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COVID-19: DESCRIPTIVE CASE STUDY OF A K-8 SCHOOL DISTRICT'S ABRUPT  
TRANSITION TO REMOTE LEARNING FROM A TRADITIONAL IN-PERSON MODEL

By

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TRANSITION TO REMOTE LEARNING FROM A TRADITIONAL IN-PERSON MODEL

ABSTRACT

COVID-19 resulted in many changes worldwide in how humans and organizations interact and operate. One such significant adjustment was the closure and transition from a classroom instruction model to a remote instruction model across the United States. The purpose of this descriptive case study was to explore student achievement, teacher preparation and instructional hours, and student attendance levels for grades kindergarten through eighth grade (K-8) at four schools in a single school district. The study examined these datasets at a school administrative unit (SAU) comprising of three terms during the 2019-20 school year, comparing pre-COVID-19 levels with post-COVID-19 levels. The overarching research question for this case study was to explore how abruptly moving to a fully online learning environment affects student achievement and assessment, teacher work hours, and student attendance. The study examined four K-8 schools with a total population of 1,370 students, 75 core content teachers and 20 unified arts teachers. The findings supported the hypothesis that there would be no difference in student achievement between terms one through two and term three as measured by competency grades based on curriculum standards. However, the traditional assessment grades did see an increase from terms one through two compared to term three. Further, teachers reported working fewer hours per week in term three. Finally, the student absences increased in term three. There are a few practical recommendations to improve an abrupt change from a traditional in-person

instructional model to an online instructional model in the event of crisis. Equity is a concern for vulnerable groups and can be addressed with the provision of internet, computing devices, and meals. Further, follow-up with student guardians and implementation of a non-punitive grading and assessment system can mitigate equity issues. The researcher suggests that further qualitative research is necessary to understand full implications of a crisis-induced transition from in-person to online learning. Additional insight into why teachers worked fewer hours, students attended class less regularly, and if/why teachers adjusted grading and assessment may prove beneficial.

*Keywords:* COVID-19, in-person instruction, online instruction, K-8

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## TABLE OF CONTENTS

Chapter 1: Introduction.....	1
Statement of the Problem.....	2
Purpose of the Study .....	3
Research Questions and Hypothesis .....	3
Conceptual Framework.....	4
Scope, Assumptions, Limitations, and Delimitations .....	7
Scope.....	7
Assumptions.....	7
Limitations .....	8
Delimitations .....	9
Rationale and Significance .....	10
Definition of Terms.....	10
Conclusion .....	12
Chapter 2: Literature Review .....	14
Conceptual Framework.....	15
Traditional Schools .....	19
Online Schools.....	21
Previous Pandemics or Crises: Effect on Education.....	24



COVID-19: Preliminary Effect.....	26
Initial COVID-19 Effect on Education .....	28
Conclusion .....	31
Chapter 3: Methodology .....	32
Purpose.....	32
Research Questions, Hypothesis, and Design of Study .....	33
Site Information .....	35
Population .....	36
Data Collection and Instrumentation .....	36
Data Analysis .....	39
Potential Limitations / Delimitations .....	41
Validation / Credibility .....	43
Ethical Concerns .....	44
Summary .....	44
Chapter 4: Data Analysis and Results .....	46
Analysis Method .....	46
Presentation of Results.....	47
Student Achievement .....	47
Student Assessment Levels.....	48
Teacher Preparation and Instructional Levels.....	50

Student Attendance Levels .....	52
Summary .....	53
Chapter 5: Discussion and Conclusion .....	55
Summary of the Results .....	55
Interpretation of Findings .....	57
Research Question 1 Results .....	58
Hypothesis 1 Results .....	60
Sub-Question 1 Results .....	61
Sub-Question 2 Results .....	62
Sub-Question 3 Results .....	63
Implications.....	64
Recommendations for Action .....	65
Recommendations for Future Research .....	66
Conclusion .....	67
References .....	69

## LIST OF TABLES

Table 1: <i>2019-20 Student Competencies Achieved at the End of the Term: Summary</i> .....	48
Table 2: <i>2019-20 Student Final Grades at the end of the term: Summary</i> .....	49
Table 3: <i>2019-20 Teacher Weekly Hours Worked: Summary</i> .....	50
Table 4: <i>2019-20 Teacher Weekly Hours Worked: Median</i> .....	51
Table 5: <i>2019-20 Teacher Weekly Hours Worked: Mean</i> .....	52
Table 6: <i>2019-20 Student Weekly Absences: Summary</i> .....	52

## LIST OF FIGURES

Figure 1: <i>Communication Facilitating Community Resilience</i> .....	19
Figure 2: <i>2019-20 Student Final Grades at the End of the Term: Normal Probability Curve</i> .....	49
Figure 3: <i>2019-20 Teacher Weekly Hours Worked: Normal Probability Curve</i> .....	51
Figure 4: <i>2019-20 Student Weekly Absences: Normal Probability Curve</i> .....	53

## CHAPTER 1

### INTRODUCTION

The acute respiratory disease COVID-19 garnered notice, spreading through China and quickly worldwide to become a public health concern and pandemic (Guo et al., 2020). The World Health Organization (WHO) declared the COVID-19 epidemic a public health emergency and significant international concern on January 30, 2020. The emergence of COVID-19 follows two recent coronavirus outbreaks; severe acute respiratory syndrome coronavirus (SARS) in 2002 and middle east respiratory syndrome coronavirus (MERS) in 2012. As of July 6, 2020, the WHO reported a total of 11,500,302 confirmed worldwide COVID-19 cases and 535,759 confirmed worldwide COVID-19 deaths in 216 countries and territories (WHO, 2020b).

Increasingly, evidence suggests a high rate of human to human transmission was due to asymptomatic and pre-symptomatic people infecting others, resulting in community transmission. COVID-19 symptoms include cough, fatigue, loss of taste and smell, muscle pains, fever, chills, and shortness of breath. The elderly and people with underlying conditions have been found more susceptible and at higher risk of more severe symptoms and outcomes (Li et al., 2020).

The initial epicenter of the outbreak occurred in Wuhan, in the Hubei province of China. Chinese authorities reported the first positive infection case on December 31, 2019. The specific origin of the virus is uncertain. Cases linked to the Huanan Seafood Wholesale Market, which sold domestic and wild animals, have been determined to have a high probability of origin (Wang, Horby, Hayden & Gao, 2020). According to China's Centers for Disease Control and Prevention, 33 environmental samples taken at the market tested positive for COVID-19 out of a total of 585 collected samples. As such, the prevailing hypothesis is that transmission from live

animals to humans occurred at the market, with rapid human-to-human transmission after that (Lu, 2020).

The public health emergency due to COVID-19 resulted in the closure of all U.S. kindergarten through twelfth grade (K-12) schools in spring 2020 (Education Week, 2020). Excepting schools in Montana and Wyoming, all schools remained closed through the end of the school year, affecting over 124,000 public and private schools and more than 55 million students. Fauci et al. (2020) asserted that “the COVID-19 outbreak has posed critical challenges for the public health, research, and medical communities” (p. 1). In short, the COVID-19 pandemic resulted in government-mandated precautions, including the closure of schools.

### **Statement of the Problem**

COVID-19 resulted in many changes worldwide in how humans and organizations interact and operate. One such change is the closure of physical K-12 school buildings across the United States. The closures affected how U.S. public schools operate and provide instruction to students. The COVID-19 pandemic forced American schools to change from a physical classroom instruction model to a remote instruction model (Centers for Disease Control and Prevention, 2020b). Online schools operate extensively within the United States; however, there is no precedent of a large population of students transitioning abruptly from a classroom to an online learning model mid-school year. This descriptive case study explored the effect on specific teacher and student behaviors and results due to this dramatic change in content delivery, specifically for those in kindergarten through eighth grade (K-8). Detailed in this chapter are the statement of the problem, the purpose of the study, research questions, conceptual framework, assumptions, limitations and scope, rationale and significance, the definition of terms, and a summary of the study.

### **Purpose of the Study**

The purpose of this descriptive case study was to explore student achievement, teacher preparation and instructional levels, and student attendance levels for grades K-8 at four schools in a single school district. The term for school districts in New Hampshire is school administrative units (SAUs), which provide shared central administrative services. The study examined datasets from the four K-8 schools at a SAU comprising three terms during the 2019-20 school year, comparing pre-COVID-19 levels with post-COVID-19 levels. It scrutinized the first two terms (terms one-two) of the school year in a physical classroom environment, compared to term three of the school year in a remote instruction environment. The study investigated whether variation existed in three primary datasets: 1) teacher preparation and instructional hours, 2) student attendance levels, and 3) student achievement scores, after an abrupt change in content delivery mechanism due to COVID-19. The study aimed to juxtapose these datasets in the pre-pandemic classroom environment versus the pandemic-induced remote learning environment in a single SAU. Exploration of this case study and topic intended to provide a better understanding of this unique response to the crisis and some initial findings. Further, the study adds to a limited body of literature on the topic, and potentially allows for further research to better prepare for and respond to an abrupt change in the instructional model due to crisis.

### **Research Questions and Hypothesis**

The overarching research focus for this case study was to explore how the advent of abruptly moving to a fully online learning environment manifests itself in teacher preparation and instructional hours, student attendance, and student assessment. These research questions guided the study:

RQ1: How does an unexpected mid-year change from the physical classroom to a remote classroom learning environment affect student achievement?

HO1: There is no difference in achievement for students in a physical classroom or a remote classroom.

HA1: Student achievement decreased for students after transitioning to a remote classroom from a physical classroom.

The following research sub-questions further guided this descriptive case study:

Q1: How do students' assessment scores compare between terms one through two and term three, after transitioning from a classroom model to a remote learning model?

Q2: How do teachers' working hours compare between terms one through three and term three, after transitioning from a classroom model to a remote learning model?

Q3: How do students' attendance levels compare between terms one through two and term three, after transitioning from a classroom model to a remote learning model?

### **Conceptual Framework**

The conceptual framework is shaped or identified via the literature review and provides the boundaries, scaffolding, and focus of the research problem to align and narrow the scope of the study (Roberts, 2010). Miles and Huberman (2014) defined a conceptual framework as such: “a conceptual framework explains, either graphically or in narrative form, the main things to be studied—the key factors, variables, or constructs—and the resumed relationships among them” (p. 20). The following section outlines the conceptual framework for the descriptive study



examining a change in the K-8 content delivery model due to COVID-19 in a single SAU. The study explored and compared teacher and student outcomes after a change to a remote instruction model from a traditional in-person instruction model. The effects on teacher preparation and instructional hours, student attendance, and student assessment scores were compared by the change in content delivery method due to COVID-19.

The descriptive case study explored COVID-19 in its early phase and while the pandemic was still an ongoing public health emergency. Due to the unprecedented large-scale closures of public schools in the United States, there is a dearth of relevant studies and a significant gap in research on COVID-19 and its impact on public education. There is no comparable historical case study where traditional, physical schools were closed and replaced with remote, online schooling. Before the early 21<sup>st</sup> century, schools did not possess the technological capability to offer remote instruction. Previous cases of crises, wars, or pandemics causing the closure of schools resulted in school displacement, not an alternative remote model. Therefore, there is no real empirical research specific to the identified topic currently available. The void of available research and studies proved it difficult for this study to build upon existing empirical research. However, the gap in existing research affords the opportunity to explore a new line of inquiry on the topic.

The literature review examines existing ancillary research in an attempt to fill the gap with various components of the study. The review includes an examination of traditional schools (Blohm, 2017), online schools (Grazianno & Bryans-Bongey, 2018), COVID-19's preliminary effects on human interaction and organizational operations (Fauci et al., 2020), and an exploration of previous pandemics or crises with historical impact on public education (Stuart,

2020). The study built upon these auxiliary components of the topic and coalesced around a theoretical framework focused on communication during a crisis.

This case study explored the SAU's response to COVID-19 through the theoretical framework developed by Hyvärinen and Vos (2015) related to the utility of communication to facilitate community resiliency. How the teachers, students, and school community reacted, collaborated, and displayed resiliency in the face of COVID-19 aligns with the theoretical framework for necessary engagement, communication, and resiliency during a crisis. A compulsory level of resiliency was necessary for teachers and students to cope and function during this unique and unanticipated pandemic. The study explores how the online teacher and student collaboration, requisite resiliency, and embedded engagement affected teacher hours, student attendance rates, and student achievement scores.

The theory asserts that there are three primary components to successful communication in crisis: 1) empowerment, 2) awareness and preparedness, and 3) individual and collective resiliency. The concept is to empower stakeholders through relationship building, awareness, open lines of communication, and fostering partnerships before a crisis event. The role of proactively preparing community stakeholders is vital in order to engage the disparate public community members, citizens, and organizations for proper awareness and appropriate partnership. This cooperation between stakeholders is particularly important with complex organizations and the disarray inherent in crisis. The SAU response to the COVID-19 crisis required open lines of communication in order to maximize engagement between students, teachers, parents, administrators, school staff, community members, state officials, police, and fire departments. The communication, empowerment, and collective resiliency were core

components to successful navigation of school operations during COVID-19 (Hyvärinen & Vos, 2015).

### **Scope, Assumptions, Limitations, and Delimitations**

The following section identifies external conditions or inherent weaknesses that limit the case study's scope (Bloomberg & Volpe, 2015). Included are assumptions to specify what the researcher has taken for granted (Roberts, 2010). Finally, delimitations outline the parameters that the researcher utilized to limit the scope of the study (Bloomberg & Volpe, 2015).

#### **Scope**

The scope of this study consisted of one SAU in New Hampshire. The study examined the K-8 schools represented in the same SAU with shared central administrative services. The total population included 1,370 students who attended the SAU's K-8 schools in the 2019-2020 school year to measure achievement scores and attendance levels. Additionally, the researcher examined teacher activity comprising of hours spent on preparation, delivery, office hours, and assessment of content. The study included approximately 75 core content teachers and 20 unified arts teachers working in four K-8 schools in the same SAU during the same time period (New Hampshire Department of Education, 2020).

#### **Assumptions**

Assumptions reflect certain premises thought to be accurate at the advent of the research (Bloomberg & Volpe, 2015). There are a few assumptions inherent in this study. The first assumption is that the teacher survey data will include honest and accurate responses regarding hours the teachers worked on preparation, instruction, and assessment. A second assumption is that the teacher survey responses were honest and accurate when reporting on student attendance

and teacher working hours. The final assumption is that participants answered the surveys honestly, without incentives or fear of repercussions.

### **Limitations**

There are a few limitations to this study. These include the fact that teacher working hours and student attendance rates are self-reported by the teachers, which can result in a slight margin of error and potential misreporting. The assistant superintendent of the SAU collected the data and provided it to the researcher in aggregate form. Since the data collected for this study are archival, and the researcher was not the primary collector, verification of accuracy, authenticity, or thoroughness of the data collection cannot occur. Another limitation is that data compared two terms in a traditional classroom model and only one term in a remote learning model.

The research study occurred in the school district where the researcher is employed and is a member of the leadership team responsible for navigating the COVID-19 crisis implications and delivery of instruction to students in the SAU. Therefore, the topic is of personal interest to the researcher and has a direct effect on performance and student outcomes. Further, it is crucial for all educators and school leaders to better understand the impact of COVID-19 on teachers and students, how to take corrective or remedial action, and learn critical lessons for potential future crises. The researcher's personal interest represents a potential conflict of interest. However, the dataset is numeric, so there is little risk for bias when analyzing and evaluating the data.

The grading system is consistent in both classroom instruction and remote instruction when analyzing achievement data. However, there could be potential equity issues with students not having the same resources, schedules, and support at home for remote instruction. This

dynamic creates a potential limitation on student achievement data. However, the researcher asserts that due to measures put in place, the potential inequity effect is minimal. Grading standards and expectations across all schools create alignment and consistency through a SAU-wide framework. Additionally, the SAU administration ensured that every student received a computer and internet hotspot if lacking internet access at home. Furthermore, meals were provided for all students, regardless of need, via pickup or delivery for seven days a week during the closure. These measures and precautions were instituted to create equity and provide equitable learning opportunities for all students.

### **Delimitations**

Delimitations clarify the boundaries of the study (Roberts, 2010). The parameters or delimitations instituted for this study include limiting the population to grades K-8. The researcher removed grades nine through 12 and pre-kindergarten, as those grade levels are structured differently from the K-8 grade levels. The pre-kindergarten grade level only offers half-day sessions, and the high school survey does not collect the full student attendance levels by class due to students meeting with multiple teachers.

The teachers included in this study were limited to classroom teachers and removed non-classroom teachers. The approximately 100 non-classroom teachers include guidance counselors, librarians, Title I instructors, board-certified behavior analysts (BCBA), related service providers, specialists, nurses, paraprofessionals, and special education teachers (New Hampshire Department of Education, 2020). Finally, data collection and analysis was limited to student assessment scores, teacher working hours, and student attendance levels. The analysis reported mean and median scores to determine the central tendency when comparing the classroom model

versus the remote model intervention due to crisis. Further calculation of standard deviation, Z-scores, and percentile rank inferred any potential variances and measure of relative standing.

### **Rationale and Significance**

There is a significant gap in research specific to unanticipated closure of schools resulting in a mid-year change in content delivery from in-person classroom instruction to remote online instruction. Minimal research addresses how an abrupt change from classroom to remote instruction affects teacher and student behavior or achievement. A body of literature exists examining teacher and student behavior in the classroom environment (OECD, 2014). This existing research provides a baseline dataset of teacher and student activity levels to compare to data compiled during the COVID-19 pandemic. Many traditional schools provide online instructional tools or a small selection of online courses (Kimmons, 2015). However, the two educational delivery mechanisms (virtual and in-person) are discrete and distinct instructional methods with respective systems, training, and operations tailored to the particular method (2015). Historically, there is no instance of schools forced to abruptly change instructional methods, with limited planning, in a matter of days. The COVID-19 crisis and resulting governmental intervention provide an opportunity to explore the differences in behavior pre-pandemic in the classroom and post-pandemic online. The resulting case study for a specific K-8 school administrative unit may be helpful for further research on the effects of this abrupt, structural change in education and instruction. Further, the data may provide insight into any efficiencies or deficiencies to address or opportunities for integrating remote learning in the future.

## Definition of Terms

This study includes several key terms throughout the report. The below definitions of terms provide elucidation and clarity of usage.

**Core content teacher.** Core content teacher is an academic teacher certified in the grade level (i.e., elementary first through fourth grades) or a specific academic area (i.e., middle school mathematics, science, language arts) (DeVoss, 2020).

**COVID-19.** COVID-19 is the Novel Coronavirus Disease 2019 pandemic affecting countries worldwide from December 2019 to present, resulting in the closure of public schools (Fauci et al., 2020).

**Limited English Proficiency.** Limited English proficiency refers to students who are learning English as a second language and do not have written or verbal proficiency as determined by an English language proficiency assessment (Jung, 2017).

**Free and reduced lunch population.** The free and reduced lunch population are students who qualify for the free and reduced lunch program. This federally funded program provides free or reduced-cost meals to qualified students based on family income requirements (Marklein, Hayes & Webb, 2018).

**In-person instruction.** In-person instruction includes instructional classes that are taught entirely in a school building face to face (Blohm, 2017).

**Online instruction.** Online instruction includes instructional classes that occur entirely online in a remote manner (Grazianno & Bryans-Bongey, 2018).

**School Administrative Unit (SAU).** SAU is an organizational unit – similar to school districts or school systems in other states – comprised of physical school buildings providing

oversight and serving pre-kindergarten to grade 12 (PK-12), in a specific geographic area (State of New Hampshire, 2020).

**School district.** The school district (or school system) is a local structure of government that holds strategic and operational oversight and authority over multiple schools within its jurisdiction (Naicker & Mestry, 2015).

**Student attendance.** Student participation is measured as the number of class hours a student participates weekly (NCES, 2018).

**Student achievement.** Student achievement is measured as the end of term assessment grade students received from teachers, pre and post-COVID-19 (Arnesen, Hveem, Short, West & Barbour, 2019).

**Teacher working hours.** Teacher working hours are the number of hours teachers work weekly to prepare their lesson plans, instruct their classes, and assess students (Startz, 2019).

**Terms one through two.** Terms one through two is defined as the 119 classroom days teachers provided instruction to students face to face in the classroom, before COVID-19 (New Hampshire Department of Education, 2020).

**Term three.** Term three is defined as the 58 remote classroom days teachers provided instruction to students remotely via online instruction, post-COVID-19 (New Hampshire Department of Education, 2020).

**Unified arts teacher.** Unified arts teacher is a teacher certified in physical education, wellness/health, music, or visual arts (School Administrative Unit 21, 2020).

### **Conclusion**

The COVID-19 pandemic forced schools to change from a physical classroom instruction model to a remote instruction model. The purpose of this descriptive case study was to explore



student achievement, teacher working hours, and student attendance levels as a result of this change in the content delivery model. The study examined teacher and student attendance and achievement levels during the 2019-20 school year. Due to the unexpected COVID-19 crisis, the instruction delivered in a physical classroom environment in terms one through two of the school year was compared to term three of the school year in a remote instruction environment. This descriptive case study analyzed these datasets from the pre-pandemic classroom environment versus the pandemic-induced online learning environment in a single SAU.

Chapter two provides an overview of the relevant research that relates to this topic and provides a conceptual framework from which the study will operate. The chapter includes an examination of COVID-19's preliminary effects on human interaction and organizational operations; exploration of previous pandemics or crises with historical impact on public education; review of traditional schools with baseline data on classroom teacher working hours, student attendance levels, and student achievement; and, a review of online schools with baseline data on classroom teacher working hours, student attendance levels, and student achievement. Chapter three presents the purpose and research design of this study, associated research questions, site information, population, data collection and instrumentation, data analysis, potential limitations, credibility, ethical concerns, and an overall summary of the study's methodology. Chapter four details the data collection process and presents the data analysis. The chapter includes information on the population, display tables and graphical representations outlining the data, and provides results. Chapter five summarizes the data outlined in Chapter four. It examines the outcomes, provides interpretations, and offers conclusions. Finally, it concludes with implications and recommendations for future research on the topic of study.

## CHAPTER 2

### LITERATURE REVIEW

The following literature review provides an overview of current scholarly research focused on the topic of an abrupt change from the K-8 classroom instruction model to an online instruction model due to crisis or other events. This review explores existing research on the topic of a change in content delivery and the effect on teacher work habits, student attendance, and student achievement. The primary purpose of this review is to determine if comprehensive research exists that explores the impact of a mid-school year change in content delivery from a physical classroom learning environment to a remote learning environment. The literature review identifies a gap in research specific to an abrupt, unplanned change in the instruction model.

This literature review aggregates the data and explores similar case studies or research on an unplanned, abrupt change in K-8 content delivery. There is limited research specific to this purpose of examining instructional methods changing due to crisis. However, the review looks at the disparate research in an attempt to fill the gap with various components of the study it supports.

The literature review addresses the following five significant components: 1) Conceptual Framework, 2) Traditional Schools; baseline data on classroom teacher working hours, student attendance levels, and student achievement, 3) Online Schools; baseline data on classroom teacher working hours, student attendance levels, and student achievement, 4) Previous pandemics or crises; historical impact on public education and 5) COVID-19; preliminary effects on human interaction and organizational operations. The review examines these peripheral topics and research; however, due to the unique nature of the COVID-19 pandemic, a significant literature gap exists.

## Conceptual Framework

The conceptual framework provides a perspective, theory, or a construct that frames or conceptualizes the study's focus of research – it is a lens through which to view the research problem (Roberts, 2010). Bloomberg and Volpe (2015) describe the conceptual framework as the: “basis for the development of the study and analysis of findings” (p. 12). Another definition suggests that the conceptual framework provides an argument for why the research topic is relevant, why the manner of study is rigorous and appropriate (Ravitch & Riggan, 2017). The three primary components of a conceptual framework include 1) personal interests, 2) topical research, and 3) theoretical frameworks. Personal interest describes the reason why the researcher is conducting the study or work. Why does the researcher care about the topic, or what is the motivation for exploring the focus of study? The topical research refers to the focus of research, the work, or subject the researcher is interested in pursuing. Topical research includes existing empirical research and can be used to frame the researcher's study. Finally, Ravitch and Riggan (2017) define the theoretical framework as: “a structure composed of parts framed together” (p. 11). This conceptual framework integrates the three primary components to align and enhance the exploration of the impact of COVID-19 on content delivery in this descriptive case study. The following section outlines the conceptual framework for the descriptive study and exploration of how a pandemic-induced abrupt change in a SAU K-8 content delivery model from physical classroom instruction to a remote instruction manifests itself in teacher preparation and instructional hours, student attendance, and student assessment.

Elementary and secondary public education is a personal interest, as the researcher is an educator by profession. Further, the effect of the COVID-19 pandemic has a direct impact on the researcher's work as a K-12 school business administrator and part of the leadership team

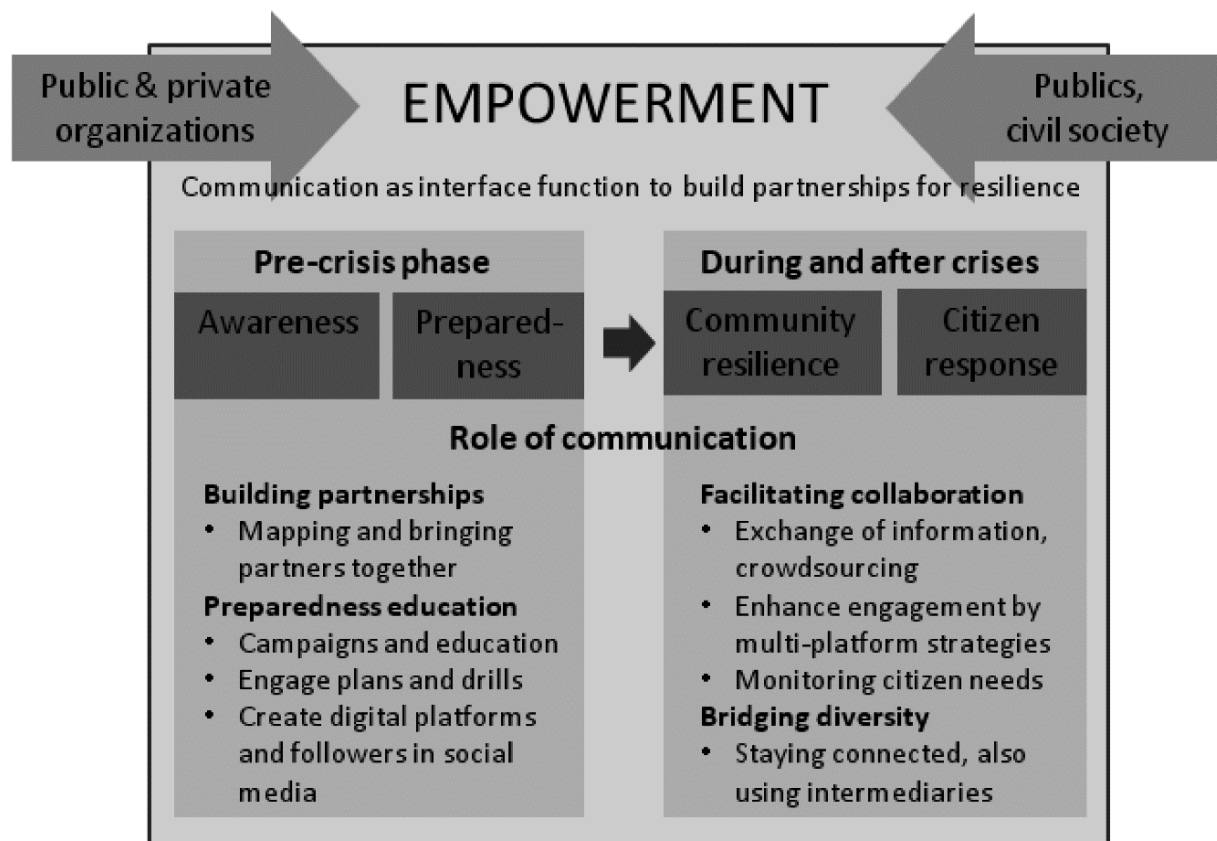
leading a SAU through the COVID-19 pandemic. It is incumbent upon school leaders to better understand how the decisions during in response to the COVID-19 crisis-affected instructional practice and results. It is crucial to better understand the impact on teachers working hours expended on preparation, instruction, and assessment, student attendance levels, and student achievement. An evaluation is helpful for leaders to understand how to better react and plan for future crisis-response.

Due to the nature of the COVID-19 pandemic and the unprecedented closure of public schools, there is a significant gap in research that directly addresses the relationship between COVID-19 and public education. The timing of this study coincides with the very beginning stage of the COVID-19 crisis. It provides the opportunity to explore a unique case study that has otherwise not occurred in human history. Due to the unprecedented nature of the case study, there is no real empirical research specific to the topic available. The literature review aggregates the findings of existing studies and explores similar case studies or research on an unplanned, abrupt change in K-8 content delivery. However, there is no existing body of research that explores schools closing physical classrooms and abruptly providing online instruction due to crisis. The lack of an existing line of inquiry creates difficulty for this study to add upon empirical research. Where there is limited research specific to this purpose, the review looks at the disparate research in an attempt to address the gap with various components of the study. The review includes an examination of traditional schools (Blohm, 2017), online schools (Grazianno & Bryans-Bongey, 2018), COVID-19's preliminary effects on human interaction and organizational operations (Fauci et al., 2020), and exploration of previous pandemics or crises with historical effects on public education (Stuart, 2020).

This study examined these relationships through the lens of the theoretical framework developed by Hyvärinen and Vos (2015), espousing awareness and empowering communication that facilitates community resilience in crisis. The framework suggests that a community approach to communication is necessary for engagement and resiliency in the event of a crisis. Communication during a crisis is a critical component of this study, exploring how COVID-19 affected teacher and student activity levels and resulting assessment. The theory outlines three components for successful communication: 1) empowerment, 2) awareness and preparedness, and 3) individual and collective resiliency. The concept is that the role of communication supports community resiliency by engaging public organizations, private organizations, and public citizens. Communication is an embedded tool for teachers to deliver instruction to students in a remote environment. Teachers were empowered to prepare and deliver content with little supervision. This study explores the impact on the actual teacher hours expended in this environment. Teachers facilitated online learning and empowered students in a crisis that included instructing students with less student accountability. This unique and unanticipated nature of the crisis required resiliency from the teachers and students. The study examines how the online teacher-student collaboration, resiliency, and engagement affected teacher hours, student attendance rates, and assessment scores.

Another component of the theoretical framework is to examine constituents' pre-crisis awareness and preparedness. Engaging stakeholders open lines of communication and develops partnerships for potential crises (Hyvärinen and Vos, 2015). The study explores this dynamic of whether teacher hours preparing in a pre-crisis classroom setting changed with an abrupt change to a crisis online setting. The theory aligns directly with the study's research questions exploring whether teacher hours expended for the preparation and delivery of content. Additionally, the

function of communication is an area of focus crucial to the concept of remote learning. The initial relationship building and communication help facilitate the response during and response post-crisis onset with necessary collaboration, information sharing, monitoring stakeholder needs, and involving, connecting, and sharing experiences and responses. Communication is essential during a time of crisis, to provide for cooperation between disparate groups, stakeholders, and organizations while engaging in community members (2015). A well-defined conceptual framework allows for more critical and acute thinking about the focus of research (Bloomberg & Volpe, 2015). This concept and framework align with the complicated school response to the COVID-19 crisis. Communication is necessary to engage students, teachers, parents, staff, emergency responders, and community members while navigating a crisis. There are many stakeholders involved in public education, so it is vital to understand how the various constituencies communicate during a crisis, and it frames the response to COVID-19, with how teachers' and students' behavior compare (Hyvärinen & Vos, 2015). According to Bloomberg and Volpe (2015), a graphical representation of the conceptual framework is appropriate to depict the relationship between concepts and ideas in the study. Figure 1 conceptualizes the role of communication in empowering stakeholders' pre-crisis, during the crisis, and post-crisis in support of community communication, resiliency, and engagement.



*Figure 1: Communication facilitating community resilience (Hyvärinen & Vos, 2015).*

### Traditional Schools

This case study compared a traditional school's student performance, teachers' working hours, and students' attendance levels during the 2019-20 school year. A traditional school provides student instruction in-person in a brick and mortar building. According to Blohm (2017), traditional schools are typically more established, have a higher rate of certified teachers, and provide more activities due to the face to face nature of the content delivery. It is essential to include this data in historical context with these data in previous years.

The Organization for Economic Cooperation and Development (OECD) (OECD, 2014) publishes an international report every five years entitled the teaching and learning international survey (TALIS). This survey included 34 countries with a minimum of 200 schools, with 20

teachers and one leader from each school participating. The survey found that the average country's teacher spent 38.3 hours per week on work, including the following activities: teaching, preparing/planning, assessing student work, counseling students, and professional teamwork. The United States did not meet the sample threshold; however, the U.S. teacher participants reported 44.8 hours per week of working (OECD, 2014). The Brookings Institution (Startz, 2019) found that when utilizing American Time Use Survey (ATUS) time diary data, the average U.S. teacher works 38.0 hours per week, which is more than the contracted amount, but less than self-reported hours. Brookings (2019) asserts that the ATUS reported hours are more accurate than over-estimated self-reported hours.

According to the National Center for Education Statistics (2018), each state has different requirements for student school days. The requirements are measured either by a minimum number of school days or the number of instructional hours. Both categories vary widely, with the required number of school days between 160 and 185 across the country. States that impose a mandated minimum for instructional hours range from 350 to 1,080 hours (kindergarten and primary grades). The low end of the range is partly due to different states requiring half-day kindergarten or full-day kindergarten. The requirement increases for secondary grades with minimums generally higher (from 712 to 1,260 hours).

Many traditional schools have online systems that can accommodate remote instruction (Kimmons, 2015). Most K-12 schools have online systems that support at least one or more of the following functions: administration, communication, course management, or student learning. Google Classroom (Zhang, 2016) is a ubiquitous online tool in traditional schools across the United States. This platform allows teachers to post information for each of their courses, provide student, administrator, and parental access, and post questions, events, and



announcements. Further, teachers can add assignments and include grading and student progress. There is the capability to include video, handouts, interactive assignments, and the ability to connect via Google Meeting via video or voice chat feature. In addition to Google Classroom and Google Meeting, many schools have deployed one to one device programs to provide each student with a computer (Hart-Davis, 2018). The overwhelming device of choice utilized in K-12 schools is the Chromebook, which was explicitly built to utilize and maximize the Google suite of apps, including Google Classroom and Google Meeting. It is important to note that previous pandemics or crises occurred before the technology integration of schools with robust technology capabilities in the last ten years (Kimmons, 2015).

The U.S. Department of Education (USDOE) published the National Education Technology Plan in 2010 (Rockwell, 2016). Before the 21<sup>st</sup> century, there were not requisite technology capabilities for schools to provide remote instruction due to crisis. Necessary Information Technology (IT) capabilities include school infrastructure, 1x1 computing devices for students and staff, and home internet accessibility. The National Education Technology Plan included a vision where all students had online access all days and times of the week, and students could learn individually, differentiated, and at their own pace. This means the COVID-19 pandemic aligned with an online technology revolution, where many schools had online capabilities to accommodate a continuation of instruction from a face-to-face classroom environment to an online instructional environment.

### **Online Schools**

This case study compared traditional schools forced to provide online instruction to the traditional in-person instruction model. As such, it is essential to examine online schools. Grazianno and Bryans-Bongey (2018) defined online education as when a school provides 80%

or more of its course content online. According to Toppin and Toppin (2016), virtual schools started to take root in the 1990s due to convenience needs and social concerns. Barbour and Harrison (2016) report an estimate of 40,000 – 50,000 students enrolled in distance education courses as of 2001. Further online program growth since that time is reported below.

The origins of online education catered to highly mobile families and rural areas of the country. However, the popularity of virtual schools has grown with increased acceptance, offerings, and internet accessibility (Toppin & Toppin, 2016). Online or virtual schools operate in 24 states within the United States, serving grades K-12; however, it noted that there is some type of K-12 online learning in all 50 states. In the 2015-16 school year, 523,000 students enrolled in virtual schools, and 935,000 students accessed supplemental online courses, with 84% of those enrollments in grades 9 through 12 (9-12) (Graziano & Bryans-Bongey, 2018). Based on another metric, Heissel asserted that over one million K-12 students access at least one virtual class each year and that several states require students to take at least one virtual class each year (2016). An example of this requirement is from the state of Michigan, which was the first state to require an online course for graduation in 2006 (Barbour & Harrison, 2016). When looking at new state requirements and figures on online student enrollment, the data suggest that enrollment numbers continue to trend higher every year in virtual schools across the United States (Gulosino & Miron, 2017). Some experts indicate this enrollment trajectory will continue. Toppin and Toppin (2016) suggested that online schools can surpass traditional school enrollment in the next ten years.

Currently, the body of research on K-12 online learning is narrow, but there is strong evidence that K-12 online education participation is growing at an accelerated rate, and that the scholarship on the topic is also increasing (Arnesen, Hveem, Short, West, & Barbour, 2019).

According to Heissel (2016), there has been very little research conducted to measure the effectiveness of virtual learning. Gulosino and Miron (2017) reiterated the point that empirical research on virtual school performance is in its infancy. Further, Linton (2016) wrote that “while there has been exponential growth in K-12 online learning, there exists a lack of research into best practices for K-12 online teaching” (p. 420). There is a paucity of research on online education, and there is a particularly abrupt change from traditional to online education, providing the opportunity to explore the topic that addresses a gap in research.

Despite the relative lack of research, the existing studies on online education have predominantly found that traditional schools outperform online schools. Gulosino and Miron (2017) conducted a census study on virtual schools in 35 states from the 2014-15 school year and found poor performance scores for school achievement measures in virtual schools. Further, Heissel (2016) found that eighth-grade students performed worse in a virtual classroom compared to similar students in a traditional class. The study found the difference statistically policy-relevant, which means the result was likely not a random occurrence but attributable to a specific cause. Another study conducted by Blohm (2017) explored high school achievement scores in online and traditional schools in Arizona. The study examined the Arizona Instrument to Measure Standards (AIMS) standardized assessment in 16 online schools and 16 similar traditional schools. Blohm found that the traditional schools scored higher by a significant margin in both reading and math for the three years studied. A study on small, rural schools in the Labrador Straits area of Canada focused on student achievement and growth over time in an area that online learning was implemented and utilized (Mulcahy, Barbour & Lahiri, 2016). The research found that the quality of the online distance learning was lacking and that the community felt in-person school scaffolding was necessary for success. There was concern about

student achievement and post-secondary options upon graduation of K-12. Another study compared student assessment and accountability between students in online schools and physical brick and mortar schools in the state of Colorado and the entire United States (Carpenter, Kafer, Reeser & Shafer, 2015). The analysis found that the online students lagged behind brick and mortar school students in both student assessment scores and accountability. The review of the literature regarding online education performance compared to traditional education performance informs this study and provides a baseline and expectation that student performance in a COVID-19 induced remote environment may reflect the performance of existing remote or online schools.

### **Previous Pandemics or Crises: Effect on Education**

Part of this literature review intended to identify historical pandemics or crises that effected public education content delivery. U.S. schools have long been affected by natural disasters or crises (Marhsall, 2018). However, due to the narrow geographical effect, students were typically moved to different traditional schools. In the aftermath of Hurricane Katrina, 300,000 students were displaced, and 160,000 remained displaced even two years after the natural disaster. There is an ongoing threat of natural disasters. According to Marshall (2018), 6,400 schools and over four million students live in areas susceptible to flooding, 39 states are vulnerable to earthquakes, 190 schools in Hawaii and Alaska reside in Tsunami hazard areas, and 1,200 tornadoes occur in the United States on an annual basis (p. 1).

Schools are vulnerable and have historically been affected by social, environmental, and economic crises. Crises are not a new phenomenon affecting human civilization. Thucydides wrote about the famous Athens and Sparta crisis resulting in the Peloponnesian War as early as 431-404 BC. Conflict, war, and crisis have afflicted all countries worldwide throughout history,

affecting education (Zamoum & Gorpe, 2018). The difference is the recent advent of online schooling and the capability of existing traditional schools to provide remote learning opportunities (Kimmons, 2015).

The most recent pandemic to affect the United States similarly to COVID-19 was the Spanish Flu outbreak in 1918 (Stuart, 2020). Other outbreaks include the measles epidemic in 1934 in the United States, the MERS epidemic in 2012 in the Middle East, and the Ebola outbreak in 2015 (Fischer et al., 2020). However, in the case of the 1918 Spanish Flu and other pandemics earlier in history, the technological capability to provide online learning was not available. More recent pandemics or epidemics were geographically narrow, so it was easier to displace students than to change the school model entirely. A few influenza pandemics occurred after the 1918 Spanish Flu pandemic in the years 1957, 1968, and 2009. However, all subsequent influenza pandemics did not approach morbidity or mortality rates associated with the 1918 Spanish Flu pandemic. Further, those three more recent flu pandemics had lower mortality and transmission rates than the current COVID-19 pandemic. Therefore, despite a flu pandemic occurring in 2009 when technology was available for remote learning, the need to isolate or self-quarantine was not present (Belser & Tumpey, 2018).

The United States has historically experienced many natural disasters and economic or social crises (Marshall, 2018). However, due to the nature of those crises, there is not a directly similar case study where schools abruptly transitioned to online remote instruction from a traditional model. The disparity is due to recent technological advancements with a proliferation of personal computing devices and internet access only occurring in the last decade (Kimmons, 2015). Upon schools achieving online capability, no crisis has reached the scale requiring widespread remote learning until the advent of COVID-19. The geographical impact of crises

occurring in the last decade was limited, and the displacement of students to other schools, not affected by the crisis, was possible (Marshall, 2018). Therefore, there is limited research specific to exploring instructional methods changing from a traditional to an online model due to crisis.

### **COVID-19: Preliminary Effect**

Preliminarily, COVID-19 has resulted in significant effects on human interaction and organizational operations. Public health officials recognized the outbreak of the respiratory disease Coronavirus 2019 or COVID-19 in December 2019 (Fauci, Lane & Redfield, 2020). The novel coronavirus is similar structurally to the two previous coronavirus disease emergences within the last 18 years: severe acute respiratory syndrome (SARS) from 2002 to 2003 and the Middle East respiratory syndrome (MERS) from 2012 to present (Fauci et al., 2020).

The original epicenter of the COVID-19 outbreak occurred in the city of Wuhan in the Hubei province of China, with a population of 11 million (Li et al., 2020). The speed of both the geographical spread and the transmission rate caught Chinese officials off-guard and overwhelmed public health services. COVID-19 spread from Wuhan to the entire country within 30 days (Wu & McGoogan, 2020). Wu and McGoogan (2020) noted that the epidemic curves indicate a potential “mixed outbreak pattern, with early cases suggestive of a continuous common source, potentially zoonotic spillover at Huanan Seafood Wholesale Market, and later cases suggestive of a propagated source as the virus began to transmit from person to person” (p. 1). In the United States, the first identified case was in Washington State on January 20, 2020. By March 17, the outbreak quickly spread from a few isolated clusters in Washington, New York, to all 50 states. By April 2, there were over 5,000 deaths in the United States (Omer, Malani, and Del Rio, 2020). According to the World Health Organization (WHO), since those first reported cases in Wuhan, as of May 9, 2020, 219 countries or territories have confirmed

cases, designating the outbreak a pandemic. As of July 6, 2020, there have been 11,500,302 confirmed cases, and 535,759 confirmed deaths reported due to COVID-19. Further, the United States had 2,877,238 confirmed cases, and 129,643 confirmed deaths (World Health Organization, 2020a).

Researchers in China conducted an epidemiologic description of the first 425 cases, which, while providing information and clarity, noted that the study faced limitations due to the ongoing nature of the outbreak and the evolving nature of a pathogen from its earliest stages. Results from these initial cases found a higher mortality rate for patients who were among the elderly or possessed pre-existing conditions. Further, the median age of patients was 59 years old, and 56% of the patients were male. Another critical note from those initial findings was that no positive cases appeared to occur in children under the age of 15 (Li et al., 2020). Fauci et al. (2020) indicated that, although still early in the process, there are currently two studies that are finding a 2% and 1.4% fatality rate in COVID-19 cases. They note that due to the number of asymptomatic and minimal symptom cases likely unreported, the fatality rate may be significantly lower than 1%. The rates compare to fatality rates of 9-10% for SARS and 36% for MERS.

Wu and McGoogan (2020) noted that transmission appears to be most prevalent where there are close contacts between person to person. Preliminarily, research suggests that COVID-19 is highly transmissible via human contact and more transmissible than SARS or MERS (2020). Omer, Malani, and Del Rio (2020) note that with community transmission firmly established, countries experience an exponential growth phase of transmission and new cases. The Centers for Disease Control and Prevention (CDC) report that there is a wide range of potential symptoms that could be mild or severe, including cough, sore throat, shortness of

breath, chills, fever, fatigue, and loss of taste or smell (2020a). The CDC also suggests that symptoms typically occur two through 14 days after exposure, which increases the risk of infecting others. Further, children frequently have more mild symptoms, and some asymptomatic people may have positive infections (2020a). As a result, the CDC has recommended several preventative actions and guidance to slow the spread of the virus, including social distancing, cloth face covers, cleaning and disinfecting, travel restrictions, closures of businesses, and closures of schools (2020a).

### **Initial COVID-19 Effect on Education**

Upon the advent of the COVID-19 outbreak in the United States, all 50 states initially closed physical school buildings until the re-assessment of the crisis in mid- to late March 2020 (Education Week, 2020). All U.S. public schools remained closed for the balance of the 2019-20 school year except for Montana and Wyoming, which allowed schools to reopen in May and June 2020. The widespread closures resulted in all U.S. K-12 public schools to transition to providing online education to replace the traditional in-person model. States implemented remote learning with varying levels of efficacy that have real effects on students with lost learning time for all levels, from early childhood education to the post-secondary level (Rollins, 2020). Over 30 million students qualify for free and reduced lunch via the national school lunch program, with COVID-19 jeopardizing delivery of the meal program as their primary source of nutrition (USDA Food and Nutrition Service, 2016). Additionally, over 2.5 million homeless students have lost not only a safe place to learn, but their primary source of food, laundry, and healthcare supplied by public schools (American Institutes for Research, 2020).

COVID-19 has resulted in some parents' loss of job and parents making the difficult decision between staying home with young children or earning a living with no childcare



available (Rollins, 2020). COVID-19 has precluded the option of utilizing the extended family for childcare (Brooks, 2020). The lack of childcare and support results in disrupting different opportunities to learn when schools operate in a remote education model with vastly different resources and parental involvement to help students navigate a new online learning environment. The disparity in resource opportunities creates significant equity concerns, creates larger learning gaps, and is most devastating to the most vulnerable students. The impact is felt disproportionately on low-income families and students with special needs or disabilities (Rollins, 2020). The former Secretary of Education for Massachusetts, Paul Reville, further explicated this equity concern: “Disadvantaged students suffer the consequences of those gaps more than affluent children, who typically have lots of opportunities to fill in those gaps” (Mineo, 2020, p. 1). COVID-19 effectively exacerbated and intensified inequity for students from low income homes, with fewer resources or a non-traditional family structure, as well as students displaced, medically fragile, or with special needs (Rollins, 2020).

An Education Week Research national survey found that school districts serving a higher proportion of needy students were less likely than affluent districts to provide remote instruction. Overall, 41% of school districts surveyed at the onset of the pandemic indicated they could not provide online learning in any capacity (Sawchuk, 2020). Subsequently, these schools either scrambled to a short-term online solution, provided printed handouts, utilized public access television, or simply did not offer formal instruction the remainder of the year. Furthermore, certain states and school districts were more prepared for a backup (i.e., remote learning) to traditional learning (Mineo, 2020). An example of a state better prepared includes New Hampshire, who has a previously developed *blizzard bag* processes, with an element of online learning due to the many snow days the state’s schools experience on an annual basis. However,

most schools nationally were not prepared for this type of significant scale school closures (2020).

The end of the 2019-20 school year looked very different for school districts than in prior years (Sawchuk, 2020). States waived standardized assessments for the year across the country. The lack of universal testing creates a gap in data and limits the ability of schools to assess the quality of instruction, identify specific needs, and adjust curriculum and resources accordingly. All in-person events and activities were canceled, modified, or moved online. These activities include extracurricular activities, athletics, end-of-year celebrations, proms, and graduations (Sawchuk, 2020).

Another potential impact and risk for students during this time of remote learning from home is an increase in domestic or gender-based abuse when not in school, with a lower rate of reporting on potential abuse (Education Cannot Wait, 2020). These potential domestic risk factors are outside the scope of this case study, however, they are important to acknowledge. Additionally, there are significant potential increased learning gaps for marginalized populations such as students displaced, students with disabilities, or students affected by trauma or mental health issues. These populations are at risk of falling through the cracks and falling helplessly behind peers with more resources or familial support (2020).

The full impact of COVID-19 will materialize over the next few years. However, in addition to the effects mentioned above on learning progress, necessary compensatory services for students with special needs, and the potential social and emotional toll on students, the effect on school funding will have a long-standing impact (Griffith, 2020). According to the U.S. Census Bureau, 47.1% of K-12 school funding comes from the state level, 44.9% comes from the local level, and only 8% comes from the federal level (2020). Although early, preliminary

estimates indicate a decrease in state revenue of between 10% through 20% with more significant drops predicted in 2021-22. To put this in perspective, a 20% drop in school budgets would represent \$57 billion, or the equivalent of 750,000 teachers (Griffith, 2020). School finance experts warn that the impact of COVID-19 on school funding will be unlike any crisis in history, with estimates of the fiscal impact at double that of the Great Recession. Further, there is an estimated \$41 billion in extra COVID-19 expenditures required for items such as technology for additional remote learning, internet access for students, health and safety equipment, personal protective equipment, and supplemented meal service for students, in order to return to school (Joy, 2020). As such, the long-term ramifications of COVID-19 on the U.S. educational system are significant.

### **Conclusion**

The literature review offers an overview of empirical research relevant to the topic of study. There is minimal research or studies on the topic of an abrupt change from the K-8 classroom instruction model to an online instruction model due to crisis or other events. The review offered a conceptual framework for the study while identifying a gap in research specific to an abrupt, unplanned change in the instruction model. Additionally, the review provided relevant research on the topics of traditional schooling, teacher working hours, student attendance (Blohm, 2017), online schools' history and student performance Grazianno & Bryans-Bongey, 2018), COVID-19 preliminary results (Fauci et al., 2020), and previous pandemics and crises (Stuart, 2020). The following chapter will review the methodology of the case study, including the purpose, research design, research questions, site information, population, data collection and instrumentation, data analysis, potential limitations, credibility, and ethical concerns.

## CHAPTER 3

### METHODOLOGY

COVID-19 has resulted in many changes worldwide in the manner humans and organizations interact and operate. One such change is the closure of physical school buildings across the United States. The closures have affected the method in which the U.S. public operates and provides instruction to students. The COVID-19 pandemic has forced American schools to change from a physical classroom instruction model to a remote instruction model. Online schools operate extensively within the United States, and some schools utilize a blended instruction model that combines classroom and online learning. However, there is no precedent of a large population of students transitioning abruptly from a classroom to an online learning model mid-school year. This descriptive case study explored the effect on specific teacher and student behaviors and results due to this dramatic change in content delivery. Detailed in this chapter are the purpose and research design of this proposed study, associated research questions, site information, population, data collection and instrumentation, data analysis, potential limitations, credibility, ethical concerns, and an overall summary of the study's methodology.

#### **Purpose**

The purpose of this descriptive case study was to explore student achievement, teacher preparation and instructional levels, and student attendance levels for grades K-8 at four schools in a single school district. The study examined these datasets at a School Administrative Unit (SAU) comprising three terms during the 2019-20 school year, comparing pre-COVID-19 levels with post-COVID-19 levels. It scrutinized the first two terms (terms one through two) of the school year in a physical classroom environment, compared to term three of the school year in a

remote instruction environment. The study investigated whether there is a variation on three primary datasets: 1) teacher preparation and instructional levels, 2) student attendance levels, and 3) student achievement levels, after an abrupt change in content delivery mechanism due to crisis. The study aimed to juxtapose these datasets in the pre-pandemic classroom environment versus the pandemic-induced remote learning environment in a single SAU. The intent was for the case study to provide a better understanding of this unique response to the crisis and provide some initial findings. Further, the study adds to a limited body of literature on the topic, and potentially allows for further research on how to better prepare and respond to an abrupt change in the instructional model due to crisis.

### **Research Questions, Hypothesis, and Design of Study**

The overarching research question for this case study allowed the researcher to explore how the advent of abruptly moving to a fully online learning environment manifests itself in teacher preparation and instructional hours, student attendance, and student assessment:

RQ1: How does an unexpected mid-year change from the physical classroom to a remote classroom learning environment affect student achievement?

HO1: There is no difference in achievement for students in a physical classroom or a remote classroom.

HA1: Student achievement decreased for students after transitioning to a remote classroom from a physical classroom.

The following research sub-questions further guided this descriptive case study:

Q1: How do student assessment scores compare between terms one-two and term three, after transitioning from a classroom model to a remote learning model?

Q2: How do teacher working hours compare between terms one-two and term three, after transitioning from a classroom model to a remote learning model?

Q3: How do student attendance levels compare between terms one-two and term three, after transitioning from a classroom model to a remote learning model?

A descriptive case study describes an intervention or phenomenon in the real-life context that it occurs (Yin, 2003). This descriptive study explored a particular intervention, the COVID-19 crisis forcing remote instruction, within an organization – for a specific SAU. Utilizing a case study method is most appropriate to better understand this real-life remote learning experience in the context of the COVID-19 crisis (Yin, 2014). Further, a case study approach is suitable to answer *how* and *why* questions. The researcher cannot modify the behavior of the study participants, there is a desire to explore contextual conditions thought to be of importance, or there are no clear boundaries in the particular set of parameters and context (Yin, 2003). Creswell (2014) explained that case studies investigate a real-life, contemporary bounded system or systems, with multi-sourced data collection methods, while reporting back on the case study's themes or description.

Further, the case study can be a single-site or multi-site case study (2014). This single-site descriptive case study design, guided by stated research questions, compared and examined data collected at a single SAU. The study explored students' achievement, teachers' working hours, and students' attendance levels compared between the pre-pandemic classroom instructional environment and an unexpected remote learning environment, spanning a single school year.

### Site Information

The setting of this study was in one SAU in New Hampshire. According to the State of New Hampshire's Revised Statutes Annotated (RSA), a SAU is an organizational unit similar to school districts or school systems in other states (State of New Hampshire, 2020). Further, a school district (or school system) is a local structure of government that holds strategic and operational oversight and authority over multiple schools within its jurisdiction (Naicker & Mestry, 2015). Traditionally, school districts are comprised of school buildings serving pre-kindergarten to grade 12 (PK-12), in a specific geographic area. Bantwini and Moorosi (2018) assert that the primary role of a school district is to collaborate and provide the necessary professional support and guidance to school principals to succeed. The study looked at the K-8 schools represented in the same school administrative unit with shared central administrative services. The following is the brief, summarized demographics of the four schools within the single SAU, according to the New Hampshire Department of Education (2020):

- School one: approximately 700 students, suburban setting, 85% White/Caucasian, 5% limited English proficiency, and 50% free and reduced lunch student population,
- School two: approximately 350 students, rural setting, 90% White/Caucasian, 0% limited English proficiency, and 10% free and reduced lunch student population;
- School three: approximately 200 students, suburban setting, 95% White/Caucasian, 0% limited English proficiency, and 5% free and reduced lunch student population;
- School four: approximately 100 students, rural setting, 95% White/Caucasian, 0% limited English proficiency, and 5% free and reduced lunch student population.

The SAU administration unexpectedly implemented remote instruction, effective March 18, 2020, due to the COVID-19 crisis. The SAU consists of physical traditional classroom school

buildings with no remote or blended learning available before the COVID-19 crisis. An existing one to one computer initiative was already in place for all students, providing a school-owned personal computing device for them to utilize at home during the crisis. Effective March 18, 2020, the SAU ensured that all students were provided a computer, internet access hotspot if the family did not have internet access, and allowed for all students the option for pickup or delivery (by opt-in choice) of breakfasts and lunches seven days a week. This study examined the SAU's student achievement, teacher working hours, and student attendance from 2019-20 pre-school closure compared to remote learning from March 18, 2020, through June 4, 2020.

### **Population**

The case study data are archival; however, the total site population included 1,370 students who attended the SAU's K-8 schools to measure student achievement scores and attendance levels. Additionally, the researcher examined teacher activity comprising of hours spent on preparation, delivery, office hours, and assessment of content. Approximately 75 core content teachers and 20 unified arts teachers were in the study (New Hampshire Department of Education, 2020). The utility of archival data precludes the need for human subjects or a sample.

### **Data Collection and Instrumentation**

This study utilized archival data obtained from one New Hampshire school administrative unit in the 2019-20 school year. The researcher formally requested the data for this study via written inquiry to the SAU's office of the superintendent. The superintendent of schools provided permission for use of the data, and the assistant superintendent of curriculum and instruction provided access. According to Creswell (2015), there are three instrument options to collect data: 1) develop your own, 2) modify an existing one, or 3) use an existing instrument entirely. The dataset was collected by the SAU's assistant superintendent as part of routine data



collection standards for internal review and management decision-making activity and used a SAU-developed instrument.

The researcher obtained student achievement data with permission from the SAU. The retrieval and collection of student grade-level data are via the PowerSchool student information system (SIS). The collected data included 2019-20 school year (terms one through two) report card grade data resulting from the classroom model, and 2019-20 school year (term three) report card grade data resulting from the remote instruction model. The disparate similar data allowed for comparison on student assessment scores in the classroom setting and the online setting in the same grade levels, during the same school year.

The teacher data were collected via a survey on Google Forms and was a professional expectation for every teacher, non-classroom teacher, and unified arts teacher to complete as part of their regular job responsibilities, from the date range of March 18, 2020, to June 4, 2020. The survey set a baseline for a pre-COVID-19 teacher working hours (terms one through two) by requesting the teachers to think back to when they were in the classroom face to face. It asked the teachers to estimate to the nearest hour the total amount of time spent a week on course preparation, delivery, office hours, and assessment of content for a typical five-day workweek. It specified for the teacher to include time spent both in the classroom and at home on work activities.

Further, the survey collected teacher activity data every week during the COVID-19 precipitated online learning environment. The survey measured term three teacher working hours by asking for the teachers to log the number of hours spent on preparation, delivery, office hours, and assessment of content for each week of remote learning. Teacher participation in the survey was voluntary; however, the expectation is that participation levels were high due to the collegial

nature of the exercise and its purpose for improvement, not evaluation. The researcher obtained teacher attendance and instruction hours from terms one through two and term three from the SAU's Frontline absence management software that collects teacher days and hours worked, with permission from the SAU.

The student attendance data were collected for terms one through two from the PowerSchool student information system to determine attendance rates pre-COVID-19 in the classroom. The SAU utilizes PowerSchool to track students' attendance in the traditional school environment. The remote learning model post-COVID-19 resulted in an alternative attendance collection mechanism at the SAU. In the online setting, teachers collected student attendance data and reported results in the Google Forms survey. Teachers logged student attendance levels on the weekly survey during the remote classroom environment. The survey asked teachers to report that a student participated in any manner during the week's instruction. The researcher collected and utilized the Google Forms teacher survey records to examine the term three student attendance data.

The intent was to aggregate the data, not to identify specific students or individual teachers. The provided data contained no identification attributable to a particular student, teacher, or school. However, there is a population of approximately 20 Unified Arts teachers, which narrows the selected personnel for potential identification. As is the case with all public-school data not protected by the Family Educational Rights and Privacy Act (FERPA), Health Insurance Portability and Accountability Act (HIPAA), or other protected regulations, this information is considered public record.

The three datasets obtained originated from the Google Forms survey, Frontline absence management system, and PowerSchool student information system, and were exported into

Excel. Excel was employed to compare Means in this descriptive study. Upon collection of data, descriptive statistics measured the variability of scores through the use of standard deviation to indicate the spread of scores, Z-scores to compare the population means, and percentile ranking to measure the relative standing of the scores within the dataset (Creswell, 2015).

### **Data Analysis**

Upon receipt of the data in an emailed Excel spreadsheet from the SAU office, the intent was to analyze and verify completeness of the three (3) datasets and potential input errors. An underlying assumption was that the data were complete for student assessment scores, as the collection and reporting of this data are mandatory. The teacher working hours and student attendance levels in term three are self-reported and voluntary. Therefore, there was an expectation that a small percentage of teachers neglected to participate in the Google Forms survey. The non-participation resulted in a percentage of teacher working hours and student attendance levels missing for term three from the dataset. According to de Smith (2015), it is appropriate to disregard incomplete data if the missing records represent less than 5% of the total dataset, with the preconditions that the large dataset follows the Law of Large Numbers and the missing data are random (p. 27).

Case studies are unique to other research design approaches in that researchers can collect and utilize survey data to best understand the particular intervention or phenomenon that is the focus of the study. Data from these multiple sources converge as a piece of the overall puzzle in the analysis process (Patton, 1990; Yin, 2003). There were three data sources utilized: 1) Google Forms, 2) PowerSchool, and 3) Frontline to analyze student achievement, teacher working hours, and student attendance data. For student assessment, mean and median scores were calculated in terms one through two while receiving classroom instruction, compared to the

mean and median scores in term three while working remotely. Further, the calculation of mean and median hours worked for teachers in terms one-two was compared to the mean and median hours worked in term three.

Additionally, calculation of the mean and median student attendance level in terms one-two compared the mean and median student attendance level in term three. Mean scores represent the average score, and median scores represent the middle set of scores within a distribution of scores. These scores summarize and measure the central tendency that represents single values within the distribution. This summary provides a simple, straightforward comparison of means and medians in terms one through two and term three (Vogt & Johnson, 2011).

The researcher calculated and reported on the standard deviations as an indicator of the spread of scores or variance. The standard deviation indicates the measure of variability within the distribution scores. This calculation allowed the researcher to determine how significant a difference or spread there is between scores, and whether it is a normal distribution of scores (Creswell, 2015). The resulting calculation enabled the researcher to determine how similar or aligned teacher working hours, student attendance, and assessment scores were in the traditional in-school environment. It then showed whether this spread or deviation changed in term three in a remote environment. Finally, the researcher examined the measurement of the relative standing of the group of scores by calculating the Z-scores and percentile ranking. The Z-scores allowed the researcher to infer if the teacher working hours, student attendance, or student achievement mean scores differ in terms one through two compared to term three; however, they do not establish any type of relationship or cause (Adams & Lawrence, 2015). The scores allowed the researcher to describe scores from terms one through two compared to term three, as well as any

relationship between scores for teacher working hours scores and student attendance scores with student assessment scores.

Similarly, calculation of percentile ranking determined the percentage of teachers who worked a certain number of hours, as well as student attendance levels and assessment scores. The ranking scores allowed the researcher to see the percentage or percentile change between terms one-two and term three (Creswell, 2015). All data analyses used Excel to conduct calculations and create tables.

### **Potential Limitations / Delimitations**

There were minimal limitations included in this study. The SAU employs the researcher examined in the case study in a senior-level leadership capacity part of the team responsible for providing proper instruction to students through COVID-19. This represents a potential conflict of interest. However, there is a negligible risk for bias due to the numeric dataset utilized. The data are archival, so the researcher was not the primary data collector and cannot verify the accuracy or authenticity of the dataset.

Further, the term three teacher working hours and student attendance levels were self-reported by the teachers. Therefore, there is a potential for mistakes that could result in a slight margin of error. Another potential limitation is the comparison of two school terms in the classroom model versus one school term in the remote model. Therefore, the dataset of the classroom model was two times the size of the remote model.

Finally, a potential limitation is increased equity concerns for students with lesser resources, family support, challenges due to displacement, special needs, or other vulnerabilities. The potential inequity creates a possible limitation on the veracity of the student achievement data. However, the SAU took measures to mitigate equity issues. Proactive actions included

teacher training to assess students in an equitable and non-punitive manner, standardized norms and expectations across the SAU, and a framework for consistency accounting for equity.

Further, the SAU provided every student a computer, internet hotspot if access was not available at home, and delivery and pickup of breakfast and lunch for all students seven days a week. The SAU surveyed families to determine internet needs, with a resulting 20 of the 1,370 K-8 students requesting and provided internet hotspots. However, upon completion of the school year, 14 of the 20 hotspots were not utilized, with 0.0 GB of data usage. Additionally, the free and reduced lunch student population is 23%; however, only 13% of students took advantage of the free meals (New Hampshire Department of Education, 2020). The undertaking of the measures was done to minimize equity concerns, and the researcher asserts that these actions have minimized the potential equity limitation for student achievement levels in this case study.

### **Delimitations**

The delimitations for this study included the limitation of the population to grades K-8 at four sites within a single SAU. The researcher eliminated pre-kindergarten and the high school (grades 9-12) levels due to the different academic scheduling structure of those grade levels. The survey data for the high school level did not reflect full student attendance levels by class due to the number and variety of teachers and classes each student takes. Further, the pre-kindergarten level encompasses a half-day school day.

The teachers involved in this study were limited to core classroom teachers and unified arts teachers, eliminating the non-classroom teachers also surveyed during this process. The core classroom teachers involved include grade-level teachers and subject area teachers. The unified arts teachers include physical education, health, arts, and music (New Hampshire Department of

Education, 2020). Finally, the data collection and analysis process were delimited to comprise only student assessment scores, teacher working hours, and student attendance levels.

### **Validation / Credibility**

Case study research typically includes multiple data sources, which is also a way to enhance data credibility (Patton, 1990). The study utilized archival data from a survey conducted by the SAU office of the superintendent. The survey has face validity, which is the extent to which the survey appears to the participants (teachers) that the intent of the collected data aligns with the stated purpose of the survey (Hermans, Spruytte, Cohen, Van Audenhove & Declercq, 2016).

The survey was developed with the sole intent to quantify hours and participation levels of the SAU's students and teachers during the remote learning environment. The utility of validity will verify the veracity and accuracy of any findings from the viewpoint of the three constituents: 1) the reader, 2) the participant, and 3) the researcher. Specific strategies will verify and corroborate any findings and utility of resources embedded in this case study (Creswell, 2015).

The survey questions are objective, and the instruction clearly states that the results are not for evaluative purposes. The stated intent of the survey means that the teacher evaluation process would not include any survey data. A memorandum of agreement (MOA) between the SAU and the teacher's union formalized this understanding as an addendum to the legally binding collective bargaining agreement (CBA). Potential researcher bias is possible but minimized due to the nature of archival data obtained from the office of the superintendent. Finally, since the dataset is from a single SAU, during an unprecedented pandemic, the results may not be generalizable to other K-8 schools or other regular operations in public education.

### **Ethical Concerns**

Since the data for this study are archival and obtained from the office of the superintendent, there was no direct contact with students or teachers in this study. The records used for this study are archival data and in the public domain, so no harm can be caused to any students or teachers from the use of this dataset, since all data were anonymous, with no personal information included, and displayed in aggregate form.

In addition, a common criticism of the abrupt transition to online instruction for the last three months of the 2020 school year stemmed from equity and quality of instruction concerns. There could be macro-level negative sentiment toward the teachers and administration on a generalized basis, should the data indicate lackluster effort or performance of teachers or students. The study could potentially expose a generalized deficiency in the quality of effort and content by the SAU's teaching faculty. The researcher ascertained SAU permission and received Institutional Review Board (IRB) approval from the University of New England before accessing the data. There are minimal ethical concerns relative to this study.

### **Summary**

The COVID-19 pandemic forced schools to change from a physical classroom instruction model to a remote instruction model. The purpose of this descriptive case study was to explore student achievement, teacher working hours, and student attendance levels as established in terms one and two of the school year in a physical classroom environment, compared to student achievement in term three of the 2019-20 school year in a remote instruction environment due to the unexpected COVID-19 crisis. This descriptive case study intended to compare and analyze these datasets in the pre-pandemic classroom environment versus the pandemic-induced remote learning environment in a single SAU. Upon collecting the archival data, the researcher



compared the mean scores for student achievement, teacher working hours, and student attendance levels, and reported any variance utilizing standard deviation and Z-score results comparing classroom instruction model and remote instruction model. This analysis helped to describe and compare the effects of an unprecedented pandemic and resulting content delivery paradigm shift on student achievement. The next chapter presents the data collection process, details the data analysis, includes information on the population, summarizes data with tables and graphs, and provides results.

## CHAPTER 4

### DATA ANALYSIS AND RESULTS

The COVID-19 pandemic resulted in the closure of physical school buildings for K-12 grade levels in the United States. The closures changed the manner in which U.S. public schools operate and provide instruction to students. The COVID-19 pandemic forced American schools to adjust the instructional model from a traditional physical classroom experience to a remote archetype (Centers for Disease Controls and Prevention, 2020b). As stated in Chapter 1, the purpose of the descriptive study reported here was to examine student achievement, teacher preparation and instructional levels, and student attendance levels for grades K-8 at four schools in a single school district. The study explored these three datasets comparing the first two terms (pre-COVID-19) in a physical classroom model with the third term (post-COVID-19) in a remote classroom model.

The study compared these data sets' variances in the pre-pandemic classroom environment versus the pandemic-induced remote learning environment in a single School Administrative Unit (SAU), as discussed here. A summary of the findings will conclude the chapter, which also provides an overall narrative of the three datasets.

#### **Analysis Method**

The total site population consists of 1,370 students, 75 core content teachers, and 20 unified arts teachers in four K-8 schools within a single SAU (New Hampshire Department of Education, 2020). The study utilized archival data obtained from one New Hampshire SAU in the 2019-20 school year. The data collection intended to measure and compare student achievement scores and attendance levels. Further, it examined teacher activity comprising hours spent on preparation, delivery, office hours, and content assessment.

The researcher obtained permission via a written request through the SAU's office of the superintendent to use the data. Student assessment and attendance data were recorded in the SAU's PowerSchool student information system (SIS). Teacher data were collected via a survey on Google Forms administered by the assistant superintendent and through the Frontline Absence Management software. The datasets were exported into Excel for findings and analysis. The datasets included the following data points: 28,322 final (end of term) student competency grades based on achievement of curriculum standards, 10,297 final (end of term) student course grades with traditional grading, 2,757 weekly teacher hour logs, and 14,791 student absences. The findings aggregate these datasets by calculating median, mean, stand deviation, z score, and percentile ranking.

### **Presentation of Results**

The results of the data analyses are presented in four sections: 1) student achievement; measuring student competency grades, 2) student assessment; measuring student traditional grades, 3) teacher measuring teacher hours worked, and 4) Student attendance; measuring student attendance levels at school. The data for each section detail the findings and reports the following calculations: mean, median, z Score, percentile rank, mode, standard deviation, and range. Finally, a normal probability curve is presented to visually display the data for each of the sections.

#### **Student Achievement**

During the 2019-20 school year, the mean student final (end of term) student competency grades indicating student achievement of curriculum standards were 3.01. The median end of term competency grade was 3. The 50.0 percentile rank was a competency grade of 3, with a z Score of -0.01. The standard deviation for scores was 0.54. Additionally, the mode was a

competency grade of 3 and the range was between a minimum of 1 and a maximum of 4.

Detailed results are presented in Table 1.

Table 1

*2019-20 Student Competencies Achieved at the End of the Term: Summary*

Term-End Competency	z Score	Percentile Rank
1	-3.69	<1.0
2	-1.85	10
3	-0.01	50
4	1.83	90

Mode = 3

Median = 3

Mean = 3.01

Standard Deviation = 0.54

Range: minimum = 1; maximum = 4

The results compare the median student end of term competency grades in terms one through two versus term three. The median for students in terms one through two was a competency grade of 3. This compares with a term three median competency grade of 3.

The results compare the mean student end of term competency grades in terms one through two versus term three. The mean for students in terms one through two was a competency grade of 2.99. This compares with a term three competency grade mean of a 3.10.

### **Student Assessment Levels**

During the 2019-20 school year, the mean student end of term final assessment grade was 86.61, and the median end of term final assessment grade was 89. The 50.0 percentile rank was a final grade of 89 with a z Score of 0.21. The standard deviation for scores was 11.38.

Additionally, the mode was a final assessment grade of 100, and the range was between a minimum of 0 assessment grade and a maximum of 128 assessment grade. Detailed results are

presented in Table 2. Further, the distribution of scores (final assessment grades) are displayed in a normal probability curve in Figure 2.

Table 2

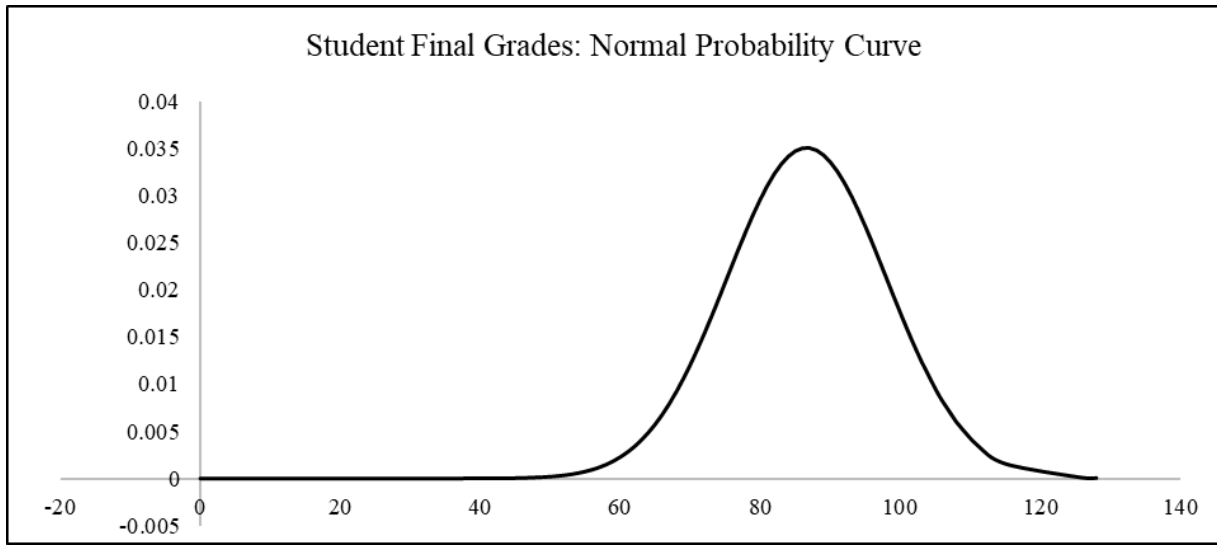
*2019-20 Student Final Grades at the end of the term: Summary*

Final grade (end-of-term)	z Score	Percentile Rank
72	-1.28	10
79	-0.67	20
83	-0.32	30
86	-0.05	40
89	0.21	50
91	0.39	60
93	0.56	70
96	0.83	80
99	1.09	90

Mode = 100  
Median = 89  
Mean = 86.61  
Standard Deviation = 11.38  
Range: minimum = 0; maximum = 128

Figure 2

*2019-20 Student Final Grades at the End of the Term: Normal Probability Curve*



The results compare the median student end of term final assessment grades in terms one through two versus term three. The median for students in terms one through two was an assessment grade of 88. This compares with a term three assessment grade median of a 94.

The results compare the mean student end of term final assessment grades in terms one through two versus term three. The mean for students in terms one through two was an assessment grade of 85.45. This compares with a term three assessment grade mean of a 90.32.

### **Teacher Preparation and Instructional Levels**

The data indicate that, during the 2019-20 school year, teachers worked a mean of 38.68 hours per week and a median of 40 hours per week. The 50.0 percentile rank was 40 hours per week with a z Score of 0.13. The standard deviation for scores was 10.17. Additionally, the mode was 40 hours per week and the range was between a minimum of 5 hours per week and a maximum of 80 hours per week. Detailed results are presented in Table 3. Further, the distribution of scores (teacher hours worked per week) are displayed in a normal probability curve in Figure 3.

Table 3

#### *2019-20 Teacher Weekly Hours Worked: Summary*

Hours Worked	z Score	Percentile Rank
25	-1.35	10
30	-0.85	20
35	-0.36	30
37	-0.17	40
40	0.13	50
40	0.13	60
45	0.62	70
48	0.92	80
50	1.11	90

Mode = 40

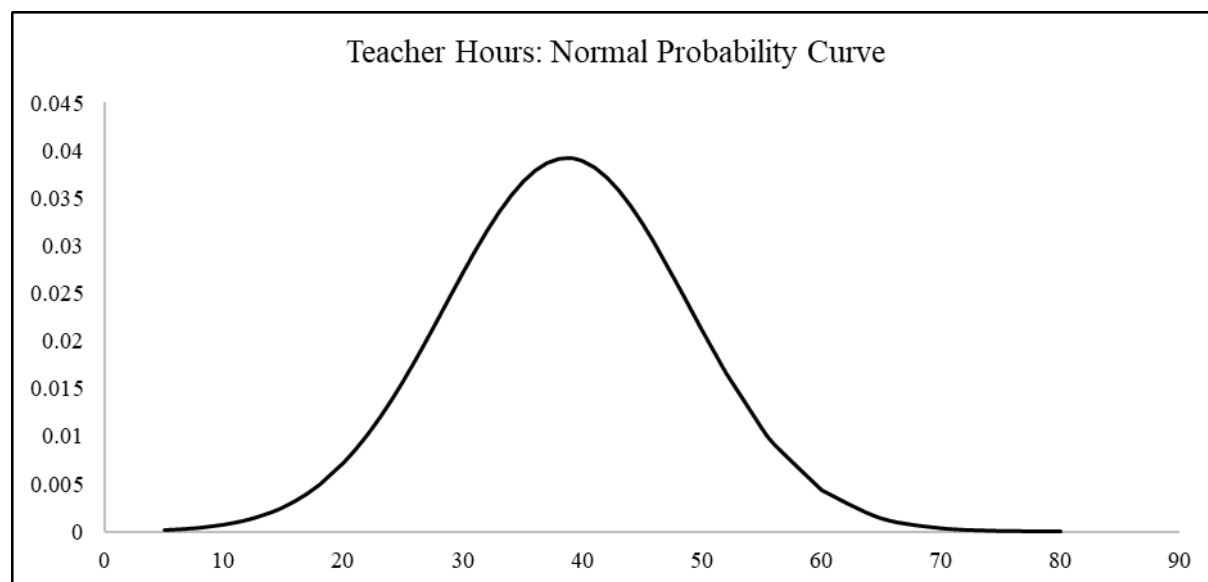
Median = 40

Mean = 38.68

Standard Deviation = 10.17

Range: minimum = 5; maximum = 80

Figure 3

*2019-20 Teacher Weekly Hours Worked: Normal Probability Curve*

The following results compare the median number of weekly hours teachers worked in terms one through two versus the weekly hours worked in term three. The median for all teachers in terms one through two was 40 hours per week. This compares with a median of 31 hours per week in term three. The detailed results are presented in Table 4.

Table 4

*2019-20 Teacher Weekly Hours Worked: Median*

	Terms 1-2	Term 3
Core Content Teachers	40	33
Unified Arts Teachers	40	30
All Teachers (Combined)	40	31

The following results compare the mean number of weekly hours teachers worked in terms one through two versus the weekly hours worked in term three. The mean for all teachers in terms one through two was 41.54 hours per week. This compares with a mean of 32.96 hours per week in term three. The detailed results are presented in Table 5.

Table 5

*2019-20 Teacher Weekly Hours Worked: Mean*

	Terms 1-2	Term 3
Core Content Teachers	42.02	33.92
Unified Arts Teachers	39.56	28.89
All Teachers (Combined)	41.54	32.96

**Student Attendance Levels**

During the 2019-20 school year, the number of students absent from school per week was a mean of 0.30 absences per student a week and a median of 0.30 absences per student per week. The 50.0 percentile rank was 0.29 absences per week with a z Score of -0.18. The standard deviation for scores was 0.07. Detailed results are presented in Table 6. Further, the distribution of scores (student absences per week) are displayed in a normal probability curve in Figure 4.

Table 6

*2019-20 Student Weekly Absences: Summary*

Student Absences (Weekly)	z Score	Percentile Rank
0.21	-1.34	10
0.23	-0.99	20
0.25	-0.72	30
0.27	-0.47	40
0.29	-0.18	50
0.31	0.12	60
0.33	0.39	70
0.36	0.8	80
0.39	1.34	90

Median = 0.30

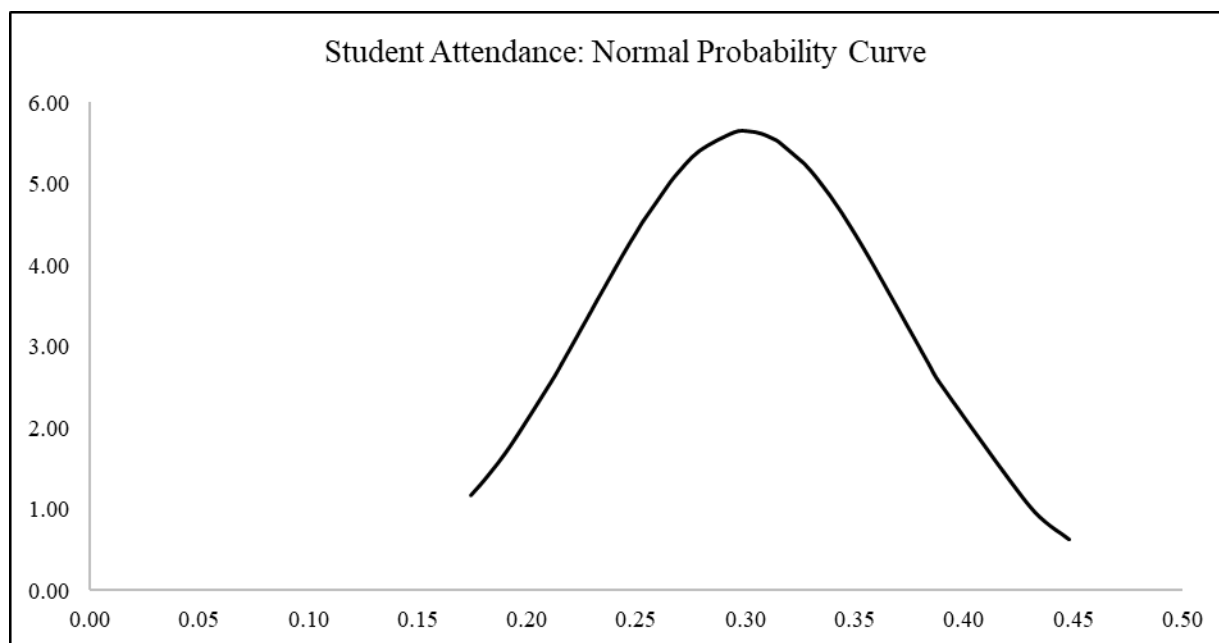
Mean = 0.30

Standard Deviation = 0.07



Figure 4

*2019-20 Student Weekly Absences: Normal Probability Curve*



The results compare the median number of weekly student absences in terms one through two versus the weekly student absences in term three. The median for student absences in terms one through two was 0.26 days per week. This compares with a median of 0.34 days per week in term three. The mean for student absences in terms one through two was 0.27 days per week. This compares with a mean of 0.35 days per week in term three.

### **Summary**

The study examined student achievement levels, student assessment scores, teacher hours worked, and student attendance levels in the physical classroom (pre-COVID-19) compared to a remote online classroom (post-COVID-19). The data were obtained from a school administrative unit in New Hampshire from the 2019-20 school year. The data consisted of records of all students' end of term competency grades, end of term final assessment grades, the number of teacher hours worked per week and the number of student absences per week. The analyses were

performed on records from 1,370 students, 75 core content classroom teachers, and 20 unified arts teachers. The data consisted of 28,322 final student competency grades based on achievement of curriculum standards, 10,297 final student course traditional grades, 2,757 weekly teacher working hour logs, and 14,791 records of student absences. Chapter 5 will provide an interpretation of the findings.

## CHAPTER 5

### DISCUSSION AND CONCLUSION

The objective of chapter 5 is to summarize and discuss the results of this study. The following section provides an overall summary of the research and delves into an interpretation of the results and what the findings mean. In addition to the interpretation of the data, a discussion on how the literature relates to the findings are addressed and recommendations for future research on the topic. Chapter 5 is organized as follows: summary of the study, discussion of the results, discussion of the results in relation to the literature, recommendations for future research, and the conclusion.

#### **Summary of the Results**

The unprecedented outbreak of the COVID-19 in March of 2020 changed the manner in which humans interact and organizations operate globally. A significant ramification of the behavioral and operational shift was the closing of physical K-12 school buildings across the United States. The closures radically transformed how U.S. public schools operate and provide instruction to students during this forced quarantine. The COVID-19 pandemic forced American schools to adjust from an in-person classroom instruction model to an online instruction model (Centers for Disease Control and Prevention, 2020b). The purpose of this descriptive case study was to explore student achievement, teacher preparation and instructional levels, and student attendance levels for grades K-8 at four schools in a single school district. The School Administrative Unit (SAU) consisted of four schools that abruptly changed from a physical classroom environment into a remote instruction environment due to COVID-19. The study examined the first two terms of the school year in a physical classroom environment, compared to term three of the school year in a remote instruction environment.

Guided by the literature review process and the theoretical framework developed by Hyvärinen and Vos (2015) espousing the utility of communication to facilitate community resilience, the following primary research question, hypothesis, and sub-questions were developed:

RQ1: How does an unexpected mid-year change from the physical classroom to a remote classroom learning environment affect student achievement?

HO1: There is no difference in achievement for students in a physical classroom or a remote classroom.

HA1: Student achievement decreased for students after transitioning to a remote classroom from a physical classroom.

Q1: How do student assessment scores compare between terms one-two and term three, after transitioning from a classroom model to a remote learning model?

Q2: How do teacher working hours compare between terms one-two and term three, after transitioning from a classroom model to a remote learning model?

Q3: How do student attendance levels compare between terms one-two and term three, after transitioning from a classroom model to a remote learning model?

To address these research questions and hypothesis, archival data were requested and obtained from the office of the superintendent at an SAU in New Hampshire for the 2019-20 school year. The datasets included student competency achievement grades, student traditional grades, teacher hours worked on preparation, instruction, and assessment, and student attendance levels. The findings compared the data between terms one through two (pre-pandemic) in an in-person instruction model and data from term three (post-pandemic) in an online instruction model.

### **Interpretation of Findings**

The timing of this study aligns with the beginning stage of the COVID-19 crisis and a previously unexplored experience of nationwide closure of public schools. Due to the unique phenomenon, previously unexperienced in modern school history, there is effectively no research available that is specific to the line of inquiry explored in this research study. The dearth of existing literature does not allow the ability for this study to add to empirical research. However, the pandemic provided a unique opportunity to examine a previously unexplored research topic. The researcher hopes further research can expound upon interpretation of the data, findings, and conclusions of this study.

This study examined the relationship between the pre-pandemic in-person learning model and the post-pandemic remote learning model through the lens of the theoretical framework developed by Hyvärinen and Vos (2015). The theory promotes the importance of empowering communication that facilitates community resilience in crisis. It also suggests that a community approach to communication is essential for engagement and resilience when faced with crisis.

The function of communication is of critical importance to successful remote learning. Communication was an embedded tool for teachers to deliver instruction to students in a remote environment. Teachers were empowered to prepare and deliver content with little supervision. An analysis of the data found that, despite being provided the tools and necessary technology for communication and a platform for teaching students, teachers spent fewer hours working on the online platform as opposed to the in-person model. Further, students were provided the ability to communicate and empowered to pursue their education. However, the data showed that students also participated less and were absent more during the on-line remote model, despite being provided personal computer devices, internet hotspots, food delivery, and scheduled online class

times. Another component of the theoretical framework is to empower constituents' pre-crisis through awareness and preparedness and engaging stakeholders with open lines of communication to prepare for potential crises (Hyvärinen and Vos, 2015). This theory suggests that other qualitative factors exist that could explain why this occurred. Additional qualitative research could explore if there were a breakdown in communication, pre-crisis planning, or a lack of empowerment or accountability that resulted in these findings.

### **Research Question 1 Results**

Research question one examined student achievement as measured by final end of term student competency grades in terms one through two compared to term three. Comparing medians, students scored a 3 in terms one through two and term three. Comparing means, students scored 2.99 in terms one through two and in term three, students scored 3.10, 0.11 points higher than in terms one through two. The results suggest no discernible impact to student achievement after changing from an in-person model to an online model. However, the researcher surmises that there are mitigating qualitative factors affecting the results that are not obviously visible in the quantitative data view. Previous studies have found that physical in-person schools outperform online schools. Studies from Blohm (2017), Heissel (2016), Gulosino and Miron (2017), Mulcahy, Barbour and Lahiri (2016), and Carpenter, Kafer, Reeser and Shafer (2015) all found student performance in traditional, in-person schools to exceed that of students in online schools. The existing research attributes higher student achievement in traditional schools compared to online schools with measurable results. Further, Heissel (2016) found the difference statistically policy-relevant, which means the result was not a random occurrence by attributable to cause.

As discussed in the limitations section, the SAU set grading standards and expectations for term three that mandated equitable and non-punitive grading and assessment. While this was helpful for maintaining equity for students who may not have the same access to internet and other resources at the same level in an online environment, the researcher surmises that it had an impact on teacher grading behavior. Linton (2016) wrote that, despite significant growth in online learning, there is a dearth of research addressing best practices for K-12 online teaching. This means that there is little defined best practice for schools and teachers to optimize learning in a defined online-only school that has the ability to develop a plan for execution.

In the case of a crisis-forced online learning environment with no precedent, the effects of school and teaching decisions on equity, grading and instruction are undetermined. All parties involved were actively experiencing a traumatic crisis in term three. Due to the high infection and mortality rates, ease of transmission through the air, symptoms occurring between 2-14 days after exposure, and the prevalence of asymptomatic carriers, COVID-19 changed the way humans behaved and interacted in the community, including school (Centers for Disease Control and Prevention, 2020a). As such, the researcher suggests that due to the non-punitive, equal SAU-wide grading dictate and human nature to help others during crisis, grades in term three were likely higher than under normal circumstances and do not necessarily reflect actual student achievement and competency. Additionally, Rollins (2020) wrote that COVID-19 exacerbated inequity for students with fewer resources, lower income families, non-traditional family structures, and students with special needs. This concept was supported by Mineo (2020) who wrote about the dire educational consequences facing disadvantaged students compared to students in more affluent families. It is possible that the equity balancing measures in the midst

of an emotionally trying crisis resulted in teachers overcompensating and providing higher assessment grades.

### **Hypothesis 1 Results**

The results of the z score for Hypothesis 1 ( $z = -0.01$ ) were statistically significant to support the hypothesis that there was no difference in student achievement between terms one through two and term three. Further, the mode, median, and mean were all significantly less spread out than one standard deviation (0.54). The standard deviation indicates the spread of scores or variation from the mean (Creswell, 2015). A standard deviation represents 68% of scores falling between one standard deviation on a normal probability curve. In summary, there was sufficient evidence to conclude that there was no difference in competency grade achievement for students in a physical classroom (terms one through two) and a remote classroom (term three) measuring student achievement. The results showed a mean student competency grade of 3.01 and a median student competency grade of 3. Further, a competency grade of 3 represented the 50.0 percentile rank with a z score of -0.01, and standard deviation of 0.54. Additionally, the mode student competency grade was 3 with a range between a minimum score of 1 and a maximum score of 4.

However, as mentioned in the discussion of research question one, the researcher suggests there is an additional opportunity for research to determine if there were additional qualitative variables that could have potentially affected these results, how those factors affected the results, and why the data findings resulted in this manner. Potential qualitative variables include SAU-wide grading instructions to better balance equity and human reaction / behavior in the event of crisis. The research includes instances of natural disasters or social and economic crises that have affected U.S. schools (Marshall, 2018). However, recent technological capability



to offer online learning precludes earlier large-scale crises, and more recent crises had a narrow geographical effect with students displaced to other in-person schools (Kimmons, 2015). With no historical precedent, a different analysis of how schools, teachers, and students plan and react to crisis is appropriate to explore those qualitative factors.

### **Sub-Question 1 Results**

Sub-question one examined student assessment scores as measured by final end of term traditional grades in terms one through two compared to term three. Comparing medians, students scored 88 in terms one through two and in term three, students scored 94, 6 points higher than in terms one through two. Comparing means, students scored 85.45 in term one through two and in term three, students scored 90.32, 4.87 points higher than in terms one through two.

The results suggest improved student grades after changing from an in-person model to an online model. However, similar to the competency achievement grades, the researcher surmises that there are explanatory qualitative factors affecting the results that are not readily apparent in the quantitative data. The traditional assessment grades results offer a stark dichotomy to the expected results. The results indicated improved student traditional assessment grades in term three compared to terms one through two. Existing research indicates measurable, higher student performance for in-person learning than online learning (Blohm, 2017; Carpenter, Kafer, Reeser & Shafer, 2015; Gulosino & Miron, 2017; Heissel, 2016; Mulcahy, Barbour & Lahiri, 2016). The SAU set grading standards and expectations for term three directing teachers to provide equitable and non-punitive grading and assessment. Research indicates a lack of equity in the COVID-19 induced crisis online learning (Brooks, 2020; Education Cannot Wait, 2020; Mineo, 2020; Rollins, 2020; Sawchuk, 2020). The intent was to provide equity for students

equipped with lesser resources in a remote learning environment from home. The researcher surmises that the attempt to create equity had an impact on the grades that teachers delivered students. Additional extenuating circumstances included an emotional toll and stressor of all teachers and students experiencing crisis through an ongoing pandemic.

The theoretical framework developed by Hyvärinen and Vos (2015) promotes the importance of empowering communication that facilitates community resilience in crisis. It is reasonable to suggest that the planning, communication and empowerment necessary to endure a crisis was not sufficient in the overwhelming challenge of COVID-19 and resulting effects on educational structures, communication, and learning. Therefore, the researcher suggests that the higher term three grades reflect the SAU grading framework for term three, and a natural human tendency for teachers to overcompensate with inflated grades amidst a crisis.

### **Sub-Question 2 Results**

Sub-question two examined weekly teacher hours worked on preparation, instruction, and assessment in terms one through two compared to term three. Comparing medians, teachers worked 40 hours in terms one through two and in term three, teachers worked 31 hours, or 9 hours less per week than in terms one through two. Comparing means, teachers worked 41.54 hours in terms one through two and in term three, teachers worked 32.96 hours, 8.58 hours less per week than in terms one through two.

The results suggest a significant decrease in teacher hours worked after changing from an in-person model to an online model. Similar to the student achievement and assessment data, further qualitative research is warranted to determine why teachers worked less post-pandemic during the online learning model. The Brookings Institution indicates that the average U.S. teacher works 38.0 hours per week (Startz, 2019). An OECD (2014) survey found U.S. teachers

to report working 44.8 hours per week. This aligns with the term one through two self-reported teacher hours median of 40 hours and mean of 41.54 hours. However, term three resulted in a significant drop in teacher hours worked. Many traditional schools have existing online systems that can provide online instructional learning (Kimmons, 2015). The SAU studied had the technological capability, but school staff had not planned to shift to online learning until suddenly forced to do so by COVID-19 in March 2020 (Education Week, 2020). Teachers possessed varying levels of comfort with the technology prior to being forced to adapt to online learning. As outlined by Hyvärinen and Vos (2015), the importance of planning, empowerment, and communication is important during crisis. The unprecedented and large-scale nature of COVID-19 precluded the ability of school staff to effectively navigate the crisis. It is the researcher's suggestion that the decrease in teacher work hours relates to human reaction in the face of crisis, comfort with the technology, how individuals react to significant stress, and a shift in the primary means of communication.

### **Sub-Question 3 Results**

Sub-question three examined weekly student attendance in terms one through two compared to term three. Comparing medians, students were absent 0.26 days per week in terms one through two and in term three, students were absent 0.34 days, 0.08 more days per week than in terms one through two. This shows that students were absent a median total of 0.96 more days in term three than in term one or term two, respectively. Further, comparing means, students were absent 0.27 days per week in terms one through two and in term three, students were absent 0.35 days, 0.08 more days per week than in terms one through two. This shows that students were absent a mean total of 0.96 more days in term three than in term one or term two, respectively.

The results suggest a significant increase in student absenteeism after changing from an in-person model to an online model. Similar to the student achievement and assessment and teacher data, additional research is warranted to determine why students were absent at a higher rate during the pandemic. The results align with existing research suggesting less accountability of students at online schools (Carpenter, Kafer, Reeser & Shafer, 2015). However, it is the researcher's suggestion that student absenteeism and accountability was exacerbated due to the unplanned nature of the remote learning; it was dependent on the availability of a parent, guardian, or other adult to supervise and facilitate work online. This finding aligns with the disparity in equity that disproportionately affect lower income families, students with disabilities or special needs, families with less resources, untraditional family structures, or students displaced (Brooks, 2020; Education Cannot Wait, 2020; Mineo, 2020; Rollins, 2020; Sawchuk, 2020). Additionally, student and family commitment could have been negatively affected based on their individual reaction in the face of crisis and their ability to manage the increased stress, and change in curriculum, communication, and teaching delivery mechanism.

### **Implications**

There is a significant gap in research addressing the unanticipated transition from a traditional in-person learning model to an online learning model due to crisis. There is little historical precedent or research that explores how an abrupt change from classroom to remote instruction affects teacher and student behavior or achievement. Existing research explores teacher and student work habits in a physical in-person model measuring teacher and student activity levels under normal conditions (National Center for Education Statistics, 2018; OECD, 2014; Startz, 2019). Similarly, research shows student achievement levels of traditional in-person schools outperforming online schools prior to COVID-19 (Blohm, 2017; Carpenter, Kafer,

Reeser & Shafer, 2015; Gulosino & Miron, 2017; Heissel, 2016; Mulcahy, Barbour & Lahiri, 2016). Additionally, many existing traditional in-person schools already provide online systems and technology capable for transition to an online model (Kimmons, 2015). However, there is no historical precedent of schools forced to abruptly change instructional models, with limited planning, in a matter of days, prior to COVID-19.

The resulting case study for a specific K-8 school administrative unit comparing pre-COVID-19 activity levels to post-COVID-19 activity levels provides initial baseline data for further analysis on the effects of this abrupt, learning model change in education and instruction. Further, the data suggests that teachers and students working habits and behavior changed not only due to the transition to online learning, but also due to COVID-19. Teacher and student work habits (teacher work hours and student attendance) likely changed in part due to the stress of living through a pandemic, in addition to the change in learning model to an online environment. Teacher grading and assessment behavior also likely changed due to the SAU's directive for equity and human nature of empathy toward students while all were living through crisis, as suggested by Marshall (2018) and Stuart (2020). The existing research suggests the other negative effects of equity for vulnerable student groups (Brooks, 2020; Education Cannot Wait, 2020; Mineo, 2020; Rollins, 2020; Sawchuk, 2020). This supports the idea of additional research addressing the effects of crisis having similar if not more consequential effects than a change in learning model.

The implication of transformative leadership applies to the school administration's planning and decision-making process through an instructional model change in crisis. Transformative leadership has a significant impact on social change, and a transformative leader is a change agent for the overall, broader good of the community (Shields, 2010). This case study

provides educational leaders an illustration to better understand how decision making such as equity balancing can potentially affect teacher behavior, and the importance of planning and communication for an instructional change to an online model and leading through crisis.

### **Recommendations for Action**

There are a few practical recommendations to improve an abrupt change from a traditional in-person instructional model to an online instructional model in the event of crisis. Equity is a primary concern with vulnerable groups such as students with special needs, low income families, students with medical or other disabilities, displaced students, and families with less resources shown to be disproportionately negatively affected by the educational change to online learning due to COVID-19 (Brooks, 2020; Education Cannot Wait, 2020; Mineo, 2020; Rollins, 2020; Sawchuk, 2020). In order to mitigate equity concerns, the provision of internet access (i.e. internet hotspots), computing devices (i.e. Chromebooks, iPads), and meals via pickup and delivery are simple measures (albeit with associated costs) to allow these students the opportunity to learn in an online model more effectively. This case study showed that these measures were effective, if not perfect. For example, provision of these resources does not ensure usage. As such, follow-up with student guardians via communication mediums (i.e. email, phone) and in-person is necessary to facilitate better usage rates.

In a crisis event, as highlighted in this case study, the aforementioned measures will help, but there will still remain embedded inequity. This can include actual usage, the viability of certain student groups capability to learn via an online platform, and familial engagement to help, support, and encourage learning from home. An online instructional model only exacerbates inherent equity issues (Rollins, 2020). Therefore, in addition to the material measures and family unit communication, it is important for the school district to implement a

standard non-punitive grading and assessment system, with proper training included. One important take-away from this case study is that a non-punitive assessment system can work, but it is important that staff fully understand how to implement and to not over-compensate and inflate grades. The data suggests that grade inflation did occur in this case study in part due to limited time and opportunity to train, but it is also surmised that the stress of living through a crisis, COVID-19, contributed to teachers' empathy and the conferring of higher grades.

### **Recommendations for Further Research**

This researcher recognizes and acknowledges that significant additional study is necessary to continue the line of inquiry and develop concrete conclusions on the topic. This study provides compelling numeric, data-based findings; however, the researcher suggests that further qualitative research is necessary to understand full implications of a crisis-induced transition from in-person to online learning. The data in this study provide information about what happened. But, is important to delve deeper to understand why teacher and student behavior and performance changed or did not change. There needs to be additional insight into why teachers worked less hours, why students attended class less regularly, and if and why teachers adjusted grading and assessment integrity.

### **Conclusion**

The data analyses supported the hypothesis that there would be no difference in student achievement between terms one through two (physical classroom) and term 3 (remote classroom) as measured by competency grades based on curriculum standards. In addition, the evidence suggests that there were teacher and student working habits or behavioral changes in term three due to the change to online learning and working through COVID-19. Despite competency grading seeing no significant variance, the traditional assessment grades did see an increase from

terms one through two compared to term three. The median and mean grades increased by 6 and 4.87 points, respectively. Further, teachers reported working fewer hours per week in term three. The median and mean weekly teacher hours worked decreased by 9 and 8.58 hours per week, respectively, from terms one through two compared to term 3. Finally, the student absences increased from terms one through two compared to term three. Both the median and mean student absences increased 0.08 days per week. The results from this study demonstrated that potential behavioral and/or external factors or rationale for the results; however, there was little to no difference between terms one through two and term three. Nonetheless, there are opportunities for further research to explore these phenomena.



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