

EXPLORING THE IMPACT OF REMOTE LEARNING ON STUDENT ENGAGEMENT
AND COMMUNICATION IN SCIENCE AND OTHER CLASSES

by

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DEDICATION

People often say that it “takes a village” to raise us as we grow, develop, and venture into the world. I don’t know anything truer. I’m eternally grateful to the individuals who were my village, spanning the entirety of Massachusetts and venturing as far as Montana; as a student at Pioneer Valley Regional School, Westfield State University, and Montana State University; and, lastly, as a teacher at both Murdock High and Leominster High School. This work is dedicated to my biggest supporters; my parents for teaching me that nothing is impossible if I work hard enough for it; my boyfriend for his unyielding support; and the countless teachers who worked to ensure my success and continued growth as a person, as a student, and as a teacher.

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ABSTRACT

During the COVID-19 pandemic, students pivoted from one learning model to the next, switching between remote, hybrid, and in-person schedules. Students and teachers were surveyed and interviewed to explore how remote learning impacted student engagement and communication in the classroom during the 2020-2021 school year. Qualitative data were analyzed through thematic analysis to gain insight into the student experience from both students' and teachers' perspectives. Four recurring themes were referenced throughout responses from each research population; for students, technology, social and academic interactions, autonomy, and health were commonly mentioned; for teachers, technology, student involvement, relationships and support systems, and evaluating student progress were commonly discussed. The results suggested that students were less engaged in their academic work and communicated less meaningfully with their peers and teachers.

CHAPTER ONE

INTRODUCTION AND BACKGROUND

Context of the Study

When I began teaching five years ago, technology was frequently used in the classroom. However, from my perspective as a public school teacher in Massachusetts, it never existed as the primary medium through which I taught. Technology has always been a supplemental resource at my disposal and that of my students, too, whether it be to show various media, use software, or create something. For many educators, technology is a tool to help teach our craft and make the material more accessible to our students. Although it feels like technology's use has gradually increased in each year that I've taught, the 2020-2021 school year exemplified its role not only as a supplemental resource but as a fundamental component of the classroom amidst the COVID-19 pandemic.

Currently, I teach in Leominster, Massachusetts. According to the most recent report from the U.S. Census Bureau (USCB) completed in 2021, the city of Leominster was occupied by 43,782 people in 2020. The community is predominantly white at 69.3%, followed by 18.4% of residents identifying as Hispanic or Latino, 6.7% as Black or African American, 3.2% as Two or More Races, 3.0% as Asian, and 0.2% as American Indian and Alaska Native. Of those individuals, the USCB reports that 26.2% of the population speaks a language other than English and that 14.9% of the population was born in a country other than the United States. In terms of education, 88.7% of Leominster's residents have earned at least a high school diploma, whereas 29.8% have earned at least a bachelor's degree. The USCB's report also shows the median

household income in 2020 was \$63,119 and 11% of the population is reported to be in poverty (U.S. Census Bureau, 2021).

Leominster High School (LHS) is a medium-sized public school, located only an hour's distance northwest of Boston in Massachusetts. Students from LHS are funneled from two middle schools into a single building that is LHS. During the 2020-2021 school year, 1888 students were enrolled between grades nine through twelve. Of those high school students, 52.55% identified as White, 35.02% as Hispanic, 7.06% as African American, 2.77% as Multi-Race/Non-Hispanic, 2.53% as Asian, and less than 1% identified as either Native American or Native Hawaiian/Pacific Islander. These values are like averages from schools across Massachusetts (MA Department of Elementary and Secondary Education, 2020). Additional demographics regarding these students were also considered in Table 1.

In the district, high school students have three programs to choose from: the general high school itself (LHS), a vocational school known as the Center for Technical Education and Innovation (CTEi), and an online program called the Leominster Center for Excellence (LCE) – all of which are housed in the same building. Although LHS, CTEi, and LCE are separate programs, they were all incorporated into this profile because classes may include a mixture of students from any of the three programs. Additionally, since all students share opportunities to interact with one another in the academic and extracurricular setting, representing the school as Blue Devils, our mascot, it only seemed fitting that all three schools be considered.

Table 1. MA Department of Elementary and Secondary Education reported the following statistics during the 2020/2021 school year regarding selected populations of high school students compared to students throughout the district.

Student Populations	LHS	CTEi	LCE	LPS District
First Language not English	27.5%	25.5%	9.1%	28.3%
English Language Learner	9%	4.2%	0%	11.8%
Students with Disabilities	15.7%	29.5%	45.5%	23.8%
High Needs	48.7%	60.5%	79.5%	61%
Economically Disadvantaged	39.2%	45.7%	61.4%	46.6%
Students Serviced	1060	784	44	5859

Notably, a large percentage of students are high needs at the district and high school levels. Statistics provided by the MA Department of Elementary and Secondary Education (2022) define high needs students as those who are indicated as low-income, economically disadvantaged, current or former English learners, or as students with disabilities. Additionally, a large portion of high school students and students at the district level are economically disadvantaged; the MA Department of Elementary and Secondary Education (2022) also defines economically disadvantaged students as those who have participated in a state-administered program, including one or more of the following: the Supplemental Nutrition Assistance Program (SNAP), the Transitional Assistance for Families with Dependent Children (TAFDC), the Department of Children and Families (DCF) foster care program, and MassHealth (Medicaid).

I began teaching in Massachusetts in 2016 and transferred to Leominster High School in the fall of 2019. I have taught college prep, honors, and advanced placement biology, as well as

college prep and honors chemistry, anatomy and physiology, and several elective science courses - many of which have had an online component. At my previous teaching assignment, I was the liaison for an online section of the school. Within this role, I taught and supported science students using an online platform called Edgenuity. These were students who typically struggled in the traditional classroom, so we coupled the online component with in-person labs and activities to help them receive hands-on learning.

I've also taken part in a project co-developed by the Concord Consortium and Michigan State University, called ConnectedBio, from 2018 to 2020. Both institutions and their staff – educational researchers, scientists, and information technology specialists – worked with teachers across the United States to develop a case study exploring factors that influence a mouse's fur color. Students investigated these factors through online simulations, better understanding how genetics and evolution coincide with one another. The project was in development for a few years prior to my arrival, but I was invited to help implement and develop the project as a biology teacher. I used the case study in my classroom and monitored students as they worked and recorded their data and answers remotely on the Concord Consortium's website. I could track their progress, review their work, and leave comments. Ultimately, my role was to implement the case study with my students and report feedback monthly during remote Zoom meetings. This included technical challenges but mostly focused on student interactions with the online content itself, such as their understanding and misconceptions, among other things. It was an invaluable introduction to remote learning prior to the COVID-19 pandemic.

When the pandemic initially gripped the country and schools began to shut down and shift toward remote coursework in the Spring of 2020, educators across the United States sought

to embrace technology for the success of remote learning. At Leominster High School (LHS) in Massachusetts, we were told to prepare remote work for two weeks which, ultimately, became the remaining school year. Everyone knew that returning for in-person learning would not likely occur during the fall of the next school year. Public schools across the country were tasked with designing plans for in-person, hybrid, and remote learning prior to the 2020-2021 school year ahead. Educators changed their curricula, reformatted activities and assignments, and found new and improved resources to better meet their student's needs in the remote setting. At LHS, we were given an additional ten days of professional development in early September to explore online resources and prepare for remote learning before the school year started. Nonetheless, despite these exhaustive efforts, educators across the country felt uncertain about the year ahead, myself included.

As school systems were constructing plans for every scenario, they were also gathering feedback from their immediate communities. In my experience, while listening to school committee meetings between March 2020 and June 2021, many community members expressed concern over continued remote learning. In the U.S. alone, 77% of public schools transitioned students from in-person to remote learning while, slightly smaller, 73% of private schools did the same in the spring of 2020 (U.S. Department of Education, 2022). In Leominster, many parents emphasized that the remote learning model did not fit all types of learners and that it was doing more harm than good. High-needs students, for example, would not be serviced like they would in person, and would fall further behind their peers. Of those high needs students, parents expressed concern regarding students with exceptional learning needs and learning disabilities.

Without teachers physically by their side, how would they accomplish the same tasks as they could while at school in person?

Frequently, I heard stakeholders emphasize what we already knew about the physical classroom: it was a place for students to explore different content areas; a place for students to converse with their peers and teachers; a place for students to participate in activities, labs and discussions; and a place for students to collaborate with one another to learn and apply new material. Without these meaningful elements of school, how could remote learning possibly replicate the in-person experience? Building relationships and engaging students were challenging during any normal year, but was replicating the in-person experience while continuing to remotely instruct even possible? Those questions continued to linger on my mind over the course of the 2020-2021 school year as the COVID-19 pandemic continued.

Focus Statement/Question

There are numerous factors that influence engagement during a normal year; however, with the COVID-19 pandemic reshaping society, many community members, teachers, and parents expressed concern over the impact that continued remote learning would have on students during future school years. After listening to remarks at school committee meetings, reading forums and articles, and sifting through posts online I felt that I needed to better understand the students' experience through their eyes as well as through their teachers. The uncertainties regarding remote learning's impact led to the development of this action research project and the following questions that guided my investigation:

My focus question was, How does remote learning impact student engagement and communication in the classroom?

My sub-questions include the following:

1. How does remote learning impact student engagement in the classroom?
2. How does remote learning impact student-to-student and student-to-teacher communication in the classroom?

CHAPTER TWO

CONCEPTUAL FRAMEWORK

To depict how remote learning has impacted both student engagement and communication, it is important to establish an understanding of what each is in many capacities; defining student engagement, what it looks like in the classroom setting, and its significance for students is pivotal in this study. It is therefore important to review previous research into remote learning prior to the pandemic to see how engagement and communication might vary relative to that of the in-person experience. Doing so will highlight which factors and strategies affect student engagement and communication most in the remote setting.

Exploring Student Engagement

Engagement itself has been described as the very foundation of learning, and through many studies, researchers have explored its various elements in the classroom setting. In doing so, a variety of definitions have arisen, many of which share key ideas. Newmann (1992) defined student engagement as “the student’s psychological investment in and effort directed toward learning, understanding or mastering the knowledge, skills, or crafts that academic work is intended to promote.” (p. 12) This definition focuses primarily on evaluating the student’s role in their engagement without describing factors influencing the investment and effort that students put forth. Comparatively, Martin and Torres (2016) defined student engagement as “meaningful student involvement throughout the learning environment” (p. 5). Although briefer, this definition suggests that student engagement isn’t a result of students’ actions alone but includes how their surroundings influence the degree of engagement they experience. In their User’s

Guide and Toolkit of Student Engagement, Martin and Torres (2016) describe that student engagement varies according to an individual's relationship with major elements of the learning environment, including their school community, its constituents, as well as the instruction and curricula being implemented.

In their study of student engagement through a contextual model, Lam et al. (2009) explored that, from the age range of children to adults, all individuals develop in what they refer to as different microsystems. These include but are not limited to school, home, and the workplace. In the school setting, Lam et al. point out that two contextual factors must be considered: the instructional and social aspects.

Instructional and Social Aspects of Engagement

In the classroom setting, the educator's instruction plays a significant role in their student's understanding of content. Educators who provide opportunities during their instruction that motivate their students are more likely to engage them. Lam et al. (2007) reported that motivation flourishes when six components exist within the curriculum that educators implement: challenge, real-life significance, curiosity, autonomy, recognition, and evaluation. The more frequently that these components are included in the teaching practice, the more intrinsically motivated and engaged those students are. Furthermore, teachers who appeal to a student's personal interests, goals, and motivation within the classroom setting promote engagement and foster student-teacher relationships.

Martin and Torres (2016) emphasize the importance of understanding three interconnected dimensions of engagement as educators. These three dimensions include

behavioral, emotional, and cognitive engagement. Groccia (2018) described what these dimensions of engagement look like in an ideal scenario:

To engage at a behavioral level, the learner must have some degree of participation or effort, and be persistent in the learning process. At the affective level of engagement, the learner must have a level of interest in the experience that results in improved motivation and enjoyment, thus establishing a level of commitment. Lastly, the learner must engage on a cognitive level displaying a degree of mental activity, processing thought about the experience that should result in the ability to cognitively process the experience and establish linkages to previous experiences (p. 13-14).

Furthermore, understanding student engagement isn't as simple as one might think, considering the plethora of factors involved. As educators and researchers, Fredricks et al. (2004) considered the collective research already done on engagement and encouraged viewing the topic as being multi-faceted. Doing so, researchers suggest, will ultimately paint a more complete picture of each student rather than simply viewing pieces of what does or does not engage them.

In addition to studying factors that affect student engagement, Schelchty (2001) has been widely referenced for his five-level model of student engagement, showing that engagement exists on a spectrum. His model focuses on different amounts of attention and commitment that students display in the classroom environment. The lowest level, rebellion, happens when students actively shift their attention from the material or activity and offer no commitment to the assigned task. The highest level, engagement, happens when students pay attention to the task but also offer a high degree of commitment because the activity or task is both authentic and valuable to the student (Figure 1).

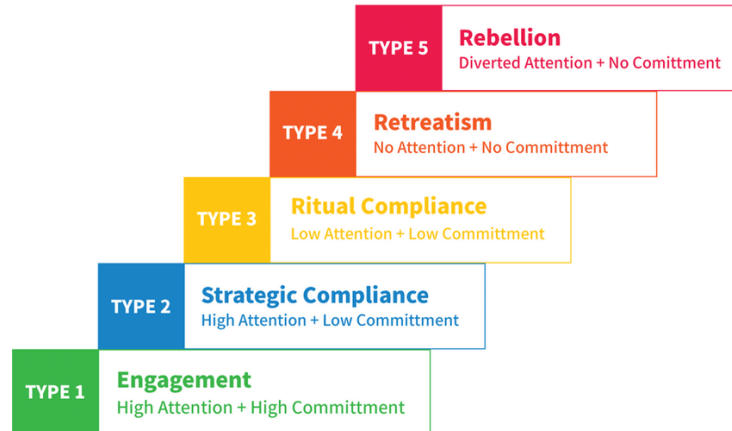


Figure 1. Five levels of student engagement (Schlechty, 2001).

As a resource for comparison, Schlechty’s model can be used by educators to reflect on how factors in the classroom setting, like student work, discussion, and behavior demonstrate their level of engagement. Additionally, teachers can also use Schlechty’s model to determine whether the tasks and activities they assign are engaging enough to elicit high attention and commitment from students throughout the school year.

For the purpose of this study and my own interpretation of those definitions, I have chosen to operationalize “engagement” to refer to a student’s degree of attention and commitment to a task as a result of all factors, internal and external, that influence it. This definition attempts to incorporate the role that a student plays in their attention and commitment to a task while also considering the reality that many environmental factors will impact the degree of attention and commitment they demonstrate.

Significance of Student Engagement

As educators, understanding engagement behaviors, whether a student is engaged or disengaged and to what extent, has large implications in the classroom setting. Finn and Zimmer (2012) emphasize that gaining such perspective is a helpful strategy in trying to reduce student failure. They highlight that engagement behaviors are important to learning, carry over as students age, and, if positive experiences, instill persistence throughout students' lives. Additionally, Lam et al. (2009) explored the various short and long-term benefits of student engagement that have been studied since the 1990s, citing better grades and conduct, academic achievement, self-esteem, and socially appropriate behavior as being just some of the results.

Although it is agreed that student engagement is crucial to learning across all content areas, the COVID-19 pandemic has further emphasized the role that engagement plays in the classroom setting. Few research studies exist that explore pandemic teaching, which creates both a challenge and opportunity for educators worldwide. As students shift between in-person and remote learning, understanding how students interact with their peers, teachers, and content – and to what degree - will provide insight and allow educators to better evaluate both models of learning and identify successful strategies for future use in remote and hybrid settings. Additionally, information gleaned from such studies that focus on pandemic teaching will better prepare teachers if such events were to occur again.

Online Learning

Online learning, more commonly referred to as remote learning, or sometimes as virtual learning, has expanded and grown rapidly over the last two decades because of advances in

technology. It has grown so much that many studies exist comparing it to in-person learning across all education levels. It has also been studied through hybrid learning, a mixture of both in-person and remote learning. Martin and Bolliger (2018) conducted a college-level study to determine which engagement strategies in online learning were considered most important to students. Upon finding this study, it made me question whether these research strategies might apply in the K-12 setting as well. They constructed a 29-item Likert survey whose statements were based on three categories of strategies that supported learner-to-learner, learner-to-instructor, and learner-to-content engagement. Of the data they collected, students responded that all three engagement strategies were important, but noted that students valued strategies that encouraged learner-to-instructor interactions more than the other two categories. This detail is significant in that it suggests educators are the most important part of the online environment. Nonetheless, exploring other strategies that support student-to-student interactions might still prove meaningful to students' remote experience as well.

Studies have shown that increasing the frequency of student-to-student interactions improves student engagement and can be achieved using the various tools that online learning has to offer. Revere and Kovach (2011) and Banna et al. (2015) list discussion boards, chat sessions, blogs, wikis, and group activities as being some tools available to educators. While these online tools aid in improving student engagement, it's important to recognize that these are more effective within environments that students find comfortable. Reushle and Mitchell (2009) suggest that using activities, like icebreakers, can set the supportive atmosphere in virtual learning that is needed to engage students. While creating this atmosphere is important, the timing in which educators implement these activities is just as pivotal because it sets the tone for

the remaining school year. Kelly and Claus (2015) state that the first three weeks are most significant in this regard, as students will learn to either work alone or collaborate with their peers. Social presence must be considered; it can be evaluated by how often students participate and express themselves, as well as whether students are inclusive of their peers' contributions. Online classroom environments where students perceive there to be more social presence can result in higher motivation among students as well as higher test scores regarding their perceived learning and satisfaction with their teacher (Richardson & Swan, 2003). The more opportunities that students are provided to interact with one another, the more likely they will engage in the online setting.

Methodologies for Studying Student Engagement

Research has shown that there are numerous approaches to assessing and measuring student engagement, including but not limited to self-report surveys, teacher ratings and checklists, interviews, and observations. According to the Handbook of Research on Student Engagement (Fredricks & McColskey, 2012), each method provides insight into student engagement and varies in specificity; some methods are more well-suited to assess academic engagement whereas others are more well-suited to assess emotional or behavioral engagement. The most recent edition of the Handbook of Research on Student Engagement also adds administrative data, experience sampling methods, and real-time measures as other approaches that are used to measure student engagement (Fredricks, 2022). In examining which approach researchers have used to measure engagement, self-report surveys appear to be the most common.

In reflecting on the broad topic of engagement and the variety of factors that affect student engagement, for the purpose of this study, self-reports were viewed as being the most favorable method of measuring student engagement. Research by Appleton et al. (2008) demonstrates that self-reports better depict students' perceptions of the classroom experience than other methods because they are less inferential; therefore, they can provide more meaningful insight into the emotional and cognitive dimensions of student engagement. Interviews were also viewed as favorable methods to assess engagement because they offer an opportunity to provide further insight into student and teacher perspectives in a way that items from a Likert survey cannot explore. With this research project's focus questions in mind regarding student engagement and communication during the COVID-19 pandemic, self-report methods seem to be best aligned with assessing student engagement from the perspective of students and teachers. This is particularly important when reflecting on how engagement is defined; students aren't the only factor in their involvement with learning but contextual factors, like the environment, play a significant role too. As such, reflecting on the importance of student-to-student and student-to-teacher interactions as being components of that environment is also important if this study is to successfully explore student engagement and communication (Martin and Bolliger, 2018).

CHAPTER THREE

METHODOLOGY

To better understand the impact of remote learning, it was important to reflect on aspects of education that bear significant weight on the student experience in the classroom setting. Ultimately, this led me to question how student engagement and communication changed because of the pandemic and the resulting shift from in-person to hybrid and remote learning. Regarding student engagement, I sought to explore how remote learning impacted student engagement, and, regarding communication, I also sought to explore how remote learning impacted communication between students as well as communication between students and their teachers.

Purpose of Study

While community members across Massachusetts, as well as those across the country, weighed in on the pandemic's educational impact, I sought to explore its impact from the individuals that spend most of their time in the classroom: the students and their teachers. At the time of this study, students in Leominster had at least seven months of experience with remote learning that carried over from the previous school year into the 2020/2021 school year. Studying their perspective in addition to that of their teachers could provide invaluable insight regarding how remote learning impacted student engagement and communication. Therefore, data collection for this research project consisted of two different surveys and interviews that I developed, one each for students as well as teachers. I sought to better understand how remote learning impacted student engagement as well as communication in the classroom setting.

Research Populations

Students that participated in this study were from five separate classes, subjects including biology, chemistry, as well as anatomy and physiology. My anatomy and physiology class had a total of 26 students ranging from grades 11 and 12; my biology class had a total of 22 students from grade 9, and my chemistry classes had a total of 75 students ranging from grades 10 and 11 ($N=123$). Their gender breakdown is provided in Table 2, organized by class period. Of these students, 74 voluntarily participated in this study and took part in the Student Likert Survey, and 30 took part in the Student Interview.

Table 2. Breakdown of student gender during the 2020/2021 school year, ($N=123$).

Class	Male	Female	Class Size
Period 1: Honors Anatomy and Physiology	11	15	26
Period 2: Honors Chemistry	10	7	17
Period 3: Chemistry	13	15	28
Period 4: Chemistry	19	11	30
Period 5: Honors Biology	10	12	22
Total:	63 Males	60 Females	

Teachers that participated in this study were from all content areas at Leominster High School (LHS) as well as from the school's vocational programs at the Center for Technical Education and Innovation. A total of 63 teachers anonymously participated in the Teacher Likert Survey. In participating anonymously, the intent was to incentivize honest responses regarding their experiences with remote and their perception of student experiences with remote learning.

25 teachers participated in the Teacher Interview, where I talked with teachers in person and online over Google Meet.

Data Collection Methods

To answer the research questions that guided this project, a variety of instruments were developed to collect data for analysis (Table 3). Collectively, all four instruments were used to measure students' experiences with remote learning from their perspective as well as from their teachers. These instruments included the Student Likert Survey and the Student Interview, as well as the Teacher Likert Survey and the Teacher Interview. To implement these instruments, I received Institutional Review Board approval and followed Montana State University protocols (Appendix A).

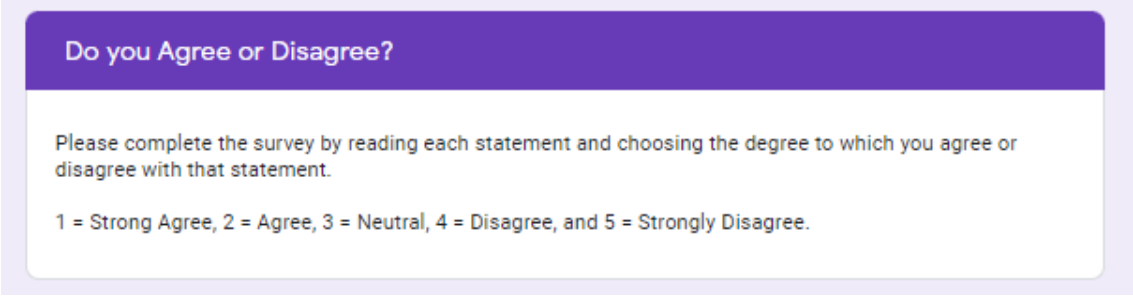
Table 3. Data Triangulation Matrix

Research Questions	Instruments			
	Student Likert Survey	Teacher Likert Survey	Student Interview	Teacher Interview
<i>How does remote learning impact...</i>				
<i>student engagement?</i>	✓	✓	✓	✓
<i>student-to-student communication?</i>	✓	✓	✓	✓
<i>student-to-teacher communication?</i>	✓	✓	✓	✓

Student and Teacher Likert Surveys

Five of my classrooms at LHS were sampled with the student survey ($N=74$), in which they responded to a total of 18 statements by marking the degree to which they agreed or disagreed with a statement (Figure 2). Following the 18 statements, students were asked 5

questions in an open-response format. The open-ended questions were developed to supplement student responses to each of the 18 statements, giving insight into details otherwise left unexplored. Additionally, teachers at LHS also completed a survey ($N=63$) in which they evaluated the same statements and responded to the same open-ended questions; however, their survey focused on their perspective of the student experience with remote learning. The purpose of doing this was for comparison; specifically, how did the self-reported student surveys on remote learning compare to that of teachers? Did students and teachers perceive remote learning's impact on student engagement as the same or different? What implications would I be able to glean from their responses?



Do you Agree or Disagree?

Please complete the survey by reading each statement and choosing the degree to which you agree or disagree with that statement.

1 = Strong Agree, 2 = Agree, 3 = Neutral, 4 = Disagree, and 5 = Strongly Disagree.

Figure 2. Student and Teacher Likert Survey Key (Appendix B, Appendix D).

Surveys were administered to students and teachers during school hours through the use of Google Forms. This allowed the data to remain organized, and safely stored in a digital format, while also generating a report of their collective responses. Afterwards, the mode of each student response was identified; the same was also completed for the teacher responses prior to their comparison.

Student and Teacher Interviews

Within a week of getting responses from the Student and Teacher Surveys, I also asked students a series of follow-up questions as part of an interview in-person as well as over Google Meet on the same day ($N=30$). Surveying and interviewing students within a short time frame ensured that the data collected remained consistent across all instruments, and that student responses on one instrument would not contradict that reported on students' earlier responses. Like the student survey's open-ended questions, the interview questions administered were constructed with the purpose of expanding the responses that students gave to the statements. As a result of Likert surveys giving little detail or rationale into why students responded as they did, the interview questions were meant to fill this gap. Teachers were also asked separate interview questions ($N=25$); however, these follow-up questions to the survey were completed on paper later during the same week because of limited time as well as to respect teachers' personal and professional responsibilities.

As a result of these interview questions being qualitative in nature, the collective responses from students and teachers in the study were compiled and examined using thematic analysis. Rather than generating my expectations prior to their responses, constructing themes from the data would prove more honest with the study's goals. The responses were examined with three major topics in mind: engagement, student-student interactions, and student-teacher interactions. Data collected from both interviews permitted me to better understand the student experience with remote learning from two perspectives, the student and teacher, which gave insight needed to answer the primary questions of this study: how has remote learning impacted student engagement and communication over these past few months?

The Validity, Reliability, and Trustworthiness of this Study

Although the goal of this study is to explore how remote learning impacted student engagement and communication, its dual purpose is to also provide insight for educators and researchers alike. The methods implemented in this study to gather and interpret data were made possible by prior studies researching student engagement, whose methods and approaches inspired those that were implemented in this study. Besides having a variety of instruments to collect data, being able to implement those instruments and collect from a large sample size instills confidence that this data is reliable, consistent, and more accurately depicts students' experiences during remote learning as well as their teachers' perceptions of student engagement and communication.

CHAPTER FOUR

DATA ANALYSIS

Student Engagement

Ten questions from the Student Likert Surveys assessed the degree to which students were engaged during remote learning (Table 4, Figure 3). When asked whether students enjoyed remote learning, the most common response was 3, neutral; 33.8% disagreed with this statement in some capacity while 25.7% agreed. Additionally, although the most common response was 3, neutral, 46% of students stated that they either disagreed or strongly disagreed; comparatively only 25.7% of students preferred the remote setting in some capacity. When students were asked whether they felt invested in their remote classwork, the most common response was 3, neutral; however, 47.3% either disagreed or strongly disagreed with that statement. Students were also asked whether they attended most of their remote classes. 66.2% of students strongly agreed with this statement while an additional 17.6% also agreed. Despite this, when asked whether students frequently participated in their remote classes, the most common response was 3, neutral. Furthermore, when asked whether students put forth their best effort as they completed their remote learning assignments, the most common response was 4, agree. Students were also asked whether they thought remote learning was challenging. Although 47.3% of students disagreed, the most common response was 2, agree. Additionally, when asked whether they found it easy to understand directions for their assignments, the most common response was also 2, agree; however, most responses were evenly dispersed. Regarding their surroundings and learning environment, when asked whether they felt as though their surroundings positively contributed to

their success during remote learning, the most common response was 3, neutral. Despite this, when asked whether felt focused in a remote learning environment the most common responses were 4, disagree, and 5, strongly disagree; only 20.3% agreed in some capacity.

Table 4. Results on students' perceived engagement with remote learning from the Student Likert Survey, ($N=74$). The highlighted data represents the mode.

	Strongly Disagree (5)	Disagree (4)	Neutral (3)	Agree (2)	Strongly Agree (1)
I enjoy remote learning.	7	18	30	12	7
	9.5%	24.3%	40.5%	16.2%	9.5%
I prefer learning in a remote setting.	17	17	21	10	9
	23.0%	23.0%	28.3%	13.5%	12.2%
I feel invested in my remote classwork.	15	20	21	15	3
	20.3%	27.0%	28.3%	20.3%	4.1%
I put forth my best efforts as I complete my remote learning assignments.	4	10	20	27	13
	5.4%	13.5%	27.0%	36.5%	17.6%
I frequently participate in my remote classes.	11	11	26	17	9
	14.9%	14.9%	35.1%	23.0%	12.2%
I attend the majority of my remote classes.	2	5	5	13	49
	2.7%	6.8%	6.8%	17.6%	66.2%
I think remote learning is challenging.	15	20	18	24	8
	20.3%	27.0%	24.3%	32.4%	10.8%
I find it easy to understand directions for my assignments during remote learning.	8	18	18	19	11
	10.8%	24.3%	24.3%	25.7%	14.9%
I feel focused in a remote learning environment.	20	20	19	10	5
	27.0%	27.0%	25.7%	13.5%	6.8%
I feel as though my surroundings positively contribute to my success during remote learning.	7	11	29	17	10
	9.5%	14.9%	39.2%	23.0%	13.5%

Comparatively, ten questions from the Teacher Likert Surveys assessed the degree to which teachers perceived student engagement during remote learning (Table 5, Figure 4). When asked whether teachers thought their students enjoyed remote learning, the most common response was 3, neutral; however, nearly the same proportion of responses disagreed in some capacity with that statement. Similarly, when asked whether their students preferred learning a remote setting, the most common response from teachers was also 3, neutral, but 50.8% of responses disagreed in some capacity. When asked whether their students felt invested in their classwork, the most common response was 4, disagree. Teachers were also asked whether their students attended most of their classes. The most common response was 5, strongly disagree, which half of the teachers selected as their response; 64.6% disagreed in some capacity. Furthermore, when asked whether their students frequently participated in their remote classes, the most common response from teachers was 5, strongly disagree. Despite this, 30.1% of teachers agreed in some capacity while 23.8% remained neutral in this regard. Additionally, when asked whether students put forth their best efforts on remote classwork, the most common response was 3, neutral; 39.7% of the responses either disagreed or strongly disagreed with the statement while only 14.3% of teachers agreed with this statement in some capacity. Teachers were also asked whether they thought remote learning was challenging for their students. The most common response was 2, agree, and collectively, 69.9% of the teachers responded that they either agreed or strongly agreed with that statement. When asked whether they thought students found it easy to understand directions for their remote assignments, the most common response was 2, agree. 25.4% of teachers remained neutral in this regard while 33.3% disagreed in some capacity. Only 41.2% of the responses stated that they thought students found it easy. Lastly,

regarding their students' remote learning environment, when asked whether most of their students seemed focused, the most common response was 4, disagree; 63.5% of respondents responded that their students were not focused while 22.2% remained neutral, and only 14.3% expressed that their students were focused. Furthermore, teachers most commonly chose 3 and 4, disagree and neutral, when asked whether they thought their students' surroundings seemed conducive to their success with remote learning. Collectively, however, more teachers disagreed than disagreed with this statement.

Table 5. Results on teachers' perceptions of student engagement with remote learning from the Teacher Likert Survey, (N=63). The highlighted data represents the mode.

	Strongly Disagree (5)	Disagree (4)	Neutral (3)	Agree (2)	Strongly Agree (1)
I think my students enjoy remote learning.	5	21	25	11	1
	7.9%	33.3%	39.7%	17.5%	1.6%
I think my students prefer learning in a remote setting.	9	23	24	5	2
	14.3%	36.5%	38.1%	7.9%	3.2%
I think students are invested in their remote classwork.	11	23	20	9	0
	17.5%	36.5%	31.7%	14.3%	0.0%
Students put forth their best efforts as they complete their remote learning assignments.	11	14	29	7	2
	17.5%	22.2%	46.0%	11.1%	3.2%
Students frequently participate in their remote classes.	16	13	15	14	5
	25.4%	20.6%	23.8%	22.2%	7.9%
Students attend the majority of their remote classes.	3	11	18	24	7
	4.8%	17.5%	28.6%	38.1%	11.1%
I think remote learning is challenging for my students.	1	10	8	25	19
	1.6%	15.9%	12.7%	39.7%	30.2%
Students find it easy to understand directions for their assignments during remote learning.	4	17	16	22	4
	6.3%	27.0%	25.4%	34.9%	6.3%
The majority of students seem focused in a remote learning environment.	17	23	14	8	1
	27.0%	36.5%	22.2%	12.7%	1.6%
Students' surroundings seem to be conducive to their success during remote learning.	13	20	20	4	6
	20.6%	31.7%	31.7%	6.3%	9.5%

Student-to-Student Communication

A portion of the Student Likert Survey assessed the degree to which students interacted with one another during remote learning (Table 6, Figure 3). When asked whether students frequently participated in verbal discussions during remote learning, the most recorded response was 3, neutral; however, 76% of students either agreed or disagreed with this statement, suggesting a large degree of variability in students' experiences with verbal discussion. Furthermore, when asked whether classwork was often completed in groups during remote learning, the most recorded response was 4, disagree. Only 23% of students either agreed or strongly agreed that they worked within groups during remote learning. Regarding student collaboration and discussion with their peers, the most recorded response was 4, disagree; however, collectively 61% of students either disagreed or strongly disagreed with that statement. Lastly, regarding whether students frequently collaborated and discussed classwork with their peers outside of remote classes, the most recorded responses were 5, strongly disagree, and 3, neutral. Few students strongly agreed with this statement, but most student responses were dispersed among the remaining options.

Table 6. Results of students' perceptions on student-to-student interactions from the Student Likert Survey, ($N=74$). The highlighted data represents the mode.

	Strongly Disagree (5)	Disagree (4)	Neutral (3)	Agree (2)	Strongly Agree (1)
I frequently participate in verbal discussions during remote learning.	15	17	18	16	8
	20.3%	23.0%	24.3%	21.6%	10.8%
I often complete my classwork within groups during remote learning.	18	22	17	10	7
	24.3%	29.7%	23.0%	13.5%	9.5%
I frequently collaborate and discuss classwork with my peers during remote classes.	15	30	16	12	1
	20.3%	40.5%	21.6%	16.2%	1.4%
I frequently collaborate and discuss classwork with my peers outside of remote classes.	20	17	20	16	1
	27.0%	23.0%	27.0%	21.6%	1.4%

Comparatively, four questions from the Teacher Likert Survey assessed the degree to which teachers perceived student-to-student interactions during remote learning (Table 7, Figure 4). When asked whether their students frequently participated in verbal discussions during remote learning, the most recorded response was 4, disagree; 65.1% of teachers disagreed or strongly disagreed with this statement while 20.6% agreed in some capacity. Furthermore, when asked whether their students often completed their classwork within groups during remote learning, the most common response was 4, disagree; however, 66.6% of teachers agreed in some capacity while only 12.7 agreed or strongly agreed. When asked whether students frequently collaborated and discussed classwork with their peers during remote classes, the most common response was 5, strongly disagree. Alternatively, when asked whether students frequently collaborated and discussed classwork with their peers outside of remote classes, most teachers also responded with 5, strongly disagree.

Table 7. Results from teachers' perceptions of student-to-student interactions from the Teacher Likert Survey, ($N=63$). The highlighted data represents the mode.

	Strongly Disagree (5)	Disagree (4)	Neutral (3)	Agree (2)	Strongly Agree (1)
Students frequently participated in verbal discussions during remote learning.	18	23	9	9	4
	28.6%	36.5%	14.3%	14.3%	6.3%
Students often completed their classwork within groups during remote learning.	16	26	13	8	0
	25.4%	41.2%	20.6%	12.7%	0.0%
Students frequently collaborated and discussed classwork with their peers during remote classes.	25	18	9	8	3
	39.7%	28.6%	14.3%	12.7%	4.8%
Students frequently collaborate and discuss classwork with their peers outside of remote classes.	31	16	6	8	2
	49.2%	25.4%	9.5%	12.7%	3.2%

Student-to-Teacher Communication

Four questions from the Student Likert Survey assessed the degree to which students perceived student-to-teacher interactions during remote learning (Table 8, Figure 3). When asked whether students communicated frequently with their teachers, the most common response was 3, neutral; however slightly less than a third of students said they disagreed or agreed in some capacity. When students were further asked whether they felt they could comfortably ask their teachers questions, the most common response was 2, agree. Despite this, 28.4% of students disagreed in some capacity while 14.9% remained neutral. Students were also asked whether they actively used their remote class time to ask their teacher questions. The most common responses were 3 and 4, neutral and disagree. Only 21.7% of students agreed that they actively used class time to ask their teacher questions. Lastly, students were asked whether they felt their teacher knew them well as a student in a remote setting. The most common response was 4,

disagree; 45.9% of students disagreed in some capacity with the statement while 25.7% remained neutral regarding that statement.

Table 8. Results on students' perceptions of student-teacher interactions from the Student Likert Survey, ($N=74$). The highlighted data represents the mode.

	Strongly Disagree (5)	Disagree (4)	Neutral (3)	Agree (2)	Strongly Agree (1)
I communicate frequently with my teachers during remote learning.	7	14	29	19	5
	9.5%	18.9%	39.0%	25.7%	6.8%
I feel my teachers know me very well as a student in a remote learning setting	14	20	19	14	7
	18.9%	27.0%	25.7%	18.9%	9.5%
I actively use my remote class time to ask my teacher questions.	12	23	23	13	3
	16.2%	31.1%	31.1%	17.6%	4.1%
I'm able to comfortably ask my teachers questions in a remote setting.	6	15	11	24	18
	8.1%	20.3%	14.9%	32.4%	24.3%

Comparatively, three questions from the Teacher Likert Survey assessed the degree to which teachers perceived student-to-teacher interactions during remote learning (Table 9, Figure 4). When asked whether students communicated frequently with their teachers, the most common response was 4, disagree. Collectively, 54% of the respondents disagreed in some capacity and 31.7% were neutral in this regard. Additionally, when asked whether students actively used class time to ask questions, 66.6% of responses disagreed in some capacity with 4, disagree, being the most common response. Lastly, regarding whether teachers felt as though they knew their students well during remote learning, the most common response was 4, disagree. Only 28.5% of teachers felt as though they knew their students during remote learning, agreeing in some capacity.

Table 9. Results on teachers' perceptions of student-teacher interactions from the Teacher Likert Survey, ($N=63$). The highlighted data represents the mode.

	Strongly Disagree (5)	Disagree (4)	Neutral (3)	Agree (2)	Strongly Agree (1)
Students communicate frequently with me during remote learning.	11	21	13	14	4
	17.5%	33.3%	20.6%	22.2%	6.3%
I feel as though I know my students very well in the remote learning setting.	21	17	14	4	7
	33.3%	27.0%	22.2%	6.3%	11.1%
Students actively use my remote class time to ask me questions.	12	22	21	6	2
	19.0%	34.9%	33.3%	9.5%	3.2%



Figure 3. Responses to the Student Likert Survey, (N=74).

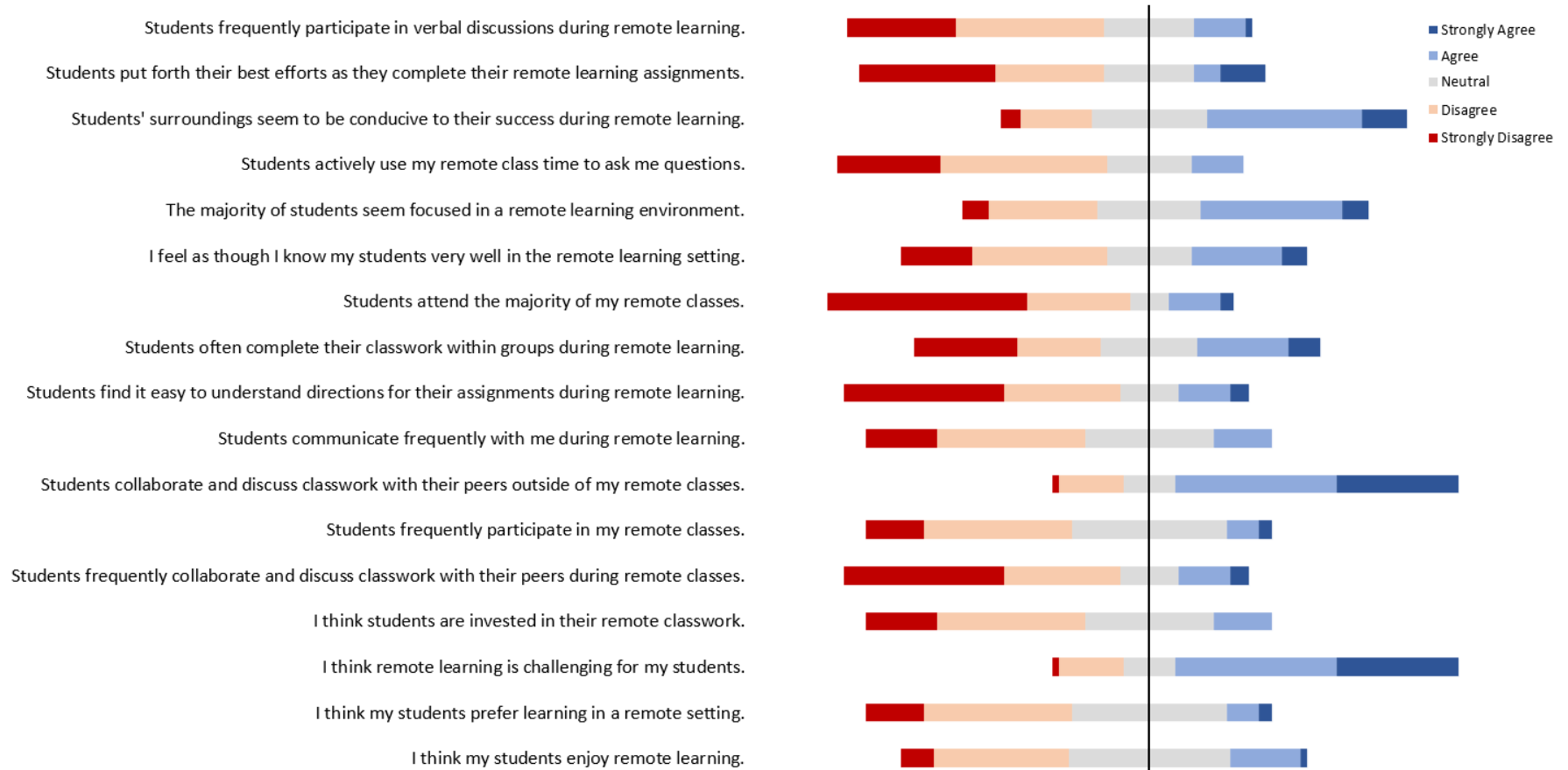


Figure 4. Responses to the Teacher Likert Survey, ($N=63$).

Data collected from respondents in Tables 3 through 9 are depicted in the bar graphs shown in Figures 3 and 4. Collectively, these figures compare the student and teacher responses to each question from the 18-item Likert surveys, showing variations in their response. The most notable differences, visually, regard student and teacher perspectives about attendance, group collaboration, and whether remote learning is challenging for students.

Student Interviews and Open-Ended Questions

In addition to the Student and Teacher Likert Surveys, volunteers were also interviewed and asked broader questions to expand upon the responses provided during the Likert Surveys. Their comments and reflections were examined and collectively grouped based upon emerging themes. From the students' perspectives regarding their experience with remote learning, four main themes and nine subthemes were identified (Table 10).

Table 10. Thematic organization and analysis of student responses.

Main Theme	Subtheme	Definition
Technology	Remote organization	Students found that work on Google Classroom was easy to find, and simple to access assignments, directions, as well as resources, grades, and teacher feedback.
	More confidence regarding classwork	Students felt more aware of their work, grades, and feedback because it was all located on Google Classroom. This allowed students to evaluate what work they had already done, what they needed to do, and what grades they had earned.
Social and Academic Interactions	Fewer opportunities to interact with classmates	Students found that remote learning catered to independent work, which prevented them from making new friends and talking to friends in the same class.
	Social discomfort on Google Meet	Students felt uncomfortable in their Google Meets because of their cameras and communication on the platform; if one person spoke, everyone was listening.

Main Theme	Subtheme	Definition
Student Autonomy	More independence	Students felt that remote learning permitted a great deal of time for them to use as they saw fit.
	Lack of focus and time management	Students struggled to complete classwork because of distractions online, from their immediate surroundings, or because of at-home responsibilities; some students felt as though work was optional because of the autonomy.
	More convenience and flexibility	Students were able to attend school at a later hour, did not have to catch the bus, could wear comfortable clothing, and attend class wherever they wanted while at home.
Health	Increased safety	Students preferred being remote instead of in-person during the COVID-19 pandemic, and worried less because of this.
	Physical comfort and discomfort	Students felt that they spent longer periods of time on their electronic devices and found it uncomfortable.

Technology

Students remarked that the benefits of remote learning revolved around the organization of classes. Everything was convenient, such as that everything could easily be found online, like assignments, directions, grades, feedback, videos, and resources. One student mentioned that “when my teachers use Google Jamboard, it’s easier to see than a whiteboard.” Additionally, work could also be completed faster because they were able to type all their work. A student discussing these factors mentioned that Google Classroom also made students feel more confident about their grades: “I can see everything on one screen. My grades, my assignments, what I’m missing, my teachers’ comments...” In contrast, other students commented that getting feedback from teachers was hard and that there was often a wait time to get individual help because everyone heard everything. While many teachers were good with technology, others

were not good with computers. One student stated that “teachers don’t know which way to teach online was best, so it felt like a challenge. The material did not feel engaging.”

Social and Academic Interactions

Many students commented that there were fewer group-based activities compared to previous school years while in-person. One student added that a class of theirs had no group-based activities whatsoever while remote the entire school year. Despite this, many students stated that because they couldn’t see their classmates it prevented social distractions. A few students mentioned that Google Breakout Rooms made talking easier than in the main Google Meet. One student stated that, “breakout rooms made talking with my teacher easier and less embarrassing without everyone hearing me.”

Making and talking with friends was another frequently mentioned topic. One student added that they were able to talk with friends using other desktop applications, such as Discord. One student wrote that, “it’s hard to make friends since I wasn’t here last year.” Others added that remote learning made them feel disconnected and “alone.” Some students remarked that they felt too embarrassed to speak up during Google Meets and that even breakout rooms “felt too awkward if you didn’t know anyone.” Another student said that although their teachers would often tell students that they could ask questions, students did not feel comfortable doing so. In contrast, a few students mentioned that some classmates spoke too much, keeping their microphones on and talking the whole Google Meet.

Student Autonomy

In their responses, students expressed that they liked how remote learning catered more to independent learning than group learning. With work being more independent, remote learning's self-paced nature was preferable among many students. One student stated that its "[pacing] gives me time to do other things I need to do during the day for my other classes and for chores at home." Some students reinforced this response by commenting that time could be more efficiently used. Other students, however, contrasted this perspective; it was often mentioned that it was too difficult to focus and pay attention to their remote classes. Students commented that because they were not forced to do something, they found it hard to manage their own time; everything felt "optional," according to one student, "which made everything hard to do." A separate student described remote learning as a "free for all," while another student added, "some distractions you'd rather pay attention to over class." Students who were able to manage their own time felt positive regarding remote learning, whereas those who could not effectively manage their own struggled to maintain focus.

Health

Among the benefits and advantages of remote learning, a few students commented that they appreciated less exposure to crowds during the pandemic. Most students said that they felt "more comfortable being at home during the pandemic," where they could avoid people, work comfortably wherever and dress how they wanted. Normal things that would cause stress were not much of a worry, some students remarked, stating that they didn't have to worry about choosing outfits, losing sleep, or missing the bus. Students mentioned that "staring" at their screens for six hours was too much; it did not feel like they got a break from school since they

were always home. Some reported that their eyes hurt and that they felt more tired, and some students mentioned having headaches as a result. One student remarked that some of their friends were not able to leave their toxic households because we were always remote.

Teacher Interviews and Open-Ended Questions

From the teachers' perspectives regarding students and their experience with remote learning, four main themes and twelve subthemes were identified (Table 11).

Table 11. Thematic organization and analysis of teacher responses.

Main Theme	Subtheme	Definition
Technology	More convenience and flexibility	Students were able to attend school at a later hour, did not have to catch the bus, could wear comfortable clothing, and attend class wherever they wanted while at home.
	Remote organization	Online content was centrally located on Google Classroom, easy to find, and simple for students, parents/guardians, and teachers to check student work.
	IT problems	Student access to their remote classes was unreliable; technology underperformed, and many students struggled to maintain stable Wi-Fi connections.
Student Involvement	Lack of attendance	Student absenteeism was more common, and often students who attended their class Google Meet were not present or were away from their device.
	Lack of participation	Fewer students involved themselves in their classes and classwork.
	Lack of focus and time management	More students struggled to accomplish classwork in a reasonable timeframe because of distractions online, from their immediate surroundings, or because of at-home responsibilities.

Main Theme	Subtheme	Definition
Relationships and Support Systems	Inconsistent expectations	Teachers felt that expectations and support from administration and home was not clear, making it challenging for teachers to hold students accountable.
	Lack of student-to-student interactions	Teachers found that fewer students interacted with one another during Google Meets in social and academic contexts; introverted students seemed to prefer independent work.
	Lack of student-to-teacher interactions	Teachers felt that they had fewer interactions with their students, academically and socially, throughout the school year.
Evaluating Student Progress and Learning	Quality over quantity	Teachers felt that although there was less classwork than normal school years, the work that was assigned evaluated students' understanding of the big ideas.
	Less visibility made check-ins challenging	Teachers felt that being remote made it challenging to assess students as they complete work since students are not physically in front of them.
	More plagiarism	Teachers found that there were more frequent occurrences of students copying one another and/or online resources.

Technology

The first emerging theme in teacher responses was technology, its use, and its effect on remote learning. Teachers praised the flexibility that remote learning provided, describing the ease and comfort of teaching and learning from home without the worry of transportation for themselves or their students. The ability to attend class regardless of one's location was also mentioned as being helpful. Other teachers highlighted the importance of Google Classroom, which made the management of assignments and student work "organized, legible, and easy to

find.” One teacher mentioned how much easier online applications were for organizing and reporting data from student work, lessening their workload. It was also noted by several teachers that because work was found all in one place, “it allows making up missing work easier for students that were absent.”

Among the many advantages mentioned, teachers made common remarks regarding issues with technology and its reliability, including challenges with software, hardware, and Wi-Fi on the user end. Teachers also stressed that it was difficult to ensure equitable access to reliable technology, such as students’ access to low/high bandwidth which made it hard for students to complete work while attending a Google Meet. Additionally, some teachers expressed that those challenges existed due to a “lack of familiarity with technology, programs, and applications,” whereas some teachers struggled to gain access to content-specific resources. One teacher remarked that “although students are often accustomed to technology, remote learning assumed that all students were proficient with technology.” For many teachers, finding the time to develop digital resources was a challenge since teachers were expected to digitize their in-person curricula in addition to their normal tasks, which teachers expressed as being more difficult with abstract concepts.

Student Involvement

Teachers commented that there was little to no student participation; “students spoke less, and teachers spoke more,” as one teacher stated. Another teacher further added that teachers likely had to speak more often to make up for the lack of student participation, which in turn made the classroom more teacher than student-driven. Additionally, some teachers stated that it was common for students not to attend their Google Meets and that “absenteeism is at a high.”

Others stated that time management skills were often a struggle. Some students were also away from their computers while in a Google Meet; some teachers mentioned that students had to juggle school on top of home responsibilities, like chores and babysitting, while others were avoiding schoolwork by attending the meet but walking away. Another teacher added that despite complaints regarding the remote learning experience, “following the early return of students in the spring of 2020, most students remained online.”

Relationships and Support Systems

Among the benefits of remote learning, teachers commented that there were fewer behavioral issues in the classroom setting, including: fewer distractions from classmates, less drama and bullying, as well as less anxiety for students who were afraid to be at the center of class. One teacher stated that “collaboration was easier” while another added that “breakout rooms permit one-on-one conversations and check-ins” with students. In the remote setting, teachers expressed that group work was hard for students. One response stated that there were “icons to hide behind,” while another said that assessing social cues was hard for some students. There were fewer interactions between students and teachers and, as a result, less meaningful long-term relationships like normal years. One teacher emphasized that “remote learning does not permit any one-on-one conversations because everything is an open mic for all to hear,” which makes verbal interactions while online a challenge, especially for shy and introverted students. Ultimately, there was less socializing or bonding among students.

Regarding the home environment, teachers remarked that it was difficult next to impossible to mitigate distractions. For some students, teachers said that their home environment was not conducive to learning, whether that was because of family, friends, or other things that

students preferred doing. One teacher remarked that students were unable to escape their home environment, its challenges, and distractions. Additionally, teachers commented on the lack of parental support; teachers expressed that parents and guardians did not enforce or sufficiently support expectations of remote learning; that parents did not or were unable to help students with classwork. One teacher remarked that there was no accountability, and that the community as well as social media did not support teachers. It was hard to discipline students for attendance issues, like tardiness or skipping, especially if parents and guardians were not easily reachable. Teachers also commented on challenges from the administrative side of the school. Firstly, teachers remarked that the bell schedule was overwhelming; that the lack of breaks between periods was hard on students and teachers alike after five periods in a row. Teachers also mentioned that they did not feel as though there were consistent expectations across the board regarding attendance, due dates, and work completion. One teacher stated that “students will be passed no matter what because we did that last year,” referencing how students earned a pass or fail grade during the Spring semester of 2020 across many schools in Massachusetts.

Evaluating Student Progress and Learning

Among the benefits of remote learning, teachers noted that it primarily catered toward students who were more introverted, appealing especially to students that were good with technology. As opposed to in-person learning, one teacher wrote that “quieter students, introverts” could type their questions instead of asking in front of the whole class. Teachers discussed the repetitive nature of remote learning, stating that it became boring for students. Some stated that students had difficulty focusing, and it became increasingly difficult to maintain

student engagement. One teacher remarked that it was impossible to replicate lab experiences in a remote fashion.

Teachers emphasized that the flexibility of remote learning allowed students to complete work at their own pace. One teacher noted that this helped students complete work especially when they felt motivated to do so, even if it was before or after class. A few teachers commented that parents had contacted them, stressing that some students were performing better remotely than they had in-person the year prior because of its flexibility. One teacher commented that remote learning “focused more on the quality of the content over the quantity,” while another added that there was, “less memorization and more application.” The organization of Google Classroom was simple, kept a record of assignments, and allowed students to view material and individual feedback. Remote learning was especially helpful to English Language Learners (ELLs), one teacher stated, because they could easily translate documents. Teachers stated that it was easy for students to “slip through the cracks” and that it was difficult to assess whether a student grasped a topic, and where students struggled. One teacher remarked that there was less visibility, which limited teacher prompting and made it harder for teachers to check-in and follow-up with students regarding their learning; it was hard to assess which strategies worked and which did not. Some remarked that there were frequent issues with cheating and plagiarism that were more apparent than they’d been previously while in-person. Additionally, one teacher stated that decreasing the student course load from seven to five classes did little to prepare students for upcoming school years. Teachers commented that it was challenging for students to initiate and organize tasks as well. Inconsistencies regarding student accountability made learning inconsistent.

CHAPTER FIVE

CLAIM, EVIDENCE, AND REASONING

Claims From the Study

The goal of this action research was to explore the impact of remote learning on student engagement and communication during the COVID-19 pandemic in one school district in Massachusetts. To do so, two major perspectives were surveyed and explored in contrast to one another: that of the teacher and that of the student. A list of recurring themes was developed from each perspective and used to reflect upon the main questions of this study.

Student Themes

Overall, four recurring themes were apparent in student responses during the open-ended questions of the Student Likert Survey as well as from the Student Interviews. These themes included technology, social and academic interactions, student autonomy, and health.

Technology. Student responses regarding technology and its use during remote learning were mostly positive, often referencing its convenience and organization. The visibility of course content, instructions, and grades instilled confidence in students as they navigated Google Classroom. One student stated, “I feel more organized and I don’t have 600 papers crammed into a small binder.” Another student said, “work is nicely displayed on Google Classroom, making assignments easy to find,” while another added that, “you can see what you have not done and then you can do it.” This student’s remarks reference how Google Classroom organizes each student’s work as a list, informing students what work they had already completed and what

work they still needed to do. Ultimately, these responses suggest that the organization of Google Classroom enhanced students' awareness of their classwork.

Although fewer students reported issues with hardware, some students referenced challenges in maintaining a consistent and stable Wi-Fi connection. Challenges with technology, however, were frequently mentioned regarding one's familiarity and experience with it. One student said that "some teachers do not really know how to use tech very well, which can make some of their work harder. They also just assume we know what to do sometimes," referencing applications, like Google Jamboard, which were new to most classrooms, as well as online assignments. One student explained this further, adding that "some of my teachers don't give us that well of instructions so I find myself doing the work for a couple of hours." Another student said that "it's difficult when some teachers don't add directions to assignments in Google Classroom or forget to post parts of an assignment and have to do it again." Ultimately, students suggested that, for students and teachers alike, familiarity with technology, applications, and programs made remote learning more challenging.

Social and Academic Interactions. Student responses throughout the Likert survey as well as from the student interviews suggest there were fewer social and academic interactions between students during the remote school year. While the Likert survey questions were tailored more to academic interactions, student interviews revealed significantly more about social interactions while they were remote.

Academically, students work independently of one another more often. Nearly 54.0% of students disagreed in some capacity with the statement that they often complete their classwork within groups compared to the 22.9% of students that agreed, while the remaining proportion of

students remained neutral (Table 6). Furthermore, a significantly larger proportion of students, 60.8%, disagreed in some capacity with the statement that they frequently collaborated and discussed classwork with their peers during remote classes, whereas 18% of students agreed. Nearly the same proportions of students reported the same regarding collaboration outside of class. This data suggests that while working in groups may not have been uncommon, collaboration during and outside of students' remote classes did not occur often. When it did occur, one student emphatically said that "it felt awkward, especially when you didn't know who your classmates were." From a social perspective, data collected from student interviews suggest that remote learning also resulted in fewer student-to-student interactions. Among participants' responses, it was common to find mention of socializing; however, students often reported that they were rarely able to speak with their friends. When asked about the challenges of remote learning, some common responses from students were "not being able to see or interact with my friends," "less social activities", and "you make less friends." These responses, in unison, suggest that students perceived there to be few student-to-student interactions during the remote school year, both in academic and social regards.

Regarding interactions with their teachers, although 56.7% of students reported that they felt comfortable asking their teachers questions in the remote setting, student responses suggest that they did not take teachers up on that offer. Data shows that there was a decline in agreement regarding student use of class time to actively ask teachers questions, to which 32.5% of respondents agreed. It is also important to consider that these responses could also indicate that students who felt comfortable simply did not have questions to ask. Further reflecting on the remote environment, many students described the class discussions on Google Meet as being

daunting. One student said that a challenge of remote learning was “not being able to raise your hand and ask a teacher privately for help. If you need help you have to make the whole class listen to your question.” Another student supported this, saying “it’s awkward since it’s an open mic. When someone speaks, everyone can hear. That just makes me nervous.” This format of communication subjected some students to feelings of anxiety and discomfort while speaking aloud in front of their teacher and peers. Instead, some students remained silent, emailed questions, or requested to join one-on-one Breakout Rooms with their teachers where they could receive individual help. There were challenges in doing this, as some students who sought help through email mentioned that it was difficult “waiting on email responses as opposed to usually being able to just go up to the teacher and ask your questions.” Sometimes when teachers did reply, one student said that teachers “were not specific enough and didn’t answer my questions.” Overall, student survey and interview responses predominantly describe strains in student-teacher interactions during remote learning.

Reushle and Mitchell (2009) described the significance of making the online classroom comfortable for students, stating that it sets the routine that students will follow for the remaining year. Furthermore, Richardson and Swan (2003) also described the need for social presence, stating that without it, students are less likely to participate in class discussions. Ultimately, in reflecting on the data from this study in combination with existing research, some students did not feel comfortable communicating with their classmates or their teacher. This could have decreased social presence, resulting in few student-to-student interactions as well as few student-to-teacher interactions.

Student Autonomy. Student responses throughout this study heavily spoke to the independence that remote learning provided. Studies show that autonomy is one of many important factors needed to develop and encourage student motivation (Lam et al., 2007). For students who prioritized and had good time management skills, the independence that remote learning offered was highly valued. One student stated that “[remote learning] allows you to manage the work you need to do on your own time,” while another student agreed, adding that “there’s more independence and more time to put effort towards a specific class if you want to.” For other students, the autonomy that remote learning provided was too much of a challenge. One student explained that “it’s just super hard to stay focused and motivated to do the assignments and show up for class... It feels optional for some reason too.” These responses were further supported by responses to the Student Likert Survey, where 54% of respondents stated that they did not feel focused in their remote learning environment (Table 5). These responses are likely the result of too much independence for some students since they were no longer in a structured environment where teachers could prompt students to remain on task. One student supported this, stating that “You aren’t as focused because someone isn’t there to tell you to get off your phone and pay attention.” Another student explained these sentiments further, saying that “an element of remote learning that makes it harder is that we are learning alone... and for me, there is no one in the room who would hold me accountable for focusing.” These responses suggest that for students who had not developed strong time management skills, there was not enough structure to support them as they tackled classwork in a new setting with a greater degree of freedom and independence. Ultimately, data collected from student responses

suggest that remote learning provided a great deal of autonomy for students, but not enough structure and support for all students to find success in this autonomy.

Health. An unexpected theme that arose from responses during the student interviews focused on health, in which many students expressed an appreciation for remote. Across the news, social distancing was the message being sent to curb the spread of the COVID-19 virus. One student said that “remote learning keeps us safe from exposure to hundreds of people a day and I appreciate that.” Another student, speaking about the advantages of remote learning, stated that “there aren’t any other than the obvious safety benefits during the pandemic.” Overall, it appeared as though a small group of students appreciated the safety that remote learning provided, but it was not a focal point in student responses regarding health.

Instead, many students emphasized that they appreciated how remote learning was more physically comfortable compared to attending school in-person. One student said that emphasized that an advantage of remote learning included that “we can sleep in, and we can attend school from the comfort of our own home. Also, we can stay in PJs all day if we really want to.” Most students also described sleeping in later in the morning as being the most comfortable part. While mention of being comfortable was common, another comment frequently mentioned by students was regarding their screen time. One student complained about “constantly looking at the screen for six hours straight” while another stated that it gave “headaches from so much screen usage.” Although remote learning provided physical comfort regarding their choice in sleeping in, wearing comfortable clothes, and learning wherever they wanted while at home, there was also discomfort because of screen time.

Teacher Themes

Overall, four recurring themes were apparent in teacher responses during the open-ended questions of the Teacher Likert Survey as well as from the Teacher Interviews. These themes included technology, student involvement, relationships and support systems, and evaluating student progress and learning.

Technology. In their responses to the Teacher Interview, technology was often mentioned as being helpful but with the caveat of being unpredictable. Teachers appreciated the simplicity of Google Classroom for its organization on both the student and teacher end. A teacher reported that “some students were much more organized without the hassle of having to lug a backpack around. The assignments were in front of them, and they were able to follow the timelines easier.” In addition to the benefits of organization, teachers also expressed that student work was more understandable because of “having the student’s work typed instead of trying to read their handwriting.” Ultimately, the organization of Google Classroom made classes run smoothly for students and teachers because for both, “it was easy to keep track of assignments and missing work.” In contrast to the benefits of technology, several teachers remarked concerns regarding student familiarity with technology as well as their own, suggesting a disparity among individuals within both populations. One teacher said that “some students had never used computers this often and really struggled.” Reflecting on how this could potentially impact student engagement and communication, misunderstanding how technology works – whether a device or program – could be detrimental to a student’s ability to interact with their peers and their coursework. Familiarity and comfort with materials are vital components of remote learning.

Student Involvement. In their responses to the Teacher Likert Survey and Teacher Interview, teachers emphasized that the remote school year lacked student participation compared to previous school years. Teacher responses suggest that from their perspective, students did not participate as often in their classes, especially regarding verbal discussions, as 65.1% of teachers agreed upon in the Likert survey. During interviews, lack of participation was brought up and one teacher said that “it made remote learning more teacher-driven because educators were trying to make up for the lack of verbal responses from their students.” Another factor that likely impacted participation was absenteeism. Teachers frequently remarked during the interview that students were often absent from their Google Meets or walked away from their devices without warning. One teacher stated that “student absences were at an all-time high.” Additionally, after the first few weeks of school, many students did not feel obligated or required to keep their cameras on. Teachers emphasized there was a change in their presence as a result. “My sophomores do not turn their cameras on or participate. It feels like talking to a wall.” Other teachers added that “students who may struggle with motivation or who may need more step by step help seem to disengage easier while remote.” Considering the challenges that students faced with participation and attendance, prior research on social presence by Richardson and Swan (2003) is relevant; they describe social presence as being an important factor of online courses and is linked to student motivation. During remote learning, increased absenteeism and decreased participation, as described by teachers, could have contributed to an online climate that lacked social presence. This suggests that without a tangible social presence among students, there was less motivation to participate and involve themselves in their online classes.

Relationships and Support Systems. Data collected from this study suggests that from the teachers' perspectives, there were fewer student-to-student and student-to-teacher interactions during remote learning. Although some teachers stated in interviews that remote learning was convenient for collaboration, there was an overall higher frequency in the number of teachers who disagreed with the statement that students frequently collaborated; only 17.5% agreed that collaboration existed during class, whereas 15.9% agreed that collaboration existed outside of class (Table 7). While this study did not assess the capacity in which opportunities for collaboration existed, teachers reported that when opportunities were present, collaboration was challenging: "Students who did not know each other barely spoke, and some students who worked together just copied one another." Behaviors like these better represent group work than collaboration. In part, referencing back to the theme of student involvement, without cameras on and with limited participation, teachers stated that it seemed impossible for students to read social cues. One teacher even described students as hiding behind icons without their cameras on, while another teacher added that "if they think no one can see them then it is an easy step to think they are invisible and no one cares." If participation was an issue during remote learning and establishing relationships was also a challenge, it stands to reason that certain students would struggle more than others in the remote setting. Quieter, introverted students who did not know their classmates likely faced more social challenges than their extroverted peers. One teacher alluded to this by explaining that "extroverted students or even students who knew their classmates were able to find opportunities to talk with their classmates and friends."

Regarding interactions between students and their teachers, responses implied from the Teacher Likert Survey that a good portion of teachers did not know their students well.

Additionally, they felt as though students did not actively use their class time to communicate with their teacher (Table 9). One teacher reflected upon prior years of teaching, stating that “I knew half of my students from previous classes which was an advantage. I knew them, their personalities, their strengths, their weaknesses. I feel that I still do not know the other students. I don’t know their personalities, I can’t see their struggle or know when they need assistance or redirection. Many of them are just icons on a screen.” It seems that a variety of factors are involved in the lack of relationships, some of which involve attendance, participation, and social presence during remote learning.

In addition to interactions that occurred during remote classes, a subtheme among their responses to the Teacher Interviews also suggested a lack of support for teachers from both administration and families. Martin and Torres (2016) as well as Lam et al. (2009) emphasized the importance of these roles as part of the larger picture in student engagement, and that each role is vital. For teachers in this study, their responses suggest that they were supported in a variety of ways but specifically wanted more support reinforcing expectations for students to follow while learning remotely. This involved the notion to students that they could get away with anything. “Students believe that they’ll get passed along like they did last year when remote learning started.” Teachers listed expectations that they wanted support with, including logging into students’ Google Meets on time, keeping their cameras on, being present for the duration of each class, doing their classwork while school was in session, and avoiding distractions as much as possible. For parents, teachers wished that some at-home responsibilities were not forced upon students. “I have kids who babysit brothers and sisters and frequently do chores during school.” Some teachers appeared to be understanding of the challenge that the administration and parents

were, too, facing. “I think that we just need to come together as a community and communicate the same message to kids. They need to be here, not just physically in the meet but also mentally.” Reflecting on these remarks, consistent messages from all parties in a student’s learning environment have the potential to better reinforce expectations. Nonetheless, from the teacher’s perspective, the data suggests that fewer relationships existed during remote learning and more consistent support could have been provided.

Evaluating Student Progress and Learning. For teachers, assessing a student’s understanding of a topic was a challenge during remote learning. A lack of familiarity with technology and existing online resources was one challenge that educators faced. Additionally, because interactions with students were limited, it was difficult to assess students using the same strategies that are typically effective while learning in person. Without being in person, one teacher said that “I have trouble helping students when they are struggling and sometimes by the time I know they are struggling it’s too late.” Furthermore, as teachers stated in their interviews and surveys, students spoke less often, forcing teachers to speak more in an attempt to carry out the discussion. Looking at work that students turn in is not enough to sufficiently understand whether they know the material; conversation is just as important a tool. With limited verbal communication, using conversation as a formative assessment tool became less effective because fewer students were participating in remote class discussions. As such, assessing students through remote surveys, activities, and quizzes became more common, focusing on quality over quantity. From my experience as a teacher, I also know that I focused more on the big pictures that each unit had rather than all the minute details. Checking in on student progress and their work was also difficult, as some teachers said, because proximity no longer included leaning

over a student's shoulder to see what they were thinking or writing; instead, proximity involved looking at a remote document without seeing the writer and wondering, what do they genuinely know?

Remote assignments stood out in contrast to those normally completed in person, and many science teachers emphasized that their content “felt less engaging without the labs” and hands-on experiences that their subject area normally provided. Replicating the in-person experience was nearly impossible, and remote learning portrayed education in an entirely new light. One teacher summarized remote learning as a “shift from application back to memorization,” which newer educational standards and practices discourage. This could perhaps explain the increased plagiarism that teachers noticed while teaching remotely, another common remark made during the interviews. “Students just screenshot their work and send it to their friends.” While this study did not examine the assignments students completed during the remote year, questions without higher-order thinking skills might have focused more on recall than application. Thus, student work could have been more accessible to google and research. Some teachers suggested that although they applied their best efforts, they could do little to maintain student focus and attention. A higher proportion of teachers from the Likert Survey indicated that students were not invested in their remote learning either.

Key Similarities and Differences Between Students and Teachers Regarding Remote Learning During the COVID-19 Pandemic

In examining the data from each instrument and gaining insight into students' and teachers' perspectives, what stood out most was how vast and unique everyone's experience was with remote learning. While each student and teacher could tell a story of their own, among their

experiences arose a variety of similarities and differences regarding student engagement and communication during the 2020/2021 school year.

Similarities. Although students and teachers alike generally agreed that students attended most of their remote classes, teachers' responses showed a greater range of agreement while student responses were more consistent. Both students and teachers also agreed that students did not feel focused during remote learning. This was expressed in the Likert Surveys and was frequently mentioned during individual interviews with both research populations. Regarding their understanding of classwork and directions, the proportion of students that found directions easy to understand for their assignments was nearly equal to the proportion of students that did not. Teachers responded similarly. Additionally, students and teachers alike expressed similar responses regarding the active use of class time to ask questions; a similar proportion of students and teachers both disagreed that class time was actively used. Despite this, there was a diverse array of student and teacher responses regarding how frequently students communicated with their teachers. This difference in the use of active class time compared to the frequency in communication makes sense when considering how comfortable students were actively talking aloud with their teachers; most reported that they were uncomfortable doing so. Communicating, however, could also be achieved through Google Meet chat, Google Classroom, or email as alternatives. Regarding classmates and collaboration, students and teachers shared similar responses that classwork was not completed within groups during or outside of class. This was often supported by comments made by students and teachers that the format of Google Meet made it daunting to speak aloud while everyone could hear. An unfortunate but similar response arose regarding student-teacher relationships; nearly half of the students that participated in the

Likert Survey stated they felt that their teachers did not know them well as students. Similarly, more teachers agreed with this statement while a significant portion of students and teachers felt neutral in this regard. Limited opportunities to speak to one another outside of the academic context likely contributed to these shared feelings.

Differences. Upon examining the data for the Student and Teacher Likert Surveys, the greatest disparity in responses appears to be the degree of agreement. Although most student and teacher responses fell within similar ranges, teachers tended to disagree with statements to a greater extent than students did. Overall, regarding whether students enjoyed remote learning, there was a general difference in student and teacher responses. The proportion of students that found remote learning enjoyable was nearly equal to the proportion of students that did not. Furthermore, while students and teachers generally expressed that students did not find remote learning preferable, student responses were more split. From this perspective, this could speak to the self-motivated introverts that found success in the school year and thrived with the autonomy and independence that remote learning provided. One surprising aspect of students' responses that remains unclear is in regard to their participation in verbal discussions during remote learning. On the Likert Survey, the proportion of students that felt as though they did participate in this regard was nearly equal to the proportion of students that did not. This is surprisingly relative to the student interviews that took place because students commonly discussed how talking during their classes over Google Meet was awkward and difficult. Students' responses during the interview coincide better with teachers' responses on both their Likert Survey as well as their interviews. Another difference that stood out was regarding effort. Generally speaking, in the Likert Survey a larger proportion of students expressed that they applied their best efforts as

they completed their remote learning assignments. Teachers generally disagreed with this statement; however, a large proportion of teachers remained neutral in this regard. In connecting these efforts to the difficulty of classwork, students were split in agreement regarding how challenging that work was. Teachers, on the other hand, strongly expressed that remote learning was challenging for their students.

Recommendations to Future Online Educators

Reflecting on how similar the shared experiences were between students and their teachers during the remote school year, there are a variety of recommendations I would like to suggest to improve future remote endeavors, especially regarding student engagement and communication in the classroom setting.

First and foremost, to future online educators – learn who your students are as people first and learners second. Then, of course, allow them to learn who their classmates are and, ultimately, who you are along the way. Course curriculum can be hard enough to learn in person, never mind remotely; it is arguably more challenging when the two most important aspects of the learning environment are separate from one another. Establishing a social presence among students is self-sustaining in the sense that they will be motivated by their peers' involvement and participation in the remote setting. Relationships are important and the more familiar students are with their classmates and teacher, the more likely they are to interact with one another and you as their teacher.

Second, establish an atmosphere that promotes an open dialogue in the remote classroom. Relationships must come first and routines second. Students need to trust that they can speak aloud in a remote setting without fear of ridicule from you or their classmates. Schedule specific

times during class for students to interact with one another, talk aloud, and share ideas. Develop rotating groups so that students can learn how to talk to their classmates, and over time gradually change those groups so students interact with each other more often.

Third, openly ask what is and is not working for them as remote learners. Own your mistakes and talk about them so that students can see you are human, too, and are both reflective and willing to change for the sake of their benefit. This will especially help them reflect on their strengths and weaknesses, but also provide you with useful information about what they enjoy and will engage with more. Chat with students, each and every one of them, as often as you can so that no student feels hidden behind an icon, even if they want to. Those small conversations and check-ins are essential to develop relationships with students and to help them establish better time management skills. With so much independence and autonomy, students need some structure and guidance. Students appreciate flexibility but it needs to be balanced; too much and students lose focus, but too little and they feel as though they lose their voice.

Lastly, make your content as relatable as possible and show your passion for class topics. Get excited! You will be pleasantly surprised by how contagious excitement can be and how awesome real-life connections are. Take the remote learning experience day by day.

Value of the Study and Consideration for Future Research

I think all educators would agree that remote learning has incredible tools at its disposal, from the online gradebook and feedback to the central location of reminders, supplemental materials, and assignments on Google Classroom... The list of tools is endless. From my perspective as an educator, the organizational aspects of remote learning that made students more organized and self-aware of their work were phenomenal. Additionally, the autonomy that it

provided gave many students a feeling of confidence regarding their work and use of time.

Despite its resources, convenience, and opportunities, I do not think that remote learning can replace the in-person experience without major adjustments – in particular, adjustments made to the social interactions that take place in the classroom setting.

As educators, we heavily rely on communication to learn who our students are as people and as learners. When that interaction is restricted or unclear, it is difficult to effectively communicate. For remote learning to be as effective as the in-person setting, or more effective than it was in my experience, clear routines need to be set in place to ensure that students understand what is expected of them. Reflecting on comments made by teachers in my survey and interviews, inconsistent expectations, and lack of reinforcement regarding these expectations made it difficult for students to hold themselves accountable and learn. As teachers, we are only able to hold ourselves responsible for enforcing these expectations in our own classroom; as a community, however, we can accomplish so much more. We also need the support of our administration and our students' families to uphold and reinforce the expectations we all agree upon. Developing a clear plan and list of common expectations and practices as a community reinforces the shared idea of what remote learning should and could be across the board. This should be taken into consideration before students shift from an in-person to a remote setting.

In reflecting on this project, I cannot say for certain when remote learning will appear again in the same capacity that it did during the COVID-19 pandemic. Regardless of that, remote learning will always exist in some capacity. This study, while exploring student engagement and communication, only applies to the student experience in Leominster. In my district, the student's experiences likely varied by grade level and by teacher too; there are simply too many

variables to consider. To better investigate how remote learning impacted students' engagement and communication, it would be helpful to narrow down variables of focus, such as the course subject or classroom instruction strategies. This study viewed, although broad in theory, only gained a sliver of perspective to truly evaluate whether students were engaged in every sense of the term. More can be evaluated to understand the whole picture of the student experience.

Impact of Action Research on the Author

As a young educator with seven years of experience in the teaching field, remote learning has been the hardest obstacle to get through and move on from. As a society, even two years after its start I do not think we fully understand the impact that the pandemic has had on education; however, we are just beginning to find out. Exploring how remote learning has impacted student engagement and communication has been eye-opening, especially regarding the similarities and differences in perception between students and teachers. In short, I can say that each student's experience with remote learning was their own. To some, it worked well; for others, it did not. Regardless of who found the most success, remote learning can be an effective tool when carefully organized. As a teacher, I did not personally hate or enjoy the remote experience. I have also not yet figured out my rhythm to remote teaching. Despite this, I better understand which aspects of the remote setting were lacking from students' and teachers' experiences: relationships. That alone is a win in my book, and I can use that as an advantage for future remote endeavors. This action research project was challenging to balance alongside my career, but I found its reflective nature to be refreshing, awesome, and hopeful. There is always something we can learn when we reflect on the past and explore options for the future.

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APPENDICES

APPENDIX A

IRB Exemption Form



INSTITUTIONAL REVIEW BOARD
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MEMORANDUM

TO: Dylan Gamache and Marcie Reuer

FROM: Mark Quinn *Mark Quinn CJ*
 Chair, Institutional Review Board for the Protection of Human Subjects

DATE: December 1, 2020

RE: "Exploring the Impact of Remote Learning on Student Engagement and Communication" [DG120120-EX]

The above research, described in your submission of November 30, 2020, is exempt from the requirement of review by the Institutional Review Board in accordance with the Code of Federal regulations, Part 46, section 101. The specific paragraph which applies to your research is:

- (b) (1) Research conducted in established or commonly accepted educational settings, involving normal educational practices such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
- (b) (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation; and (iii) the information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by section 16.111(a)(7).
- (b) (3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
- (b) (4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available, or if the information is recorded by the investigator in such a manner that the subjects cannot be identified, directly or through identifiers linked to the subjects.
- (b) (5) Research and demonstration projects, which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.
- (b) (6) Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed, or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the FDA, or approved by the EPA, or the Food Safety and Inspection Service of the USDA.

Although review by the Institutional Review Board is not required for the above research, the Committee will be glad to review it. If you wish a review and committee approval, please submit 3 copies of the usual application form and it will be processed by expedited review.

APPENDIX B

DATA COLLECTION INSTRUMENT #1

Instrument #1: Student Survey Questions

Please complete the survey by reading each statement and circling the degree to which you agree or disagree with that statement.

- | | | | | | | |
|-----|---|----------------|-------|---------|----------|-------------------|
| 1. | I enjoy remote learning. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 2. | I prefer learning in a remote setting. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 3. | I think remote learning is challenging. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 4. | I feel invested in my remote classwork. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 5. | I frequently collaborate and discuss classwork with my peers <i>during</i> my remote classes. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 6. | I frequently participate in my remote classes. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 7. | I frequently collaborate and discuss classwork with my peers <i>outside</i> of my remote classes. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 8. | I communicate frequently with my teachers during remote learning. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 9. | I find it easy to understand directions for my assignments during remote learning. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 10. | I often complete my classwork within groups during remote learning. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 11. | I attend the majority of my remote classes. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 12. | I feel my teachers know me very well as a student in a remote learning setting. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 13. | I feel focused in a remote learning environment. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |

14. I actively use my remote class time to ask my teacher questions.
 Strongly Agree Agree Neutral Disagree Strongly Disagree
15. I feel as though my surroundings positively impact my success during remote learning.
 Strongly Agree Agree Neutral Disagree Strongly Disagree
16. I'm able to comfortably ask my teachers questions in a remote learning setting.
 Strongly Agree Agree Neutral Disagree Strongly Disagree
17. I put forth my best efforts as I complete my remote learning assignments.
 Strongly Agree Agree Neutral Disagree Strongly Disagree
18. I frequently participate in verbal discussions during remote learning.
 Strongly Agree Agree Neutral Disagree Strongly Disagree

Open-Ended Questions

19. How do you think remote learning has affected your attitude toward each of your classes?
20. What are the advantages of remote learning?
21. What are the disadvantages of remote learning?
22. What elements of remote instruction makes learning easier?
23. What elements of remote instruction makes learning harder?

APPENDIX C

DATA COLLECTION INSTRUMENT #2

Instrument #2: Student Interview Questions

1. How has your remote learning experience been so far?
2. Describe what a typical day of remote learning is like from your perspective.
 - How do classes typically start?
 - What types of activities do you complete?
 - Are these activities completed independently or in groups?
 - Which classes?
3. How often do you verbally talk to your teacher during remote learning? Other students?
 - How often do you email your teacher during remote learning?
4. Do you find yourself engaged in remote learning activities? Why or why not?
5. What aspects of remote learning have been positive? Why?
 - What aspects of remote learning have been negative? Why?

APPENDIX D

DATA COLLECTION INSTRUMENT #3

Instrument #3: Teacher Survey Questions

- | | | | | | | |
|-----|--|----------------|-------|---------|----------|-------------------|
| 1. | I think my students enjoy remote learning. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 2. | I think my students prefer learning in a remote setting. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 3. | I think remote learning is challenging for my students. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 4. | I think students are invested in their remote classwork. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 5. | Students frequently collaborate and discuss classwork with their peers <i>during</i> remote classes. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 6. | Students frequently participate in my remote classes. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 7. | Students collaborate and discuss classwork with their peers <i>outside</i> of my remote classes. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 8. | Students communicate frequently with me during remote learning. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 9. | Students find it easy to understand directions for their assignments during remote learning. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 10. | Students often complete their classwork within groups during remote learning. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 11. | Students attend the majority of my remote classes. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 12. | I feel as though I know my students very well in the remote learning setting. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 13. | The majority of students seem focused in a remote learning environment. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 14. | Students actively use my remote class time to ask me questions. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |

15. Students' surroundings seem to positively impact their success during remote learning.
 Strongly Agree Agree Neutral Disagree Strongly Disagree
16. Students feel comfortable asking me questions in the remote learning setting.
 Strongly Agree Agree Neutral Disagree Strongly Disagree
17. Students put forth their best efforts as they complete their remote learning assignments.
 Strongly Agree Agree Neutral Disagree Strongly Disagree
18. Students frequently participate in verbal discussions during remote learning.
 Strongly Agree Agree Neutral Disagree Strongly Disagree

Open-Ended Questions

Please complete the survey by reading each question and responding with as much detail as you think is necessary to answer each question.

1. How do you think remote learning has affected your students' attitudes toward your class?
2. What are the advantages of remote learning?
3. What are the disadvantages of remote learning?
4. What elements of remote instruction makes learning easier?
5. What elements of remote instruction makes learning harder?

APPENDIX E

DATA COLLECTION INSTRUMENT #4

Instrument #4: Teacher Interview Questions

1. From your experience, how has remote learning affected student engagement? Are they more or less engaged, and in what ways?
 - Which activities/strategies appear to be working well? Which don't?
2. How often do students reach out to ask questions or seek help? Are they? If so, in what ways and how often?
3. Do you feel as though you've been able to get to know your students in the remote setting?
4. What is student attendance like in your classes?
5. In what ways do students communicate with one another during your classes? Do they collaborate with each other and, if so, in what ways?
6. What aspects of a remote setting have made learning easier for students? More difficult?
 - How have you approached these challenges?
7. How has student engagement during remote learning affected their performance and understanding of content?