude and thanks. Without your support and guidance, I would have never achieved my goal. Your feedback was always helpful, and it pushed me further in my thinking. You were always so kind, helpful, and responsive. You were always positive with me, even when I may have been a little frazzled. You mentored me every step of the way, and for that, I am forever grateful. Without your support, I would not have completed this journey so successfully. Thank you from the bottom of my heart.

An additional thank you goes out to Dr. Barthlow. I met Dr. Barthlow during my coursework as I took a course she was teaching. She was the first professor I met over video conferencing. Her guidance then allowed me to narrow down my topic. She also guided me towards the type of analysis my study would need. From the start, she made me feel important. Without her, I would not be on the path I am today. Since then, she advised me of my chair member selection, and she became my committee member and methodologist. In this role, she was supportive and gave excellent advice. I never thought I would be able to analyze quantitative data, but she was encouraging and gave me tips on how to do so. Thank you so much.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

Analysis of Covariance (ANCOVA)

Analysis of Variance (ANOVA)

coronavirus disease 2019 (COVID-19)

dual-coding theory (DCT)

Dual Language Immersion (DLI)

Dynamic Indicators of Basic Early Learning Skills (DIBELS)

English language learners (ELL)

electronic school (E-school)

grade point averages (GPAs)

Gray Oral Reading Test (GORT)

Institutional Review Board (IRB)

International Literacy Foundation (ILF)

Iowa's Iowa Tests of Basic Skills (ITBS)

measures of academic progress (MAP)

National Assessment of Educational Progress (NAEP)

National Early Literacy Panel (NELP)

National Institute of Child Health and Human Development (NICHD)

National Reading Panel (NRP)

Northwest Education Association (NWEA)

oral reading fluency (ORF)

Pennsylvania System of School Assessment (PSSA)

post-traumatic stress disorder (PTSD)

Science, Technology, Engineering, Art, and Mathematics (STEAM)

Science, Technology, Engineering, and Mathematics (STEM)

self-efficacy theory (SET)

self-determination theory (SDT)

socioeconomic status (SES)

Statistical Package for the Social Sciences (SPSS)

Texas Assessment of Knowledge and Skills (TAKS)

United States Department of Education (USDOE)

University of West Alabama (UWA)

Utah State Board of Education (USBE)

Wechsler Individual Achievement Test (WIAT-III)

Woodcock-Johnson Tests of Achievement (WJ-IV)

words per minute (WPM)

CHAPTER ONE: INTRODUCTION

Overview

The purpose of this study was to see if students in traditional: Science, Technology, Engineering, and Mathematics (STEM)-related; or Dual Language Immersion (DLI) based programs had changes in their reading fluency scores due to coronavirus disease 2019 (COVID-19) related closures school program and what impacts, if any, these school programs have on students who have been forced into school soft closures for more than four months. In this study STEM-related included schools that teach STEM classes or Science, Technology, Engineering, Art, and Mathematics (STEAM).

Chapter 1 will discuss the recent forced closures of schools due to COVID-19 pandemic and more specifically the reading fluency test scores. Discussion in this chapter includes the problem statement which will include research from previous studies. Also discussed are the purpose of this study and the significance of this study. Lastly, the research question for the study will be revealed.

Background

Recently, schools have had to close due to the COVID-19 pandemic forcing students into soft school closures. Soft school closures meant that students had to stay at home and learn online and remotely rather than come to school (Herbert, 2020). The expectation was that students in Utah were to learn remotely for 2 weeks (Herbert, 2020). The intention of doing a soft school closure was to increase telework for teachers, ensure the retention of school district employees, and limit the number of people in school buildings (Herbert, 2020). In Utah, soft school closures were in effect to slow the infection rate of the coronavirus and increase social distancing (Herbert, 2020). This soft school closure remained in effect for longer than the two-

week period and extended through the end of the 2020 school year (Herbert, 2020). Often, each district mandated its expectations for students and teachers during this time. Many schools were in soft school closure for 5 months because of the coronavirus disease 2019 (COVID-19) pandemic, which meant students missed vital literacy instruction during that time. Since students missed vital literacy instruction, it is critical to determine, which type of school best supports student achievement and reading fluency.

There has long been a focus on student achievement and reading fluency in the education realm (Chiu et al.,2017). Due to school closures, students could not receive in-person reading instruction. Reading on grade level is vital for all students' future academic success. Torgesen and Burgess (1998) explained that if students are not reading on grade level as early as the end of first grade, they may never make the gains unless they have access to intense intervention. Additionally, Stanovich (1992) reiterates this by stating that the achievement gaps between strong and struggling readers continues to grow each year unless students receive an intervention. If students are not reading on grade level, McIlraith et al., (2016) believe this will impact their further academic career, as well as, have an impact on their lives. If by the end of third grade students are not reading on grade level, they may never read on grade level (Schechter et al., 2015). Students in soft school closure miss reading instruction including vital literacy interventions.

As of late, there is also immense pressure placed on students to get the best education possible so that they can attend prestigious universities (Mahnken, 2018). School closures for so long meant that students may not have received the best education during that time. Black (n.d.) explained that it has become harder to get into the top universities. Part of this is due to the fact that universities now have common applications which makes applying to more colleges easier

for students (Black, n.d.) Parents are also concerned about starting the educational journey of their students as early as possible. Some parents enroll their students in highly competitive elementary schools as soon as their children are born (Mahnken, 2018). Many parents enroll their children in highly competitive preschool preparatory classes (Mahnken, 2018). These days, many parents are highly concerned with the early education their children receive. With this intense focus on early education, many parents have enrolled their children in Science, Technology, Engineering, and Mathematics (STEM)-related or even Dual Language Immersion (DLI) programs hoping to give their children a leg up on the competition. Studying the effects that these school programs have on fluency will help parents make the best choice for their children. Additionally, knowing which school type best supports fluency during soft school closures will further help support parents in their selections of schools.

Historical Overview

In the past, schools ran in a traditional fashion where students of many different ages were in one schoolhouse (Leinster-Mackay & Silver, 1996). Eventually, students were together based on their ages and placed into grade levels (Leinster-Mackay & Silver, 1996). This latter model is still in use, but with other educational experiences offered to students. Some students still attend a traditional school while others attend DLI programs for introduction to other languages. In contrast, others might get to experience STEAM education (Mahnken, 2018). In all these schools, student achievement has long been a focus, along with student reading comprehension and fluency levels (Chiu et al., 2017).

Reading is a very difficult task, and it progresses over time. Due to this, the number of students reading below level is high. Student reading levels have long been a topic of research. Harty and Kanfush (2019) explained the recent completion of considerable progress in

addressing effective reading instruction. However, Harty and Kanfush claimed that more research is necessary on low-achieving adolescents. When the number of students not reading on level become too much to bear, Congress grew concerned. Congress formed the National Reading Panel [NRP] (National Institute of Child Health and Human Development, NICHD, 2000). They began to look at the skills necessary to become a proficient reader. Among these skills are phonics, phonemic awareness, vocabulary, fluency, and comprehension (NICHD, 2000).

Society-at-Large

After the coronavirus pandemic hit, many students had to use online learning environments during the soft school closures. These types of learning environments are a challenge for some students. Vaculíková (2018) studied student engagement in online learning with student achievement. In this study, some parts of the online course were predictors of how well students would do (Vaculíková, 2018). The author also noted that online learning would continue to be a large part of the education realm in the future. During the pandemic, Gewertz (2020) explained that teachers believed their students were not spending as much time learning in their online learning environment as they did before. Education Trust (2020) believed learning for students was inhibited because many low socioeconomic students lacked proper equipment. Kanniainen et al. (2019) studied the effects of online learning environments with students and their comprehension and fluency levels. The authors found that struggling readers face difficulties when faced with online learning environments. No matter the reasons for online learning, there seems to be evidence that students struggle with these learning environments.

There have been studies on DLI schools and their effects on student achievement (Barac et al., 2014) Tedick and Lyster (2019) explained that there have been positive outcomes for

students immersed in a second language through DLI. The authors stated that how these DLI programs are implemented increases the likelihood of how successful the programs are for students. The United States Department of Education (USDOE, 2015) believed that society benefits from cultural interactions like those found when people learn different languages. Dual language programs improve students social and cognitive growth (Howard et al., 2018). Additionally, Barac et al. (2014) said that dual language learning provides cognitive as well as language benefits for students. Another benefit of dual language programs is that students enrolled in them, can use a variety of reading strategies when reading (Bourgoin & Dicks, 2019). Parents wanting the best education for their child may consider DLI school programs because they have a positive effect on student learning including reading.

STEM and STEAM schools have ties to student achievement. Johnson et al. (2015) stated that STEAM education focuses on cross-curricular instruction. Originally, art education was not a part of STEM education, but more of an emphasis placed on humanities so that there is a balance between curriculum and education of students (Johnson et al., 2015). Grant and Patterson (2016) explained that the popularity of STEAM programs has been on the rise since 2013. Yakman (2008) believed students should have exposure to the type of things education that they will encounter in the real world. Therefore, students should have exposure to STEM or STEAM education. Boy (2013) explained that STEM education prepares students to solve real-world problems.

Kim and Ko (2018) remarked that the way in which STEAM schools are implemented also ensures the effectiveness of these school programs. The authors believed that teacher effectiveness is one of the best predictors for the success of these programs. Teachers need

excellent training and encouragement to collaborate (Kim & Ko, 2018). When implemented well, these STEAM programs can help students have high achievement (Kim & Ko, 2018).

Theoretical or Conceptual Background

This study focuses on reading fluency, so this study will use LaBerge and Samuels' (1974) theory on automatic information process. This theory lends itself to reading fluency because students can automatically process information are able to decode words quickly and this allows them to focus more of their attention on more complex tasks like comprehension (Samuels, 2007). Samuels (2006) explained that the ability to recognize words automatically is crucial to reading fluency. Deci and Ryan's (1985) self-determination theory (SDT) will also guide the study. This theory asserts that to motivate people specific psychological needs must be met. These needs include relatedness, competence, and autonomy (Deci & Ryan, 1985). Finally, Bandura's (1997) self-efficacy theory (SET) will also guide this study. Self-efficacy is the belief in one's abilities and is the basis behind motivation (Bandura, 2004). These theories focus on fluent reading, student motivation, and the way in which students feel about themselves and their environments.

Problem Statement

It is important to study which types of schools, traditional, STEM-related, or DLI schools, are the best equipped to help students read fluently. There is such a great emphasis placed on schools and teachers to ensure that students are reading on grade level especially by the end of third grade (Schechter et al., 2015). If students are not reading on grade level by the end of their grade, their chances of ever reading on grade level are diminished (Schechter et al., 2015). Getting students to read on grade level remains an area of great focus for school districts and teachers. With so much emphasis placed on the best education for students and reading

preparedness, there are questions and concerns about which type of education supports student academic success in the best way. Erbeli et al. (2017) claimed that proficiency in reading and reading comprehension are predictors of academic success. The question then becomes which type of school gets more students reading proficiently. When students lack early literacy skills that becomes a critical reason students have reading difficulties (Zorfass & Urbano, 2008).

There is an emphasis on reading fluency and its link to comprehension (Samuels & Farstrup, 2006). Students who can read fluently are able to understand what they read (Samuels, 2006). LaBerge and Samuels (1974) theory on automatic information process lends itself well to fluent reading because automatic information process is the ability for students to decode words quickly without a lot of devotion into the task (Samuels, 2007). Samuels and Farstrup (2006) explained that the theory of automatic information process focuses on word recognition. Readers who can automatically read and decode words are able to focus on more difficult tasks like comprehending what one is reading (Tracey & Morrow, 2012).

For centuries, the education system has relied on face-to-face interaction within a traditional school setting (Lovenheim & Walsh, 2017). Some people use online learning, but most people still use face-to-face interaction (Lovenheim & Walsh, 2017). The authors reported that from 1993 to 2007, the percent of public-school students who attended their assigned school went from 80% to 73%. This increased the number of alternative schools offered such as charter schools, online schools, and school district choice programs (Lovenheim & Walsh, 2017). Those who do partake in online instruction have varying achievement levels based on their ability to utilize resources (Soffer et al., 2019).

This problem affects most the earth's population, and there is a chance that another pandemic could hit. Much like other viruses, the possibility for another virus to create a

pandemic is possible. Since this chance of another round of this pandemic exists, it is beneficial to understand what will happen to students who must learn online for extended periods of time and how it will affect their academic achievement. It is also important to know which type of school, traditional, STEM-related, or DLI is the most effective type that will keep students' reading fluency at or above where it regularly would have been after a school disruption. There are cultural, academic, linguistic, and societal benefits to DLI programs (Barac et al., 2014). STEAM schools offer students problem solving and inquiry skills (Johnson et al. 2015) and a way in which to solve problems of the world in real context (Boy, 2013). Additionally, STEAM education helps create economic solutions and increase empathy in students (Catterall, 2017). The literature points to the effectiveness of these programs, but not as to which type of program best prepares students to be fluent readers in the face of soft school closures. There is a gap in the literature as it pertains to this problem. If left unstudied, students will suffer because society will not know which type of school setting provides optimal results for student learning. Since it is important for students to be reading on grade level by third grade (Schechter et al., 2015), it is also essential to know, which school setting is the most effective at helping students retain their reading fluency once those students have been in an extended school closure. The problem is that the literature has a gap concerning which type of school program best helps students retain their reading fluency when these students are in soft school closures.

Purpose Statement

The purpose of this current quantitative causal-comparative study was to raise awareness of the effects of soft school closures on student reading fluency in traditional, STEM-related, or DLI schools. According to the Utah State Board of Education (2020), soft school closures meant the suspension of in school instruction, with instructional services occurring remotely. In Utah

soft school closures started in March 2020 and continued until August 2020 (USBE, 2020). This current study focused solely on fifth grade students who attended either a traditional, STEM-related, or DLI school in a public education system. If this study shows that student reading fluency levels are affected, society can determine which type of school setting is the most conducive to student achievement.

This current study evaluated students in one county in Utah. The participants were students enrolled in fifth grade public education classrooms during the 2020-2021 school year. The independent variable was the type of school program which included traditional, STEM-related, or DLI school programs. According to the Utah State Board of Education (2016), the Dual Language Immersion (DLI) programs offers young students an experience of rich bilingual education where they receive instruction in two high-quality classrooms. One classroom is English, and the other classroom is a second language which may include Chinese, French, German, Portuguese, or Spanish. What is steam education (2021) explained that STEAM education is the integration of art into STEM education. Daugherty (2013) stated that STEM education is the incorporation of science, technology, engineering, and mathematics in education.

In this current study, the dependent variable was the students' Acadience scores. According to Acadience Learning Inc. (2019), the definition of these Acadience scores is each student’s oral reading fluency (ORF). A comparison of the mid-year Acadience ORF scores of these students in fifth grade was made to their mid-year Acadience ORF scores from fourth grade. The covariate in this current study was the pretest scores for each student based on their mid-year Acadience ORF score from last school year. This current study included more than 400 fifth grade elementary school students.

Significance of the Study

The coronavirus has disrupted schools around the world and caused them to shut down, which has affected many elementary students. With this shutdown, teachers had to learn how to teach and engage with students online quickly. Im and Kang (2019) claimed that teacher self-efficacy and student self-regulation play a significant role in student achievement in online learning environments. Although school choice has been prominent in recent years (Lovenheim & Walsh, 2017), the school closures forced students into online learning, which was not by their choice.

The world of education is facing the new issue remote learning at a magnitude has never happened. Although online learning is not new (Lovenheim & Walsh, 2017), it is new in that online learning had been a choice. However, the pandemic made it a non-negotiable option. This issue is affecting countless students and teachers across many nations, which in turn has spawned studies about student achievement and its effects on learning in online classrooms. Vaculíková (2018) explained that analyzing the effects of online learning as it pertains to student achievement is very important. These unprecedented times means that any research on this topic is very new because a most elementary students have not had to lean in an online environment.

This current study is significant to educators, parents, and stakeholders alike. It helps them become aware of which type of school programs are best equipped to help students recover from any reading deficits after forced soft school closures. This currents study adds to the existing body of research because it looked at each of the types of school setting and how they contribute too student achievement. Soffer et al. (2019) conducted a study on the effects of online instruction, Chiu et al. (2017) and Schechter et al. (2015) also conducted studies on student achievement especially in terms of rereading fluency. Aro et al. (2018) studied reading

fluency and the effects of intervention on study reading fluency. Of importance to this research are the past studies looking at which types of schools contributed to student achievement.

Studying this topic allows more educators to know and understand the implications of what online learning can do to their students' academic achievement levels. Chiu et al. (2017) had focused their research on student achievement and reading fluency. However, this did not look at which type of school program prepared students best for reading fluency once school resumed.

Analyzing this problem is critical during this time of worldwide crisis. If it is found that one type of school is better equipped to help students retain fluency or even increase fluency, this information can be used throughout the world.

Research Question

RQ1: Is there a difference in reading fluency among fifth grade students attending traditional, STEM-related, or DLI programs following school closure when controlling for fourth grade achievement?

Null Hypothesis

$H_0$1: There is no statistically significant difference in reading fluency among fifth grade students attending traditional, STEM-related, or DLI programs following school closure when controlling for fourth grade achievement.

Definitions

The following terms are pertinent to this study and used throughout this paper.

1. *Acadience* – The new name for reading assessment test used in by many school districts. It was previous named Dynamic Indicators of Basic Early Learning Skills (DIBELS).

This test assesses reading comprehension, fluency, and accuracy of students (Dewey et al., 2014).

2. *Dual Language Immersion (DLI)* – Dual language is two-way bilingual education where students receive English instruction half of the time they are at school and another language which could be Chinese, French, German, Portuguese, or Spanish (USBE, 2020).
3. *Soft School Closures* - According to the USBE (2020), soft school closures are the suspension of instruction that happens in brick-and-mortar schools. Instruction occurs remotely. Utah schools faced soft school closures in mid-March 2020 (USBE, 2020), and they lasted until the next school year began in August 2020.
4. *STEAM* – The adding of arts education to STEM education (White, 2020).
5. *STEM* – The integration of science, technology, engineering, and mathematics (STEM) in education. An education realm where learning is in context and real-world problems are solved (Daugherty, 2013).

CHAPTER TWO: LITERATURE REVIEW

Overview

The purpose of this study was to raise awareness of the effects of soft school closures on student reading fluency in traditional, STEM-related, or DLI schools. This chapter consists of multiple sections including the theoretical framework, which explains the guiding theories for the study. It examines the theory of automatic information process in reading, self-determination theory (SDT), and self-efficacy theory (SET). Next, the chapter presents literature related to the background of early literacy, the components of good readers, the subskills of reading including fluency, how measure fluency, and Dynamic Indicators of Basic Early Learning Skills (DIBELS). Additionally, a discussion of school closures and their general effects. The chapter continues with discussions of summer learning losses and the projected impact of the coronavirus on school closures. Another discussion on choice of school programs, why parents choose these programs, and the discussion continues about STEM-related and DLI programs. The organization of this information is by common themes that emerge. Finally, the chapter concludes with a summary of the major findings.

Theoretical Framework

The theoretical framework for this study is three different theories. They link together crucial ideas with regards to reading. The three selected theories for this study include the theory of automatic information process in reading (LaBerge & Samuels, 1974), self-determination theory (Deci & Ryan, 1985), and Bandura's (1997) self-efficacy theory. These theories address learning influences, such as motivation, student behaviors, and reading fluency. These selected theories are essential to address because they shed light on the influences on reading both inside and outside the classroom.

Theory of Automatic Information Process in Reading

This theory dates to 1974, when theorists LaBerge and Samuels realized decoding words automatically meant that students could more fully understand what they were reading. Automatic information processing is the recalling of information automatically so that one does not need to pay attention or put in much effort to complete a task (Samuels, 2007). This theory focused on word recognition (Samuels, 2007). Automaticity in reading means readers need to master content that is easier, such as decoding, to do harder tasks like comprehending.

LaBerge and Samuels (1974) believed that early recognition of letters through repeated readings should occurs with students by teachers. The definition of repeated readings is students rereading a particular short passage until students reach a certain criteria level (Kann, 1983). Then, teachers would be able to focus on letter sounds with students (LaBerge & Samuels, 1974). LaBerge and Samuels (1974) explained that there are many approaches to repeated readings. These could include choral reading, reader's theater, and even modeling reading (LaBerge & Samuels, 1974). Choral reading is a reading technique where students all read aloud together (Kodan & Akyol, 2018). Reader's theater helps improve student reading fluency through reading prepared scripts (Young & Rasinski, 2017). Each student takes part in reading parts aloud (Young & Rasinski, 2017). Modeling includes the teacher modeling proper reading techniques like inflection, speed, and tone (Coogle et al., 2020). What matters most is practice, repetition, and error correction (LaBerge & Samuels, 1974).

According to the theory of automatic information processing, reading fluently is the ability to decode words while simultaneously being able to comprehend a text (Samuels, 2007). There are many skills that accompany the ability to read a text. These include letter recognition, sounds associated with letters, segmenting words, chunking letters together, and the ability to

blend sounds (Tracey & Morrow, 2012). Readers use focus and energy when reading a text. When more focus and energy are necessary to decode words, comprehension falters (Tracey & Morrow, 2012). Hence the reason Samuels (1979) created the repeated reading strategy based upon automaticity. The premise is that with repeated readings, readers are more confident with what they are reading, and higher-level processing skills such as comprehension increase (Samuels, 1974).

Being able to recognize words automatically is a central component of fluency, and fluency allows readers to comprehend (Samuels, 2006). The factors which make automaticity in reading are speed, effortlessness, autonomy, and lack of conscious awareness (Kuhn et al., 2010). These factors together form automaticity (LaBerge & Samuels, 1974). Students who are fluent readers can blend word sounds in each word they encounter automatically. The more students can decode words, the more they can decipher unknown words, and they will become even more fluent readers. Knowing how the theory of automatic information process helps students become fluent readers, would suggest that schools who have fluent readers would incorporate this theory. Determining which type of school has the most fluent readers will also likely point out which school uses this theory to build fluent readers.

Self-Determination Theory (SDT)

SDT by Deci and Ryan (1985) is the theory that certain psychological needs must be met to motivate people. These needs include relatedness, competence, and autonomy (Deci & Ryan, 1985). In the classroom, relatedness is the sense of belonging that students feel (Dweck, 2010). Competence is the student's belief that they can accomplish a task (Ryan & Deci, 2000). Finally, autonomy is the student's sense of being in control and having a choice (Ryan & Deci, 2000).

According to SDT people are more inclined to engage in activities when they have a sense of relatedness, competence, and autonomy (Deci & Ryan, 2000). When student needs are met, the students are better able to cope, and their academic success improves (Dweck, 2010). Pintrich (2003) explained that intrinsic motivation is when a person truly wants to achieve a task because they see the value of the task. Extrinsic motivation is the desire for a person to participate in an activity because of a tangible benefit (Eccles & Wigfield, 2002). Guthrie and Wigfield (2000) reported that reading motivation is "the individual's personal goals, values, and beliefs with regards to the topics, processes, and outcomes of reading" (p. 405). Reading motivation is a substantial contributor to student reading achievement, according to Biancarosa and Snow (2006). This relates to reading fluency because when students have their needs met in the classroom, they are more likely to be motivated and become successful readers. Dweck (2010) stated that self-determination leads to students who succeed academically because their needs are met. When chools that have students who are self-determined, the school will likely have students with more and better fluency in reading.

Relatedness

The first philosophical need necessary for SDT is relatedness (Deci & Ryan, 1985). Baumeister and Leary (1995) explained that relatedness is how attached and secure one fells in the company of others. Relatedness is the connection people feel with others (Ryan & Deci, 2000). When people feel like they are a part of things or like they are wanted in their environments, they become motivated and they persist longer in their pursuits (Ryan & Deci, 2000).

Competence

According to Deci & Ryan (1985), the next philosophical need necessary to increase motivation in SDT is competence. Competence refers to how people interact with their environments. When a person feels competence, they show a desire to display those competencies (Baumeister & Leary, 1995). Additionally, people will search for opportunities to display their competence (Baumeister & Leary, 1995). Competence alone cannot make someone successful. Hence the link with relatedness and autonomy. Once a person feels competence that they can complete a task, they are in control, and they feel like they can make decisions. They are more likely to put their skills to good use (Ryan & Deci, 2000). Once an individual puts their skills to use and finds success with it, this perpetuates the competence of the person (Deci & Ryan, 2012).

Autonomy

Finally, autonomy is the last philosophical need necessary in the attainment of SDT (Deci & Ryan, 1985). In SDT, autonomy refers to the sense of being in control of one's environment and having a choice in one's actions within that environment (Deci & Ryan, 2000). When people have autonomy, they initiate and can even regulate their own behaviors and engagement in an activity because they have choices and can make decision (Baumeister & Leary, 1995; Deci & Ryan, 2000). Students who have autonomy, have higher intrinsic motivation (Deci & Ryan, 2000). Deci and Ryan (1985; 2000) explained that autonomy does not mean that people are making all the choices for themselves, nor does it mean people are independent and free to do whatever they want. Individuals receive support in making decisions with input from others (Deci & Ryan, 1985; 2000).

Self-Efficacy Theory (SET)

Bandura's (1997) SET is the perceptions and beliefs a person has about their ability to perform tasks. SET is a theory widely applied when discussing motivation of individuals (Bandura, 2004). This theory helps to explain behavior patterns and the need for change in individuals. People need these factors to change: knowledge, goals, facilitators of change, outcome expectancy, and self-efficacy. The highest proponents of change are having self-efficacy and outcome expectancy. If one can have high self-efficacy, they can lead themselves to higher outcome expectancies, increasing their chances of reaching their goals.

Students who exhibit high self-efficacy persist longer in tasks, have fewer negative reactions when tasks go wrong, and work more regularly than their peers who have low self-efficacy (Bandura, 1997). Bandura (2004) posited that self-efficacy is the "foundation of human motivation" (p. 144). Students who exhibit low self-efficacy avoid reading tasks and withdraw from reading activities when the reading becomes more challenging (Guthrie et al., 2007). Wilson and Trainin (2007) found that students who exhibited high self-efficacy in language arts, including spelling, writing, and reading, had higher achievement levels in reading. According to these authors, students who have high self-efficacy, end up having higher achievement levels in reading. Additionally, Mucherach and Yoder (2008) found that students with high self-efficacy in reading also had higher standardized test scores than their peers who had lower self-efficacy. Schools that implement self-efficacy will have students who believe in their reading abilities and will have higher fluency levels.

Rationale for the Theories

This research looked find a statistical difference in reading fluency scores in fifth grade students based on the type of school program they attend following soft school closure. The

theory of automatic information process is a good fit for this research since automatic reading has a link to reading fluency. Self-determination theory focuses on student motivation, and motivated students are more likely to put in the effort needed to know words and become fluent readers. Having a high self-efficacy would imply that students would have high fluency scores.

Related Literature

Assessment data, as displayed in the news, often depicts a bleak outlook on how students in the United States are doing on standardized tests. In 1997, Congress asked for the formation of the National Reading Panel (NRP) because the data for reading appeared to be so bleak (NICHD, 2000). According to the National Assessment of Educational Progress [NAEP] (2017) there had not been a noticeable difference in reading trends since 1992, indicating that reading performance has stayed stagnant for many years. A lack of early literacy skills has been the major reason for reading difficulties (Zorfass & Urbano, 2008). Schechter et al. (2015) explained that students not reading on grade level by third grade may never reach the same level as their peers who are reading on level.

The significance of reading and the impact of reading fluency are important to understand. Outlined here is information about early literacy and the components of a good reader followed by information on how to measure reading fluency. The next section will include the soft school closures in Utah, the effects school closures, and the projected effects of COVID-19 on student learning. Finally, the discussion will center on the topics of why there are choices in schools and why parents might choose different school types. All this literature points to the fact that reading fluency is an imperative skill for students to acquire, that school closures are harmful to students learning, and that different types of schools have various benefits for student outcomes.

Early Academic Literacy

Torgesen and Burgess (1998) explained that longitudinal data showed that students who are poor readers at the end of first grade rarely achieve average grade-level reading achievement by the end of their elementary academic career unless they have intensive intervention and remediation. Stanovich (1992) explained that the gap between strong readers and struggling readers continued to grow each year unless there are intense interventions in the early elementary years. McIlraith et al. (2016) discovered that assessments from students as young as kindergarten and first grade could predict reading problems and other issues in students that could impact their academic career and life. Schechter et al. (2015) explained that the gap continued to grow and that students who are not reading on grade level by the end of third grade, run the risk of never meeting expected reading standards.

Overall, reading ability, comprehension, and proficiency become supported by vocabulary (Wright & Cervetti, 2017). Students who do not grow in vocabulary acquisition and word identification will often have limited growth in their reading comprehension, and this will have lasting effects on the student's academic career (NRP, 2000). To narrow the gap between strong and weak readers, teachers should be knowledgeable in vocabulary instruction and remediation (Moats, 2009).

Froiland et al. (2013) looked at early literacy development in children from birth. Froiland et al. (2013) discovered that kids from low-socioeconomic status (SES) homes had a significant deficiency in access to print and vocabulary as opposed to students from higher SES homes. Children between the ages of birth to 4-years-old who lived in low SES homes had 30 million fewer words than children from higher SES homes (Colker, 2014). After that age, the

deficit of words continued to grow (Colker, 2014). Protopapas et al. (2011) explained this lack of access to vocabulary as *The Matthew Effect*.

The Matthew Effect

The inability to read follows students throughout their academic career and ensures students will face a host of trials (University of West Alabama [UWA], 2018). The Matthew Effect in relation to reading means that students who have early success will continue to have success, and those who fail to have early success continue to struggle with reading (Protopapas et al., 2011). Duff et al. (2015) explained that The Matthew Effect is a belief where the rich continue to get richer, but the poor continue to get poorer. Students who start out behind in reading will continue to stay behind in reading (UWA, 2018). UWA (2018) reported that this effect stems from this Bible verse "For whoever has will be given more, and they will have an abundance. Whoever does not have, even what they have will be taken from them" (New International Version, 2011, Matthew 25:29).

While the Matthew Effect has been of use in the education realm, it was not until Stanovich (1986) who used it to describe reading development. The author coined the term the Matthew Effect to help describe what he was observing as he researched readers and how they acquired new skills. Stanovich (1986) believed that those exposed early and have success in reading continue to do well in reading. Furthermore, the author went on to say that students who read well often read more than their peers. This continues to make them good readers. However, those who do not do well are unlikely to achieve in reading at the same level as their peers (Stanovich, 1986). These students who are behind not only do not achieve at the same level, but they continue to do more poorly than their peers which makes the gap between the two groups of

readers even more drastic as their school years progress (Stanovich, 1986). Students who are poor readers often tend to read less and less (Stanovich, 1986).

Additionally, Stanovich (1993) stated that even delays, which may be minor in the beginning, can become major delays as time progresses especially after the third or fourth year of school. This further exacerbates the problems in early literacy development for some students. Early literacy skills build upon one another and children who start out with an advantage in this area tend to build their literacy abilities more quickly than their peers (Cunningham & Chen, 2014; Stanovich, 1986). Stanovich (1993) believed that slow reading development can have behavioral, cognitive, and even motivational consequences for students which impede their performance in other academic areas. The longer these deficits continue, the greater its effect on student achievement down the road. To ensure students do not fall victim to the Matthew Effect, it is imperative to understand what the components of a good reader are.

Components of a Good Reader

When the number of students reading below level was so staggering, Congress stepped in. In 1997, Congress asked the USDOE and the NICHD to form the NRP. The NRP researched what factors lead to improved reading comprehension. The group found that basic reading skills were necessary to become good readers. These skills included phonics, fluency, vocabulary, comprehension, and phonemic awareness (NICHD, 2000). These skills are the “Big Ideas of Reading” (NICHD, 2000).

Reading is a very complex skill and develops over time. The ability to read has several distinct skills involved. Good reading involves a synthesis of various cognitive skills. These include phonological awareness, letter name recognition, fluency, and word reading accuracy, as well as other skills like text structure, topic of a text, purpose of reading, and reading strategies.

Reading requires continual practice, refinement, and it is developmental in nature. Reading comprehension is the end goal of learning how to read. Comprehension consists of numerous skills that make it difficult to decipher (Catts & Kamhi, 2012). According to Yuill and Oakhill (1991), 10 to 15% of the population struggles with reading comprehension. Since this is the case, research is necessary along with a massive amount of effort devoted to the understanding of why comprehension is such a difficult task for some people to acquire. Since reading is such a difficult task, many students fall behind and struggle to read. A great deal of research has occurred on this discipline that had honed our understanding of what makes a good reader and points to what leads to reading difficulties.

Developing reading skills takes time and become more complex over that time. According to the NRP (2000), there are five components that have an impact on literacy. These components interconnect and include phonics, phonemic awareness, vocabulary, fluency, and reading comprehension (NRP, 2000). Being able to decode words is one of the first skills children develop. Decoding refers to the ability of a child to be able to use letter-sounds to sound out a two to three-letter word (Bear et al., 2012). Sometimes children have the task to decode words that are non-sense words, which are words that are not actual words in the dictionary but are words that have no actual meaning and can be sounded out by knowing how to sound out each letter. LaBerge and Samuels's (1974) Theory of Automatic Information Process in Reading explained that the ability to decode words quickly allows a reader to allocate their mental resources to more complex reading tasks such as comprehension. Students who can decode words quickly can do so without conscious effort. Students who are not able to decode words, spend additional mental resources on the task of sounding out each letter, which diminishes their chances of comprehending what they are reading.

Wagner et al. (2009) explained that reading comprehension is such a difficult skill because students need to decode words individually, be able to decipher word meanings, and know the word's grammatical structure. There are arguments about what factors of reading lead to difficulties in reading comprehension. However, research showed that there are so many factors that lead to reading comprehension and good readers, so it is important to understand these subskills of reading to know what the research says about each.

Subskills of Reading

The National Early Literacy Panel [NELP] (2008) explained that reading is a critical objective in the early academic school. Additionally, Schechter et al. (2015) explained that reading is a crucial skill for students to master in their early elementary years. Toste et al. (2017) explained that much of upper elementary instruction focused on students understanding and retaining more complex texts. Students in upper elementary including fourth and fifth grade are reading more difficult material and their focus is usually comprehension. That is why fluency is so important to investigate in this study. Reading is a very complex task, and it includes various subskills which help guide a reader to the goal of reading, which is comprehension. It is important to understand each subskill of reading for this study as they all play a part in becoming a proficient reader and comprehending text. These subskills include phonemic awareness, phonic, decoding, vocabulary, and fluency (NRP, 2000). These skills be discussed as they signify the importance of each and how they tie into becoming a proficient reader.

Phonemic Awareness. Phonemic awareness is the ability to hear and identify each sound of phonemes in spoken words (NICHD, 2000; Yopp, 1992). It is also the ability to understand the syllables and sequences of speech sounds in those spoken words (Yopp, 1992). Phonemic awareness is an auditory skill. It is an important skill because it is necessary for the ability to

read words. While it is not phonics, it is a needed skill for phonics. Phonemic awareness allows students the ability to recognize words and eventually learn to spell words. Adams (1990) stated that phonemic awareness is a good predictor of early reading abilities. Additionally, the author continued to say that phonemic awareness includes sound identification, the blending of sounds, and substitutions to make new words.

Phonics. The ability to understand the correspondence of letters and their sounds is phonics. Phonics represents the relationship between letters, graphemes, and their sounds, phonemes. Tolman (2005) explained phonics as a student's ability to map letters to their sounds and analyze the structure of how to spell words. It includes the ability for students to know that words are comprised of letters from the alphabet, called the alphabetic understanding. It also has phonological record where students recognize the grapheme and phoneme relationship and can use this to pronounce unknown words and string these words together. The NICHD (2000) explained that phonological recording allows a learner to read regular words, irregular, and analyze words. Phonics is a prerequisite skill for early reading and fluency building (Pikulski & Chard, 2005).

Vocabulary. Pikulski and Chard (2005) believed that listening comprehension and vocabulary are border language skills. Verhoeven and Van Leewe (2008) reported that vocabulary is a necessary skill for reading and can even predict reading comprehension. Vocabulary is a skill that students use to understand the meaning of words. Students need to be able to understand words to comprehend text. Carroll (1993) said that the correlation between reading comprehension and vocabulary is high in children. Vocabulary skills is a good predictor of reading comprehension and verbal IQ (Ouellette, 2006). According to Cain et al. (2004), over time, research has established a link between vocabulary and reading comprehension.

Decoding. According to the NICHD (2000), the ability to decode words comes primarily from phonics and phonemic awareness instruction. Furthermore, Martens et al. (2013) believed that phonemic awareness and phonics instruction leads to rapid decoding skills. Decoding is a skill that enables students to read words through letter-sound relationships, letter patterns, and word patterns (Bear et al., 2012). Students who can decode are able to read real words found in the dictionary, as well as words that are non-sense words. Non-sense words have no meaning, but through letter-sound recognition, students can pronounce the words. Crosson and Lesaux (2010) explained that decoding uses the alphabetic principle. Proctor et al. (2005) stated that decoding includes accuracy and efficiency. Toste et al. (2017) and Wexler et al. (2008) stated that older students who are poor readers struggle with phonics and the ability to decode words correctly. Tolman (2005) stated that phonics and decoding are prerequisite skills that need mastering in grades kindergarten through third grade. Samuels (2006) explained that students who can recognize words automatically become more fluent readers. This points to the significance of exposing younger students to and mastery of these skills early in their academic careers.

Reading Fluency. Reading fluency is the ability to read at an adequate rate and accurately (Crosson & Lesauz; Kim & Wagner, 2015). The skill of reading fluency can predict reading comprehension (NRP, 2000). The usual measure of reading fluency is by oral reading fluency (ORF) where students read a text passage aloud for a set time. This produces a score for the correct number of words read in that set amount of time minus the number of incorrect words read in that same time. Kim and Wagner (2015), as well as Pikulski and Chard (2005), reported that reading fluency bridges the gap between decoding words and comprehending text. Decoding words leads to fluency, which leads to comprehension.

Some early studies focused on fluency rates. Later, studies began to look more at physical aspects of reading, such as lip and eye movement and speed of reading. However, it was not until the mid-1900s that theories began to look at the comprehension of the text as one read. These studies were the foundation of what is the five key elements of early reading instruction. In recent years, Harty and Kanfush (2019) posited that immense progress concerning reading instruction has taken place. With that, Harty and Kanfush (2019) believed more research is necessary on low-achieving students.

Young and Daly (2016) explained that fluency is a key factor for successful readers. Additionally, Strong et al. (2016) believed that oral reading fluency is a predictor of the reading success students will have. Students who do not read fluently often find themselves in Tier 3 interventions (Young & Daly, 2016). The word fluency has many definitions, according to Katzir et al. (2006). Cho et al. (2017) stated that fluency is a predominant gauge of competency in reading. Aro et al. (2018) defined fluency as the ability of a student to read with accuracy and speed. Powell and Gadke (2018) defined ORF as the ability of a student to read with a focus on speed, accuracy, and appropriate expression.

Comprehension. Reading comprehension is the ability to construct the meaning of a text as one reads. It is a difficult and complex task. Comprehension is the goal of learning how to read. According to Klingner et al. (2007), if a student is not able to understand what they read by constructing a text's meaning, then reading a text means very little to the student. When a student struggles with the foundational skills of learning to read, it has a significant impact on their ability to read.

Automaticity and Fluency and Their Connection to Comprehension. Readers who are proficient can use decoding, vocabulary, and phonological awareness to understand what

they read (Kuhn & Stahl, 2000). Fluency is correlated to reading comprehension and used to predict how well students understand what they have read (Miller & Schwanenflugel, 2006). Literacy is comprised of the ability to fluently read whole words and text (Murray et al., 2014).

In their study, Murray et al. (2014) delved into two different reading intervention programs to identify the similarities and differences between each. Within these programs, the authors looked at the five components of reading, which included phonics, phonemic awareness, vocabulary, comprehension, and fluency. Murray et al. (2014) found benefits and drawbacks to each intervention program. However, they also discovered that when one was fluently reading whole words with automaticity, the more quickly that person could also remember words within whole texts (Murray et al., 2014). This study backs the importance of fluency.

Gellert (2014) found that repeated readings by students were a significant predictor of future oral reading fluency success in students. The author said that repeated readings need to be meaningful and associated with skill development for them to make an impact on fluency. McArthur et al. (2015) supported this research saying that the less time spent on decoding words, the more reading fluency improved. A study by Gibson et al. (2014) found different results that repeated reading enhanced fluency. However, in their study, they only tested eight students, all of whom were in the first grade versus upper elementary students like those found in Gellert (2014) and McArthur et al. (2015).

Price et al. (2016) found that ORF was a contributing factor of comprehension. There was a correlation value of .44 at $p < .001$, which pointed to the relationship between fluency and comprehension (Price et al., 2016). Additionally, Lipka (2017) aimed to find the connection between fluency and comprehension in students in upper elementary. The purpose of the longitudinal study was to find ways to prevent fluency failures and remediate with students for

success (Lipka, 2017). The study took place in 30 Canadian schools and found $R^2 = .43$ $p < .01$ (Lipka, 2017). These results indicated that fluency is important to the successful reading skills of students in upper elementary. Solari et al. (2017) found similar results and not just with students considered to be typically developing students. Results from Solari et al. (2017) found that there is a strong relationship between ORF and reading comprehension, even in students with special needs. In primary elementary grade, Kim and Wagner (2015) found that word reading, and text reading had a high correlation $r = .96$. Additionally, Kim and Wagner (2015) found that beyond first grade, word reading and listening comprehension were correlated to reading comprehension $r = 0.3$. These studies indicate the importance of ORF.

Measuring Reading Fluency

Ervin (2016) believed that testing reading fluency is important, and that process includes prescreening students, and then continued screening as needed to determine if students are making progress in their Tier instruction. As progress monitoring continues, Kern and Hosp (2018) indicated that educators make informed decisions as to what instruction and supports students will need next. There are many standardized and normed tests used, according to Kern and Hosp (2018). These tests are valid and reliable, and they eliminate the need for local curriculum-based tests. Some of the tests included the Gray Oral Reading Test (GORT), Woodcock-Johnson Tests of Achievement (WJ-IV), Wechsler Individual Achievement Test (WIAT-III), and Dynamic Indicators of Basic Early Learning Skills (DIBELS), to name a few. To test the various aspects of reading, there is a need for all the different types of tests. Some reading tests are age-specific, and some only test a certain skill. For example, Miles et al. (2016) explained that WIAT-III can only assess students between the ages of four to seven. Good et al. (2003) explained that DIBELS can be of us in all elementary grades, it is quick to administer,

and it is valid and reliable. Matlock (2013) tested the validity of DIBELS and found state assessment scores predicted an increase of 1.88 points for every increase in a student's ORF score. For this current research, students taking part in the assessment will be older than the four to seven age range, so the assessment used will be DIBELS, which is now Acadience.

Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Now Acadience

The DIBELS test is now called Acadience. It is a widely used and universal assessment tool used for screening and monitoring progress in students from kindergarten through sixth grade, usually administered at the beginning, middle, and end of the school year (Acadience Learning Inc., 2019). To measure fluency, students read for one minute and their score is the total of correct words per minute (WPM). The ORF is the number of incorrect words in the minute deducted from the correct words. Each grade level has a specific number of ORF benchmark goals that students should be able to attain. In fifth grade, the beginning of the school year benchmark is an ORF of 111. In the middle of the school year, the benchmark is 120. Finally, at the end of fifth grade, students should have an ORF of 130 or higher.

Baker et al. (2008) found a concurrent validity correlation of 0.67 for DIBELS ORF. Shapiro et al. (2008) found a correlation of 0.68 between DIBELS and the Pennsylvania System of School Assessment (PSSA). Furthermore, Roehrig et al. (2008) found concurrent validity of $r = 71$ on the ORF in The Florida Comprehensive Assessment Test. On the Iowa Tests of Basic Skills (ITBS), there was a correlation between .56 and .68 (Schilling et al., 2007). While widely used, Ding and Liu (2013) believed that DIBELS should not test for reading, nor is it the best test for indicating reading comprehension. However, they do agree that it is doing its intended job of assessing reading fluency very well.

The Acadience assessment tool is valid and reliable and widely used and it will be the assessment of choice for this study. Schools in Utah use the Acadience test to assess student reading fluency. Before the soft school closures, students in Utah schools had taken the Acadience middle of the year test. However, the soft school closures canceled the end of year testing (USBE, 2020) without students taking the Acadience test. Since students did not take the end of year testing, middle of the year testing will be the scores used in this study.

Soft School Closures in Utah

Soft school closures not only disrupted Acadience testing (USBE, 2020), but it also disrupted attending school in person (Herbert, 2020). To socially distance and slow the spread of the novel coronavirus, Governor Herbert announced that schools in Utah would enter a two-week soft school closure starting on Monday, March 16, 2020 (Herbert, 2020). Governor Herbert explained this soft school closure as a preventative measure that would be reevaluated at the end of the two-week period. This announcement came on Friday, March 13, 2020, and it allowed teachers two days to ensure plans for continued instruction in a remote setting would resume on Wednesday, March 18 (Herbert, 2020). During soft school closures, schools would maximize telework and limit the number of people allowed into school buildings (USBE, 2020). Schools would still provide meals as needed (Herbert, 2020; USBE, 2020). On March 14, 2020, Governor Herbert issued a clarifying statement explaining that parents who are unable to stay home with their children would be able to bring them to the school. Governor Herbert declared that this would not be the case (Herbert, 2020). The governor continued by saying that the school campuses would remain open so that students could retrieve personal items and assignments from their teachers (Herbert, 2020). Additionally, some instruction may be available for one-on-one tutoring for brief periods of time (Herbert, 2020).

On March 19, 2020, the USBE explained that they were going to waive certain requirements for schools to minimize the burden schools face and allow for flexibility (USBE, 2020). Some of the waivers for schools included the number of instructional days and hours, transportation costs and mileage, and the administration of the third reading benchmark assessment (USBE, 2020). Finally, the board voted to suspend the administration of end of year statewide assessments (USBE, 2020). The board decided not to have statewide assessments administered because they believe that it would be a distraction to instructional services, and they wanted to minimize stress. In addition, these high-stakes tests would be impossible to administer in an unsecured online environment (USBE, 2020). The elimination of the third reading benchmark means that students did not take the final Acadience reading fluency test.

On April 14, 2020, Governor Herbert, along with Sydnee Dickson, the State Superintendent of Public instruction with the Utah State Board of Education, announced that public schools in the state of Utah would remain in soft school closure until the end of the 2020 school year (Herbert, 2020). With schools remaining closed, the governor and the state superintendent hope to continue to provide learning opportunities, meals for students, and keep employees gainfully employed (Herbert, 2020). Additionally, the governor wanted to support staff and students with social-emotional and mental needs (Herbert, 2020). Most schools in Utah resumed in class learning in the fall of 2020 which began a new school year.

Effects of School Closures

School closures are not a new concept. In fact, since the beginning of schools, they have had to close for one reason or another (Goodman, 2014; Hansen, 2011). During recent times, schools closed for weather concerns, which usually do not impact students leaving schools for long periods of time. However, schools have closed due to natural disasters when schools have

had to close for months on end impacting the academic performance of students for extended periods of time. (Esnard et al., 2017; Gibbs et al., 2019; Lai et al., 2018; Pietro, 2017; Sacerdote, 2008; Scrimin et al., 2009). In addition, many schools in the United States remained closed over the summer months as well. With these school closures, there are academic impacts on student learning (Alexander et al., 2007; Atteberry & McEachin, 2020; Cooper et al., 1996; Horowitz, 2020; Kuhfeld et al., 2020; Quinn & Polikoff, 2017). It is important to note these disparities and then discover which type of school program bests supports students, so they do not have significant academic losses during school closures like the one faced during this pandemic. The next section outlines the effects of school closures.

Effects of School Closures following Inclement Weather or Natural Disasters. A factor to consider when thinking of the impact of school closures from COVID-19 is past school closures due to inclement weather and natural disasters. There is a great deal of research and literature on school closures due to these factors (Esnard et al., 2017; Gibbs et al., 2019; Lai et al., 2018; Pietro, 2017; Sacerdote, 2008, Scrimin et al., 2009). They can provide insight into what might happen to students academically from an unexpected school disruption. Usually, these disruptions are shorter in duration than school closures that have happened due to COVID-19. Inclement weather and natural disasters can have a significant impact on education programs and even academic achievement (Esnard et al., 2017; Gibbs et al., 2019; Lai et al., 2018; Pietro, 2017; Sacerdote, 2008, Scrimin et al., 2009).

In Massachusetts, Goodman (2014) found that snow day school closures did not have much of an impact on student achievement. However, students who were low-socioeconomic had a decline of 0.016 standard deviations in reading for each day they missed school (Goodman, 2014). Additionally, these same students also had a decline in mathematics (Goodman, 2014). In

Colorado and Maryland, schools have closures because of snow days, and Hansen (2011) discovered that for each lost day due to snow from 2002 to 2006, eighth grade students had achievement levels that dropped anywhere from 0.013 to 0.039 standard deviations in their mathematics achievement. The author claimed that adding instructional days to the academic school year raised end of level scores test scores by 0.039 standard deviations in Colorado. Adding five more instructional days would increase year end test scores anywhere from 0.05 to 0.15 standard deviations (Hansen, 2011). Additionally, Hansen (2011) found that adding an additional day of schooling in Maryland would improve end of level test scores anywhere from 0.013 to 0.016 standard deviations per day.

Before the novel coronavirus, school closures were not a new concept. Many natural disasters have led to school closures (Esnard et al., 2017; Pietro, 2017; Sacerdote, 2008). Pietro (2017) studied the effects of the L'Aquila earthquake in central Italy. In 2009, the city had an earthquake displacing 90% of the residents (Pietro, 2017). A local university hard hit by the earthquake caused students to face housing issues, psychological problems, and transportation concerns (Pietro, 2017). Seventy percent of the infrastructure at the university was damaged, and places on campus had to close following the earthquake (Pietro, 2017). In fact, the engineering department was not able to return until 2013 (Pietro, 2017). There were numerous steps taken to mitigate the negative effects on students, but even so, the disruption to the learning environment negatively affected the students' academic performance (Pietro, 2017). The author found that the disaster led to a significant number of students' failure to graduate on time, and the disaster led to a decline in the likelihood that students would earn a first-level degree after being enrolled in the university for three years.

After Hurricane Katrina, Sacerdote (2008) found that declines in student achievement levels were about 0.10 standard deviations. Following Hurricane Ike in 2008, some schools in Texas closed for zero to 19 days (Esnard et al, 2017). Some schools closed as a precaution and reopened quickly, but some schools closed for longer periods due to needing necessary repairs (Esnard et al., 2017). Hurricane Ike led to a great decline in student enrollment by up to 20% (Esnard et al., 2017). This led to lower school budgets and even teacher layoffs, according to the Texas Engineering Extension Service (2011). After Hurricane Ike, some Texas schools closed for more than 10 days because of damage (Esnard et al., 2017). Lai et al. (2018) researched a cohort of 462 public schools in Texas. The researchers looked at the Texas Assessment of Knowledge and Skills (TAKS) test data from the years of 2005 through 2011. They found that natural disasters do not affect all students the same. In fact, students who are economically disadvantaged had more adverse outcomes academically after a disaster than their peers.

Gibbs et al. (2019) explained that educational opportunities are disruptive for children following a natural disaster, but not much information is available on exactly what happens to children's academic performance. In their study, Gibbs et al. (2019) evaluated the academic scores for children in Australia following a major bushfire in 2009. In this study, 33,690 students from 78 schools (N=1,285) participated (Gibbs et al., 2019). These students came from one of three levels of affectedness where zero means a low level of bushfire affectedness, and a level two was a high level of affectedness (Gibbs et al., 2019). In 2011, these students completed their national assessment standardized test in third grade, and they completed the same test for fifth grade in 2013 (Gibbs et al., 2019). These national tests assess students in reading, writing, language conventions, and numeracy (Gibbs et al., 2019). The authors found that reading and

numeracy gains for students from third grade to fifth grade reduced when they had higher affectedness of bushfires.

In addition to academic hardships students face after natural disasters, many students face childhood trauma and even post-traumatic stress disorder [PTSD] (Turley & Obrzut, 2012). Barrera-Valencia et al. (2017) explained that these effects on the student's psyche can disrupt their ability to learn because they have a difficult time paying attention, their processing speed can be diminished, and their working memory can be affected, among other issues. According to Cragg and Gillmore (2014) and Wang et al. (2016), working memory and processing speeds are key aspects and required skills for numeracy and reading skills.

Scrimin et al. (2009) suggested that the consequences of missing school because of disasters can be catastrophic and can further contribute to academic difficulties for students. Disruptions to schools can impact student achievement, which also contributes to poverty and can reduce income potential for students who are subject to closures (Dunn et al., 2015). It is important to understand what the research says about school closures and their effects on students to better understand what the outcomes may be for the pandemic.

Summer Slide. The learning losses seen in students over the summer vacation has long been an interest of researchers. Horowitz (2020) explained that a great number of parents who have children in kindergarten through 12th grade were worried that their children will fall behind academically because of school disruptions from COVID-19 closures. One factor suitable for investigation, as it compares to what could happen to students during forced school closures due to COVID-19, is the summer break. Most students have a summer break, and for a long time, the summer break had the nickname as the summer slide. This was because students often regress over the summer months in their learning. Using summer slide information can help determine

the impact of forced school closures. According to Quinn and Polikoff (2017), research on summer vacation has continually shown that student achievement declines over the months off, but the decline in achievement is usually more staggering in mathematics. The summer months mean a learning loss for students of about a month, and low-income students have even more learning losses than their peers, primarily in reading (Alexander et al., 2007; Cooper et al., 1996).

Recently, summer slide research was conducted on kindergarten and first-grade students. The information gathered showed that these students had little loss in academic growth (von Hippel et al., 2018). However, there were significant losses in academic growth for students in other grade levels because of summer vacation (Atteberry & McEachin, 2020; Kuhfeld et al., 2020). In their study, Kuhfeld et al. (2020) used the test scores from third through seventh-grade students in the United States. These students were from over 18,000 schools, and there were 5 million participants (Kuhfeld et al., 2020). The authors looked at these students over a 2-year period from the 2017-2018 and the 2018-2019 school years and the summer vacation from 2018 (Kuhfeld et al., 2020). The authors analyzed the test data from the Northwest Education Association (NWEA). The NWEA used the measures of academic progress (MAP) tests with these students and collected the reading and mathematics assessment information (Kuhfeld et al., 2020). This test an adaptive computer-based test that accurately measures academic achievement for students (Kuhfeld et al., 2020). The test can estimate gains of students across time and assessments occur three times a year (Kuhfeld et al., 2020). The researchers found that the summer vacation led to significant learning drops for students (Kuhfeld et al., 2020).

Projected Impact of COVID-19

With the affects seen from taking several months off for summer vacation, it makes sense that there will be impacts to student achievement and academic gains observed from school closures due to the coronavirus. Because of this, Kuhfeld et al. (2020) set out to project the possible impact to academic achievement due to the COVID-19 pandemic and the school closures that happened as a result. Kuhfeld et al. (2020) claimed that before their study, it was unclear what the effects would be on student achievement once students had to use remote learning.

Large gaps in effective remote instruction, limited internet access for some students, and the struggle faced by working parents to help educate their children created unique educational challenges. Kuhfeld et al. (2020) postulated that with so many factors facing students, it is hard to estimate the impact of COVID-19. However, Kuhfeld et al. (2020) believed there is a way to project what will happen to student achievement because of this pandemic by using estimates from parallel situations. There is already research on what happens to student achievement during summer break, natural disasters such as Hurricane Katrina, and absenteeism. The researchers wanted to have a clearer understanding of how COVID-19 would affect student achievement (Kuhfeld et al., 2020). However, Kuhfeld et al. (2020) realized that their study would not be all-encompassing because they will not be able to account for impacts of trauma related to COVID-19.

Kuhfeld et al. (2020) stated that their results will be preliminary estimates of the negative impacts that will occur because of the extended school closures. The authors reported “one way to think about COVID-19 school closures is to consider them extensions of summer break for most students” (p. 550). Additionally, the closures are like school closures due to inclement weather and natural disasters because these can cause disruptions to schedule instruction, and

they happen unexpectedly (Kuhfeld et al., 2020). Lastly, Kuhfeld et al. (2020) believed that school absenteeism can shed light on the projected impact of COVID-19. This study had several research questions that the researchers addressed. If students received half of their traditional instruction, the finding was that students would begin the fall school year with "60% to 87% of their typical learning gains" (Kuhfeld et al., 2020, p. 560). Additionally, the authors projected the expectation that learning gains for students would be lower for the 2019-2020 academic year than it would be under normal circumstances. These projected affects are likely to impact many students and because of this, it is important for parents to know which type of school will beset support their child's learning needs and keep them fluent readers.

Online Learning Environments

Due to recent soft school closures, students had to use online learning environments. In the past, many school closures did not include remote learning for students. However, many schools and districts implemented remote learning for students following COVID-19 in the spring of 2020. These plans often included assignments aligned to curriculum (Brennan, 2020). This online instruction could have mitigated negative academic impacts on student learning during the pandemic. However, Lieberman (2020) believed that the instruction and the measures taken may not have been as good as instructors had hoped. Kurtz (2020) reported that many teachers in April of 2020 were communicating with their students, but much of this communication took place via electronic mail.

According to Malkus (2020), many school districts were not meeting their vision and standard for rigorous online learning. Additionally, Gewertz (2020) said that many teachers across the nation believed that their students were spending about half as much time with online learning than they did pre COVID-19. Some of this may have been because students lacked the

access to online materials. According to Education Trust (2020), poll results explained that close to 50% of low socioeconomic families lacked the proper equipment to access online material. Lake and Dusseault (2020) reported that many schools did not provide proper support and accommodations to student populations that needed them. Without proper accommodations for students, it is not likely that students will be able to maintain or even make gains in the future. Students accessing and engaging in online instruction during the pandemic was the responsibility of parents or caretakers, some of whom were not capable of carrying such a burden.

In the past, virtual and online instruction has occurred. However, there are mixed results as to the effectiveness of these programs. According to Ahn and McEachin (2017), students in a charter school, which was a virtual school setting, performed lower than their peers who attended traditional public schools. Hart et al. (2019) found that results for students in online courses varied depending on the student and their learning options. With these varying results, it is difficult to predict the effects of virtual and online instruction on student achievement during school closures due to the pandemic.

Vaculíková (2018) evaluated student engagement and achievement in their online environment. The findings were that some parts of the online learning courses were good predictors of how well students would learn (Vaculíková, 2018). Although not all learning environments are the same, Vaculíková (2018) noted that they will continue to be a large part of future education, so it needs more study. When it comes to comprehension and fluency, Kanniainen et al. (2019) studied the effects of online learning environments with students. They found that struggling readers continued to face problems and difficulties in their online learning environments (Kanniainen et al., 2019). With so many variances that can happen with online learning, it is important to study the effects it has had on student reading fluency.

Choice in School Programs

Schools in the past housed all students regardless of age in one room (Leinster-Mackay & Silver, 1996). Then students went into classrooms based on their age (Leinster-Mackay & Silver, 1996). These educational experiences relied heavily on face-to-face interaction in what is a traditional school setting (Lovenheim & Walsh, 2017). Through the progression of time and technology, some classrooms have begun to use online learning environments. Lovenheim and Walsh (2017) explained that although there has been a shift to online learning environments, many students still use in-person instruction.

As of late, this traditional classroom setting has remained virtually unchanged, but instruction and curriculum have changed a great deal. Some students attend a traditional school where they learn using a curriculum by a teacher, yet other students are in other school settings, including STEAM and DLI (Mahnken, 2018). DLI school programs and STEAM education programs have increased in popularity due to parents' concerns over their child receiving the best education possible (Mahnken, 2018).

School choice has gained in popularity for many reasons. In their study, Lovenheim and Walsh (2017) found that the number of students who attended their assigned school went from 80% in 1993 to 73% in 2007. In this time, the number of alternative schools offered increased (Lovenheim & Walsh, 2017). These schools included online schools, charter schools, and school districts offering choices in school programs including STEM and DLI schools.

Since parents are searching for choices and options with schooling, it has become necessary for schools to market themselves (Jabbar, 2016). "The explicit goal of marketing for most schools was to inform parents about the programs and services the school already offered, future services, or specific features of their school programs or services" (Jabbar, 2016, p. 13). In

this marketing, schools may want to be able to boast about how fluently their students read because of the school programs offered within. Jabbar (2015) explained that schools may want to market themselves, especially when they want to attract or retain students. However, "critics of school choice programs have long employed the language of creaming away the best students and cropping off the worst students to describe the process by which alternative educational options may exacerbate rather than improved educational inequality" (Carlson & Cowen, 2015, p. 5). Since school choice has gained popularity, it appears that it will be around in the future (Turner, 2017). Because of this, it is vital to recognize, which school type best prepares students academically when and if schools need to close again.

Why Parents Might Choose Different School Programs

Gaining acceptance to prestigious universities has always been, but there seems to be even more pressure now days (Black, n.d.). Today's world is very competitive for young people and more students understand the importance of a good education, which means more students are applying to top universities. According to Black (n.d.), it is difficult to get into prestigious universities because more international students are submitting applications. The colleges having common applications makes it easy for students to submit more applications than in the past (Black, n.d.). Black (n.d.) explained that the more applications colleges get, the more selective they can be, and this increases the colleges' ranking. Because of these immense pressures and concerns of attending top universities, parents begin to look at elementary schools and the programs they offer, so they can make the best choice for the child (Mahnken, 2018). No matter the school program, student reading comprehension and fluency levels remain a focus (Chiu et al., 2017).

With the competitiveness of gaining access to prestigious universities, school choice has become increasingly popular. These choices for parents include charter, public, and even online schools. If a parent chooses to have their child remain in the public education system, school districts have begun to offer different programs within their districts to offer various educational pursuits for students. In this current study, we will evaluate which school type whether traditional, STEM-related, or DLI best supports students in their reading fluency and hence supports their academic achievement. For this study, STEM-related will include STEM and STEAM classes.

Dual Language Education. There are many studies pertaining to DLI and its ability to help students achieve academically (Tedick & Lyster, 2019; USDOE, 2015). The USDOE (2015) stated that language immersion in a second language has positive outcomes for students. According to the USDOE (2015), society and students alike benefit from cultural interaction that comes from learning languages. The USDOE (2015), specifically the Office of English Language Acquisition, looked at data from literature reviews, case studies, and research studies. The ability to learn more than one langue has many benefits (USDOE, 2015). Barac et al. (2014) explained that dual language programs offer academic, cognitive, and language benefits. Another added benefit of dual language learning is that it improves communication skills and fosters cultural understanding. Howard et al. (2018) stated that dual language programs promote biliteracy as well as help students with social and cognitive development. Furthermore, Thomas and Collier (2002) found that Dual Language programs encourage students to increase their vocabulary across diverse areas of study and to develop deeper academic proficiency in the partner language than they would with a traditional foreign language.

There are cognitive, academic, and language benefits for students in dual language programs (USBE, 2016). Academic outcomes of students who are bilingual students are better than that of their monolingual peers (Thomas & Collier, 2012). This is true no matter the demographics of the students, including race and gender, and even any learning differences (Thomas & Collier, 2012). Additionally, multilingual students reap the benefits of mental flexibility and the ability to reflect upon language (de Jong, 2011). The achievement gap closes in English learners in. DLI programs, as well as other traditionally low performing sub-groups such as low SES students and African Americans (Thomas & Collier, 2002). DLI helps to counteract the harmful impact of low socioeconomic students when it comes to their academic performance (Thomas & Collier, 2002). Furthermore, students in dual language programs outperform their peers who do not partake in DLI programs (Thomas & Collier, 2002).

In addition to the academic benefits of DLI, students also reap the benefits of social-emotional and higher self-efficacy (de Jong, 2011). Multilingual students can negotiate their ideas in their heads and can more easily affirm their self-identity (de Jong, 2011). Students in DLI feel more confident linguistically and culturally, which builds their confidence and their self-efficacy to succeed and do well in school (Cummins, 2009). The school culture in buildings that have DLI programs has also seen the benefits of these programs (Cummins, 2009). The cultural climate of the school is more culturally aware and friendly (Gandara & Hopkins, 2010).

The societal benefits of DLI are also high. Jackson and Malone (2009) reported that because of terrorism and globalization, “it has never been more urgent to develop American citizens who fully understand and can communicate effectively with people of other cultures” (p. 17). The benefits to society include economic and equity banters (Gandara & Hopkins, 2010).

With all the benefits of dual language programs, it is essential to evaluate if these programs help students read more fluently than other programs.

Literacy instruction must be utilized in both languages (Tedick & Lyster, 2019). Students who can read in one language are able to use reading strategies in the second language (Bourgoin & Dicks, 2019). Lee and Chen (2018) found that reading fluency and comprehension were high in DLI students. Tedick and Lyster (2019) stated that DLI programs are effective because they have accountability.

However, not all programs are equal and proper implementation increases the success of the program. Tedick and Lyster (2019) claimed that teacher quality, curriculum, instructions, accountability, and program design are all keys to the success of a DLI program. Tedick and Lyster (2019) explained that teacher quality refers to teachers who work well together and attend professional development. They also said that the program design is good when common goals are committed to (Tedick & Lyster, 2019).

STEM and STEAM Education. STEAM is a new educational movement. It stems from STEM education. Daugherty (2013) explained that STEM education is the combination of science, technology, engineering, and mathematics into the education system. Originally, the emphasis was on STEM, but Johnson et al. (2015) claimed that more of an emphasis on humanities was necessary for a balanced curriculum. What is steam education (2021) explained that STEAM education is the integration of arts into STEM education.

Yakman (2008) believed that we live in a world in which we are unable to understand science without some form of technology, and technology exist "without an understanding of the arts and mathematics" (p. 15). The author continued by saying that what we teach in the education realm should more closely represent what students will face in the real world

(Yakman, 2008). STEAM education focuses on cross-curricular teaching styles that implement science, technology, engineering, art, and mathematics in all subject areas (Johnson et al., 2015). Quigley and Herro (2016) coined this as transdisciplinary, where the discipline lines blur and transcended. The popularity of STEAM education has risen dramatically since 2013 (Grant & Patterson, 2016).

In STEAM education, there is a great emphasis on problem solving, inquiry, completing authentic tasks, and integrating technology (Johnson et al., 2015). Boy (2013) believed that STEM education is necessary to integrate all the problems of the world. STEM education looks at finding solutions for the world's problems in context versus segments at a time (Boy, 2013). Catterall (2017) stated that STEAM education leads to innovative solutions to problems. It creates solutions to economic issues, and it increases the empathy of students (Catterall, 2017).

There have also been studies conducted on STEAM schools and student achievement (Kim & Ko, 2018). Kim and Ko (2018) explained that STEAM schools can be effective when implemented correctly. Jamil et al. (2017) explained that one of the drawbacks of STEAM education is that teachers are not sure how to integrate the concepts. STEAM education is a concern for teachers because they need to figure out new behavior and time management skills (Jamil et al., 2017). Like DLI programs, teacher effectiveness is a strong predictor of how well STEAM programs do (Kim & Ko, 2018). Teachers must have professional development and should collaborate (Kim & Ko, 2018). If done properly, STEAM programs are very effective at helping students achieve at high levels. With all the benefits of STEAM education programs, it is important to evaluate if these programs help students read more fluently than other programs.

Summary

The literature here provided information that showed the importance of reading. It explained the various components of reading including fluency and how they play a part in the goal of being able to comprehend text. With a push on test scores and parents desperately searching for the best learning environments and experiences for their children, it becomes imperative to know which type of school best supports students in their reading fluency. Schechter et al. (2015) expressed the need for students to be good readers before third grade. Parents and states require more and more from educational institutes each year. Because of this, there have been spikes in the types of schools and school offerings available. The choices are numerous. This current study includes traditional public schooling, STEM-related, and DLI programs. It is apparent that STEM-related and DLI programs have benefits. There are drawbacks to each of the school programs, and each teaches curriculum in very different ways. Regardless, many studies mentioned that teachers would need professional development to be effective (Tedick & Lyster, 2019). With the number of choices and the benefits and weaknesses of each program, it is good practice to know which program best supports fluency, especially when faced with unprecedented times and soft school closures as well as trying to best prepare students for bright futures.

CHAPTER THREE: METHODS

Overview

While research has looked at DIBELS and ORF as well as research on the type of schools students attend, little research has occurred on the combination of differences between ORF of students and the types of school's students attended especially after a long-term soft school closure. Chapter three will discuss in detail the design of this study. It will describe the research mythology along with the instrument used, the population of the participants, and the rationale for this research.

Design

This study used a quantitative causal-comparative research design to determine the difference between students' fifth grade Acadience reading fluency scores on their mid-year assessment (posttest) and their fourth grade mid-year assessment scores (pretest). Quantitative research allows for the use of causal-comparative research design. Causal-comparative research design is appropriate here because the study was non-experimental and the researcher investigated a cause-and-effect relationship between groups of students (Gall et al., 2007). In a causal-comparative research design, there are numerous independent variables that are in categories, and the researcher does not manipulate the independent variable (Creswell, 2015; Gall et al., 2007). A feature that is important in a causal-comparative research design is that independent variables are categorical (Gall et al., 2007). Here the categorical data was the independent variable, which was the type of school students attend. It was casual because it is trying to determine if the three groups of students are different (Leedy & Ormrod, 2005). As the researcher, I observed the differences between the dependent variable, Acadience reading fluency, and the independent variables, types of schools. This research involved neither

manipulation nor random assignment of experimental variables (Leedy & Ormrod, 2005). Creswell (2015) and Gall et al. (2007) explained that claiming causality by a researcher should occur tentatively as other interpretations could be present.

Leedy and Ormrod (2005) explained that quantitative research addresses the differences between variables to explain, predict, or control events. In this research, quantitative research was appropriate because it reduced the potential for bias by examining direct responses without any interpretation (Leedy and Ormrod, 2005). Quantitative research uses specific questions targeted at measuring variable relationships (Creswell, 2015). For this current research, qualitative research was not the method of choice because the collected data was numerical rather than textual or thematic.

Explanatory research modeling is when two variables co-vary or when the changes in a variable reflect in the other variable (Creswell, 2015). Prediction research modeling anticipates the outcomes of the research by using certain variables as predictors of what will happen (Creswell, 2015). This study used explanatory modeling because it found the statically significant relationship of variables (Creswell, 2015; Humble, 2020). This study aimed to show the extent of the differences between student reading fluency and the type of school they attended. The goal of explanatory modeling is to test a theoretical hypothesis to determine the theoretical and statistical significance of relationships (Creswell, 2015; Humble, 2020).

Research Question

RQ1: Is there a difference in reading fluency among fifth grade students attending traditional, STEM-related, or DLI programs following school closure when controlling for fourth grade achievement?

Null Hypothesis

$H_0$1: There is no statistically significant difference in reading fluency among fifth grade students attending traditional, STEM-related, or DLI programs following school closure when controlling for fourth grade achievement.

Participants and Setting

Population

The participants for the study came from a convenience sample of fifth grade elementary students in central Utah. The school district in this study had a variety of students enrolled based on gender, socio-economic status, and race. For this study, data analysis came was from 434 students enrolled in one school district that participated in administering Acadience testing for reading data. The sample size for this study was 434 which exceeds the minimum of 166 required for an ANCOVA with three groups, statistical power of .7, and .05 alpha level (Gall et al., 2007).

Participants

The data used in this study needed to come from students enrolled in the school in fourth and fifth grades and had completed the Acadience middle of the year oral reading fluency test. This resulted in 149 fifth grade students enrolled in traditional classes, 152 students enrolled in STEM or STEAM classes (which are STEM-related), and 134 students enrolled in DLI classes. However, in the DLI program, there was one outlier. I removed this outlier from the data presented in this current study. I evaluated if the outlier was due to a data entry error, a measurement error, or was a genuinely unusual value. Since I evaluated the data, I noticed that the fourth grade pretest and the fifth grade posttest scores were both higher than the average student when looking back at the Excel file. I decided that the outlier was not a data entry error. Because Acadience is a valid and reliable measurement tool, I decided that the outlier was not a

measurement error. I decided that the data set was a genuinely unique value. The Laerd Statistics (2017) website reported that these types of outliers are the most difficult to address because there is no good reason to reject the value as being invalid. According to the website, what to do in these situations is controversial because there is no clear-cut or recommended way to deal with these outliers.

Laerd Statistics (2017) reported the two ways to deal with outliers. One is to keep it and transform the dependent variable, run a nonparametric test, or include the outlier because the researcher believes it will not materially affect the results. The other way to deal with outliers such as these is to remove the outlier (Laerd Statistics, 2017). Draper and Smith (1998) explained that a researcher should not screen out outlier to simply make their model fit. I determined that the outlier was, in fact, a genuinely unusual value. As explained by the Laerd Statistics (2017) website, removal of outliers from data sets can be removed as a last resort. The pretest score was 235, and the posttest score was 297, both of which were significantly higher than the mean score for the DLI and other programs. I determined that although the results were valid, these results may have an undue influence on the generalization of the results. Hence the DLI classes used 133 students in the study results. According to a study conducted by Bakker and Wicherts (2014), "we failed to find that the removal of outliers from the analysis in psychological articles was related to weaker evidence (against the null hypothesis of no effect), sample size, or the prevalence of errors" (p.1).

I decided to modify my research application with IRB to ensure STEM was a part of the research. Then, I changed the title of the research to include STEM-related so that STEM and STEAM students were under the same category. This would ensure that all students in the STEM/STEAM type of program had the proper categorization. The first modification was

accepted on August 9, 2021. Approval for the title change of the study was accepted on October 12, 2021.

I chose the schools in this district because of the convenience since I am a teacher a teacher in the same school district. In this study, data came from six elementary schools from the same school district. These schools had either traditional classes, STEM-related classes, DLI classes, or a combination of these school types. One school was a traditional school only. At this school, there were 515 students enrolled during the 2020-2021 school year, 48 students considered English language learners (ELLs), and 131 were low socioeconomic status (SES). Another school had gifted classes and traditional classes. I removed the gifted classes information from the data set. The enrollment at this school was 526 students. Of those students, 157 were ELL, and 273 low SES. Another school had traditional, and DLI classes. This information had the correct categorization. At that school, there were 623 students. There were 66 students who were ELL, while 139 were low SES. One school was DLI and STEAM, and this information went correctly into IMB SPSS (Version 28). At that school, there were 536 students enrolled. Sixty-five students were ELL, and 107 were low SES. While another school was DLI and STEM, and I categorized this information correctly. There were 667 students enrolled at this school, with 138 considered ELL and 190 considered low SES. Lastly, one school was strictly STEM. This school's total enrollment was 601 students, with 78 ELL students and 220 low SES students. Of the 13 elementary schools in the district, six were used in this study. The reason for this is that some schools did not have the correct school programs, some data points went missing for other schools, or there happened to be enough participants from the schools chosen.

The responses to the Acadience assessment were the dependent variables, and the students' type of school was the independent variable with three different categories. The

students in the study had taken the Acadience ORF assessment mid-year in fourth grade in 2020. They took the same test mid-year in fifth grade in 2021. Therefore, the data from this study included student Acadience scores, and the type of school they attended. Each of the participants were in fifth grade during the 2020-2021 school year. These classroom teachers all taught the same Utah State Core Standards. However, students all had different educational experiences.

Setting

In the DLI program, most students had exposure to a second language since first grade. These DLI students used English for half of the day and the second language for the other half of the day. Students in grades one through three learned a foreign language and mathematics in that foreign language. In these grades, the teaching of science was in the native language. In grades four through six, students learned the foreign language and science in that language. Students in these grades learned mathematics in their native language. All elementary grades had English language arts in the students' native language. The DLI students learned the Utah Core Standards.

The STEM-related students have not necessarily had STEM-related classes for their elementary career, but their teacher incorporated science, technology, engineering, and mathematics throughout most of the classroom lessons. In some school programs, there was the inclusion of art. What is steam education (2021) stated that STEAM education is STEM education with the inclusion of art integrated into the program. STEAM education incorporates many curriculums into each subject and lesson (Johnson et al., 2015). Students in STEAM education receive encouragement to problem solve and complete authentic tasks (Johnson et al., 2015). Boy (2013) believed that STEM education urges students to solve real world problems and look at finding solutions to these problems. These students had teachers who integrated

STEM-related education while using the Utah Core Standards.

Lastly, students in traditional classrooms received lessons, like the DLI and STEM-related students, but in a traditional classroom format. These classrooms did not teach different languages. However, teachers may have incorporated different elements of STEM-related education based on teacher preference. Students in a traditional classroom still had the same access to Utah Core Standards.

Instrumentation

The Acadience, formerly known as Dynamic Indicators of Basic Early Literacy Skills (DIBELS), determined student ORF scores. The purpose of this instrument is to accurately measure student reading fluency (Acadience Learning Inc., 2019). Acadience is a universal screening tool created by the University of Oregon, and it collects data on reading fluency and retell (Acadience Learning Inc., 2019). The data collected in this study included the Acadience ORF. While using Acadience, students read a passage that is grade-level appropriate. These passages have benchmarks and are administered to students individually at the beginning of the year, the middle of the year, and the end of the year (Acadience Learning, Inc., 2019). All these passages yield an ORF score for each student (Acadience Learning Inc., 2019). Students read three passages for one minute each, and the score for students consists of the number of correct words read (Acadience Learning Inc., 2019). The final score is a median of the students' scores for all three passages, and this becomes the score for the testing period. These scores classify students as most at risk, some rick, and low risk (Acadience Learning Inc., 2019). Students in the school district all took the middle of year test in 2020. Because of soft school closure, end of year testing could not be completed with students in their fourth grade year. However, the

students took the middle of the school year Acadience test in 2021. Because this is a standardized test, it is appropriate as a measurement tool for student ORF.

According to Acadience Learning Inc. (2012), Acadience is a standardized, reliable, and valid assessment. Baker et al. (2008) stated that the DIBELS ORF had a concurrent validity correlation of .67. Shapiro et al. (2008) said the correlation is .68 on the Pennsylvania System of School Assessment (PSSA). Roehrig et al. (2008) stated concurrent validity of $r = 71$ on the ORF in The Florida Comprehensive Assessment Test. On the Iowa Tests of Basic Skills (ITBS), the correlation was between .56 and .68, according to Schilling et al. (2007). This instrument has been of use in the past and there is proof that Acadience is a valid instrument.

Procedures

Approval from the Institutional Review Board (IRB) at Liberty University came before the 07/21/21 start date of the study. After approval from the IRB, I contacted the school district for approval of the study. The participants for the study were from schools in one district in central Utah. These participants were students enrolled in traditional, STEM-related, or DLI classrooms. These students had already taken the mid-year Acadience assessment in 2020 during fourth grade through the school district. They also recently completed the mid-year Acadience assessment for 2021 in fifth grade.

I assumed that training of teachers and aides on how to administer the Acadience assessment was similar like the training teachers and aides received during the 2019-2020 schoolyear. This school district had each school administer these tests at the beginning, middle, and end of the school year. Students in first through sixth grade take the Acadience assessments. However, in 2020, students did not take any end of year assessments (USBE, 2020).

After IRB approval, I contacted the school district's Director of Assessment, Data, and

Research. The data was on an online database. The data used in the study was from Acadience, which is an assessment that screens and monitors progress in students from kindergarten through sixth grade (Acadience Learning Inc., 2019). The pretest scores in this study were the covariate. These scores were from the participants' fourth grade middle of the year assessment. Acadience measures various reading-related tasks, but this study focused on student ORF. The data for this study included the ORF scores collected from the students' middle-of-the-year fourth grade scores, as well as the middle-of-the-year from the same students' fifth grade year. The posttest in this study was the dependent variable. Finally, I evaluated the type of school students attended, which was the independent variable for this study. This independent variable had three categories traditional, STEM-related, and DLI, where each of the 434 students came from. The students in this district attended: Traditional, STEM-related, and DLI. This school district has thirteen elementary schools. Five of these schools have DLI programs. The languages offered are Chinese, French, Spanish, and Portuguese. There are also several STEM-related and traditional schools. The sample came from the different schools where the participants were in fifth grade for the 2020-2021 school year and the participants were in one of the different school programs. Data from this study included the type of school students attended and Acadience information such as composite scores, ORF accuracy scores, ORF fluency scores, ORF retell scores, ORF retell quality scores, ORF retell errors, and ORF errors. The only data the I needed was the school type students came from and the Acadience ORF fluency scores.

This study used a convivence sample for the data because I am a teacher within the school district. After IRB approval and after the mid-year assessment window closed, I asked the district data director for the necessary data. I then analyzed the data accordingly.

Data Analysis

I used IBM Statistical Package for the Social Sciences. (SPSS, Version 28) software to analyze the data. A one-way analysis of covariance (ANCOVA) was of use to analyze the data. ANCOVA tests the interaction effects of variables on a continuous dependent variable (Bollen, 1990). It controls for the effects of selected covariates (Bollen, 1990). The covariate in this study was the students' pretest from fourth grade. The independent variable was the type of school the student's attended, and the dependent variable was the students' Acadience posttest. ANCOVA determined if there was a difference in reading fluency of fifth grade students based on the type of school they attended. This approach is appropriate to test the hypothesis because it eliminated unwanted variance (Bollen, 1990). Gall et al. (2007) explained that ANCOVA allows the researcher to increase test sensitivity.

An analysis of covariance (ANCOVA) is a statical tool that allows a researcher to adjust the dependent variable (Acadience posttests) to represent all groups (school type) equally on the covariate (Acadience pretests). The covariate is a variable that might affect the dependent variable but is controlled to prevent variance when analyzing with ANCOVA.

I visually inspected the data for missing data points and irregularities. A box and whisker plot for each group of the independent variable screened for extreme outliers. Then, assumption testing followed. The assumption of normality was tested with Shapiro-Wilk's statistics. Using a series of scatter plots between the covariate and posttest variable for each group, I assessed the assumption of linearity. The assumption of bivariate normal distribution uses the same series of scatter plots between the covariate and posttest variable for each group. I checked the scatter plots for the classic "cigar shape" to confirm this assumption. For the assumption of homogeneity of slopes, I next examined the scatter plots for interactions. Finally, Levene's Test

of Equality of Error Variance tested the assumption of Equal Variance. The alpha level was set at .05, therefore, rejection of the null hypothesis could have been at the 95% confidence level.

CHAPTER FOUR: FINDINGS

Overview

This was a quantitative causal-comparative research design used to determine if there was a difference between students' fifth grade Acadience reading fluency scores on their mid-year assessment (posttest) and their fourth grade mid-year assessment scores (pretest). This chapter includes results from the data, the procedures used to collect and evaluate the data. Acadience was the assessment used to measure the pre and posttest scores to determine the ORF of students. The study aimed to analyze the impact of the type of school students attended on their ORF scores. A one-way ANCOVA assessed the effects of school type using the ORF scores from Acadience. An alpha level of .05 indicated any statistical significance. The chapter concludes with a summary of the results.

Research Question

RQ1: Is there a difference in reading fluency among fifth grade students attending traditional, STEM-related, or DLI programs following school closure when controlling for fourth grade achievement?

Null Hypothesis

$H_0$1: There is no statistically significant difference in reading fluency among fifth grade students attending traditional, STEM-related, or DLI programs following school closure when controlling for fourth grade achievement.

Descriptive Statistics

The descriptive statics for this study are listed in Table 1. Following Table 1 is a discussion of the data. Then, demographic information about the participants. Additionally, a discussion of the unadjusted, and adjusted means.

An ANCOVA tested the null hypothesis. It tested if the Acadience posttest scores across the school types were statically significant. The sample consisted of 434 participants who were in various school types. The results were as follows. The number of students in traditional classrooms (n=149), the number of students in STEM-related classrooms (n=152), and the number of students in DLI (n=133). Table 1 shows the sample size for all three school types. All these fifth grade students took part in the Acadience pretest and the Acadience posttest. Unadjusted means are presented unless otherwise stated. Posttest Acadience fluency scores were greater in the DLI group (M = 153.0, SD = 38.2 pre/post) compared to the STEM-related group (M = 130.3, SD = 38.8 pre/post) and the traditional group (M = 128.6, SD = 43.3 pre/post), respectively.

Table 1

Descriptive Statistics

School Type	*Mean*	*SD*	*n*
Traditional	128.60	43.251	149
STEM-related	130.26	38.798	152
DLI	153.03	38.152	133
Total	136.67	41.559	434

Table 2 presents the adjusted means, unless otherwise stated. Table 2 shows the posttest Acadience fluency scores, which were greater in the DLI group (M = 140.2, SE = 13.2 pre/post) compared to the STEM-related group (M = 135.0, SE = 12.2 pre/post). Additionally, the table shows the posttest Acadience fluency scores, which were greater in the DLI group (M = 140.2, SE = 13.2 pre/post) compared to the traditional group (M = 135.3, SE = 12.4 pre/post).

Table 2

Estimates

Dependent Variable: Posttest

			95% Confidence Interval	
School Type	*Mean*	*Std. Error*	Lower Bound	Upper Bound
Traditional	135.253[a]	1.235	132.825	137.680
STEM-related	134.972[a]	1.220	132.574	137.369
DLI	140.193[a]	1.324	137.591	142.795

Note. [a.] Covariates appearing in the model are evaluated at the following values: Pretest = 124.33.

Data collection

The school district's data director had to access the Acadience database and retrieve scores from fourth and fifth grade students from the school district. This director informed me that the data would be available sometime in July. On July 21, 2021, I received the data from the school district's director. I removed Acadience information from the excel file that was received, such as composite scores, ORF accuracy scores, ORF retell scores, ORF retell quality scores, ORF retell errors, and ORF errors. I did this so that only pertinent information remained. The pertinent information was the school's name and fourth grade ORF scores, and fifth grade ORF scores. Then, I transferred the pre and posttest scores along with the school-type information into IBM SPSS (Version 28). In the variable values section of IBM SPSS (Version 28), the traditional school had a value of one and labeled traditional, STEM-related school had a value of two and labeled STEM-related. Finally, DLI school had a value of three and labeled as DLI.

Data Analysis

Quantitative data analysis for the difference in reading fluency among fifth grade students attending traditional, STEM-related, or DLI programs occurred during soft school closures. The data analysis included a one-way analysis of covariance (ANCOVA) where the pretests were the

covariate, the posttests were the dependent variable, and the school types were the independent variable with three different types traditional, STEM-related, and DLI.

ANCOVA has several assumptions. These assumptions are normality, homogeneity of variance, independence, and homogeneity of regression. I addressed these assumptions based on what the assumption is and what the expectation was. Included in the results section is a discussion of how these assumptions were tested.

In this study, the independent variable was the school type, and it was evaluated to indicate if it influences the dependent variable (Acadience posttests). In IBM SPSS (Version 28), the independent variable was nominal (categorical). The dependent variable was a continuous scale of measurement. Also, the covariate was set up as a continuous scale of measurement.

Results

The results section included a discussion of the assumption tests and results. Also included are comments about the alpha levels and effect size. In addition, the section included and evaluation of the null hypothesis. Finally, the section concluded with a discussion of whether I failed to reject the null hypothesis.

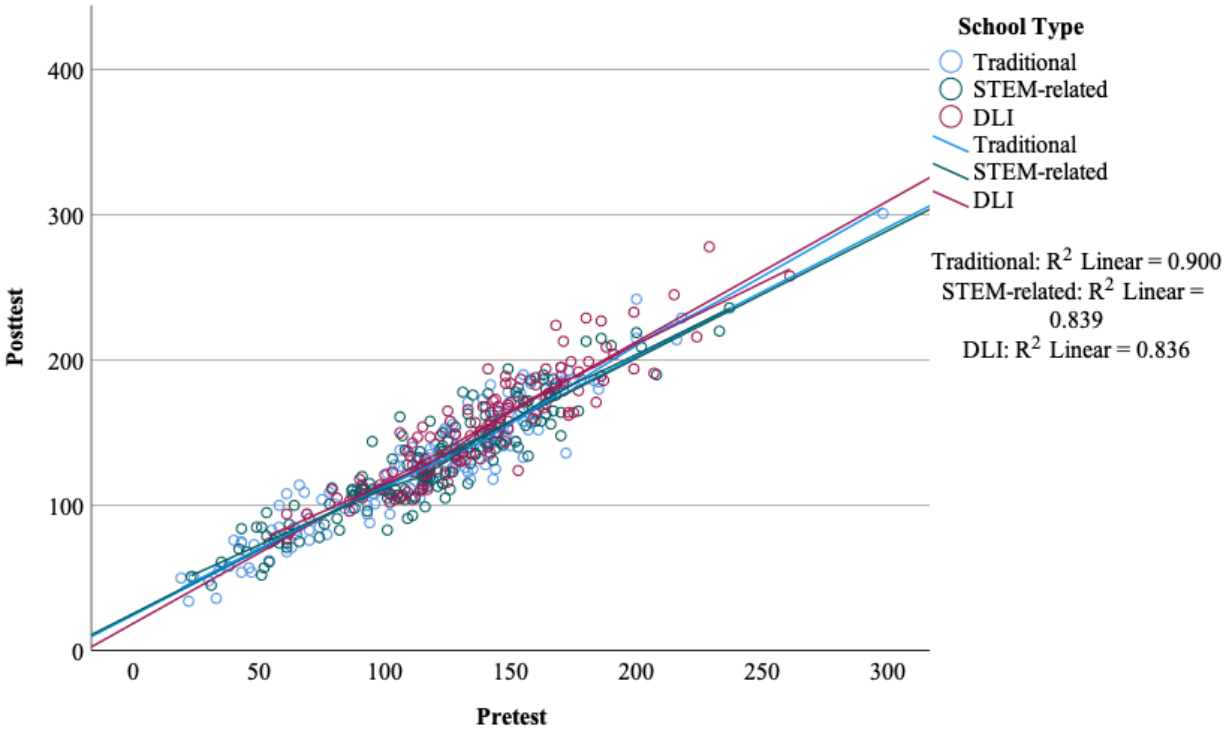
Assumption Tests

IBM SPSS (Version 28) examined the data using predictive analytics software. An ANCOVA determined the effect of a school type on posttest Acadience fluency scores from fifth grade after controlling for pretest Acadience fluency scores from fourth grade. The assumption of homogeneity of regression assumes that the interaction between the covariate (Acadience pretests) and the independent variable (school type) in predicting the dependent variable (Acadience posttests) is not significant. I expected this relationship to be linear, and the lines for each school type should be parallel. However, if the lines are not parallel, they should have a

similar slope. A scatter plot determined the slopes of regression. There was a linear relationship between pretest and posttest scores for each school type, as assessed by visual inspection of a scatterplot. This is in Figure 1.

Figure 1.

Scatter Plot of Posttest by Pretest by School Type



Additionally, I tested this assumption further. The statical evaluation indicated that the interactions between the covariate (Acadience pretests) and the independent variable (school type) were not significant. As seen in Table 3, there was homogeneity of regression slopes as the interaction term was not statistically significant, $F(2, 428) = 2.13$, $p = .120$. The assumption of assumption of homogeneity of regression slopes was tenable.

Table 3

Tests of Between-Subjects Effects

Dependent Variable: Posttest

Source	Type III Sum of Squares	*Df*	*Mean Square*	*F*	Sig.
Corrected Model	652090.920[a]	5	130418.184	582.970	<.001
Intercept	20239.010	1	20239.010	90.469	<.001
School	273.112	2	136.556	.610	.544
Pretest	573281.082	1	573281.082	2562.570	<.001
School*Pretest	952.550	2	476.275	2.129	.120
Error	95749.302	428	223.713		
Total	8854178.000	434			
Corrected Total	747840.221	433			

Note. [a.] *R* Squared = .872 (Adjusted *R* Squared = .870)

In ANCOVA, the assumption of normality assumes that the population sample contained in the data is normal and would fit a bell curve. To test this assumption, I used Shapiro-Wilk's statistics. Shapiro-Wilk's test analyzes the normality of the distribution. The distribution of the sample means for this study were normal across the groups. Table 4 depicts standardized residuals for the school types and for the overall model were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$). The assumption of normality is tenable as seen in Table 4.

Table 4

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	School Type	Statistic	*df*	*Sig.*	Statistic	*df*	*Sig.*
Standardized Residual for	Traditional	.048	149	.200[*]	.993	149	.681
Posttest	STEM-related	.067	152	.094	.985	152	.108
	DLI	.071	133	.096	.981	133	.055

Note. [*.] This is a lower bound of the true significance. [a.] Lilliefors Significance Correction

Next, the assumption of homogeneity of variance means that the expectation was that the independent variable (school type) will affect the means of the covariate (Acadience pretests) and the dependent variable (Acadience posttests), but there should be no variance among the groups (school type). The variance between the groups (school type) should be consistent. To

test this assumption, I used Levene's test. Moreover, the assumption of independent observations indicates that the sample retrieved from the population is in fact, a random sample and that the values of the dependent variables (Acadience posttests) are independent of each other. There was homoscedasticity and homogeneity of variances, as assessed by visual inspection of a scatterplot and Levene's test of homogeneity of variance (p = .106), respectively. See Figure 2 and Table 5 for this information.

Figure 2.

Scatter Plot of Standardized Residual for Posttest by Predicted Value for Posttest by School Type

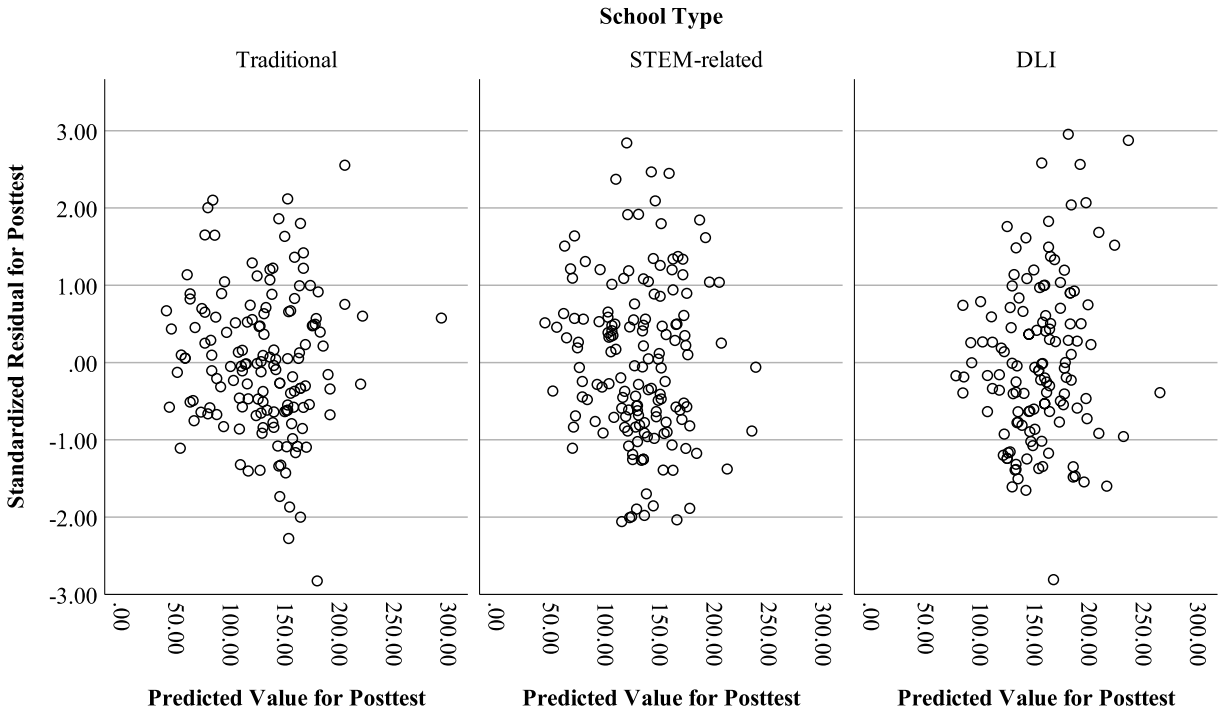


Table 5

Levene's Test of Equliity of Error Variances[a]

Dependent Variable: Posttest

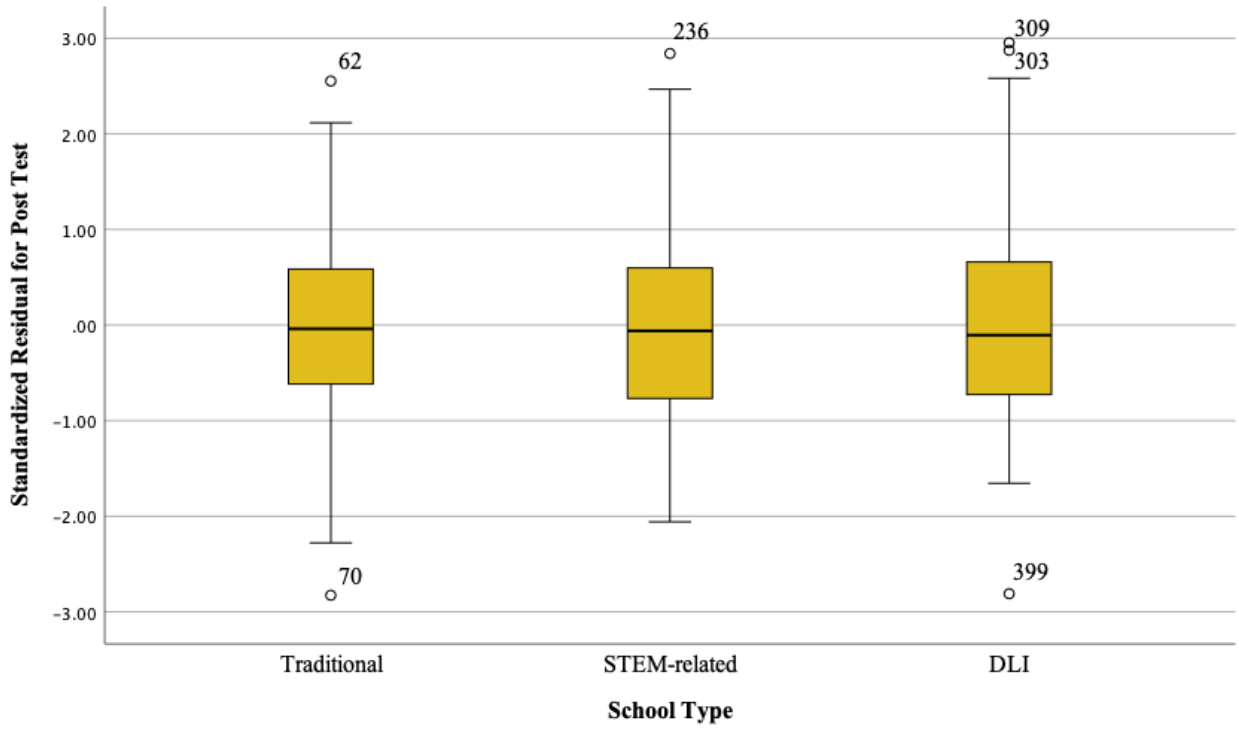
F	*df1*	*df2*	Sig.
2.255	2	431	.106

Note. Tests the null hypothesis that the error variance of the dependent variable is equal across groups. [a.] Design: Intercept + Pretest + School

The finial assumption test pertained to outliers. After I removed the initial outlier, I deemed that there were no outliers in the data. The assessment showed no cases with standardized residuals greater than ±3 standard deviations. This is information is visible in Figure 3.

Figure 3.

Box and Whisker Plots for Posttest



Hypothesis

The null hypothesis was: There is no statistically significant difference in reading fluency among fifth grade students attending traditional, STEM-related, or DLI programs following school closure when controlling for fourth grade achievement. After adjustment for pretest Acadience fluency scores, there was a statistically significant difference in posttest Acadience fluency scores between the school types, $F(2, 430) = 5.05$, $p = .007$, partial $\eta^2 = 023$.

The groups significantly differ from one another $p < .05$. The effect size was .02, which means that about 2% of variance from the posttest scores explain what type of school a participant was in. This tells how likely this difference will be present in the population at large. The significance was <.001, which is quite a bit less than .05. This means the pretest had a significant effect on the posttest outcome. Table 6 shows the pretest Eta squared was .861, so about 86% of the variance in the posttest scores can be explainable by the pretest and not by which type of school students were in. Hence, using a covariate was a great choice to try to determine its effect on the posttest. It had a statically significant effect. Consult Table 6 for these results.

Table 6

Tests of Between-Subjects Effects

Dependent Variable: Posttest

Source	Type III Sum of Squares	*df*	*Mean Square*	*F*	Sig.	Partial Eta Squared
Corrected Model	651138.369[a]	3	217046.123	965.130	<.001	.871
Intercept	25076.805	1	25076.805	111.508	<.001	.206
Pretest	599591.340	1	599591.340	2666.177	<.001	.861
School	2270.551	2	1135.275	5.048	.007	.023
Error	96701.852	430	2 24.888			
Total	8854178.000	434				
Corrected Total	747840.221	433				

Note. [a.] *R* Squared = .871 (Adjusted *R* Squared = .870)

Post hoc analysis occurred with a Bonferroni adjustment. Posttest Acadience scores were statistically significantly greater in the DLI group versus the traditional group (Mdiff = 4.941 pre/post, 95% CI [0.546, 9.335], $p < .05$) and the STEM-related group (Mdiff = 5.222 pre/post, 95% CI [0.865, 9.578], $p < .05$). The traditional group and the STEM-related group were not significantly different from each other $p > .05$. See Table 7 for the comparisons.

Table 7

Pairwise Comparisons Pairwise Comparisons

Dependent Variable: Posttest

					95% Confidence Interval for Difference [b]	
(I) School Type	(J) School Type	Mean Difference (I-J)	Std. Error	Sig.[b]	Lower Bound	Upper Bound
Traditional	STEM-related	.281	1.729	1.000	-3.875	4.437
	DLI	-4.941*	1.828	.021	-9.335	-.546
STEM-related	Traditional	-.281	1.729	1.000	-4.437	3.875
	DLI	-5.222*	1.813	.013	-9.578	-.865
DLI	Traditional	4.941*	1.828	.021	.546	9.335
	STEM-related	5.222*	1.813	.013	.865	9.578

Note. Based on estimated marginal means. *. The mean difference is significant at the .05 level. b. Adjustment for multiple comparisons: Bonferroni.

This study resulted in the rejection of the null hypothesis. Type of school does have a significant effect on Acadience fluency scores while controlling for the effect of an Acadience fluency pretest score. It appears that the DLI group had the highest posttest fluency scores compared to the traditional and STEM-related groups. If one were to choose among the three groups as to which was the most effective, it appears that the DLI group was the most effective at helping students retain their reading fluency when these students had to go into soft school closures compared to the traditional and STEM-related groups. The traditional and the STEM-related groups were not significantly different from each other $p > .05$.

CHAPTER FIVE: CONCLUSIONS

Overview

Chapter five will discuss the outcomes found in this study. It will evaluate any implications of the study. The chapter will focus on the limitations of this current study. Finally, the chapter will conclude with recommendations for the future.

Discussion

School closures affected numerous students throughout the globe when COVID-19 struck (Kuhfeld et al., 2020). Many of these students were in various types of school programs. Traditional education classrooms have been around for many years, and they serve their purpose (Lovenheim & Walsh, 2017). The current literature states that there are educational benefits to STEM-related and DLI school programs (Boy, 2013; Tedick & Lyster, 2019). This study aimed to decipher if one type of school program helped students better with their reading fluency after school closures. The purpose of this study was to raise awareness of the effects of soft school closures on student reading fluency in traditional, DLI, or STEM-related schools.

The research question for this study asked if there was a difference in reading fluency among fifth grade students attending traditional, STEM-related, or DLI programs following school closure when controlling for fourth grade achievement. After analyzing the data and removing the outlier, the researcher did determine that, in fact, there was a statically significant difference in reading fluency among fifth grade students based on the type of school program they were a part of. This resulted in the rejection of the null hypothesis.

$H_0$1: There is no statistically significant difference in reading fluency among fifth grade students attending traditional, STEM-related, or DLI programs following school closure when controlling for fourth grade achievement.

The findings from this study supported the rejection of the null hypothesis regarding the research question. Posttest Acadience scores were statistically significantly greater in the DLI group versus the traditional group (Mdiff = 4.941 pre/post, 95% CI [0.546, 9.335], $p < .05$) and the STEM-related group (Mdiff = 5.222 pre/post, 95% CI [0.865, 9.578], $p < .05$). The traditional group and the STEM-related group were not significantly different from each other $p > .05$. These comparisons are in Table 7.

Theories

The three selected theoretical frameworks for this study included the theory of automatic information process in reading (LaBerge & Samuels, 1974), self-determination theory (Deci & Ryan, 1985), and Bandura's (1997) self-efficacy theory. These theories address learning influences like motivation, student behaviors, and reading fluency. This research aimed to find if there was a statistical difference in reading fluency scores in students based on the type of school program they attended following soft school closure. It is essential to analyze the results of this study through the lenses of these theories. The Theory of Automatic Information Process is a good fit for this research since automatic reading has a link to reading fluency. Self-Determination theory focuses on student motivation, and motivated students are more likely to put in the effort needed to know words and become fluent readers. Having a high self-efficacy would imply that students would have high fluency scores. These theories are a basis for interpreting the results of this study.

The participants in the study were all from the same school district, but enrolled in different school types. However, not all the results were the same. LaBerge and Samuels's (1974) theory of automatic information process in reading is the recall of information automatically so that student does not need to pay attention or put much effort into the completion of a task

(Samuels, 2007). Automaticity in reading allows a reader to master easier content so they can focus on more difficult tasks like comprehension. The ability to recognize words automatically is a fundamental part of fluency, and fluency allows readers to comprehend text (Samuels, 2006). I believe that it is possible that students in DLI programs have better automaticity from a younger age than their peers who partake in traditional or STEM-related education programs. It makes sense that schools that have fluent readers incorporate this theory, even if not fully aware of doing so, better than schools that do not have as fluent of readers.

Self-determination theory (SDT) by Deci and Ryan (1985) is the theory that there are clear psychological needs that must be met for people to be motivated. These needs include relatedness, competence, and autonomy (Deci & Ryan, 1985). In the classroom, relatedness is the sense of belonging a student feel (Dweck, 2010), competence is the student's belief in their ability to finish a task successfully, and autonomy is a student's sense of having control and choice in their environment (Ryan & Deci, 2000). Dweck (2010) posited that those students whose needs are met are better able to cope and have more academic success in the classroom. As far as this study is concerned, the researcher believes that students in DLI programs may have higher self-determination than the students in the other groups. Biancarosa and Snow (2006) stated that reading motivation is a big contributor to reading achievement. Additionally, when a student feels competent, they will have an innate desire to continue to show those competencies (Baumeister & Leary, 1995). If students have their needs met in a classroom, this will translate to better reading fluency.

Finally, Bandura's (1997) self-efficacy theory (SET) is the beliefs a person has about their individual ability to perform tasks. This theory is applies when discussing individual motivation (Bandura, 2004). This theory helps to explain behavior patterns and the need for

change in individuals. The highest supporter of change is a student's self-efficacy. Students who have high self-efficacy persist longer in tasks than their peers (Bandura, 2004). It may be possible, based on the results of this study, that students in DLI classrooms have a higher self-efficacy.

School Choice

School choice has significantly gained in popularity, and Turner (2017) believed this is because schools lack in providing fundamental early literacy skills. The number of alternative schools has increased from 1993 to 2007 (Lovenheim & Walsh, 2017). Parents choose different school types for many reasons. One of these reasons is that colleges are increasingly becoming more challenging to get into (Black, n.d.). With this great popularity and the rising number of school programs, it becomes important for schools to market what they offer (Jabbar, 2016). Schools may want to market how their programs boost fluency. Because school choice is going to be around for some time to come, it is vital to understand which school types prepare students the most in their fluency if schools need to close again.

Literacy Skills

A lack of early literacy skills confounds difficulties in reading difficulties for children (Zorfass & Urbano, 2018). If a child is not reading on grade level by third grade, they may never catch up to their peers who are reading on level (Schechter et al., 2015). All of this could lead to the Matthew Effect. The inability to read will follow some students throughout their academic career, and it will ensure that these students will face a host of trials academically (UWA, 2018). The Matthew Effect in reading means that students who have early success will continue on a successful path while those who struggle will continue to struggle (Protopapas et al., 2011).

Previous Literature

With the results of this study, it shows that DLI school programs are the most effective in preparing students for reading fluency after soft school closure. However, Boy (2013) believed STEM education is vital for students so they can learn to solve all the problems of the world. STEM education looks to find solutions to real-world problems in context (Boy, 2013). Moreover, STEAM education looks at innovative solutions to economic problems, and it increases student empathy (Catterall, 2017). Johnson et al. (2015) stated that STEAM education focuses on problem-solving, inquiry, the completion of real authentic tasks, and it integrates technology. Additionally, these types of programs are effective at emphasizing student achievement when implemented correctly (Kim & Ko, 2018). Teacher effectiveness is a strong predictor of how these programs prepare students (Kim & Ko, 2018).

On the other hand, Barac et al. (2014) explained that dual-language programs give students cognitive, language, and academic benefits. Thomas and Collier (2002) found that dual-language programs inspire students to increases their vocabulary skills as opposed to other ways of learning a foreign language. Additionally, Thomas and Collier (2002) explained that bilingual students have higher academic outcomes than their monolingual peers. In fact, Thomas and Collier (2002) continued by stating that this is true for all students no matter their race, gender, and learning abilities; low-performing students and students in low SES groups have learning gaps closed in dual-language programs. In addition to these benefits, students in dual language programs outperform their peers not enrolled in dual language programs. Furthermore, de Jong (2011) believed multilingual students have the ability of mental flexibility and the ability to reflect upon language. In their study, Lee and Chen (2018) discovered that reading fluency and comprehension were high in DLI students.

Implications

The existing literature covers many of the issues facing students who have been in school closures and also the components that make a good reader. However, there is a gap in the existing research. There is limited research as to the reading fluency scores of students who have had to learn during school soft closures. In addition, there is also limited research on which type of school, whether traditional, STEM-related, or DLI program is the most effective at helping students retain or improve upon their reading fluency scores once forced into extended soft school closure. In this study, STEM-related includes STEM and STEAM classes.

This study aimed to bring awareness to more educators, parents, and stakeholders of which type of school programs are the best equipped to help students recover from any reading deficits after forced school closures. This study supported the findings of Lee and Chen (2018), who claimed that students in dual language programs have high reading fluency and comprehension. One can infer that this study supported Thomas and Collier (2002) when they stated that all students, no matter their demographics, have higher academic outcomes than their monolingual peers.

While there were no statically significant differences in STEM-related and traditional classes, that is not to say that neither of them is effective. I believe all types of learning environments are important and useful. Traditional classrooms have a long-standing purpose. It is a good choice for many students. STEM classrooms prepare students for real-world problems and experiences (Boy, 2013). These may be the leaders of tomorrow who will make changes to policies or may revolutionize how products work.

One type of school program is not necessarily better than another. In this study, it was the measure of reading fluency that was important. While I believe that the conclusion of this study

is true and that DLI classes do prepare students to be more fluent readers, I also know that this skill is not the only building block of making a well-rounded student. While reading fluency is an essential component of comprehension (NRP, 2000), it is not the be-all-end-all to how a child will develop and who they will become. Many types of schools, including DLI and STEM-related classes, have varying benefits. There are societal benefits to being a part of DLI programs: these include economics and building equity (Gandara & Hopkins, 2010). On the other hand, a benefit of STEM-related classes is that they create solutions to economic issues, and they increase empathy in students (Catterall, 2017). There are also drawbacks to each school type. In fact, Kim and Ko (2018), as well as Tedick and Lyster (2019) believed that teacher effectiveness and quality are key in predicting how well students in STEAM and DLI programs perform. School choice is popular for a reason, so parents, stakeholders, and educators can use their new awareness of the information from this study to determine their next move.

Limitations

In this study, limitations were evident and noteworthy. Because this study was research for a dissertation, it had limitations that consisted of resources, time, and money. Because I lacked connections with other school districts, there was the limitation of resources, so a convenience sample was of use. I worked full-time, have two children, and had been a full-time student, so I had limited time. Additionally, there was limited funding for this study.

Another limitation of this study is that the sample size was 434 students. While this number is not small, the convenience sample did not allow for the analysis of the Acadience posttest scores for all the fifth graders. Moreover, the sample size was not the same among all the school types. Gall et al. (2007) suggested that when sample size increases, there is less of a chance to fail to reject the null hypothesis. Another limitation of this study was the removal of

the outlier at the start. I still ran the assumptions and statistical analysis of these original numbers, without a discussion of the information in the findings. However, Bakker and Wicherts (2014) stated that they failed to find that the removal of outliers resulted in weaker evidence. Draper and Smith (1998) cautioned that a researcher should not remove an outlier to simply make their model fit. I determined that the outlier was, in fact, a genuinely unusual value and, as such, removed the outlier. The Laerd Statistics website (2017) explained that removal of outliers from data sets can be a last resort.

A causal-comparative research design, like the one used in this study, has its own limitations. Causal-comparative research design is non-experimental, and the researcher cannot manipulate the independent variable (Creswell, 2015; Gall et al., 2007). The researcher has no control and cannot randomly assign subjects to the various groups. This meant that I had no control over some variables in the study. Salkind (2010) explained that it is impossible for the researcher to choose the groups because the events in the study have already occurred. These variables can have explanations for the causes on the dependent variable. Since this research design aims to investigate cause and effect relationships, this can make it so that the relationship may not be what it seems do to a lack of research controls. Moreover, in this type of research, causes and effects can reverse. An external third factor could be responsible for both the hypothesized case and the hypothesized effect. In many cases, the results from the research are tentative at best. Creswell (2015) and Gall et al. (2007) explained that a researcher should be careful when claiming causality because other interpretations of the data could be present. Additionally, this type of research design requires repeated measures to ensure definitive results.

Furthermore, a restriction of the sample was to some fifth graders in one district in the state of Utah. One problem with a convenience sample is that it dismisses scores from a large

group of the population. However, a convenience sample is ideal in some situations because participants are readily available, and it is an inexpensive way to conduct research. I could not use all fifth grade scores because some students did not attend the same school type during fourth and fifth grade. Also, not all scores for the district were necessary. Once I had enough participants in groups that were similar in sample size, tI stopped adding data to IBM SPSS (Version 28).

Additionally, in the STEAM group, there were only 27 students represented. Although they were in with the STEM-related group, this part of the group was underrepresented. This was because many parents opted to homeschool their children during the 2020-2021 school year because of COVID-19. Electronic school (E-school) at this school district was also an option. These options limited the number of students who could have participated in this study. In this convenience sample, groups were diverse in that some groups had more ELL students, and some had more students who were low SES. Some groups may have an underrepresentation, and some may have an overrepresentation. Although some groups were overrepresented, Gall et al. (2007) explained it is better to have a convenience sample than to never conduct the study.

Another limitation of this study lies with the teachers. With several classrooms and teachers at each school in this district, the quality of teachers from class to class could vary greatly. Not all programs are equal and implementation increases the success of the program. Tedick and Lyster (2019) explained that teacher quality, instructions, and curriculum, and accountability all play a part in the success of DLI programs. Often, this type of limitation is beyond a researcher's control. Also, the background of each student was a limitation. All students come to school will various degrees of home life. Again, these limitations are beyond a researcher's control.

An additional limitation of this study was that took place during COVID-19. The participants in this study had taken the Acadience middle-of-the-year assessment in fourth grade during the 2019-2020 school year before the coronavirus pandemic hit. After this, the pandemic closed schools in the area in March 2020, and schools remained closed until school started up again in August 2020. However, these same participants took the Acadience middle-of-the-year assessment in fifth grade in 2020 after the coronavirus pandemic spread. Students in this school district during the 2020-2021 school year attended school significantly less than previous school years. At the beginning of the 2020-2021 school year, students attended class on Monday and Wednesday, or Tuesday and Thursday based on their last name. This was to ensure students were socially distanced and disinfecting could take place. When students were not at school, they were expected to learn online. For example, students who attended on Monday and Wednesday learned online on Tuesday, Thursday, and Friday. At this time, schools released about two hours early each day. Eventually, all students returned to school but still learned remotely on Fridays; schools were still released early every day. Finally, students returned to school Monday through Friday, but schools still released about two hours early for the rest of the school year. These participants had possible traumatic experiences from COVID-19. They also attended school for much less time during their fifth grade school year, so one could speculate that this could be a significant limitation in this study.

Finally, a limitation with this study was that many students took the pretest and posttest from a teacher, an aide, or some other trained adult. While I assumed this training was all the same, it is still a limitation because there is no way to be certain. Differences in how the test administration and how data was collected could have been a possibility. There was no way to know if there were differences in these data collection and administration.

Acknowledging limitations is important in any study. These limitations had the possibility of altering the results of this study. The limitations listed were expected. I controlled for these limitations as much as was possible

Recommendations for Future Research

Overall, I believe this study to be a valuable addition to the current body of literature. However, the recommendations laid out below will further expand the knowledge in this field of study. Limitations from the previous section should be a consideration when replication this research. The recommendation is that this research be carried out again with the following in mind:

- Since the study used a convenience sample, it did not include a diverse or large group of students. Replication should include a larger and much more diverse group of students.
- Furthermore, it was conducted in one small district in Utah. The recommendation is that this study use more geographical areas.
- The study could include other types of school programs.
- Additionally, it could include other grade levels.

REFERENCES

Acadience Learning Inc. (2019). Acadience Reading K–6. Retrieved from https://acadiencelearning.org/acadience-reading/k-grade6/

Adams, M. J. (1990). Beginning to read: Thinking and learning about print. MIT Press.

Ahn, J., & McEachin, A. (2017). Student enrollment patterns and achievement in Ohio's online charter schools. *Educational Researcher, 46*(1), 44-57. doi:10.3102/0013189x17692999

Alexander, K.L., Entwisle, D.R., & Olson, L.S. (2007). Lasting consequences of the summer learning gap. *American Sociological Review, 72*(2), 167-180.

Aro, T., Viholainen, H., Koponen, T., Peura, P., Räikkönen, E., Salmi, P., & Aro, M. (2018). Can reading fluency and self-efficacy of reading fluency be enhanced with an intervention targeting the sources of self-efficacy? *Learning and Individual Differences*, *67*(2018), 53–66. https://doi.org/10.1016/j.lindif.2018.06.009

Atteberry, A. & McEachin, A. (2020). School's out: The role of summers in understanding achievement disparities. (EdWorkingPaper: 20-82). Retrieved from Annenberg Institute at Brown University: https://doi.org/10.26300/2mam-bp02.

Baker, S. K., Smolkowski, K., Katz, R., Fien, H, Seeley, J. R., Kame'enui, E. J. (2008). Reading fluency as a predictor of reading proficiency in low performing, high-poverty schools. *School Psychology Review, 37*(1), 18-37.

Bakker, M., & Wicherts, J. M. (2014). Outlier removal and the relation with reporting errors and quality of psychological research. *PLoS ONE*, *9*(7), 1–9. doi.org/10.1371/journal.pone.0103360

Bandura, A. (1997). Self-efficacy: The exercise of control. Freeman.

Bandura, A. (2004). Health promotion by social cognitive means. *Health Education & Behavior, 31*(2), 143-164.

Barac, R., Bialystok, E., Castro, D. C., & Sanchez, M. (2014). The cognitive development of young dual language learners: A critical review. *Early Childhood Research Quarterly, 29*(4), 699-714. doi:10.1016/j.ecresq.2014.02.00

Barrera-Valencia, M., Calderón-Delgado, L., Trejos-Castillo, E., & O'Boyle, M. (2017). Cognitive profiles of posttraumatic stress disorder and depression in children and adolescents. *International Journal of Clinical and Health Psychology, 17*(3), 242– 250. https://doi.org/10.1016/j.ijchp.2017.05.001

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497-529.

Bear, D. R., Invernizzi, M., Templeton, S., & Johnston, F. (2012). *Words their way: Word study for phonics, vocabulary, and spelling instruction* (5th ed.). Pearson/Prentice Hall.

Biancarosa, C., & Snow, C. E. (2006). *Reading next—A vision for action and research in middle and high school literacy:* A report to Carnegie Corporation of New York (2nd ed.). Washington, DC: Alliance for Excellent Education.

Black, P. (n.d.). Why is it so hard to get into college today? Retrieved from https://prepwellacademy.com/blog/why-is-it-so-hard-to-get-into-college-today/#:~:text=Why%3F,more%20money%20they%20can%20charge.

Bollen, K. A. (1990) Overall fit in covariance structure models: Two types of sample size effects. *Psychological Bulletin, 107*(2), 256-259.

Bourgoin, R., & Dicks, J. (2019). Learning to read in multiple languages: A study exploring allophone students' reading development in French immersion. *Language and Literacy, 21*(2), 10-28. doi:10.20360/langandlit29466

Boy, G. A. (2013). *From STEM to STEAM: Toward a human-centred education, Creativity & Learning Thinking*. Association for Computing Machinery (ACM). Retrieved from https://dl.acm.org/doi/10.1145/2501907.2501934.

Cain, K., Oakhill, J., & Lemmon, K. (2004). Individual differences in the inference of word meanings from context: The influence of reading comprehension, vocabulary knowledge, and memory capacity. *Journal of Educational Psychology, 96*(4), 671–681. https://doi.org/10.1037/0022-0663.96.4.671

Carlson, D., & Cowen, J. M. (2015). Student Neighborhoods, Schools, and Test Score Growth. *Sociology of Education, 88*(1), 38-55. doi:10.1177/0038040714561801

Carroll, J. (1993). *Frontmatter*. In *Human Cognitive Abilities: A Survey of Factor-Analytic Studies* (pp. I-Ii). Cambridge University Press.

Catterall, L. (2017). A brief history of STEM and STEAM from an inadvertent insider. *Steam, 3*(1), 1-13. doi:10.5642/steam.20170301.05

Catts, H. W., & Kamhi, A. G. (2012). Language and reading disabilities. Pearson.

Chiu, M. M., Chow, B. W. Y., & Joh, S. W. (2017). Streaming, tracking and reading achievement: A multilevel analysis of students in 40 countries. *Journal of Educational Psychology*, *109*(7), 915–934. https://doi.org/10.1037/edu0000188

Cho, E., Capin, P., Roberts, G., & Vaughn, S. (2017). Examining predictive validity of oral reading fluency slope in upper elementary grades using quantile regression. *Journal of Learning Disabilities, 51*(6), 565-577. doi:10.1177/0022219417719887

Colker, L. (2014). The word gap: The early years make a difference. *Teaching Young Children, 7*(3), 26-28.

Coogle, C. G., Parsons, A. W., Croix, L. L., & Ottley, J. R. (2020). A comparison of dialogic reading, modeling, and dialogic reading plus modeling. *Infants & Young Children, 33*(2), 119-131. doi:10.1097/iyc.0000000000000162

Cooper, H., Nye, B., Charlton, K., Lindsay, J., & Greathouse, S. (1996). The effects of summer vacation on achievement test scores: A narrative and meta-analytic review. *Review of Educational Research, 66*(3), 227-268.

Cragg, L., & Gilmore, C. (2014). Skills underlying mathematics: The role of executive function in the development of mathematics proficiency. *Trends in Neuroscience and Education, 3*(2), 63– 68. https://doi-org.ezproxy.liberty.edu/10.1016/j.tine.2013.12.001

Creswell, J. W. (2015). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (5th ed.). Prentice Hall, Inc.

Crosson, A. C., & Lesaux, N. K. (2010). Revisiting assumptions about the relationship of fluent reading to comprehension: Spanish-speakers' text-reading fluency in English. *Reading and Writing, 23*(5), 475-494. doi:10.1007/s11145-009-9168-

Cummins, J. (2009). Multilingualism in the English-language classroom: Pedagogical considerations. *TESOL Quarterly, 43*(2), 317-321. doi:10.1002/j.1545-7249.2009.tb00171.x

Cunningham, A. E. & Y.-J. I. Chen (2014). Rich-get-richer effect (Matthew Effects). In Brooks, P., & Kempe, V. (Ed.), *Encyclopedia of Language Development* (pp. 367–368). essay, Sage.

Daugherty, M. K. (2013). The prospect of an "A" in STEM education. *Journal of STEM Education*, *14*(2), 10-15.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York, NY: Plenum.

Deci, E.L., & Ryan, R.M. (2000). The "what" and the "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268.

de Jong, E. J. (2011). *Foundations for multilingualism in education: From principles to practice.* Caslon Pub.

Dewey, E. N., Powell-Smith, K. A., Good, R. H., & Kaminski, R. A., (2014) Technical Adequacy Supplement for Acadience™ Reading Oral Reading Fluency. Eugene, OR: Dynamic Measurement Group, Inc.

Ding, C., & Liu, Y. (2014). Assessing construct of DIBELS: Measurement invariance of DIBELS subscales, from kindergarten to the first grade. *Studies in Educational Evaluation, 40*(2014),12-17. doi:10.1016/j.stueduc.2013.11.008

Duff, D., Tomblin, J.B., Catts, H., (2015). The influence of reading on vocabulary growth: A case for a Matthew effect. *Journal of Speech, Language, and Hearing Research, 58*(3), 853-864.

Dunn, C. G., Kenney, E., Fleischhacker, S. E., & Bleich, S. N. (2020). Feeding low-income children during the Covid-19 pandemic. *New England Journal of Medicine, 382*(18), e40(1-3).

Draper, N. R., & Smith, H. (1998). *Applied regression analysis* (3rd ed.). Wiley.

Dweck, C. S. (2010). Mindsets and equitable education. *Principal Leadership, 10*(5), 26- 29.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology, 53*(2002), 109-132. doi:10.1146/annurev.psych.53.100901.135153

Education Trust. (2020). *COVID-19: Impact on education* equity: *Resources and responses.* https://edtrust.org/covid-19-impact-on-education-equity-resources-responding/

Erbeli, F., Hart, S. A., & Taylor, J. (2017). Longitudinal associations among reading-related skills and reading comprehension: A twin study. *Child Development, 89*(6). doi:10.1111/cdev.12853

Ervin, R. A. (2016). Considering Tier 3 within a Response-to-Intervention model. Retrieved from http://www.rtinetwork.org/essential/tieredinstruction/tier3/consideringtier3

Esnard, A., Lai, B. S., Wyczalkowski, C., Malmin, N., & Shah, H. J. (2017). School vulnerability to disaster: Examination of school closure, demographic, and exposure factors in Hurricane Ike's wind swath. *Natural Hazards, 90*(2), 513-535. doi:10.1007/s11069-017-3057-2

Ford, J. W., Kern, A. M., Hosp, M. K., Missall, K. N., & Hosp, J. L. (2018). Improving efficiency for making screening decisions: A statewide comparison of early literacy curriculum-based measurement tools. *Learning Disabilities Research & Practice, 33*(4), 207-218. doi:10.1111/ldrp.12181

Ford, J. W., Missall, K. N., Hosp, J. L., & Kuhle, J. L. (2017). Examining oral passage reading rate across three curriculum-based measurement tools for predicting grade-level proficiency. *School Psychology Review, 46*(4), 363-378. doi:10.17105/spr-2016-0014.v46-4

Froiland, J., Powell, D., Diamond, K., Son, S. (2013). Neighborhood socioeconomic well-being, home literacy, and early literacy skills of at-risk preschoolers. *Psychology in Schools, 50*(8), 755-769.

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An introduction* (8th ed.). Pearson.

Gandara, P. & Hopkins, M. B. (2010). The changing linguistic landscape of the United States. In P. Gandara & M. B. Hopkins (Eds.), *Forbidden language: English learners and restrictive language policies* (pp. 7-19). Teachers College Press.

Gellert, A.S. (2014). Does repeated reading predict reading development over time? A study of children from grade 3 to 4. *Scandinavian Journal of Psychology, 55*(4), 303-310. doi:10.1111/sjop.12132

Gewertz, C. (2020). *Instruction during COVID-19: Less learning time drives fears of academic erosion.* Education Week. https://www.edweek.org/teaching-learning/instruction-during-covid-19-less-learning-time-drives-fears-of-academic-erosion/2020/05

Gibbs, L., Nursey, J., Cook, J., Ireton, G., Alkemade, N., Roberts, M., Gallagher, H.C., Bryant, R., Block, K., Molyneaux, R., Forbes, D. (2019). Delayed disaster impacts on academic performance of primary school children. *Child Development, 90*(4), 1402-1412. doi:10.1111/cdev.13200

Gibson, J. L., Cartledge, G., Keyes, S. E., & Yawn, C. D. (2014). The effects of a supplementary computerized fluency intervention on the generalization of the oral reading fluency and comprehension of first-grade students. *Education & Treatment of Children, 37*(1), 25–5.

Good, R. H. III, & Kaminski, R. A. (Eds.). (2003). Dynamic indicators of basic early literacy skills (6th ed.). Sopris West.

Goodman, J. (2014). *Flaking out: Student absences and snow days as disruptions of instructional time* (NBER Working Paper 20221). National Bureau of Economic Research. https://doi.org/10.3386/w20221

Grant, J., & Patterson, D. (2016). Innovative arts programs require innovative partnerships: A case study of STEAM partnering between an art gallery and a natural history museum. The Clearing House: *A Journal of Educational Strategies, Issues and Ideas, 89*(4-5), 144-152. doi:10.1080/00098655.2016.1170453

Guthrie, J. T., Hoa, A. L. W., Wigfield, A., Tonks, S. M., Humenick, N. M., & Littles, E. (2007). Reading motivation and reading comprehension growth in the later elementary years. Contemporary Educational Psychology, 32(3), 282-313. https://doi.org/https://doi-org.ezproxy.liberty.edu/10.1016/j.cedpsych.2006.05.004

Guthrie, J. T., & Wigfield, A. (2000). Engagement and motivation in reading, In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research: Volume III* (pp. 403-422). Lawrence Erlbaum Associates, Inc.

Hansen, B. (2011). School year length and student performance: Quasiexperimental evidence. Social Science Research Networking Paper. https://doi.org/10.2139/ssrn.2269846

Hart, C. M., Berger, D., Jacob, B., Loeb, S., & Hill, M. (2019). Online learning, offline outcomes: Online course taking and high school student performance. *AERA Open, 5*(1). https://doi.org/10.1177/2332858419832852

Harty, K., & Kanfush, P. M. (2019). Improving oral reading fluency and comprehension using grade-level fiction: A study of systematic reading remediation with urban youth at risk for school failure. *Reading Improvement*, *56*(2), 59-66.

Herbert, G. R. (2020). Gov. Herbert announces two-week dismissal of Utah's public schools. Retrieved from https://www.schools.utah.gov/file/d50bddb8-a7bb-417a-9016-20b317a8b32b#:~:text=Herbert%20announced%20today%20that%20Utah's,novel%20coronavirus%20in%20our%20communities.

Horowitz, J. (2020). Lower-income parents most concerned about their children falling behind amid COVID-19 school closures. Retrieved from https://www.pewresearch.org/fact-tank/2020/04/15/lower-income-parents-most-concerned-about-their-children-falling-behind-amid-covid-19-school-closures/#:~:text=Lower%2Dincome%20parents%20express%20more,children's%20school%20is%20currently%20closed.

Howard, E. R., Lindholm-Leary, K. J., Rogers, D., Olague, N., Medina, J., Kennedy, B., Sugarman, J., & Christian, D. (2018). Guiding Principles for Dual Language Education (3rd ed.). Washington, DC: Center for Applied Linguistics.

Humble, S. (2020). *Quantitate analysis of questionnaires: Techniques to explore structures and relationship* (1st ed.). Routledge.

Im, T., & Kang, M. (2019). Structural relationships of factors which impact on learner achievement in online learning environment. *International Review of Research in Open and Distributed Learning, 20*(1), 111–124.

Jabbar, H. (2015). "Every kid is money": Market-like competition and school leader strategies in New Orleans. *Educational Evaluation and Policy Analysis, 37*(4): 638-659. doi:10.3102/0162373715577447

Jabbar, H. (2016). Selling schools: Marketing and recruitment strategies in New Orleans. *Peabody Journal of Education, 91*(1), 4–23.

Jackson, F., & Malone, M. (2009). *Building the foreign language capacity we need: Toward a comprehensive strategy for a national language framework.* Washington, DC: Center for Applied Linguistics.

Jamil, F. M., Linder, S. M., & Stegelin, D. A. (2017). Early childhood teacher beliefs about STEAM education after a professional development conference. *Early Childhood Education Journal, 46*(4), 409 417. doi:10.1007/s10643-017-0875-5

Johnson L., Adams Becker S., Estrada V., & Freeman A. (2015) *New Media Consortium (NMC) horizon report: 2015 K-12 edition.* The New Media Consortium; 2015.

Kann, R. (1983). The method of repeated readings. *Journal of Learning Disabilities, 16*(2), 90-92. doi:10.1177/002221948301600205

Kanniainen, L., Kiili, C., Tolvanen, A., Aro, M., & Leppänen, P. H. T. (2019). Literacy skills and online research and comprehension: struggling readers face difficulties online. *Reading and Writing*, *32*(9), 2201–2222. https://doi.org/10.1007/s11145-019-09944-9

Katzir, T., Kim, Y., Wolf, M., O'Brien, B., Kennedy, B., Lovett, M., & Morris, R. (2006). Reading fluency: The whole is more than the parts. *Annals of Dyslexia, 56*(1), 51-82. doi:10.1007/s11881-006-0003-5

Kim, M. K., & Ko, Y. H. (2018). STEAM education research trend in domestic early childhood education. *Early Childhood Education Research & Review*, *22*(6), 359–384. https://doi.org/10.32349/ecerr.2018.12.22.6.359

Kim, Y., & Wagner, R. (2015). Text (oral) reading fluency as a construct in reading development: An investigation of its mediating role for children from grades 1 to 4. *Scientific Studies of Reading, 19*(3), 224-242. doi:10.1080/10888438.2015.1007375

Kern, A. M., & Hosp, M. K. (2018). The status of decoding tests in instructional decision-making. *Assessment for Effective Intervention, 44*(1), 32-44. doi:10.1177/153450841774987

Klingner, J., & Vaughn, S., & Boardman, A. (2007). Teaching Reading Comprehension to Students with Learning Difficulties. What Works for Special-Needs Learners. Guilford Publications.

Kodan, H., & Akyol, H. (2018). Effects of choral, repeated and assisted reading strategies on reading and reading comprehension skills of poor readers. *Ted Eğitim Ve Bilim, 43*(193), 159-179. doi:10.15390/eb.2018.7385

Kuhfeld, M., Soland, J., Tarasawa, B., Johnson, A., Ruzek, E., & Liu, J. (2020). Projecting the potential impact of COVID-19 school closures on academic achievement. *Educational Researcher, 49*(8), 549-565. doi:10.3102/0013189x20965918

Kuhn, M., Schwanenflugel, P., Meisinger, E. (2010). Aligning theory and assessment of reading fluency: Automaticity, prosody, and definitions of fluency. *Reading Research Quarterly, 45*(2), 230-251.

Kurtz, H. (2020). *National survey tracks impact of coronavirus on schools: 10 key findings.* Education Week. https://www.edweek.org/teaching-learning/national-survey-tracks-impact-of-coronavirus-on-schools-10-key-findings/2020/04

LaBerge, D., Samuels, S.J. (1974). Toward a theory of automatic information process in reading. *Cognitive Psychology, 6*(2), 293-323.

Laerd Statistics (2017). One-way ANCOVA using SPSS Statistics. Statistical tutorials and software guides. Retrieved from https://statistics.laerd.com/

Lai, B. S., Esnard, A., Wyczalkowski, C., Savage, R., & Shah, H. (2018). Trajectories of school recovery after a natural disaster: Risk and protective factors. *Risk, Hazards & Crisis in Public Policy, 10*(1), 32-51. doi:10.1002/rhc3.12158

Lake, R., & Dusseault, B. (2020). *School systems make a slow transition from the classroom to the cloud. Center for Reinventing Public Education*. https://www.crpe.org/thelens/school-systemsmake-slow-transition-classroom-cloud

Lee, K., & Chen, X. (2018). An emergent interaction between reading fluency and vocabulary in the prediction of reading comprehension among French immersion elementary students. *Reading and Writing*, *32*(7), 1657–1679. https://doi.org/10.1007/s11145-018-9920-z

Leedy, P. D., & Ormrod, J. E. (2005). *Practical research: Planning and design* (8th ed.). Prentice Hall.

Leinster-Mackay, D., & Silver, H. (1996). Good schools, effective schools: Judgements and their histories. *History of Education Quarterly*, *36*(3), 309-311. https://doi.org/10.2307/369391

Li, X., & Zhang, M. (2008). Reconciling DIBELS and OSELA: What every childhood educator should know. *Journal of Research in Childhood Education, 23*(1), 41- 51.

Lieberman, M. (2020). Many Districts Won't Be Ready for Remote Learning If Coronavirus Closes Schools; With prospect of prolonged closures, districts may struggle with e-learning. *Education Week, 39*(25), 1.

Lipka, O. (2017). Reading fluency from grade 2–6: A longitudinal examination. *Reading and Writing, 30*(6), 1361-1375. doi:10.1007/s11145-017-9729-1

Lovenheim, M. F., & Walsh, P. (2017). Does choice increase information? Evidence from online school search behavior. Cambridge; National Bureau of Economic Research.

Mahnken, K. (2018). How America's schools have (and haven't) changed since the Brown v. Board Verdict. *The Education Digest*, *84*(3), 14–19.

Malkus, N. (2020). *School Districts' Remote-learning plans may widen Student Achievement Gap*. Education Next. Retrieved from https://www.educationnext.org/school-districts-

remote-learning-plans-may-widen-student-achievement-gap-only-20-percent-meet-standards/.

Martens, B. K., Werder, C. S., Hier, B. O., & Koenig, E. A. (2013). Fluency training in phoneme blending: A preliminary study of generalized effects. *Journal of Behavioral Education, 22*(1), 16-36. doi: https://doi.org/10.1007/s10864-012-9159-8

Matlock, K. (2013). The reliability of DIBELS and its effective use as a response to intervention progress monitoring tool. *Journal of Educational Research & Policy Studies, 13*(3), 110-129.

McArthur, G., Castles, A., Kohnen, S., Larsen, L., Jones, K., Anandakumar, T., & Banales, E. (2015). Sight word and phonics training in children with dyslexia. *Journal of Learning Disabilities, 48*(4), 391-407. doi:10.1177/0022219413504996

McIlraith, A., Catts, H., Hogan, T., Resrepo, M. (2016), Predicting word reading ability: A quantile regression study. *Journal of Research in Reading, 41*(1), 79-96.

Miles, S., Fulbrook, P., & Mainwaring-Mägi, D. (2016). Evaluation of standardized instruments for use in universal screening of very early school-age children: Suitability, technical adequacy, and usability. *Journal of Psychoeducational Assessment, 36*(2), 99-119. doi:10.1177/0734282916669246

Miller, J., & Schwanenflugel, P. J. (2006). Prosody of syntactically complex sentences in the oral reading of young children. *Journal of Educational Psychology, 98*(4), 839–853. doi:10.1037/0022-0663.98.4.839

Missall, K. N., Hosp, M. K., & Hosp, J. L. (2019). Reading proficiency in elementary: Considering statewide testing, teacher ratings and rankings, and reading curriculum-based

measurement. *School Psychology Review, 48*(3), 267-275. doi:10.17105/spr-2017-0152.v48-3

Moats, L. (2009). Knowledge foundations for teaching reading and spelling. *Reading and Writing: An Interdisciplinary Journal, 22*(4), 379-399.

Morris, D., Trathen, W., Gill, T., Schlagal, R., Ward, D., & Frye, E. M. (2017). Assessing reading rate in the primary grades (1–3). *Reading Psychology, 38*(7), 653-672. doi:10.1080/02702711.2017.1323057

Mucherach, W., & Yoder, A. (2008). Motivation for reading and middle school students' performance on standardized testing in reading. *Reading Psychology, 29*(3), 214- 235. doi:10.1080/02702710801982159

Murray, M., Munger, K., Hiebert, E. (2014). An analysis of two reading intervention programs: How do the words, texts, and programs compare? *The Elementary School Journal, 114*(4), 479-500.

National Assessment of Educational Progress (NAEP) reading report card. The Nation's Report Card. (2017). Retrieved from https://www.nationsreportcard.gov/reading_2017/nation/scores/?grade=4.

National Early Literacy Panel [NELP] (2008). Developing early literacy: A scientific synthesis of early literacy development and implications for intervention. Jessup, MA: National Institute for Literacy.

National Institute of Child Health and Human Development [NICHD] (2000). Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction (NIH Publication No. 00-4769). Washington, DC: U.S. Government Printing Office.

National Reading Panel [NRP] (2000) Report of the National Reading Panel-Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and Its Implications for Reading Instruction. Washington, D.C.: National Institute of Child Health and Human Development.

New International Version. (2011). BibleGateway.com. https://www.biblegateway.com/passage/?search=Matthew+25%3A29&version=NIV

O'Keeffe, B. V., Bundock, K., Kladis, K. L., Yan, R., & Nelson, K. (2017). Variability in DIBELS Next progress monitoring measures for students at risk for reading difficulties. *Remedial and Special Education, 38*(5), 272-283. doi:10.1177/0741932517713310

Ouellette, G.P. (2006). What's meaning got to do with it: The role of vocabulary in word reading and reading comprehension. *Journal of Educational Psychology*, *98*(3), 554–566. doi:10.1037/0022-0663.98.3.554

Pietro, G. D. (2017). The academic impact of natural disasters: Evidence from L'Aquila earthquake. *Education Economics, 26*(1), 62-77. doi:10.1080/09645292.2017.1394984

Pikulski, J. J., & Chard, D. J. (2005). Fluency: Bridge between decoding and reading comprehension. *The Reading Teacher, 58*(6), 510–519.

Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology, 95*(4), 667-686. doi:10.1037/0022-0663.95.4.667

Powell, M. B., & Gadke, D. L. (2018). Improving oral reading fluency in middle-school students: A comparison of repeated reading and listening passage preview. *Psychology in the Schools, 55*(10), 1274-1286. doi:10.1002/pits.22184

Price, K. W., Meisinger, E. B., Louwerse, M. M., & D'Mello, S. (2016). The contributions of oral and silent reading fluency to reading comprehension. *Reading Psychology, 37*(2), 167-201. https://doi.org/10.1080/02702711.2015.1025118

Proctor, C. P., Carlo, M., Snow, C., August, D. (2005). Native Spanish-speaking children reading in English: Toward a model of comprehension. *Journal of Educational Psychology, 97*(2), 246-256.

Protopapas, A., Sideridis, G., Mouzaki, A., Simos, P. (2011). Matthew effects in reading comprehension: Myth or reality? *Hammill Institute on* Disabilities, 44(5), 402-420.

Quigley, C. F., & Herro, D. (2016). "Finding the joy in the unknown": Implementation of STEAM teaching practices in middle school science and math classrooms. *Journal of Science Education and Technology, 25*(3), 410–426

Quinn, D., & Polikoff, M. (2017). Summer learning loss: What is it, and what can we do about it? Retrieved from https://www.brookings.edu/research/summer-learning-loss-what-is-it-and-what-can-we-do-about-it/

Roehrig, A. D., Petscher, Y., Nettles, S. M., Hudson, R. F., & Torgeson, J. K. (2008). Accuracy of DIBELS Oral Reading Fluency measure for predicting third grade reading comprehension outcomes. *Journal of Psychology, 46*(3), 343-366.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78.

Sacerdote, B. (2008). When the saints come marching in: Effects of Hurricanes Katrina and Rita on student evacuees. Working paper no. 14385. Retrieved from http://www.nber.org.ezproxy.liberty.edu/papers/w14385

Salkind, N. (2010). Encyclopedia of Research Design. doi:10.4135/9781412961288

Samuels, S. J. (1979). The method of repeated readings. *The Reading Teacher, 32*(4). 403-408.

Samuels, S. J. (2006). Toward a model of reading fluency. In S. J. Samuels & A. Farstrup (Eds.), *What research has to say about fluency instruction* (pp. 40-63). International Reading Association.

Samuels, S. J. (2007). The DIBELS tests: Is speed of barking at print what we mean by reading fluency? *Reading Research Quarterly, 42*(4), 563-566.

Samuels, S. J., & Farstrup, A. E. (2006). *What research has to say about fluency instruction*. International Reading Association.

Schechter, R., Macaruson, P., Kazakoff, E., Brooke, E. (2015). Exploration of a blended learning approach to reading instruction for low ses students in early elementary grades. *Computers in the Schools, 32*(3-4), 183-200

Schilling, S., Carlisle, J., Scott, S., & Zeng, J. (2007). Are fluency measures accurate predictors of reading achievement? *The Elementary School Journal, 107*(5), 429- 448.

Scrimin S., Moscardino U., Capello F., Axia, G. (2009). Attention and memory in school-age children surviving the terrorist attack in Beslan, Russia. *Journal of Clinical Child Adolescent Psychology, 38*(3) 402–414.

Shapiro, E. S., Solari, E., & Petscher, Y. (2008). Use of a measure of reading comprehension to enhance prediction on the state high stakes assessment. *Learning and Individual Differences, 18*(3), 316-328.

Shaw, R., & Shaw, D. (2002). *DIBELS oral reading fluency-based indicators of third grade reading skills for Colorado State Assessment Program (CASP).* (Technical Report) Eugene, OR: University of Oregon.

Soffer, T., Kahan, T., & Nachmias, R. (2019). Patterns of students' utilization of flexibility in online academic courses and their relation to course achievement. *The International Review of Research in Open and Distributed Learning, 20*(3), 202–220. doi: 10.19173/irrodl.v20i4.3949

Solari, E. J., Grimm, R., McIntyre, N. S., Swain-Lerro, L., Zajic, M., & Mundy, P. C. (2017). The relation between text reading fluency and reading comprehension for students with autism spectrum disorders. *Research in Autism Spectrum Disorders, 41–42*(2017), 8–19.

Stanovich, K. E. (1993). Does reading make you smarter? Literacy and the development of verbal intelligence. *Advances in Child Development and Behaviour, 24*(1993), 133-180.

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly, 189*(1-2), 360-406.

Stanovich, K. E. (1992). Speculations on the causes and consequences of individual differences in early reading acquisition. In P. B. Gough, L C. Ehri, R. Treiman (Eds.), Reading acquisition (pp. 307-342). Hillsdale, NJ: Laurence Erlbaum Associates, Inc.

Strong Hilsmier, A., Wehby, J. H., & Falk, K. B. (2016). Reading fluency interventions for middle school students with academic and behavioral disabilities. *Reading Improvement, 53*(2), 53-64.

Tedick, D. J., & Lyster, R. (2019). *Scaffolding language development in Immersion and Dual Language Classrooms*. Routledge.

Texas Engineering Extension Service (2011) Hurricane Ike impact report. Retrieved August 4, 2021, from https://docplayer.net/2860388-Hurricane-ike-impact-report.html

Thomas, W., & Collier, V. P. (2002). A national study of school effectiveness for language minority students' long-term academic achievement (Final report: Project 1.1). Santa Cruz: University of California, Center for Research on Education, Diversity, and Excellence.

Thomas, W. P., & Collier, V. P. (2012). *Dual language education for a transformed world.* Fuente Press.

Tolman, C. (2005). *Working smarter, not harder: What teachers of reading need to know and be able to teach* [Paper Presentation]. Racing to Literacy 57th Annual Conference. Indianapolis, Indiana. https://www.smartspeechtherapy.com/wp-content/uploads/2018/07/Working-Smarter-Not-Harder.pdf

Torgesen, J. K., & Burgess, S. R. (1998). Consistency of reading-related phonological processes throughout early childhood: Evidence from longitudinal-correlational and instructional studies. In J. L Metsala & L. C. Ehri (Eds.), *Word recognition in beginning literacy* (pp. 161 – 188). Mahwah, NJ: Lawrence Erlbaum.

Toste, J. R., Williams, K. J., & Capin, P. (2017). Reading big words: Instructional practices to promote multisyllabic word reading fluency. *Intervention in School and Clinic, 52*(5), 270-278. doi: https://doi.org/10.1177/1053451216676797

Tracey, D. H., & Morrow, L. M. (2012). *Lenses on reading: An introduction to theories and models*. The Guilford Press.

Turley, M. R., & Obrzut, J. E. (2012). Neuropsychological effects of posttraumatic stress disorder in children and adolescents. *Canadian Journal of School Psychology, 27*(2), 166– 182. https://doi-org.ezproxy.liberty.edu/10.1177/0829573512440420

University of West Alabama. (2018). *Overcoming the Matthew Effect in Early Education*. Retrieved from https://online.uwa.edu/news/matthew-effect/

U.S. Department of Education [USDOE]. (2015). Dual language education programs: Current state policies and practices. Retrieved from https://ncela.ed.gov/files/rcd/TO20_DualLanguageRpt_508.pdf

Utah State Board of Education [USBE]. (2016). Welcome to Dual Language Immersion. Retrieved from https://www.schools.utah.gov/curr/dualimmersion

Utah State Board of Education [USBE]. (2020). Extended School "Soft Closure". Retrieved from https://schools.utah.gov/file/4ae16501-83dd-4a2d-9044-e81b517ce26c

Vaculíková, J. (2018). Measuring self-regulated learning and online learning events to predict student academic performance. *Studia Paedagogica*, *23*(4), 91–118. https://doi.org/10.5817/SP2018-4-5

Verhoeven L, & Van Leeuwe J (2008). Prediction of the development of reading comprehension: A longitudinal study. *Applied Cognitive Psychology, 22*(3), 407–423

von Hippel, P. T., Workman, J., & Downey, D. B. (2018). Inequality in reading and math skills forms mainly before kindergarten: A replication, and partial correction, of "Are schools the great equalizer?" *Sociology of Education, 91*(4), 323-357

Wagner, R. K., Schatschneider, C., & Phythian-Sence, C. (Eds.). (2009). *Beyond decoding: The behavioral and biological foundations of reading comprehension.* Guilford Press.

Wang, Y., Mauer, M. V., Raney, T., Peysakhovich, B., Becker, B. L. C., Silva, D. D., & Gaab, N. (2016). Development of tract-specific white matter pathways during early reading development in at-risk children and typical controls. *Cerebral Cortex, 27*(4), 2469– 2485.

Wexler, J., Vaughn, S., Edmonds, M., & Reutebuch, C. K. (2008). A synthesis of fluency interventions for secondary struggling readers. *Reading and Writing, 21*(4), 317-347. doi: https://doi.org/10.1007/s11145-007-9085-7

What is steam education? Rethink Together. (2021). Retrieved from https://xqsuperschool.org/rethinktogether/what-is-steam-education/

Wilson, K. M., & Trainin, G. (2007). First-grade students' motivation and achievement for reading, writing, and spelling. *Reading Psychology, 28*(3), 257-282. doi:10.1080/02702710601186464

Wood, D. E. (2006). Modeling the relationship between oral reading fluency and performance on a statewide reading test. *Educational Assessment, 11*(2), 85-104.

Wright, T. & Cervetti, G. (2017). A systematic review of the research on vocabulary instruction that impacts text comprehension. *Reading Research Quarterly*, *52*(2), 203– 226. doi:10.1002/rrq.163

Yakman, G. (2008). *STEAM Education: an overview of creating a model of integrative education.* Research Gate. Retrieved from https://www.researchgate.net/publication/327351326_STEAM_Education_an_overview_of_creating_a_model_of_integrative_education.

Yopp, H. K. (1992). Developing phonemic awareness in young children. *The Reading Teacher, 45*(9), 696–703.

Young, N. D., & Daly, E. J. (2016). Effects of performance criteria during reading instruction on generalized oral reading fluency. *Behavioral Interventions, 31*(3), 291-299. doi:10.1002/bin.1441

Young, C., & Rasinski, T. (2017). Readers Theatre: Effects on word recognition automaticity and reading prosody. *Journal of Research in Reading, 41*(3), 475-485. doi:10.1111/1467-9817.12120

Yuill, N., & Oakhill, J. (1991). Children's problems in text comprehension. Cambridge University Press.

Zorfass, J., & Urbano, C. (2018). *A description of foundation skills interventions for struggling middlegrade readers in four urban Northeast and Islands Region school districts*. Institute of Education Sciences (IES). Retrieved from https://ies.ed.gov/ncee/edlabs/regions/northeast/pdf/REL_2008042_sum.pdf.

APPENDIX A

March 29, 2021

Director of Assessment, Data, and Research

Dear :

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a doctorate degree. The title of my research project is "Difference in Reading Fluency among Fifth-grade Students Attending Traditional, STEAM, or DLI Programs during Soft School Closure", and the purpose of my research is to raise awareness of the effects of soft school closures on student reading fluency in traditional, DLI, or STEAM schools.

I am writing to request your permission to access and utilize student records.

The data will be used to determine if there is a difference in reading fluency among fifth-grade students attending traditional, STEAM, or DLI programs following school closure, when controlling for fourth-grade achievement.

Thank you for considering my request. If you choose to grant permission, please provide a signed statement on official letterhead indicating your approval. A permission letter document is attached for your convenience.

Sincerely,

Patricia Blanton

APPENDIX B

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

March 29, 2021

Patricia Blanton

Re: IRB Conditional Approval - IRB-FY20-21-661 Difference in reading fluency among fifth-grade students attending traditional, STEAM, or DLI programs during soft school closures

Dear Patricia Blanton,

We are pleased to inform you that your study has been **conditionally** approved by the Liberty University Institutional Review Board (IRB). Conditional approval means that your complete approval is pending our receipt of certain items, which are listed below:

Documented approval from each research site you are enrolling in your study. Acceptable forms of documentation include a letter on official letterhead or a time-and-date stamped email from a person with the authority to grant permission.

Please keep in mind that you are not permitted to begin recruiting participants or collecting data until you have submitted the above item(s) and have been granted complete approval by the Liberty University Institutional Review Board.

Thank you for your cooperation with the IRB, and we wish you well as you continue working toward complete approval.

Sincerely,

Administrative Chair of Institutional Research
Research Ethics Office

APPENDIX C

ASSESSMENT, DATA & RESEARCH
DEPARTMENT OF TEACHING & LEARNING

EXECUTIVE DIRECTOR

DIRECTOR

May 24, 2021

To Whom It May Concern:

This letter gives approval for Patricia Blanton to conduct a research study titled "*Difference in reading fluency among fifth-grade students attending traditional, STEAM, or DLI programs during soft school closures*" in . Your research request has been reviewed and you are given permission for the research to move forward. This means that personnel and/or students may be contacted, but neither personnel nor students are required to participate. No undo pressure should be applied in order to gain participation. Any report of such pressure will result in your approval being rescinded.

Per this approval, you also agree to provide with the results of your findings within 30 days of the study's conclusion.

If you have any questions or need additional information, feel free to contact me at or at .

Regards,

Director of Assessment, Data & Research

APPENDIX D

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

August 9, 2021

Patricia Blanton

Re: Modification - IRB-FY20-21-661 Difference in reading fluency among fifth-grade students attending traditional, STEAM, or DLI programs during soft school closures

Dear Patricia Blanton,

The Liberty University Institutional Review Board (IRB) has rendered the decision below for IRB-FY20-21-661 Difference in reading fluency among fifth-grade students attending traditional, STEAM, or DLI programs during soft school closures.

Decision: Exempt

Your request to "add STEM students from the same district to [your] study" has been approved.

Thank you for complying with the IRB's requirements for making changes to your conditionally approved study. Please do not hesitate to contact us with any questions.

We wish you well as you continue with your research.

Sincerely,

Administrative Chair of Institutional Research
Research Ethics Office

APPENDIX E

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

August 12, 2021

Patricia Blanton

Re: IRB Exemption - IRB-FY20-21-661 Difference in reading fluency among fifth-grade students attending traditional, STEAM, or DLI programs during soft school closures

Dear Patricia Blanton,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:
101(b):

(ii) Information, which may include information about biospecimens, is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained directly or through identifiers linked to the subjects, the investigator does not contact the subjects, and the investigator will not re-identify subjects.

Please note that this exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,

Administrative Chair of Institutional Research
Research Ethics Office

APPENDIX F

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

October 13, 2021

Patricia Blanton

Re: Modification - IRB-FY20-21-661 Difference in Reading Fluency among Fifth-grade Students Attending Traditional, STEM-Related, or DLI Programs During Soft School Closures.

Dear Patricia Blanton,

The Liberty University Institutional Review Board (IRB) has rendered the decision below for IRB-FY20-21-661 Difference in Reading Fluency among Fifth-grade Students Attending Traditional, STEM-Related, or DLI Programs During Soft School Closures. .

Decision: Exempt

Your request to change your study title has been approved.

Thank you for complying with the IRB's requirements for making changes to your approved study. Please do not hesitate to contact us with any questions.

We wish you well as you continue with your research.

Sincerely,

Administrative Chair of Institutional Research
Research Ethics Office