LEARNING LOSS IN PASSAGE READING FLUENCY FOR ELEMENTARY STUDENTS DURING COVID-19 SCHOOL CLOSURE.

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Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

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ABSTRACT

The onset of the COVID-19 pandemic in 2020 caused public schools across the United States to suddenly close and interrupt face-to-face instruction for all students for a sustained period of time. It remains uncertain the total effect of the prolonged closure on student learning. This study provides a historical research review of the effect of previous school closures, such as traditional summer breaks and explores the phenomenon of learning loss that occurs when instruction is paused. This causal-comparative study examined the effect on passage reading fluency and reading comprehension of fourth grade elementary students following an unprecedented 24-week disruption of instruction due to school closure during the COVID-19 crisis. This study compared EasyCBM Passage Reading Fluency scores obtained before the school closure with scores obtained after schools reopened to determine if students experienced significantly more reading fluency loss during the extended period of disrupted instruction based upon subgroup category (socioeconomic status and gender). Findings indicated that male students experienced significantly more reading fluency loss during a 24-week COVID-19 school closure compared to female students.

Keywords: Student learning loss, summer slide, achievement gap, passage reading fluency, reading comprehension,

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List of Abbreviations

Analysis of Variance (ANOVA)

Career Technical Education (CTE)

Coronavirus Aid, Relief, and Economic Security (CARE)

Coronavirus Disease (COVID)

Curriculum Based Measurements (CBM)

Elementary and Secondary School Emergency Relief (ESSER)

Every Student Succeeds Act (ESSA)

Individuals with Disabilities Education Act (IDEA)

Learning Management System (LMS)

Local Education Agency (LEA)

Multi-Tiered System of Supports (MTSS)

No Child Left Behind (NCLB)

Norm-Referenced Tests (NRT)

Passage Reading Fluency (PRF)

Personal Protection Equipment (PPE)

Positive Behavior Interventions and Supports (PBIS)

Response to Intervention (RTI)

Science, Technology, Engineering, and Mathematics (STEM)

Socio-Economic Status (SES)

Supplemental Nutrition Assistance Program (SNAP)

Temporary Assistance for Needy Families (TANF)

Zone of Proximal Development (ZPD)

CHAPTER ONE: INTRODUCTION

Overview

This chapter provides an explanation of student learning loss that occurs when formal instruction is disrupted for a prolonged period of time. The background section provides an account of the body of research that addresses how learning loss occurs when schools close for the summer and how these closures affect some subgroups of students more than others in a phenomenon called "summer slide." The problem is, there is no research determining whether any subgroup of students experienced significantly more learning loss than other subgroups during prolonged school closures such as closure due to COVID-19. The purpose of this study is to determine whether prolonged COVID-19 school closure affected learning loss differently for various subgroups of students. Research questions and definition of terms are provided at the end of the chapter.

Background

The sudden onset of the Coronavirus disease in the early spring of 2020 caused virtually every public school in the United States to close, bringing traditional face-to-face instruction to a complete halt. According to Hoffman and Miller (2020), 43 states ordered schools to close, affecting over 55 million students attending more than 124,000 public and private schools across the United States. Although some schools attempted to provide materials and some level of virtual instruction, most schools were unprepared to continue any significant level of instruction for the remainder of the 2019-2020 school year. Although it is almost certain that this extended time out of school impacted student achievement, it is still too early to quantify the total effect on student achievement and the learning loss that may have occurred during this time (Kuhfeld et al., 2020). In addition to the loss of instructional time, students also faced unprecedented stress,

anxiety, and illness, as well as disparities in access to learning resources, such as printed materials, internet access, and technology devices (Middleton, 2020). While learning loss or academic decline will most likely occur, it may affect grades, schools, and various subgroups of students differently (Wyse et al., 2020). School districts are faced with the challenge of identifying how different groups of students were affected and developing intervention strategies targeting students who were most affected by school closure.

Before the onset of COVID-19, public schools were challenged to mitigate complex and long-standing factors directly or indirectly contributing to the achievement gap that exists between students of different socioeconomic statuses. In 1983, "A Nation at Risk" exposed various problems and disparities that existed within the educational systems in the United States, creating urgency to address the widening achievement gap between various socioeconomic and racial groups (National Commission on Excellence in Education, 1983). The No Child Left Behind Act enacted a wide range of accountability measures designed to narrow the achievement gap (Beck, 2011). Despite the massive national effort and high stakes accountability measures, the achievement gap continues to exist between different socioeconomic and racial groups, regional, and geographic setting impacted by economic, historical and moral factors (Ladson-Billings, 2006). These efforts have, however, brought issues of inequality among gender, race, and family income to the forefront of the nation's educational agenda (Allington et al., 2010).

There is an existing body of research that has examined the impact of school closure during summer months on student learning. During the mid 1980s, Karl Alexander, Doris Entwisle, and Linda S. Olson (2007) at John Hopkins University, conducted a longitudinal study that closely followed a cohort of nearly 800 students in the Baltimore Public School System for nearly 25 years. Their findings, which have become a landmark study, illuminated learning loss

that occurs during the traditional summer break and disparities that exist between poor children and middle-class children. It was this research that coined the expression “summer slide.” These findings were consistent with the meta-analysis of 39 studies examining student achievement decline during summer (Cooper et al.,1996). According to Cooper et al., elementary and middle school students from low-income households experienced learning loss equivalent to one month on a grade level equivalent scale.

This notion of “summer slide” has spurred an entire body of educational research focusing on learning loss during summer breaks, and it is the rationale for summer intervention and enrichment programs targeting students from low-socioeconomic households (Bowers & Schwarz, 2018). Students who come from homes of lower socioeconomic statuses tend to lose one to three months of progress, as measured by reading assessments during a typical summer break in contrast to students from middle-class homes who either experience either no loss or may actually gain. Families from middle-to-high socioeconomic statuses tend to encourage learning opportunities for their children during the summer months and possess more financial resources to provide books, games, technology, as well as travel and attendance in summer camps (Alexander et al, 2007). Families with inadequate incomes often face many challenges associated with poverty, such as a lack of social and economic capital to ensure their child’s success (Payne, 2019). Summer learning loss for students from low SES ensures maintenance at best or even widening of the achievement gap at worst (Sandberg & Reschly, 2013).

Today, most public school districts offer some type of summer intervention program in an effort to minimize “summer slide.” Many of these programs utilize Title I funds, which specifically target students from low SES households, providing ongoing reading and math instruction combined with various enrichment and exploratory activities. Data collected in 2010

indicated over 14 million children were served in summer reading programs across the United States, and 18 states included summer school data as part of the accountability requirements (Reed et al., 2020). According to Folsom et al. (2019), 33 states had summer school legislation in 2018.

More recently, an emerging body of research suggested a closer look at "summer slide" because the phenomenon is considerably more complicated than socioeconomic status. The original studies do not fully encompass the wide range of variability within various sub-groups that exist in today's public schools (Atteberry & McEachin, 2020). This emerging research is revealing gaps in the literature and a need for further research. There is strong evidence that summer school programs for at-risk populations are mitigating summer learning loss and, in many cases, generating learning gains (Campbell et al., 2019).

Theories as to why students from lower SES tend to experience summer slide are founded on the idea that the student's environment, experiences, and/or social interactions affect various academic skills, such as reading comprehension, fluency, vocabulary, mathematical computation and reasoning, and problem-solving. Slates et al. (2012) attribute Coleman and Hoffer's (1987) theory of within-family social capital presenting that parents transmit their level of human capital to their children. The primary theoretical foundation for this study is grounded in social learning theory. Social learning theory suggested that all learning is social (Vygotsky, 1962). Therefore, more social interactions lead to higher levels of learning. Bandura's (1977) theory of social learning builds upon Vygotsky's theory by adding the notion that learning is fundamentally a labor-intensive process that becomes much easier when learning with others in a social setting. Therefore, a student's learning is often a product of his or her social environment. Students from lower SES are often afforded far less social learning opportunities compared to their more

affluent peers who more often engage in social activities, such as summer camps and vacations, or whose parents have more time and resources to engage in academic-based activities with the child. Another extension of social learning theory is called “faucet theory” which suggests that all students receive the same steady flow of instruction and resources (like the flow of a faucet) throughout the year, but the faucet is disrupted or is inconsistent for many students during the summer (Neuman & Celano, 2001).

Social learning theory provides some explanation as to why students from more affluent households have more opportunities during a typical summer break than students from low-income households, therefore, creating a learning gap that is compounded summer after summer. The phenomenon of “summer slide” disproportionately affecting low-income children is well documented. The meta-analysis conducted by Cooper et al., (1996) examined 13 different investigations conducted between 1975 and 1995 and found that students lost about a tenth of a standard deviation on test scores in the areas of reading and math, which is the equivalent of about one month of instruction. Reading losses were strongly influenced by socioeconomic status. Students from low SES households experienced greater losses in reading compared to students from high SES households. Therefore, logic would suggest that prolonged school closure, such as COVID-19 school closures, would further exacerbate the achievement gap. This assumption is embedded in the Elementary and Secondary School Emergency Relief Fund (ESSER 2.0), which recently allocated an additional $54.3 billion targeting learning loss for children from low-income households (Office of Elementary & Secondary Education, 2021). However, the school closures due to COVID-19 may not affect students the same way as a typical summer break. There are many unique factors that can affect students in profound ways. The enriched social interactions and experiential learning opportunities associated with vacation

travel often afforded by children from higher income families were not available during COVID-19 closures because of travel restrictions and social distancing rules. Social learning theory would suggest that, without these advantages, all students would experience similar learning loss.

Determining the level of learning loss that occurred during COVID-19 school closure and whether there are measurable differences in learning loss between different groups of students based on SES requires a broad fundamental metric. Learning loss has consistently been demonstrated in area of reading among children from low-income households, often performing one to three months lower in the fall compared to assessments given in the spring before the summer break (Bowers & Schwarz, 2018). Reading is most often employed in studies examining learning gains or losses during summer breaks (Campbell et al., 2019). Reading fluency is a primary element in the development of reading comprehension and is recognized as a predictor of future comprehension abilities (Lipka, 2017). Reading fluency and reading comprehension are interrelated and are also correlated with school outcomes across all grade levels and academic life. There are three main elements to reading fluency, which includes reading rate, accuracy, and prosody (Bigozzi et al., 2017). Reading comprehension is dependent on the ability to recognize words accurately and fluently (Kang & Shin, 2019). For the purpose of this study, reading fluency will be the metric used to represent learning gains or losses during the 24-week COVID-19 school closure.

EasyCBM is an example of a curriculum-based measurement tool. Curriculum-based measurement tools, or CBMs, were developed to provide teachers with practical evaluation procedures to make decisions about adjusting their students' instruction (Deno, 1985). CBMs are a set of short, standardized probes that measure basic skills in reading, mathematics, and written

expression (Shapiro, 2011). There are five components to reading literacy that can be measured by CBMs: phonemic awareness, phonics, vocabulary, comprehension, and fluency (Cervetti & Heibert, 2015). This study will focus specifically on measuring students' reading fluency. Once a teacher has administered an oral reading fluency CBM, the students' fluency skills are reported as both the number of correct words read per minute, as well as low risk, some risk, or high risk for reading below grade level (Roehrig et al., 2008).

Because of the influence of these test results on adjusting students' instruction, it is important that schools be permitted access to instruments that are reliable and valid, and CBM probes' research indicated them to be both. In addition, CBM assessments are relatively inexpensive and are simple to administer, which make them attractive options to school districts in need of universal screening and progress monitoring tools. Additionally, CBM assessments have demonstrated a strong correlation to statewide achievement tests (Yeo, 2010), which is crucial for school districts to consider, as school accountability continues to be a focus across the nation.

The school district in this study administers universal screening to all elementary students three times annually, including a fall, winter, and spring administration. The spring administration occurs in May prior to summer break, and the fall administration occurs in August, soon after students return to school. Comparing the spring and fall scores provides a measure of reading fluency gain or loss during the summer. The winter administration occurs in late January and serves as a measurement of progress during the year. During the spring of 2020 the winter administration served as the last measurement of students' reading fluency prior to school closure due to COVID-19. The district reopened in August 2020 and universally screened all students. Comparing the winter 2020 reading fluency scores to the fall 2020 reading fluency

scores provided a measurement of reading fluency gain or loss for all students and serves as a predictor of learning loss during the COVID-19 school closure.

Problem Statement

The COVID-19 crisis resulted in much of the world moving into various forms of lock down and social distancing scenarios, including schools across the globe. A primary factor of this study is that many schools were forced to close their doors for prolonged periods of time. In the United States more than 124,000 public and private schools were closed, with all 50 states recommending schools remain closed until the end of the 2019-2020 school year (Pattison et al., 2021). Although it is certain that school closures had negatively impacted student learning, it is uncertain the degree to which student progress had been impeded and whether it had disproportionately affected various sub-groups of students compared to others. A nationwide study examining school pandemic preparedness determined schools to be unprepared for such an event, meeting less than half of the pandemic preparedness indicators (Rebmann et al., 2016).

There is a well-established body of research establishing that students experience some level of learning loss during the traditional ten-week summer break (Cooper et al., 2000). Furthermore, it is a common belief that this "summer slide" impacts some sub-groups of students more dramatically than others, particularly students categorized as low originating from socioeconomic statuses (Alexander et al., 2007). Therefore, considering learning loss occurs during a typical ten-week summer break, exploring whether or not learning loss occurs when a global pandemic disrupts instruction for a much longer period of time, how does this affect various sub-groups of students, and to what degree will it contribute to the existing body of research on learning loss?

On March 6, 2020, the school district in this study closed schools for spring break. During this time, the governor of Tennessee closed all Tennessee public schools for the remainder of the school year due to COVID-19, canceling the last 12 weeks of school. Furthermore, no summer school programs operated during the traditional ten-week summer break because of the pandemic. It is projected that students will suffer significantly greater learning loss during COVID-19 school closures, compared to the typical "summer slide" experienced during a normal summer (Kuhfeld et al., 2020). After 24 weeks without instruction, students returned to school and once again resumed in-person instruction. Determining which students were most affected by the school closure is critical to developing intervention strategies that target students with the greatest needs. The problem is that the literature has not fully addressed how a pandemic of such magnitude that, not only closed schools, but also suspended all face-to-face social interactions for a sustained period, might impact student learning.

Purpose Statement

The purpose of this quantitative study is to examine whether there is a difference in learning loss following the 2019 traditional 10-week summer break among elementary male and female students who were economically disadvantaged and those who were not as measured by EasyCBM Passage Reading Fluency. This study examined whether there was a difference in learning loss following the 2020 24-week pause in instruction due to COVID-19 among elementary male and female students who are economically disadvantaged and those who are not, as measured by EasyCBM Passage Reading Fluency. The independent variables were socioeconomic status (SES) and gender. SES refers to the overall income and financial resources available to the household of each student. For the purposes of this study, SES is divided into two categories, which include economically disadvantaged and not economically

disadvantaged. Tennessee public schools divide all students into these two SES categories. Economically disadvantaged is defined as a student whose family has obtained direct certification of economic disadvantage and participates in the state income nutrition program or is categorized as foster care, homeless, migrant, or runaway (Tennessee Department of Education, 2021). Household income must fall below a specific amount to qualify for certification. Gender is defined as the biological sexual orientation reported by the parent on school registration form, indicated as either male or female. The dependent variable is the EasyCBM Passage Reading Fluency scores. The population to be studied was a cohort of fourth grade students at six different elementary schools who participated in district-wide universal screening of passage reading fluency, both before school closure and after school reopening.

Significance of the Study

Similar causal-comparative studies have examined learning loss that occurs during the traditional summer break for public school elementary students, concluding that students from low SES households are more likely to experience greater learning loss during the break than students from middle class households (Atteberry & McEachin, 2020). This loss, also known as "summer slide," is attributed to fewer opportunities for engaging experiences, which are known to promote learning throughout the summer months (Alexander et al., 2007). One noteworthy difference is this study considers a significantly longer period of time for which schools were closed. This study will examine a 24-week period of time, which is more than double the traditional ten-week summer break. Another significant difference is that previous studies examined only SES as the independent variable. This study will also consider gender. Research indicated that gender contributes to the achievement gap, more specifically, male students often underperform in reading compared to female students (Bronzo et al., 2014). Most importantly,

there is limited research that examines learning loss during a global pandemic. The added stress, anxiety, and illness that is associated with COVID-19 might affect students differently than a closure during a typical summer (Middleton, 2020). For example, factors associated with the pandemic might affect males differently than females, resulting in a measurable difference in the retention or loss of basic academic skills, such as reading. The outcome of this study will help school leaders formulate intervention strategies, which target students who display the greatest need.

Research Questions

RQ1: Is there a difference in learning loss following the 2019 traditional 10-week summer break among elementary male and female students who are economically disadvantaged and those who are not as measured by EasyCBM Passage Reading Fluency?

RQ2: Is there a difference in learning loss following the 2020 24-week pause in instruction due to COVID-19 among elementary male and female students who are economically disadvantaged and those who are not as measured by EasyCBM Passage Reading Fluency?

Definitions

1. *Student learning loss* – represents the decline in a measurable academic skill, such as reading comprehension level (Cooper et al., 2000).
2. *Summer slide* - refers to learning loss that takes place during the traditional summer break and the disparities that exist between poor children and middle-class children (Alexander et al., 2007).
3. *Achievement gap* – refers to lower academic achievement measures associated with socioeconomic status (Alexander et al., 2007).

4. *Passage Reading Fluency (PRF)*- A standardized reading assessment that measures reading fluency with connected texts (Tennessee Department of education, 2015).
5. *EasyCBM*- A monitoring system used to measure student progress within a specific curricular program.

CHAPTER TWO: LITERATURE REVIEW

Overview

This study focuses on the effects of COVID-19 on student achievement and how prolonged school closure leads to significant learning loss. A theoretical framework based on Vygotsky's sociocultural theory was applied to examine how a student's circumstances, environment, and social interactions affect learning and academic performance. To better understand the potential effects of the pandemic on student achievement, this chapter explores the historical literature on learning loss that occurs during a typical summer break, also known as "summer slide" or summer learning loss, and how this phenomenon affects various subgroups of students. Various strategies and interventions often used to minimize or prevent summer learning loss will be considered as potential solutions to mitigating potential learning loss as a result of COVID-19 school closure.

Theoretical Framework

This study utilized the theoretical lens of sociocultural theory developed by Lev Vygotsky, who suggested that learning is profoundly influenced by the socio-cultural environment. Sociocultural theory suggested that all learning is social (Vygotsky, 1962). Therefore, students primarily learn from social interactions and from their surroundings. Increased social interactions lead to higher levels of learning. Bandura's (1977) theory of social learning expands upon Vygotsky's theories by adding the notion that learning is fundamentally a labor-intensive process that eases when learning with others in a social setting. Therefore, a student's learning is often a product of his or her social environment.

Vygotsky described knowledge as existing on two different levels: an interpersonal external level and an intrapersonal internal level (Kay & Kibble, 2016). The learner cannot gain

internal knowledge without first gaining exposure to external knowledge. Vygotsky (1978) theorized that children learn from their environment in one of three ways. They first learn through imitation of adults, usually their parents. Secondly, they learn through some type of instruction. Thirdly, children learn through social interactions or a collaborative process where a group of children are working towards the same goal of understanding within a shared learning environment. Therefore, children learn from others who have more experience, knowledge, or skills, such as parents, teachers, family members, friends, and classmates. Vygotsky described these important influencers in children's lives as "more knowledgeable other[s]" (Eun, 2019, p. 20).

Vygotsky (1978) emphasized the importance of scaffolding the learning process to address the needs of children, introducing the concept of the zone of proximal development (ZPD). ZPD is a process where the student is guided by a more knowledgeable person, such as a parent, teacher, or peer. The ZPD represents the gap between what the child knows and what the child has the potential to learn. When a child is trying to learn new skills, he or she needs to be supported by a more knowledgeable person, whether it is in the home or the school environment. Many educators attribute ZPD to differentiated instructional strategies that consider a student's background, language, interest, readiness level, and learning style (Kay & Kibble, 2016). Therefore, ZPD represents knowledge or skill that is just outside the reach of the child. However, the teacher who is the more knowledgeable person can differentiate for a particular child by using the child's background, language, interest, readiness level, and learning style as a tool, bridge, or context to help the child obtain the desired knowledge or skill (Eun, 2019).

Based upon Vygotsky's (1978) social learning theories, the classroom provides a rich learning environment that allows social interaction, collaboration, and guided instruction from a

knowledgeable teacher designed to maximize learning. Therefore, the level of learning loss that occurs during school closure is influenced by the environment and social interaction opportunities students have outside the classroom throughout the duration of the school closure. Bowers and Schwarz (2018) conducted a study of elementary students from low SES households who participated in summer program designed to improve reading and writing narrative skills based upon Vygotsky's (1978) sociocultural perspective, putting forth that literacy instruction is based upon social interactions, which allow the student to construct meaning. Participating students demonstrated a measurable improvement in oral narrative skills, as well as written composition skills. CBM scores indicated that participating students did not experience summer learning loss of literacy skills.

Related Literature

A significant challenge facing public education is creating and maintaining an equitable system that provides a high-quality education for all students. The following related literature explores various factors and circumstances that place some students at a disadvantage creating an achievement gap between various subgroups of students. The literature review begins with the 2019-2020 global health crisis caused by the onset of COVID-19 and then traces back historical factors that contribute to learning loss and disparities for some students.

COVID-19 School Closure

According to UNICEF (2021), more than 168 million children worldwide had been unable to return to in-person learning for more than a year since the March 2020 COVID-19 closure. Furthermore, an estimated 214 million children worldwide had been deprived of at least three-quarters of a school year of in-person learning. In the United States, more than 124,000 public and private schools were closed with all 50 states recommending schools remain closed

until the end of the 2019-2020 school year (Pattison et al., 2021). This lack of formal instruction has the potential to produce devastating consequences for children, not only for their academic progress, but also their physical and psychological health. Schoolchildren worldwide depend upon the schoolhouse, not only as a place for academic training, but also a place where they are able to socialize with peers, receive needed academic support and intervention, access health and counseling services, and receive nutritious meals (UNICEF, 2021). Schools are essential to child and adolescent development through the provision of academic instruction, reliable nutrition, as well as mental health services (Pattison et al., 2021).

School systems worldwide were unprepared for a global pandemic. Although schools across the globe made efforts to meet the academic needs of students by converting to online platforms, there were many inequities among students, such as unequal access to technologies. The American Academy of Pediatrics advocated for states to institute policies that set forth goals that students return to in-person instruction for the 2020-2021 school year (Pattison et al., 2021). However, a large-scale global pandemic, such as COVID-19, was not unimaginable. Scientists had been warning of this potential for decades. In 2011, a nationwide study examining school pandemic preparedness determined schools to be unprepared for such an event, meeting less than half of the pandemic preparedness indicators (Rebmann et al., 2016). For instance, pandemics were not included in most school disaster plans, there was insufficient stockpiling of personal protection equipment (PPE) or medications, no thresholds for school closures, and no methodologies for distance-based learning. As schools began to reopen, students needed support readjusting to the school environment and mitigating learning loss. Substantial resources was needed to help mitigate lost learning.

In the United States, Congress allotted $30.75 billion as part of the Education Stabilization Fund. Additionally, $13.2 billion had been allocated for the CARES Act Elementary and Secondary School Emergency Relief Fund (Office of Elementary & Secondary Education, 2021). On December 27, 2020 an additional $54.3 billion was added through the ESSER II Fund. As part of President Biden's American Rescue Plan, an additional $123 billion was allocated for K-12 schools as part of ESSER III (Hendrix, 2021). These funds funneled through state educational agencies to be distributed to local school districts to address the effects of COVID-19 on elementary and secondary students across the United States. These funds were allocated for the next few years to help address the long-term effects of COVID-19 school closures.

Face-to-face instruction was interrupted for almost every K-12 student in the United States in the month of March 2020 through the remainder of the school year. Every state and territory cancelled 2020 spring standardized achievement testing and federal accountability measures were waived (Keng et al., 2020). Although many schools attempted to provide some level of remote learning opportunities for students during the final months of the 2019-2020 school year, it remains uncertain of its effectiveness, considering most schools and students were not sufficiently experienced with online learning and most districts were unequipped with the necessary technology to deliver adequate online instruction (Kuhfeld et al., 2020). In addition to the loss of instructional time, students were also challenged by unprecedented stress, anxiety, and illness, as well as disparities in access to learning resources, such as printed materials, internet access, and technology devices (Middleton, 2020). While learning loss or academic decline will most likely occur, it may affect grades, schools, and various subgroups of students differently (Wyse et al., 2020). Although there is no method to precisely predict the influence on student

achievement due to the totality of COVID-19, there is historical data related to other reasons for students experiencing prolonged periods of instruction loss, such as summer vacation, natural disaster (e.g., Hurricane Katrina), and chronic absenteeism, that can help forecast the effects on student achievement (Kuhfeld et al., 2020).

Most schools in the United States resumed some level of instruction for the 2020-2021 school year, including face-to-face instruction, remote distance learning instruction, and hybrid instruction, which involved a combination of face-to-face and remote learning instruction where students spend a portion of the week at home and a portion of the week at school. To gain some measure of the effects of school closure and the effectiveness of the various forms of instruction, it is essential to resume achievement testing to assess the level of learning loss, how it affected different groups of students, and the methods facilitating the quickest recovery. These summative assessments will help states better understand and communicate the effects of COVID-19 on student achievement. However, there are many issues to consider when resuming large scale standardized testing when a significant variation of factors continues to exist for so many schools at different stages of reopening. Districts must consider how test design, reliability, and validity apply to remote and hybrid learning situations, how to proctor and address test security in remote settings, and how to maintain an appropriate testing environment with ongoing safety protocols, such as distancing, masking, sanitizing, isolating, and quarantining (Rochelle, 2020). Keng et al. (2020) provided several spring 2021 testing recommendations for state testing administrators to consider regarding test design, administration and scoring, psychometrics, and interpretation and use of test results. In the area of test design, states needed avoid altering their test designs, although they needed to review test items with content that might elicit an emotional reaction or be influenced by COVID-19. In the area of administration and scoring, states needed to monitor

and document the accessibility and security of remote testing and remote proctoring. Traditional test administrations require contingency plans for ongoing safety protocols, such as flexible schedules. In the area of psychometrics states were to have examined standard setting items and revisit cut scores, as well as develop a research agenda in order to detail technical differences for 2021. The interpretation and use of test results required consideration of the context of 2021 and use of non-traditional data to help understand 2021 testing results.

The impact of COVID-19 extends beyond quantifiable losses in academic skills. There are psychological effects on students that will be difficult to quantify, such as anxiety, fear of contracting the virus, isolation and depression, and a variety of stressors on families economically affected due to businesses closures (Middleton, 2020). The pandemic highlighted significant inequities that existed within the public education system and illustrated disparities between wealthy and poor students, black and white students, and suburban, urban, and rural school districts (Codding et al., 2020). These issues were magnified by the sociocultural climate resulting from the deaths of George Floyd and Breonna Taylor. These highly publicized events influenced the Black community's sense of safety, belonging, and well-being (Codding et al., 2020).

To better understand the impact on mental health and well-being due to isolation during COVID-19 school closure, McCluskey et al. (2021) conducted a qualitative study interviewing 45 young people between the ages of 14 and 18. While there is a rapidly growing body of quantitative research and data measuring the effects of COVID-19, such as number of days schools were closed, universal screening data, and other forms of student achievement outcomes suggesting a significant negative impact on students, there is very little qualitative data that seeks to identify how students, themselves, perceived how COVID-19 had personally impacted them,

as well as what the students suggest would help address their concerns. Participants indicated a range of response both positive and negative. For some participants, school closure was a welcome change, because they had more freedom and autonomy to manage their daily schedule. This was described as a "sense of personal agency and autonomy" (McCluskey et al., 2021, p. 53). However, many of these students expressed that once online learning started, the pressure to complete independent online assignments was more stressful than traditional in-person classes. Other students expressed high levels of anxiety associated with uncertainty, not knowing how long the pandemic and isolation would last, nor knowing how the cancellation of various high stakes year-end assessments might impact their future opportunities. Students in the study talked in detail about how being isolated from their peers had a negative impact on their mental health and personal relationships. Participants also described both positive and negative effects when returning to school. Overall, participants described returning to school as a welcome and positive experience, although, it was coupled with anxiety about continued risks of COVID-19 and a lack of clarity concerning rules associated with social distancing, masking, and whether schools would once again shut down.

According to McCluskey et al. (2021), the negative effects of isolation during a pandemic are more severe for those students described as vulnerable and who were already isolated, marginalized, or had pre-existing mental health issues. This also included students who live in households where there is violence or abuse, have a family member suffering illness or death associated with COVID-19, or a member of a minority group, such as LGBT. YoungMinds (2020) was engaged in an extensive survey of more than 2,000 youths in the United Kingdom who were identified with a history of mental health issues when the COVID-19 pandemic caused the global shutdown in the spring of 2020. According to the survey, 83% of the participants

reported their mental health issues worsened because of COVID-19, and 26% indicated they no longer had any support due to schools being closed.

The psychological effects and toll on mental health not only affected students, but it also had a tremendous impact on teachers and school staff. There is a strong correlation between student achievement and teacher effectiveness (Goldhaber et al., 2020). Therefore, COVID-19's effect on teacher mental health and wellbeing also impacted students. Confusion and stress for teachers are among a number of adverse consequences of school closures affecting teachers. Much of the stress indicated by teachers was associated with uncertainty about how long schools would remain closed and unfamiliarity with remote instruction (Kim & Asbury, 2020). The majority of public-school teachers had not received any formal training in teaching online. Nevertheless, at the beginning of the 2020-2021 school year, many teachers across the Unites States were required to teach remotely using online platforms. Technological competence and teacher self-efficacy had a significant impact on student learning within the virtual setting (Martin, 2018). Many teachers may have felt apprehensive about providing instruction remotely and using technologies and online platforms with which they were unfamiliar.

The Achievement Gap

COVID-19 did not generate the inequities and disparities that exist within public schools in the United States. The nation has been challenged with equity issues for decades. The National Commission on Excellence in Public Education (1983) published "A Nation at Risk" which placed educational reform at the top of the national agenda with the assertion that public schools in the United States were failing to produce a globally competitive workforce. Following this report, educational reform has remained a top political issue for more than a quarter of a century and has remained a top political priority throughout Republican and Democratic

administrations (Johanningmeier, 2010). The sustained focus on the quality of education provided by public schools revealed disparities in educational outcomes among various schools and among various subgroups of students, resulting in the increased role of government to ensure equality in educational opportunities for all students.

As the United States government increased funding to improve public schools, monitoring and accountability measures also increased. The No Child Left Behind Act (NCLB), enacted in 2001 under President George W. Bush, attempted to ensure high quality education and equality for all students through an array of educational reform legislation coupled with nationwide high stakes testing. This increase in standardized testing, which was designed to allow the government to measure school performance, also produced significant student achievement data sets to be analyzed by educational researchers.

A significant body of research emerged with a focus on the differences in educational outcomes that existed between different groups of students. The term “achievement gap” became the widely accepted term to describe this phenomenon of varied academic performance based on student subgroups, such as socioeconomic status, race, ethnicity, disability, and gender (Ladson-Billings, 2006). Educational research has identified how socioeconomic status is often a primary contributing factor to creating an achievement gap between children from low-income households compared to children from middle to high-income households (Dolean et al., 2019). Research has also determined an achievement gap often exists between students based on race and ethnicity, primarily between White and Black students, and is often identified by geographic location when comparing inner city urban schools to suburban schools (Kuhfeld, Gershoff, & Paschall, 2018). There is also an identifiable achievement gap based upon gender, which

indicates females tend to outperform their male counterparts in reading and language arts (Reardon et al., 2019).

The term “achievement gap” has received criticism among some scholars who put forth that term. The phrase is often associated with deficit lens, with middle to upper class white student achievement often considered normal, and poor and minority students often evaluated on what they are perceived to lack (Quinn et al., 2019). Therefore, by focusing on student performance rather than the various structures that create racial and economic inequalities, the “achievement gap” framework suggested it is the students that need fixing rather than the system that needs to improve (Ladson-Billings, 2006).

Summer Learning Loss

While there are many factors that contribute to the achievement gap, there is a well-established body of research suggesting that the traditional summer break contributes to widening the achievement gap. During the school year, all students experience consistent instruction, support systems, interventions, and opportunities resulting in consistent academic progress for all students (Alexander et al., 2007). When schools discontinue formal instruction during the summer break, many students experience some level of regression or loss in academic skills. This decline in academic skills is commonly referred to as “summer learning loss” (Cooper, 2003). Resulting from the Baltimore study was the “faucet theory” using the analogy of a faucet of instruction and learning turned on during the school year which benefits all children during the school year (Entwhistle et al., 2001). However, when the “faucet” is turned off during the summer months, reading proficiency among students from affluent households continues to develop, while reading proficiency declines for students from disadvantaged households.

Cooper et al. (1996) traced summer learning loss as far back as 1919, citing early evidence that all students decline in academic skills if there is no intervention or enrichment. When students return to school in the fall, they demonstrate, on average, academic performance one to three months behind their previous performance gains (Cooper et al., 2000). Losses in reading comprehension and reading achievement during the summer has been well documented for decades (Whittington & Rickman, 2015). Furthermore, Cooper et al. (2000) found that summer learning loss was greater at higher grade levels, having a greater effect in mathematics than reading, and disadvantaged students were affected more than their more affluent peers. Early childhood research found that children from socioeconomically disadvantaged households fell 2.5 months behind peers from advantaged households during the summer months for students in kindergarten and first grade (Downey et al., 2004).

Research analyzing learning loss during the summer identified significant discrepancies in the amount of learning loss students experience based on family socioeconomic status. While all students from various socioeconomic backgrounds demonstrated similar rates of academic growth during the school year, students from middle-to-upper class households demonstrated significantly less learning loss than students from low-income households, and in some cases, demonstrated slight learning gains during summer break (Alexander et al., 2007). This is attributed to the ability of middle-to-upper class households to provide learning and enrichment opportunities for their children during the summer months, as well as maintaining a literature-rich environment in the home. Early research by Heyns (1978), who conducted a longitudinal study of 42 public schools in Atlanta, Georgia comparing spring and fall achievement scores, found that the achievement gap widened by socioeconomic status and race/ethnicity during the summer break, with reading being the most pronounced.

Other factors associated with poverty can also contribute to academic performance gaps, such as the physical environment of the home, single parent, health, nutrition, and parenting skills (Marks, 2006). A lack of social and economic capital to ensure a child's success is also connected to poverty (Payne, 2019). The longitudinal research conducted by Alexander et al. (2007) also found that this disproportionate learning loss during the summer created a cumulative effect, causing students from lower income households to regress further each year compared to their more affluent peers. This annual cumulative disparity in learning loss further widens the achievement gap for low-income students in a phenomenon called "summer slide". This series of summer setbacks, causing some students to underperform their peers, can be very discouraging for the student. The longer the student experiences this regression, the more difficult it is for the student to become college and career ready (Green et al., 2011).

There is an emerging body of research advocating for a closer examination of the "summer slide," suggesting that defining the phenomenon is much more complicated than addressing a singular factor, such as socioeconomic status. The original studies do not fully encompass the wide range of variability within various sub-groups that exist in contemporary public schools (Atteberry & McEachin, 2020). This emerging research is revealing gaps in the literature and a need for further research. There is strong evidence that summer school programs for at-risk populations are mitigating summer learning loss and, in many cases, generating learning gains (Campbell et al., 2019).

School Calendar

Although much of American society has shifted away from farming and agriculture, the school calendar has evolved. Most schools in the United States continue to use a traditional calendar that closes schools for the summer. There are far less schools that use year-round school

compared to the traditional summer break schedule. The phenomenon known as summer learning loss, also referred to as “summer slide”, dates as far back as 1906 when the summer break became part of the school calendar, becoming a significant part of American society needing their children to take time off to help with farming (Borman & Boulay, 2004). According to Fairchild (2011), the traditional school schedule, which includes a long summer break, was also the result of urban school systems in the early 1900s, which closed schools because so many residents left the city in the summer to escape the heat and other sanitation issues. The summer break became heavily motivated by politics. These political forces included a wide range of business industries, such as the vacation industry, that generates a significant amount of tax revenue due to profits made from tourism during the summer months when families take vacations (Fairchild, 2011). Fairchild went on to point out how summer breaks are deeply rooted in the American culture and are embedded in popular culture through songs, movies, and television.

There was a shift in the 1990s, as a growing number of researchers began to suggest that alterations to the school calendar play a significant role in the enhancement of student learning and academic outcomes (Davies & Kerry, 1999). Despite the popularity of the traditional school calendar built around the summer break, some schools and school districts adopted year-round school in efforts to mitigate summer learning loss. An example of a popular year-round model is a schedule that offers instruction for nine weeks at a time with a two-week break in-between each period and a short summer break that is about half the time of a traditional summer break. Many schools that use this model offered a variety of interventions during the two weeks between the nine-week periods (Schulte, 2009). The year-round model initially showed promise, with measurable effects on the quality of student learning, such as some benefit to all students

and less time required to reteach compared to students returning from long summer breaks (Davies & Kerry, 1999). Converting to a year-round calendar may improve student achievement for many students. Such changes have a more significant impact on disadvantaged students due to limited home and school support for learning during the summer months, which contributes to summer learning loss. According to Schulte (2009), some year-round studies indicated improved academic achievement, while also incurring increased expense, while other studies produced contradictory or inconsistent findings. Nevertheless, year-round school has not gained widespread popularity.

Absenteeism

Another potential predictor of the effects of school closure and disruption of instruction on student achievement is chronic absenteeism. An estimated five to seven million students miss at least one month's worth of school each year due to absenteeism (Gottfried & Kirksey, 2017). Addressing absenteeism was deemed a national priority with the 2015 Every Students Succeeds Act (ESSA), which requires school districts to report on chronic absenteeism and allows state education agencies to monitor as a non-academic indicator of school quality as part of their accountability systems (Lenhoff & Pogodzinski, 2018).

It is well established that students who experience excessive absences receive fewer hours of instruction and are consequently more likely to require more intervention and remediation when returning to school (Gottfired, 2019). There is also a well-established relationship between chronic absenteeism and poverty (Childs & Lofton, 2021). School absenteeism is also associated with many other at-risk behaviors, such as delinquency, substance abuse, risky sexual behavior, teen pregnancy, and mental health disorders, specifically depression and suicidal tendencies (Gubbels et al., 2019). Early childhood studies indicated that

children three and four years old who experience chronic absenteeism demonstrated fewer gains in the areas of mathematics and literacy, while their absences detracted from the benefits of preschool education (Ansari & Purtell, 2018).

Although there is a strong relationship between chronic absenteeism and student achievement outcomes, it is difficult to establish a clear cause-and-effect because there are so many potential fundamental issues that lead to chronic absenteeism (Gottfired, 2019; Lenhoff & Pogodzinski, 2018). These underlying factors most likely affect academic outcomes more significantly than simply missing instruction while absent. Therefore, absenteeism might not be a reliable predictor of the effects of COVID-19 school closure because the reasons why students are absent are completely different. In the broader context of school closure, this underscores the importance of recognizing underlying factors associated with the school closures rather than simply considering the number of days schools are closed.

Natural Disasters

Predicting COVID-19 school closure's influence on student achievement is much more complicated than simply factoring the number of lost instructional days. The psychological toll associated with the trauma of the pandemic will likely affect student achievement. Therefore, an examination of previous natural events that not only result in prolonged school closures, but also elicited significant psychological stress for students and their families, is important to this study. In August 2005, Hurricane Katrina devastated the Gulf Coast, resulting in over 1,800 deaths and causing over $125 billion in damages. Many schools along the Gulf Coast and in coastal metropolitan cities were completely destroyed, forcing school districts to close for extended periods of time. This event not only represents a case study for school closure, it also includes a significant psychological event for students challenged by life threatening situations, who were

also displaced from their homes, and whose families lost job opportunities due to destroyed businesses.

Lamb et al. (2013) conducted a post-Katrina study examining the effects on student achievement in mathematics. Poor and rural schools were most profoundly affected in the areas of mathematics achievement and, overall, students demonstrated the most significant decline in Algebra 1 after the Katrina event. According to Ward et al. (2008), in Mississippi there were no significant differences between displaced students and non-displaced students regarding a decrease in academic achievement; however, the displaced students experienced greater suspensions and expulsions. Displaced students in Louisiana exhibited excessive behavior problems compared to non-displaced students (Pane et al., 2008).

Researchers have examined the impact earthquakes have on student achievement. Ceyhan and Ceyhan (2007) studied the academic performance of earthquake survivors in Turkey and found that students directly affected by the earthquake performed lower than students not exposed to the earthquake. Following severe flooding in Thailand, Thamtanajit (2020) reported significant declines in academic achievement scores for students in grades 6, 9, and 12. Although these examples of various natural disasters differ in many ways and are on a much smaller scale compared to the COVID-19 global pandemic, they may still provide some predictive outcomes for students who are affected by traumatic and disruptive events.

Gender Gap

Research indicates that gender contributes to the achievement gap; more specifically, male students often underperform in reading compared to female students (Bronzo et al., 2014). Gender gap research in education tries to explain why differential achievement exists between boys and girls. Masculinities theory is often used as a framework as an explanation (Vantieghem

et al., 2014). More recent studies on gender disparities found boys and girls score similarly in areas of mathematics but girls, on average, outperform boys on reading and language arts tests. However, these gender gaps may vary substantially between local communities, and socioeconomics affect male and female academic achievement differently (Reardon et al., 2019). Community attitudes and stereotypes influence gender academic performance across contexts and subject areas (Carter & Borch, 2005). From Vygotsky's (1978) sociocultural perspective, these attitudes and stereotypes are passed on or taught to the child by the adults and more knowledgeable others. Many parents interact with their child and invest time and resources in their children in gender specific ways. According to Reardon et al. (2019), parents spend more time reading and storytelling with their female children than male children, beginning as early as only a few months in age.

Teacher bias can also contribute to the gender achievement gap when teachers have predetermined or fixed expectations about a particular gender. Even when the gap narrowly favors female students, teachers consistently rate females higher than males in both reading and math (Robinson & Lubienski, 2011). Teacher expectations are highly correlated with student academic performance. Therefore, gender stereotypes, such as a belief that males are inherently better at math or girls are inherently better at reading, influence the teacher's expectations and affects student performance.

Teachers often project higher expectations for girls in areas of reading (Muntoni & Retelsdorf, 2018). Throughout the industrialized world, male students generally underperform compared to their female counterparts. Legewie and Diprete (2012) argued that the school environment reinforces conceptions of masculinity throughout the school setting, which fosters anti-school attitudes, as well as anti-school behavior. Therefore, male students are more sensitive

and resistant than female students to resources and efforts designed to create a learning-oriented setting. Conversely, female students are underrepresented in focus areas and subjects, such as Career Technical Education (CTE) and Science, Technology, Engineering, and Mathematics (STEM), which are considered more masculine (Wang & Degol, 2017).

Intervention

For the better part of a century there has been a sustained national effort to provide intervention for the purpose of narrowing the achievement gap that exists between different groups of students. Title I, Part A of the Elementary Secondary Education Act, which was reauthorized in 2015 by the Every Student Succeeds Act (ESSA), is a federal program designed to provide more than $14 billion dollars in financial assistance to local school districts across the nation for children from low income households to help ensure that all children are presented the opportunity to meet challenging academic standards (National Center for Education Statistics, 2021). ESSA required states to revise accountability systems while allowing more autonomy to determine the indicators for student academic performance (Ferguson, 2016). The rationale for this sustained effort is based on the premise that a significant achievement gap continues to exist between students from low-income households and students from more affluent households. These federal dollars allow local school districts to develop a wide range of enrichment and intervention programs designed to meet the needs of at-risk students. The continued support for this substantial Title I federal program implies a sustained national belief that student socioeconomic status continues to be a significant variable in determining academic achievement.

In an effort to minimize or reverse the effects of “summer slide”, many school districts offer a variety of summer enrichment and summer reading programs, targeting students from

low-income households. Some school districts provide at-risk and low-income students a variety of reading materials and books to read throughout the summer break. Jackson et al. (2019) conducted a four-year study in which research-based reading materials, such as high-interest books, sight word games, phonics games, and phonological activities were provided to first, second, and third grade at-risk students. Participating students retained 30% to 97% more reading ability than students in the control group. This suggested that increased access to research-based reading materials leads to a higher level of retention of reading skills. It also explains how students in a literature rich environment may have an advantage retaining reading skills compared to a student who is not exposed to high quality reading material during school closure. Anderson, Wilson, and Fielding (1988) conducted research on the relationship between the amount of time reading and reading achievement and found that time reading is a reliable predictor of reading achievement in grades two through five. Students with limited reading and comprehension skills will also build vocabulary and thinking skills through increased time reading (Cunningham & Stanovich, 1997). However, it is important that reading materials intended for independent reading use texts at the appropriate reading level. Appropriate text should have a readability level providing an objective numerical score formulated to measure sentence difficulty, providing the grade level in which the student can read the passage independently (Rasinski et al., 2009). Teachers can use these levels to match the appropriate reading material to the student's reading level. It is important to be cautious about providing students with reading material that is too challenging for them (Allington, McCuiston, & Billen, 2014). From Vygotsky's sociocultural perspective, these materials sent home may encourage the adult to engage more frequently with the child, which would promote learning through social interactions.

Other school districts offer comprehensive summer reading camps that allow students to engage in formal reading instruction. These camps often range from two to six weeks, and from half days to full days, including breakfast and lunch, as well as transportation to and from school. Lara-Cinisomo et al. (2020) conducted a study examining the effectiveness of a six-week summer reading program utilizing the Children's Defense Fund Freedom School curriculum serving kindergarten through eighth grade low-income students measuring independent and frustration reading levels. Frustration reading levels refers to the point when reading difficulty is at a level that is challenging to the level that frustrates and discourages the student to keep trying. The results indicated significant improvement in both independent reading levels and frustration reading levels. However, there are some instances when summer programs are ineffective. It can be challenging for school districts to attract highly qualified teachers during the summer months (Denton, 2002).

Most school districts also offer a variety of interventions throughout the school year in an effort to narrow the achievement gap. A common approach is a multi-tiered system of supports (MTSS), which includes universal screening of all students, tiers of interventions, and ongoing progress monitoring. MTSS is often integrated with a Response to Intervention (RTI) framework, and Positive Behavior Interventions and Supports (PBIS). MTSS programs most often utilize a three-tiered system beginning with general instructions strategies in the general education classroom as tier one, and pullout small group instruction for tiers two and three, focusing on skill deficits in reading and mathematics. This same tiered approach is also used for behavior in an RTI-B mode,l which targets students' behavior, both in the general education classroom and utilizing pullout small group instruction, to help students develop behavior management strategies.

RTI is a proactive approach with the goal of intervening before students fall so far behind that they qualify for special education services to provide needed support. RTI is based on the premise that schools should provide targeted intervention to all students once they demonstrate a need (Buffam et al., 2010). The state of Tennessee adopted the RTI model as a statewide program to provide all students with a support system and access to high quality instruction and intervention. This also included universal screening of all students in the areas of reading and mathematics multiple times throughout the school year to identify which specific students demonstrated a need for intervention.

The assessment tools used in universal screening of reading and mathematics skills are called curriculum-based measurement tools, or CBMs. Curriculum-based measurement is a framework that uses systematic ongoing assessments to monitor students' progress, determining program modifications, and to prescribe student intervention (Gesel & Lemons, 2020). CBMs are typically administered following a regimented progress monitoring schedule, such as every two weeks. During the past two decades, CBMs have demonstrated to be a valid and reliable indicator of student performance (Yeo, 2010). These instruments are also relatively inexpensive and easy to administer.

CBMs also demonstrate a strong correlation with statewide achievement tests (Yeo, 2010). This is compatible with the nationwide focus on school accountability. These CBMs include standardized probes designed to measure basic skills in reading, mathematics, and writing (Shapiro, 2011). The reports from CBMs allow a comparison of student performance to a nationally representative sample of grade level peers (Shinn, 2008). CBMs not only identify skill deficits, but because they are administered multiple times a year, they also are a reliable indicator of effectiveness of interventions showing progress over time (Howell & Nolet, 2000).

EasyCBM is a specific CBM tool approved by the Tennessee Department of Education. It is used for students in kindergarten through eighth grade, including a Spanish version for students in kindergarten through second grade. EasyCBM has assessed over four million students and has been used by over 425,000 educators throughout the United States (University of Oregon, 2014b). EasyCBM can also be administered online, allowing easy access, data entry, and analysis by educators (University of Oregon, 2016).

The Passage Reading Fluency (PRF) assessment requires students to read a grade level passage out loud for one minute. The student receives a score based on how many words they read correctly during the time limit. These scores can be converted to a national percentile (University of Oregon, 2014a). If a student scores above the 50th percentile, they are considered to be at low risk of needing intervention. Students who score between the 10th percentile and 50th percentile are considered to be at some risk, and students who fall below the 10th percentile are considered to be at high risk of need for intervention (University of Oregon 2016). A typical license provides districts with unlimited access to results for all students multiple times a year at an approximate cost of four dollars for each student. The online reports that the program generates are an easy way for districts to monitor student progress and measure student academic growth.

CBMs, such as EasyCBM, allow school districts to identify students who need targeted intervention toward specific standards that are part of the general curriculum. The multi-tiered systems of support, or RTI, provides multi-levels of supports, typically through three levels or tiers. Students who progress through the intensified tiers and fail to respond to the various interventions are subsequently referred for special education screening. These students are often screened using norm-referenced academic achievement tests (NRTs). These NRTs are often

administered by school psychologists to help determine special education eligibility (Lockwood et al., 2021).

Special education eligibility is a multidisciplinary team process that requires a team to review all student data to determine whether the student meets the criteria for a specific educational disability as defined by the Individuals with Disabilities Education Act (IDEA). The multidisciplinary team is usually made up of a regular education teacher, a special education teacher, the parent, a representative of the local education agency (LEA), and an interpreter of assessment data, such as a school psychologist. Criteria for most educational disabilities also requires a full psychoeducational evaluation to obtain a student's IQ or developmental levels. These psychoeducational evaluations require a licensed school psychologist or clinical psychologist to administer and interpret (Lockwood et al., 2021).

Reading Fluency

Reading fluency refers to the ability to read text accurately and quickly with proper expression at a reasonable rate with limited miscues and, including expression that sounds like language (Swain et al., 2017). Reading fluency is recognized as a fundamental skill necessary for success across all content areas, and early reading skills, such as fluency, have been shown to predict more advanced reading skills in later grades (Cunningham & Stanovich, 1997). Research indicated that reading fluency, along with phonological awareness, decoding skills, vocabulary, and reading comprehension, are fundamental to effective reading instruction (Swain et al., 2017). Reading fluency is a primary element in the development of reading comprehension and is recognized as a predictor of future comprehension abilities (Lipka, 2017). The ability to comprehend written text is essential to daily living, such as reading a street sign, understanding a medical or phone bill, or enjoying a novel for pleasure. The ability to read allows an individual

to participate fully in society (Allington et al., 2010). Reading allows the individual to acquire knowledge, is a basis for cultural engagement, democracy, and success in the workplace (Castles et al., 2018).

Reading fluency and reading comprehension are interrelated and are also correlated with school outcomes across all grade levels and contents (Bigozzi et al., 2017). A strong relationship between reading, writing, and spelling has been established in numerous studies (Negrete & Bear, 2019; Graham & Santangelo, 2014; Morris et al., 2011). Oral reading fluency, especially in early grades, reveals prognostic information and has the potential to facilitate instructional and remediation decisions (Kim, et al., 2010). There are three main elements to reading fluency, which include reading rapidity, accuracy, and prosody (Bigozzi et al., 2017). Reading comprehension is dependent on the ability to recognize texts accurately and fluently (Kang & Shin, 2019).

Passage reading fluency (PRF), also known as oral reading fluency (ORF), is the most established progress monitoring assessment used to track student academic progress (Chaparro et al., 2018). PRF is a fundamental component among most RTI and MTSS programs, which are now routine in most public schools across the United States. This is fueled by legislation, such as IDEA, No Child Left Behind, and the Every Student Succeeds Act, which all require evidence-based intervention (Gersten et al., 2020). Since the colonial period in early America, ORF has been a major focus of beginning literacy instruction with the aim of developing eloquent readers (Morrison & Wilcox, 2020). ORF measures progress toward automaticity, which is the reader's ability to automatically identify words quickly and accurately.

In addition to automaticity, prosody is often associated with ORF. Prosody refers to the reader's ability to not only produce vowel and consonant sounds but also incorporate appropriate

intonation, rhythm, and tone when reading (Morrison & Wilcox, 2020). Variations in pitch and tone of voice is central to the meaning of a text and can be a powerful tool when expressing a thought or conveying meaning (Rasinki, 2012). Therefore, students need to have an awareness of the meaning of a text in order to demonstrate prosody (Rasinki et al., 2009). Prosody can be much more complicated to measure than a simple rate of ORF. There are a variety of ways to assess ORF or PRF. There are now automated assessments that utilize computer software to analyze and measure audio recordings of students reading a passage for one minute. However, most schools use human assessments that have been validated and normed through the use of scripted instructions and protocols. EasyCBM is among the many instruments used by school districts to progress monitor students' PRF levels.

At Home Learning

Although this study focuses in on the initial phase of school closure within a specific school district that did not provide any type of instruction, face to face or virtual, for a sustained 24-week period, like the majority of school districts across the United States, the school district implemented a comprehensive virtual at home learning option for students in kindergarten through twelfth grade for the 2020-2021 school year. Therefore, it is relevant to take a close look at the literature related to the history and implementation of various forms of at-home learning models within this chapter. With the onset of COVID-19 shutting down schools and closing off public spaces and group gatherings, many schools implemented some type of at-home learning plan, ranging from district-wide virtual school to hybrid models that offered a combination of in-person and at-home virtual programs. For example, the school district in this study offered parents a choice of returning to in-person learning or registering for virtual school across all grade levels, kindergarten through twelfth grade. The district also submitted an emergency at

home learning plan with the Tennessee Department of Education in the event the governor called for another statewide stay at home order. This plan detailed how instruction would continue remotely for the in-person students in the event of another statewide shut down.

At-home learning models have been around well before the onset of COVID-19. At-home learning is also referred to as distance learning. Distance learning is described as learning done from afar due to limitations for delivering instruction in person (Perry & Pilati, 2011). The evolution of at-home or distance learning ranges from correspondence courses, which often utilize tradition materials, to online courses, which rely on internet platforms (Barbour, 2018). There are records of correspondence courses offered by mail in the United Kingdom dating back to 1837, and the first university using only distance learning was Open University in the United Kingdom founded in 1969 (Torres-Colorado & Eberle, 2012). The first online private kindergarten through twelfth grade school was Laurel Springs, which opened in 1991 (Barbour, 2019). However, it was the school choice movement and No Child Left Behind Act that was the catalyst for the rapid growth of online education in the United States (Rice, 2014). School choice and the rapid evolution of mobile devices, including cell phones, tablets, and affordable laptops, made on-line learning accessible to students worldwide.

There are now five states that include e-learning as a graduation requirement, and others are developing similar e-learning pathways (Schwirzke et al., 2018). By 2015, there were an estimated 320,000 K-12 students participating in full-time online programs (Clark & Barbour, 2015). However, the effectiveness of at-home learning is dependent upon implementation. Online environments are diverse, and design and implementation vary greatly across K-12 schools. There needs to be more research and literature on design, delivery, and support (Barbour, 2018).

Three models for online learning include: taking online classes to supplement traditional courses, taking all classes online, and hybrid learning that combines in-person learning with online instruction, which is also called blended learning (Gemin & Pape, 2017). At-home learning can be either synchronous or asynchronous. Some designs take a personalized learning approach, which is self-paced. This allows some students to accelerate learning and complete course work on a different schedule than the traditional academic calendar (Archambault & Crippen, 2009). Other designs offer online instruction that follows the same pacing guides as in-person instruction.

A- home learning models typically use a Learning Management System (LMS) to track attendance, and the amount of time a student is engaged in the content (Hasler-Waters et al., 2014). The school district in this study utilizes a LMS called Canvas. This LMS has the ability to monitor student participation by both staff and parents, has the ability to organize learning groups, and allows the instructor to update content and adapt instruction for whole group or individual students. A LMS allows the school to either build their own content or integrate purchased material from an established vendor. The district in this study used both content developed by district staff and purchased materials from Florida Virtual School. Florida Virtual School offers a comprehensive K-12 curriculum. However, the district supplemented with additional material developed by staff members to ensure Tennessee academic standards were fully covered.

There are critics of virtual learning programs, and the literature reveals mixed results both positive and negative (Schwirzke et al., 2018). There are several studies that show no statistical difference between virtual learning and traditional face-to-face instruction (Glass & Welner, 2011). Prior to COVID-19, there was a growing number of researchers who were critical of

virtual charter organizations for pursuing the expansion of large-scale virtual programs without statistical evidence of being effective (Molnar et al., 2019). Molnar et al. found that students in virtual programs typically spend less time in synchronous learning compared to students in traditional face-to-face instruction. Class size and student teacher ratios in virtual school programs have also been criticized for allowing much larger class sizes compared to traditional face-to-face instruction. Minority students and students from low-income households are often underrepresented in many virtual programs (Wang & Decker, 2014). Other criticisms include dropout rates, course quality, costs associated with equipment and licensing, and the need to train teachers (Picciano & Seaman, 2007).

Summary

The onset of COVID-19 in March of 2020 resulted in widespread lockdowns, travel restrictions, and school closures. The toll of the pandemic was unsurmountable considering the massive loss of life, economic impact, and psychological effect. As schools began reopening, school personnel were challenged with the task of assessing the total effect on school children, including the students' physical, mental, psychological, and academic readiness to resume learning. Unprecedented federal funding had been allocated to schools nationwide in an effort to reopen all schools and address the needs of students as they reacclimated to the routines of schooling.

Prior to COVID-19, the educational system in the United States had been engaging with the complex challenge of addressing a persistent achievement gap that existed between various groups of students. The most prominent gaps exist between high and low socioeconomic groups, Black and White racial groups, and suburban and urban communities. Although it is too early to determine whether COVID-19 school closures will influence the existing achievement gap in a

positive or negative manner, there are historical contexts when instruction has been interrupted, such as summer breaks, that provide some level of prediction for how students are affected when schools are closed for prolonged periods of time. Studies on summer learning loss suggested that school closure will significantly influence students from low-income households compared to students from more affluent households. The federal government is underscoring on this prediction by providing funds for large scale intervention programs targeting students who demonstrate learning loss and originate from low-income households. School districts are establishing plans to expand intervention programs, such as Response to Intervention (RTI), after school tutoring, and comprehensive summer school programs, all designed to close the achievement gap.

Basic reading skills provide a vital measurement of a student's academic fitness and serves as a predictor of overall academic achievement. Universal screening is a system of large-scale progress monitoring, which allows a school district to identify students that are underperforming in various basic academic skills, such as reading and mathematics. The school district central to this study screens elementary students via a variety of reading and math skills assessments three times per year: once in the fall, winter, and spring. This allows the school district to identify students who are underperforming their peers and respond with targeted intervention through a three-tiered system. By means of a data analysis with data collected prior to COVID-19 school closure and after schools reopen, the universal screening process will also allow the school district to measure the level of learning loss that occurred during the closure and provide intervention to those students most affected by the pandemic.

CHAPTER THREE: METHODS

Overview

The purpose of this quantitative, causal-comparative study was to examine a convenience sample of 225 fourth grade elementary school students attending six elementary schools within a southeastern Tennessee public school district who participated in universal screening multiple times throughout the 2018-2019 and 2019-2020 school years using archived scores from the EasyCBM Passage Reading Fluency assessment. The universal screening data was used to determine whether reading fluency gains or losses varied between different groups of students during the traditional 2019 summer break. It was also used to determine whether reading fluency gains or losses varied between different groups of students during the COVID-19 school closure that ranged from March 2020 to August 2020. Within this chapter, a discussion on the details of the design of the research is discussed. The research questions were identified, along with the hypotheses for the study. The participants and various subgroups were defined, as well as the setting in which the research occurs. An explanation of the instruments used in the study were discussed, including the reliability and validation of the tools. Finally, the procedures for gaining permission, acquiring and managing data, as well as data analysis were also discussed.

Design

This study utilized a causal-comparative design to analyze the regression of reading fluency skills following various school closures, which included the 10-week summer break in 2019 and the 24-week COVID-19 school closure in 2020. According to Gall et al. (2007), a design should be chosen that answers the framing questions. The questions sought to determine whether there was a significant difference in the amount of learning loss between groups of students based on socioeconomic status (SES) and gender following the 2019 traditional 10-

week summer break and following the 2020 24-week pause in instruction due to COVID-19. The purpose of this study was to explore the educational phenomenon of learning loss that occurs when schools close, such as COVID-19, and compare to the previously researched phenomena known as summer learning loss or "summer slide" (Alexander et al., 2007; Cooper et al., 2000). This study used EasyCBM Passage Reading Fluency to measure learning loss in reading. EasyCBM archived fluency data was the dependent variable in this study.

The study compared historical data following two different circumstances of school closures looking at learning loss among different groups of students, such as males and females, and students originating from economically disadvantaged households, including not economically disadvantaged households. The appropriate design was a causal-comparative design because the study investigated data from an event that has already occurred to determine a cause-and-effect relationship between length of school closure, socioeconomic status, and learning loss. Causal-comparative research is a nonexperimental design that seeks to identify cause-and-effect relationships (Gall et al., 2007). This study was nonexperimental because it did not involve researcher intervention or group assignment. Rather, this study explored phenomena as they existed, such as learning loss occurring when schools are closed.

The presumed causes, also known as independent variables, included socioeconomic status (SES) and gender. SES referred to the overall income and financial resources available to the household of each student. For the purposes of this study, SES was divided into two categories, which included economically disadvantaged and not economically disadvantaged. Tennessee public schools divide all students into these two SES categories. Economically disadvantaged was defined as a student whose family has obtained direct certification of economic disadvantage and participates in the state income nutrition program or was categorized

as foster care, homeless, migrant, or runaway (Tennessee Department of Education, 2021). Household income must have fallen below a specific amount to qualify for certification. Gender was defined as the biological sexual orientation reported by the parent on school registration form indicated as either male or female. The dependent variable was the EasyCBM Passage Reading Fluency scores. In this case the independent variables were continuous. The presumed effect, also known as the dependent variable, was the change scores (gains or losses) in passage reading fluency.

The 225 potential participants for the study were a convenience sample of a fourth-grade cohort attending six different elementary schools within the same school district during the 2018-2019 and 2019-2020 school years. For this study, to determine cause and effect, a valid and objective measurement was identified. This process should begin by defining the construct of interest (Gall et al., 2007). In this case, the study measured learning loss or gain. Therefore, this study sought test data that was considered objective, valid, and reliable measuring an academic skill fundamental to all academic achievement. Reading skills are foundational to all academic subjects (Herbers et al., 2012). Identifying a measurement of basic reading skills provided an indication of broader academic skills and was representative of student learning. According to Gall et al. (2007), there are four criteria that are commonly used to determine if a test is sufficient to be used in educational research. This includes objectivity, standard conditions of administration and scoring, standards for interpretation, and fairness.

Research Questions

RQ1: Is there a difference in learning loss following the 2019 traditional 10-week summer break among elementary male and female students who are economically disadvantaged and those who are not as measured by EasyCBM Passage Reading Fluency?

RQ2: Is there a difference in learning loss following the 2020 24-week pause in instruction due to COVID-19 among elementary male and female students who are economically disadvantaged and those who are not as measured by EasyCBM Passage Reading Fluency?

Hypotheses

The null hypotheses for this study are:

$H_0$1: There is no difference in learning loss following the 2019 traditional 10-week summer break, as measured by EasyCBM, among elementary male and female students who are economically disadvantaged and those who are not economically disadvantaged.

$H_0$2: There is no difference in learning loss following the 2020 24-week pause in instruction due to COVID-19, as measured by EasyCBM, among elementary male and female students who are economically disadvantaged and those who are not economically disadvantaged.

Participants and Setting

There were 225 participants for the study used as a convenience sample of a fourth-grade cohort attending six different elementary schools (represented as school A, B, C, D, E, and F) in a school district located in southeastern Tennessee during the 2018-2019 and 2019-2020 school years. The school district was a midsize suburban working-class community outside of a growing metropolitan area. The demographic distribution of the cohort was 50.4% male and 49.6% female, 40.4% economically disadvantaged, 15.3% English language learners, and 12.9% students who qualified for special education services. Racial and ethnic demographics included 2.5% Asian, 8.5% African American, 29.2% Hispanic, 9.5% Multi-Ethnic, 0.5% Pacific Islander, and 49.6% White.

School A served 287 students in kindergarten through fifth grades, with 35 fourth graders

who participated in the study. The demographic distribution of school A was 54.7% male and 45.3% female, and 57.1% economically disadvantaged. Racial and ethnic demographics for School A included 1.3% Asian, 14.6% African American, 35.8% Hispanic, 10.4% Multi-Ethnic, 1.0% Pacific Islander, and 36.5% White.

School B served 659 students in kindergarten through fifth grades, with 96 fourth graders who participated in the study. The demographic distribution of school B was 48.7% male and 51.3% female, and 65.8% economically disadvantaged. Racial and ethnic demographics for School B included 0.6% Asian, 14.5% African American, 26.7% Hispanic, 13.5% Multi-Ethnic, 0.75% Pacific Islander, and 43.7% White.

School C served 486 students in kindergarten through fifth grades, with 87 fourth graders who participated in the study. The demographic distribution of school C was 51% male and 49% female, and 28.3% economically disadvantaged. Racial and ethnic demographics for School C included 4.7% Asian, 6.7% African American, 17.4% Hispanic, 10.4% Multi-Ethnic, 0.0% Pacific Islander, and 60.9% White.

School D served 397 students in kindergarten through fifth grades, with 54 fourth graders who participated in the study. The demographic distribution of school D was 52.2% male and 47.8% female, and 51.5% economically disadvantaged. Racial and ethnic demographics for School D included 0.0% Asian, 13.1% African American, 24.7% Hispanic, 16.9% Multi-Ethnic, 0.0% Pacific Islander, and 642.9% White.

School E served 237 students in third through fifth grades, with 77 fourth graders who participated in the study. The demographic distribution of school E was 58.6% male and 41.4% female, and 44.3% economically disadvantaged. Racial and ethnic demographics for School E included 2.5% Asian, 6.7% African American, 23.6% Hispanic, 8.4% Multi-Ethnic, 0.0% Pacific

Islander, and 58.6% White.

School F served 338 students in kindergarten through fifth grades, with 33 fourth graders who participated in the study. The demographic distribution of school F was 57.6% male and 42.4% female, and 40.5% economically disadvantaged. Racial and ethnic demographics for School F included 1.7% Asian, 6.8% African American, 30.4% Hispanic, 12.1% Multi-Ethnic, 0.6% Pacific Islander, and 47.9% White.

For this study, permission was obtained from the Director of Schools to access retrieved archival data with student identifiers removed from the Director of Student Information. The number of participants sampled was 225. This exceeded the required minimum for a two-way ANOVA when assuming a medium effect size, power .7 and $\alpha = .05$, of 144. Power analysis for an analysis of variance was conducted to determine a sufficient sample for a medium effect size of 0.70, alpha = 0.05. Based on the previous assumptions, the desired sample size was 144 (Gall et al., 2007).

Some participants in the study were categorized as economically disadvantaged. Within the state of Tennessee, the economically disadvantaged subgroup was defined as a student whose family had obtained direct certification of economic disadvantage and participated in the state income nutrition program or was categorized as foster care, homeless, migrant, or runaway (Tennessee Department of Education, 2021). Among those students certified as economically disadvantaged were those who received Supplemental Nutrition Assistance Program (SNAP) benefits, those who lived in a household participating in the Temporary Assistance for Needy Families (TANF), and those who participated in Head Start. This new definition was put into place in 2016 as a state-wide criterion, replacing the old system of self-reported free and reduced lunch applications. The new definition resulted in fewer Tennessee students being considered

economically disadvantaged. Most school districts across the state experienced a significant drop in the number of students qualifying as economically disadvantaged between the 2015 and 2016 school year.

Ethical considerations included the use of ex post facto data; therefore, the research was not involved in disrupting, performing, or collecting the data. All data was obtained through the participating school district with the permission of the Chief Academic Officer. All identities of participants were protected, and anonymity was guaranteed since no identifying information was included in the study.

Instrumentation

EasyCBM

Reading fluency and reading comprehension were chosen as an indicator of learning because it was considered a reliable predictor of more advanced reading skills, such as reading comprehension (Lipka, 2017). The instrument applied in this study was the EasyCBM Benchmark Screener in Reading, Passage Reading Fluency used to measure the dependent variable, which was each student's passage reading fluency percentile score. This instrument was developed by a team of educational researchers at the University of Oregon who created the EasyCBM system (University of Oregon, 2014b). The purpose of this system was to identify deficits in math and reading. Published in 2006, the EasyCBM system has been used worldwide to assess more than 26 million students and has received more than $8 million from the federal government for further program development.

Using EasyCBM Passage Reading Fluency as the instrument in this study was appropriate because it was a primary progress monitoring tool used by the school district to measure academic progress. Because students read from a grade level reading passage aloud for

one-minute, EasyCBM was a quick assessment to administer. In addition, since test administrators merely count student errors during the one-minute timed test, it was easy to score. EasyCBM was a simple, inexpensive, and reliable assessment to use for mass screenings of students and for progress monitoring.

EasyCBM scores were reported as national percentiles from zero to 100. Students scoring from zero to the 10th percentile were considered to be at high risk for reading below grade level, students scoring from the 11th through the 25th percentile were considered to be at some risk, and students scoring from the 26th through the 100th percentile were considered to be at low risk. These grade level norms were nationally stratified in 2014 in order to ensure reading performance across the country accurately represented each region of the United States, as well as gender, ethnicity, and race (University of Oregon, 2014). In addition to percentiles, scores were also reported as words read correctly per minute. This method of scoring utilizes grade level norms to equate words per minute to national percentiles (University of Oregon, 2014a). For example, norms for passage reading fluency at the beginning of the school year in third grade were as follows: 47 words per minute equates to the 10th percentile, 68 words per minute equates to the 25th percentile, 87 words per minute equates to the 50th percentile, 112 words per minute equates to the 75th percentile, and 138 words per minute equates to the 90th percentile. Correct words per minute expectations for these norms increase as the school year progresses for winter and spring screenings (University of Oregon, 2014).

A number of methodologies were employed to develop the EasyCBM assessments. The difficulty and fit of test items were determined by Rasch modeling. The alignment of passage difficulty was determined through analyses of variance which ensured consistency and appropriateness of the intended use (University of Oregon, 2014a). Internal consistency, test-

retest, and alternate form were used to prove the EasyCBM assessment system is reliable, with Cronbach's alpha being used to measure internal consistency. Additionally, Pearson's bivariate correlations were also used to confirm reliability. Third grade alternate form reliability of the Passage Reading Fluency ranged from 0.94-0.95. The remaining grades ranged from 0.83-0.98, which demonstrates a robust relation. Test-retest reliability ranged from 0.84-0.97 in grades one through five, which is also a very strong relation. Finally, criterion validity was evaluated through latent factor analyses.

Table 1

Reliability and Validity of EasyCBM Passage Reading Fluency

	Alternate Form Reliability	Test-Retest Reliability	Criterion Validity
Grade 1	.95 to .97	.91 to .97	
Grade 2	.91 to .95	.88 to .96	
Grade 3	.94 to .95	.84 to .94	r = .55 to .69
Grade 4	.83 to .98	.86 to .96	r = .55 to .69
Grade 5	.87 to .96	.88 to .94	r = .55 to .69

Procedures

The researcher began by receiving permission from the school district to conduct research to gain access to district wide elementary archived EasyCBM Passage Reading Scores. A letter describing the purpose of the study, the procedures, and the participants was submitted to the Chief Academic Officer who approves all research projects within the school district. Secondly, the researcher sought and obtained approval from the Institutional Review Board (IRB).

Participants for this study were fourth grade students who participated in universal screening using the EasyCBM Passage Reading Fluency assessments administered in the spring and fall of 2019, as well as the winter and fall of 2020. Archival EasyCBM Passage Reading Fluency data was collected from the school district, and the Director of Student Information de-identified information, such as student names before providing it to the researcher. The data was depicted via a Microsoft Excel document in a format that could be uploaded in the Statistical Package for the Social Sciences (SPSS) software. The data set included dummy coding (1-225) in place of the student's name, a letter to represent gender (M = male and F = female), a digit to represent each student's economic status (1 = not economically disadvantaged and 2 = economically disadvantaged), and pre-test and post-test EasyCBM Passage Reading Fluency raw scores ranging from zero to 266. These pre- and post-test scores were used to calculate the change in the dependent variable, which was in the form of a positive or negative change score representing a gain or loss in Passage Reading Fluency. A positive score or gain indicated that the student's reading skills improved during the closure, whereas a negative score or loss indicated that a student's readings decreased during the break, indicating what is referred to as learning loss. Data was kept in a secure file on a password protected laptop.

Data Analysis

A two-way analysis of variance (ANOVA) was conducted for both the 2019 traditional summer break and the 2020 COVID-19 closure. A two-way ANOVA was used because there are two independent variables and one dependent variable measured on a continuous scale. This provided a comparison of the within-group variance of individual passage reading fluency scores with the between-group variance of individual reading fluency scores. All data was entered and analyzed within the Statistical Package for Social Science (SPSS) version 27 software.

Descriptive statistics included sums, means, standard deviation, and percentages. Learning loss or gain scores was derived by subtracting pre-test scores from post-test scores. Therefore, change scores were calculated for each year with the compute difference function in SPSS using the EasyCBM Passage Reading Fluency (PRF) score before the break as the pre-test and the EasyCBM PRF score after the break as the post-test. The compute variable function within the transform menu generated change scores, also known as gain scores, for each subject for both sets of closures (time).

The p value was set at $p < 0.05$. This allowed for a 95% or greater certainty that there was a difference in change scores between the independent variables. The first independent variable was the student's socioeconomic status. Students were coded as either economically disadvantaged or not economically disadvantaged. The second independent variable was the students' gender status. Students were coded as either male or female. The dependent variable was the change score representing a gain or loss in passage reading fluency between a pre-test (before break or closure) and post-test (after break or closure).

Data screening was conducted to search for outliers, missing data, and any unusual scores or inconsistencies, and was preliminarily checked for violations of assumptions. A box and whisker plot for each group and variable was used to help identify extreme outliers. The dependent variable (passage reading fluency) was measured as a ratio variable zero to 266 representing the number of words read in one minute. For a two-way ANOVA, a Kolmogorov-Smirnov test was used to confirm normality because the sample size is greater than 50. Levene's test of Equality of Error Variance was used to test homogeneity of variance. The effect size was reported using partial eta squared. Because there was significance in the main null hypothesis, post hoc tests were conducted using the Tukey method.

CHAPTER FOUR: FINDINGS

Overview

The purpose of this quantitative research study was to determine if there was a difference in learning loss among elementary students based on gender and socioeconomic status following the 2019 traditional 10-week summer break as measured by Easy CBM Passage Reading Fluency. The study also sought to determine if there was a difference in learning loss among elementary students based on gender and socioeconomic status following the 2020 24-week pause in instruction due to COVID-19 as measured by Easy CBM Passage Reading Fluency. A causal-comparative design was used to analyze the level of learning loss that occurred conducting two separate two-way analyses of variance (ANOVA) for both time periods.

Research Questions

This study investigated the following questions:

RQ1: Is there a difference in learning loss following the 2019 traditional 10-week summer break among elementary male and female students who are economically disadvantaged and those who are not as measured by EasyCBM Passage Reading Fluency?

RQ2: Is there a difference in learning loss following the 2020 24-week pause in instruction due to COVID-19 among elementary male and female students who are economically disadvantaged and those who are not as measured by EasyCBM Passage Reading Fluency?

Null Hypotheses

The null hypotheses for this study are:

$H_0$1: There is no difference in learning loss following the 2019 traditional 10-week summer break, as measured by EasyCBM, among elementary male and female students who are economically disadvantaged and those who are not economically disadvantaged.

$H_0$2: There is no difference in learning loss following the 2020 24-week pause in instruction due to COVID-19, as measured by EasyCBM, among elementary male and female students who are economically disadvantaged and those who are not economically disadvantaged.

Descriptive Statistics

The research utilized archival data from the 2018-2019 and 2019-2020 school years, derived from six elementary schools located in a suburban school district in southeast Tennessee. The participants in this study were members of a cohort of 386 elementary students who were third graders at the beginning of the 2018-2019 school year. Of this population, 161 students were removed who did not take at least one of the four assessments needed to calculate the gain scores in the research. There was a total sample size of 225 students ($N = 225$) who completed the necessary pre and post testing for both school closure periods used in this study. Gender in this study included 48.5% female and 51.5% male, as well as 49.3% economically disadvantaged and 50.7% not economically disadvantaged. The means and standard deviations of EasyCBM passage reading fluency gain scores for the 2019 traditional 10-week summer break can be found in table two, corresponding with hypothesis one. The means and standard deviations of EasyCBM passage reading fluency gain scores for the 2020 24-week pause in instruction due to COVID-19 can be found in table three, corresponding with hypothesis two.

Table 2

Descriptive Statistics

Dependent Variable: Gain_Scores_YearOne

ED	Gender	Mean	Std. Deviation	N
No	F	1.6780	10.60325	59
	M	-1.6545	13.31974	55
	Total	.0702	12.05351	114
Yes	F	-1.9200	12.15183	50
	M	-.0492	10.91700	61
	Total	-.8919	11.47436	111
Total	F	.0275	11.42889	109
	M	-.8103	12.08874	116
	Total	-.4044	11.75498	225

Table 3

Descriptive Statistics

Dependent Variable: Gain_Scores_YearTwo

ED	Gender	Mean	Std. Deviation	N
No	F	-.1695	16.13964	59
	M	-6.6545	13.97513	55
	Total	-3.2982	15.41516	114
Yes	F	-.8400	12.52648	50
	M	-2.0328	13.81300	61
	Total	-1.4955	13.20322	111
Total	F	-.4771	14.53259	109
	M	-4.2241	14.02240	116
	Total	-2.4089	14.36302	225

Results

Null Hypothesis One

The first null hypothesis for this research study stated there is no difference in learning loss following the 2019 traditional 10-week summer break, as measured by EasyCBM, among elementary male and female students who were economically disadvantaged and those who were not economically disadvantaged. A two-way ANOVA was used to analyze this hypothesis at the alpha $p < 0.05$ level.

Assumption Test

The dependent variable (EasyCBM gain score) was screened for inconsistencies and outliers using box and whisker plots to check the data for the presence of extreme outliers (Gall et al., 2007) (see figures one through four for box and whisker plots). Outliers were identified. However, it was determined there were no errors and the outliers were relevant to the results, therefore, the researcher chose not to remove the outliers from the data set. Normality was examined for each variable using Kolmogorov-Smirnov's test of normality (see tables four through seven). The assumption for normality was found tenable for non-economically disadvantaged females ($p = .200$), and economically disadvantaged females ($p = .069$) but not tenable for non-economically disadvantaged males ($p = .002$), and economically disadvantaged males ($p = .011$) at the .05 alpha level for each independent variable. Warner (2012) suggested that ANOVA is robust to violations of normality if the other assumptions are tenable. The assumption of homogeneity of variance for the dependent variable across levels of the independent variables was tested using Levene's Test of Equality of Error Variances (see table eight). The results of the Levene's test were tenable ($p = .842$).

Figure 1

Box and Whisker Plot for gender (female) and economically disadvantaged status (no)

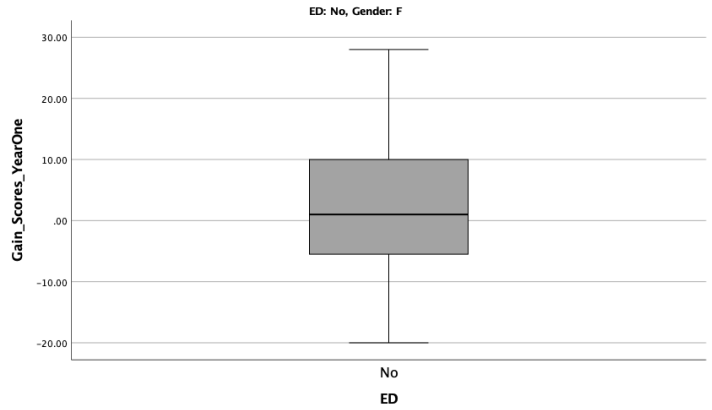

Figure 2

Box and Whisker Plot for gender (male) and economically disadvantaged status (no)

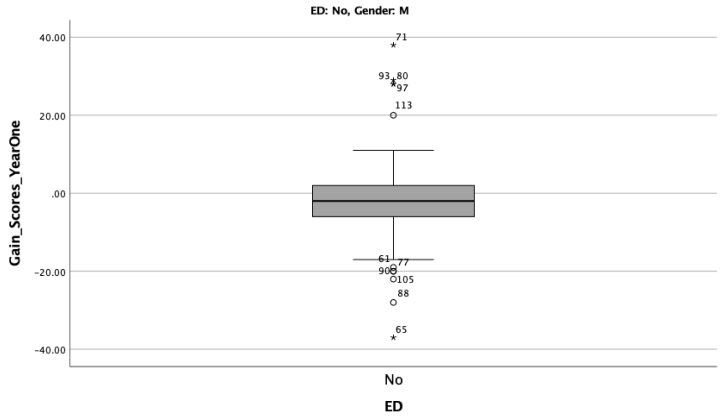

Figure 3

Box and Whisker Plot for gender (female) and economically disadvantaged status (yes)

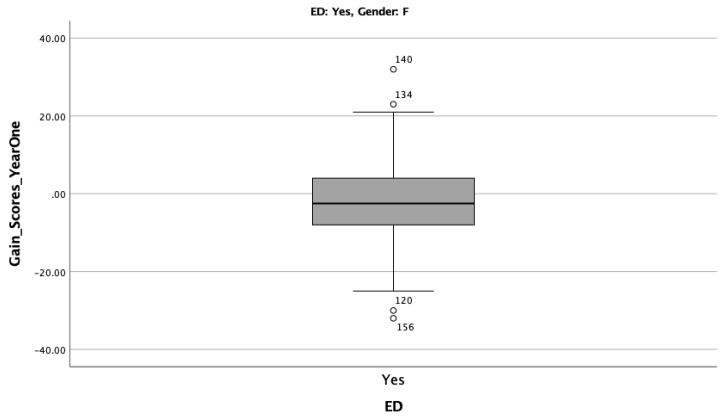

Figure 4

Box and Whisker Plot for gender (male) and economically disadvantaged status (yes)

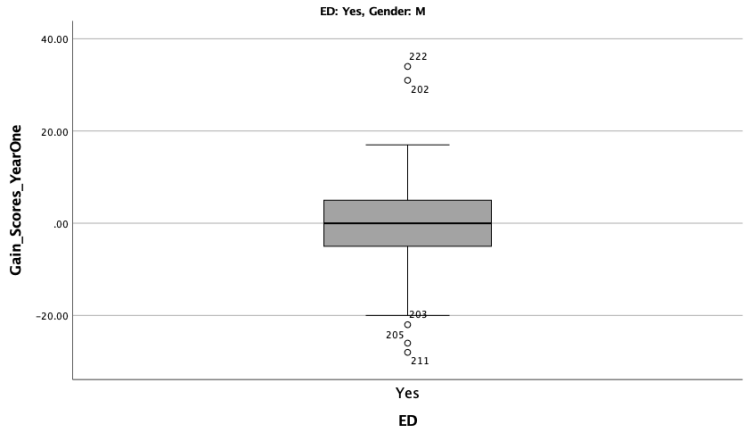

Table 4

Test of Normality for gender (female) and economically disadvantaged status (no)

Tests of Normality[a]

		Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	ED	Statistic	df	Sig.	Statistic	df	Sig.
Gain_Scores_YearOne	No	.078	59	.200*	.987	59	.779

*. This is a lower bound of the true significance.

a. ED = No, Gender = F

b. Lilliefors Significance Correction

Table 5

Test of Normality for gender (male) and economically disadvantaged status (no)

Tests of Normality[a]

		Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	ED	Statistic	df	Sig.	Statistic	df	Sig.
Gain_Scores_YearOne	No	.156	55	.002	.920	55	.001

a. ED = No, Gender = M

b. Lilliefors Significance Correction

Table 6

Test of Normality for gender (female) and economically disadvantaged status (yes)

Tests of Normality[a]

		Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	ED	Statistic	df	Sig.	Statistic	df	Sig.
Gain_Scores_YearOne	Yes	.120	50	.069	.963	50	.117

a. ED = Yes, Gender = F

b. Lilliefors Significance Correction

Table 7

Test of Normality for gender (male) and economically disadvantaged status (yes)

Tests of Normality[a]

		Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	ED	Statistic	df	Sig.	Statistic	df	Sig.
Gain_Scores_YearOne	Yes	.131	61	.011	.941	61	.005

a. ED = Yes, Gender = M

b. Lilliefors Significance Correction

Table 8

Levene's Test of Equality of Error Variances

Levene's Test of Equality of Error Variances[a,b]

		Levene Statistic	df1	df2	Sig.
Gain_Scores_YearOne	Based on Mean	.287	3	221	.835
	Based on Median	.273	3	221	.845
	Based on Median and with adjusted df	.273	3	202.581	.845
	Based on trimmed mean	.276	3	221	.842

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Dependent variable: Gain_Scores_YearOne

b. Design: Intercept + ED + Gender + ED * Gender

Statistical Analysis

A two-way ANOVA was used to analyze null hypothesis one at the alpha $p < 0.05$ level. The results of the ANOVA analysis were not significant based upon ED (F (1, 221) = .402, p = .527), Gender (F (1, 221) = .217, p =.642), or ED and Gender (F (1, 221) = .217, p = .099) (see table nine). Therefore, the researcher failed to reject the null hypothesis.

Table 9

Tests of Between-Subjects Effects

Dependent Variable: Gain_Scores_YearOne

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	464.345[a]	3	154.782	1.122	.341	.015
Intercept	52.933	1	52.933	.384	.536	.002
ED	55.512	1	55.512	.402	.527	.002
Gender	29.872	1	29.872	.217	.642	.001
ED * Gender	378.537	1	378.537	2.744	.099	.012
Error	30487.850	221	137.954			
Total	30989.000	225				
Corrected Total	30952.196	224				

[a] R Squared = .015 (Adjusted R Squared = .002)

Null Hypothesis Two

The second null hypothesis for this research study stated there is no difference in learning loss following the 2020 24-week pause in instruction due to COVID-19, as measured by EasyCBM, among elementary male and female students who were economically disadvantaged and those who were not economically disadvantaged. A two-way ANOVA was used to analyze this hypothesis at the alpha $p < 0.05$ level.

Assumption Test

The dependent variable (EasyCBM gain score) was screened for inconsistencies and outliers using a box and whisker plot to check the data for the presence of extreme outliers (Gall et al., 2007) (see figures five through eight for box and whisker plots). Outliers were identified. However, it was determined there were no errors and the outliers were relevant to the results, therefore, the researcher chose not to remove the outliers from the data set. Normality was

examined for each variable using Kolmogorov-Smirnov's test of normality (see tables 10-13). The assumption for normality was found tenable for non-economically disadvantaged females (p = .200), and economically disadvantaged females (p = .200) but not tenable for non-economically disadvantaged males (p = .010), and economically disadvantaged males (p = .002) at the .05 alpha level for each independent variable. Warner (2012) suggested that ANOVA is robust to violations of normality if the other assumptions are tenable. The assumption of homogeneity of variance for the dependent variable across levels of the independent variables was tested using Levene's Test of Equality of Error Variances (see table 12). The results of the Levene's test were tenable (p = .415).

Figure 5

Box and Whisker Plot for gender (female) and economically disadvantaged status (no)

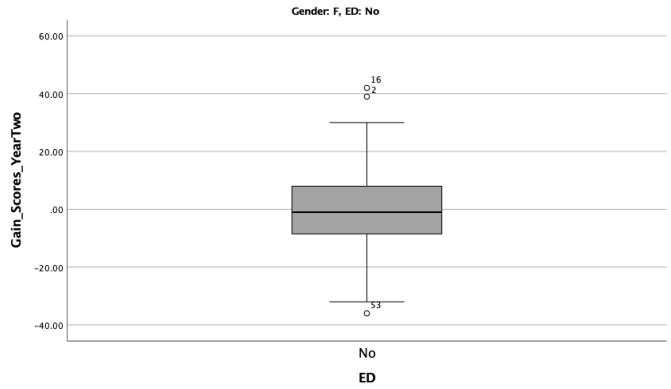

Figure 6

Box and Whisker Plot for gender (male) and economically disadvantaged status (no)

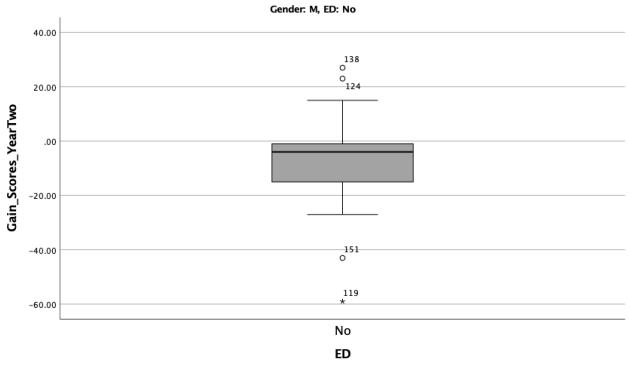

Figure 7

Box and Whisker Plot for gender (female) and economically disadvantaged status (yes)

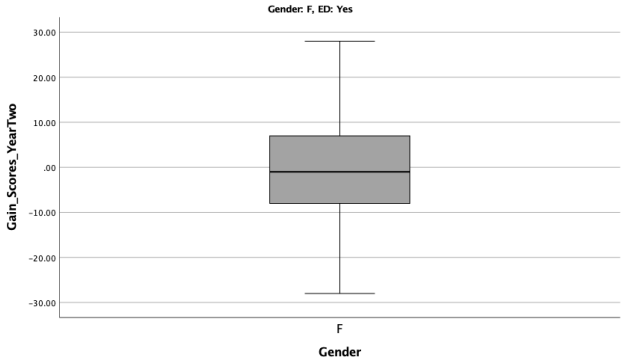

Figure 8

Box and Whisker Plot for gender (male) and economically disadvantaged status (yes)

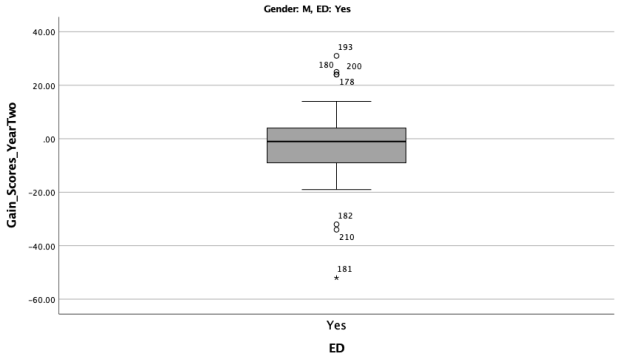

Table 10

Test of Normality for gender (female) and economically disadvantaged status (no)

Tests of Normality[a]

		Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	ED	Statistic	df	Sig.	Statistic	df	Sig.
Gain_Scores_YearTwo	No	.083	59	.200*	.984	59	.607

*. This is a lower bound of the true significance.

a. Gender = F, ED = No

b. Lilliefors Significance Correction

Table 11

Test of Normality for gender (male) and economically disadvantaged status (no)

Tests of Normality[a]

		Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	ED	Statistic	df	Sig.	Statistic	df	Sig.
Gain_Scores_YearTwo	No	.139	55	.010	.923	55	.002

a. Gender = M, ED = No

b. Lilliefors Significance Correction

Table 12

Test of Normality for gender (female) and economically disadvantaged status (yes)

Tests of Normality[a]

		Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	Gender	Statistic	df	Sig.	Statistic	df	Sig.
Gain_Scores_YearTwo	F	.090	50	.200*	.987	50	.847

*. This is a lower bound of the true significance.

a. Gender = F, ED = Yes

b. Lilliefors Significance Correction

Table 13

Test of Normality for gender (male) and economically disadvantaged status (yes)

Tests of Normality[a]

		Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	ED	Statistic	df	Sig.	Statistic	df	Sig.
Gain_Scores_YearTwo	Yes	.148	61	.002	.942	61	.006

a. Gender = M, ED = Yes

b. Lilliefors Significance Correction

Table 14

Levene's Test of Equality of Error Variances

Levene's Test of Equality of Error Variances[a,b]

		Levene Statistic	df1	df2	Sig.
Gain_Scores_YearTwo	Based on Mean	.971	3	221	.407
	Based on Median	.931	3	221	.427
	Based on Median and with adjusted df	.931	3	213.051	.427
	Based on trimmed mean	.955	3	221	.415

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

[a] Dependent variable: Gain_Scores_YearTwo

[b] Design: Intercept + ED + Gender + ED * Gender

Statistical Analysis

A two-way ANOVA was used to analyze null hypothesis two at the alpha $p < 0.05$ level. The results of the ANOVA analysis were not significant based upon ED (F (1, 221) = 1.077, p = .301) or ED and Gender (F (1, 221) = 1.932, p = .166). However, there was significance based upon Gender (F (1, 221) = 4.067, p =.045) (see table 15). Therefore, null hypothesis two was rejected.

Table 15

Tests of Between-Subjects Effects

Dependent Variable: Gain_Scores_YearTwo

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1418.986[a]	3	472.995	2.334	.075	.031
Intercept	1314.634	1	1314.634	6.486	.012	.029
ED	218.280	1	218.280	1.077	.301	.005
Gender	824.183	1	824.183	4.067	.045	.018
ED * Gender	391.588	1	391.588	1.932	.166	.009
Error	44791.396	221	202.676			
Total	47516.000	225				
Corrected Total	46210.382	224				

[a] R Squared = .031 (Adjusted R Squared = .018)

CHAPTER FIVE: CONCLUSIONS

Overview

This chapter contains a summary of the research conducted to examine the effect on passage reading fluency during two separate school closures among elementary male and female students who were economically disadvantaged and those who were not as measured by EasyCBM Passage Reading Fluency. This chapter provides a discussion of the research questions, the findings of the analysis, and how they relate to the review of literature. Additionally, the implications of the study, its limitations, and recommendations for future research are also offered.

Discussion

The purpose of this quantitative study was to examine separately whether there is a difference in learning loss following the 2019 traditional 10-week summer break and following the 2020 24-week pause in instruction due to COVID-19 among elementary male and female students who were economically disadvantaged and those who were not as measured by EasyCBM Passage Reading Fluency. The researcher posed two research questions, which are listed below. While each research question is similar in nature, each focuses on different durations of time under different circumstances and are discussed separately. Relevant literature and related studies are compared and contrasted with the results of this study.

Research Question One

Is there a difference in learning loss following the 2019 traditional 10-week summer break among elementary male and female students who are economically disadvantaged and those who are not as measured by EasyCBM Passage Reading Fluency?

Null Hypothesis One

For null hypothesis one, the researcher did not find a statistically significant difference in learning loss among elementary male and female students who were economically disadvantaged and those who were not as measured by EasyCBM Passage Reading Fluency. Although students categorized as economically disadvantaged demonstrated an overall learning loss mean score slightly lower than their non-economically disadvantaged peers, the difference was minimal and statistically insignificant. The results of this study failed to substantiate previous literature suggesting that students from lower socioeconomic households experience measurably more learning loss during summer break compared to students from more affluent households (Alexander et al., 2007; Cooper et al., 2000; Cooper, 2003; Downey et al,, 2004; Entwhistle et al., 2001; Heyns,1978; Whittington & Rickman, 2015).

Implications

Although the researcher failed to reject null hypothesis one, based on statistical analysis, there are some important implications. Previously reviewed related research suggested that students from lower socioeconomic households experience measurably more learning loss during summer break compared to students from more affluent households (Alexander et al., 2007; Cooper et al., 2000; Cooper, 2003; Downey et al., 2004; Entwhistle et al., 2001; Heyns,1978; Whittington & Rickman, 2015). Although the difference in learning loss between socioeconomic groups was not statistically significant enough to substantiate previous research, the fact that the overall group of economically disadvantaged students demonstrated some level of loss of learning (M = -.8919) while the overall group of non-economically disadvantaged students demonstrated a slight gain in learning (M = .0702) also makes it difficult to dispute previous

research. This slight learning gain by non-economically disadvantaged students is consistent with the previous research (Alexander et al., 2007).

The minimal difference in learning loss between socioeconomic groups might be explained by sustained intervention efforts strategically implemented to mitigate "summer slide." In an effort to minimize or reverse the effects of "summer slide", the school district in this study has offered a variety of summer enrichment and summer reading programs for many years targeting students from low-income households. These results could provide some indication that these intervention strategies are indeed working. Considering the theoretical lens of sociocultural theory developed by Lev Vygotsky, who suggested that learning is profoundly influenced by the socio-cultural environment, it is possible that the intervention programs offered to economically disadvantaged students allowed these students to engage in social learning opportunities more congruent to the summer social learning opportunities often available to their peers from more affluent households.

The results for question one also provide a very important context related to question two. Question two seeks to determine if there is a difference in learning loss among groups of students during the extended 24-week COVID-19 closure. The results for question one allow the researcher to see typical learning loss for the same cohort of students that occurred under normal circumstances during a typical summer break before COVID-19 existed.

Research Question Two

Is there a difference in learning loss following the 2020 24-week pause in instruction due to COVID-19 among elementary male and female students who were economically disadvantaged and those who were not as measured by EasyCBM Passage Reading Fluency?

Null Hypothesis Two

For null hypothesis two, the researcher did find a statistically significant difference in learning loss among elementary male and female students who were economically disadvantaged and those who were not as measured by EasyCBM Passage Reading Fluency. There was no significant difference in learning loss based upon socioeconomic status. However, there was a significant difference in learning loss based upon gender.

Implications

Data analysis revealed that the overall group of males in this study experienced significantly more learning loss (M = -4.2241) as measured by EasyCBM Passage Reading Fluency during the 24-week COVID-19 closure than the overall group of females in this study (M = -.4771). These findings lend support to previous research indicating male students often underperform in reading compared to female students (Bronzo et al., 2014). Like question one, the data analysis for question two did not reveal a statistically significant difference in learning loss based upon socioeconomic status. These findings suggested that there were factors during the 24-week COVID-19 school closure that had a greater impact on the male students' learning loss in the study compared to female students in this study.

Although there was no formal statistical analysis directly comparing the data from the 2019 10-week traditional summer break with the 2020 24-week COVID-19 closure, the differences in the descriptive statistics from each time period are noteworthy and suggest a need for further analysis. As expected, the longer period without instruction did result in an overall increase in average learning loss for all students. During the 10-week period, students' percentile scores dropped on average (M = -.4044) and during the 24-week period dropped (M = -.2.4089). Previous research on "summer slide" suggests an expectation that a longer disruption to

instruction would result in disproportionately more learning loss for economically disadvantaged students. However, that did not happen in this case. While it was gender, not socioeconomic status, that was found statistically significant, it is interesting that economically disadvantaged male students experienced less learning loss (M = -2.0328) compared to non-economically disadvantaged male students (M = -6.6545). This is contrary to economically disadvantaged female students who showed slightly greater learning loss than non-economically disadvantaged females and contradicts the literature suggesting school closure had a greater impact on economically disadvantaged students. This raises the questions as to why the COVID-19 closure might impact males more than females and more specifically non-economically disadvantaged males more than other students.

In addition to the differences in duration of time, it is also important to consider other factors that vary between the 10-week and 24-week time periods. The 10-week period represents a typical summer break, and the previous literature provides the sociocultural theoretical framework to explain who "summer slide" affects students from low socioeconomic backgrounds more profoundly than students from higher socioeconomic backgrounds. This is primarily attributed to increased opportunities for students from higher socioeconomic backgrounds to stay engaged in social learning activities throughout the summer months while school is closed. However, during the 24-week COVID-19 closure, the advantages typically available to families with financial resources were removed. Government lockdown policies required all individuals to remain isolated and socially distanced. These lockdown rules prevented students from traveling on vacation, attending social events, and participating in summer camps. These lockdown rules were applied equally to all socioeconomic classes, essentially removing any advantage to engage in various social learning activities. Furthermore,

there are psychological effects of a global pandemic that might have a varying impact on different groups of students.

Limitations

There are inherent weaknesses associated with this study due to the causal-comparative design using archival data. This design limits control over the independent variables and does not permit strong conclusions about cause and effect (Gall et al., 2007). This design has limited internal validity because there is a limit to the degree by which the results can be fully attributed to the independent variables, such as gender and socioeconomic status. Furthermore, while the study does suggest a relationship between school closure and learning loss, it is not able to determine that school closure is the direct cause of the learning loss. There are also limits to external validity, which refers to the extent to which the results can be generalized to other populations. For example, although this study did find that the male participants in this study did experience more learning loss during the 24-week COVID-19 closure, we cannot generalize that male students in other settings will experience similar outcomes. Participants in this study are all part of a grade level cohort from one small school district in southeast Tennessee, and the conclusions are limited to this population.

Recommendations for Future Research

The current study concluded that male students experienced more learning loss than female students during the 24-week COVID-19 school closure and that there was no significant difference in learning loss based upon socioeconomic status. The unexpected outcomes found in this study suggested a need for further research to determine the impact COVID-19 had and continues to have on student academic performance of various subgroups and the level of learning loss that takes place when instruction is disrupted.

The following are recommendations for future research:

(a) Conducting a follow-up study with a larger sample including other school districts in other regions could strengthen the external validity and provide further information to the emerging research on the effects of COVID-19 related to student performance.

(b) COVID-19 has disrupted schooling for almost two years, and it is uncertain how long it will continue to impact student learning. It is recommended that similar studies be conducted over multiple years in order to measure the ongoing impact on various subgroups of students.

(c) The results of this study suggested a need for further research that takes a closer look at how COVID-19 school closures affect learning loss based on gender.

(d) As more research emerges following the onset of COVID-19, a meta-analysis may provide more insight regarding how COVID-19 impacts student performance and learning loss based upon gender and socioeconomic status.

In conclusion, this study contributes to an expanding shared assumption that COVID-19 profoundly impacts student achievement. This study possesses a variety of internal and external limitations that prevent the generalization that male students are more negatively impacted than female students. As more COVID-19 educational studies emerge, this study may help contribute to the collective understanding of the interaction between COVID-19 school closures, socioeconomics, and gender.

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APPENDICES

Appendix A

Institutional Review Board Approval Letter

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

December 9, 2021

David Stone
Michael Patrick

Re: IRB Application - IRB-FY21-22-489 LEARNING LOSS IN PASSAGE READING FLUENCY FOR ELEMENTARY STUDENTS DURING COVID-19 SCHOOL CLOSURE.

Dear David Stone and Michael Patrick,

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 does not classify as human subjects research. This means you may begin your project with the data safeguarding methods mentioned in your IRB application.

Decision: No Human Subjects Research

Explanation: Your study is not considered human subjects research for the following reason:

It will not involve the collection of identifiable, private information from or about living individuals (45 CFR 46.102).

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

Also, although you are welcome to use our recruitment and consent templates, you are not required to do so. If you choose to use our documents, please replace the word *research* with the word *project* throughout both documents.

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

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office