

**Impact of a Remote Learning Environment for High School Student
Academic Engagement**

by

Lorien Carnahan Moyer

Bachelor of Arts, West Liberty University, 2004

Master of Education, University of Pittsburgh, 2007

Submitted to the Graduate Faculty of the
School of Education in partial fulfillment
of the requirements for the degree of
Doctor of Education

University of Pittsburgh

2022

UNIVERSITY OF PITTSBURGH

SCHOOL OF EDUCATION

This dissertation was presented

by

Lorien Carnahan Moyer

It was defended on

February 18, 2022

and approved by

Robert Isherwood, Ed.D., Associate Professor of Special Education, Slippery Rock University

Amy Srsic, Ed.D., Clinical Assistant Professor, Department of Teaching, Learning, and Leading

Dissertation Director: Diane L. Kirk, Ph.D., Clinical Associate Professor, Department of

Teaching, Learning, and Leading

Copyright © by Lorien Carnahan Moyer

2022

Impact of a Remote Learning Environment for High School Student Academic Engagement

Lorien Carnahan Moyer, EdD

University of Pittsburgh, 2022

The goal of this research was to examine teacher perceptions of high school student learning and engagement in the online learning environment due to the COVID-19 pandemic. The research was valuable in order to design, plan for, instruct, and assess students; to make technical, instructional, and student engagement modifications; and to create protocols based on the strengths and needs of online teaching programs, all through the anticipation of virtual learning in future situations.

This study sought to provide insight for school and district leaders to review current programs and policies associated with the remote learning environment and make improvements to those programs and policies. The questions of inquiry for this study were:

- 1) How can teachers successfully assess student engagement in the remote learning environment?
- 2) What skills and professional development do teachers require in order to plan for, instruct, and assess student engagement in the remote learning environment?
- 3) What do teachers perceive as modifications that need to be made in the remote learning environment?

The necessity of this research is apparent as remote learning environments continue to evolve through the COVID-19 pandemic, yet at the school of inquiry there has been limited evaluation of the remote learning environment. Accordingly, this study sought to provide insight

for school and district leaders who desire to refine remote learning environments and improve teaching and learning.

Table of Contents

Preface.....	xi
1.0 Introduction.....	1
1.1 Statement of the Problem	1
1.2 Why Is It a Problem?	8
1.3 Significance of Problem at Place of Practice.....	9
1.3.1 Technical Difficulties	10
1.3.2 Instructional Difficulties.....	10
1.3.3 Engagement Challenges of Students	11
1.4 Inquiry Questions	13
1.5 Definitions of Terms	13
2.0 Review of Literature	19
2.1 Best Practices in Remote Learning Environments.....	23
2.1.1 Planning and Instruction in the Remote Learning Environment.....	23
2.1.1.1 Universal Design for Learning	24
2.1.2 Assessment of Students in the Remote Learning Environment.....	25
2.1.3 Required Skills and Professional Development.....	26
2.2 Best Practices in Student Engagement	26
2.2.1 Methods of Instruction in the Remote Learning Environment	27
2.2.2 Assessment of Student Engagement in the Remote Learning Environment	29
2.2.3 Skills and Professional Development.....	30
2.3 Professional Development.....	30

2.3.1 Rationale for Professional Development	31
2.3.2 Teacher Planning, Instruction, and Assessment	31
2.3.3 Method of Delivering Professional Development	32
2.4 Conclusion	33
3.0 Methodology	35
3.1 Participants	36
3.2 Instrumentation	36
3.2.1 District Data Review	38
3.2.2 Survey	40
3.2.3 Interviews	41
3.3 Data Collection	42
3.4 Data Analysis	43
3.4.1 Survey	43
3.4.2 Interviews	43
3.5 Conclusion	44
4.0 Results	45
4.1 Surveys	45
4.1.1 Participant Demographics, Questions 1, 2, and 3	45
4.1.2 Survey Questions 4, 5, 6, 7, and 8	46
4.1.3 Survey Questions 9, 10, 11, 12, 13, 14, 15, and 16	47
4.1.4 Survey Questions 17, 18, 19, 20, 21, 22, 23, and 24	48
4.1.5 Survey Questions 25, 26, 27, and 28	49
4.2 One-on-One Interviews	50

4.2.1 Participant Demographics, Interview Question 1	50
4.2.2 Interview Questions 2 and 3	50
4.2.3 Interview Questions 4 and 5	51
4.2.4 Interview Questions 6 and 7	53
4.2.5 Interview Questions 8, 9, and 10	54
4.2.6 Interview Question 11	55
4.3 Data Analysis Using National Standards for Quality Online Teaching Framework	56
4.3.1 Digital Pedagogy	58
4.3.2 Diverse Instruction	58
4.3.3 Assessment and Measurement	59
4.4 Conclusion	60
5.0 Summary and Conclusions.....	61
5.1 Summary	61
5.2 Interpretation of Findings	62
5.2.1 Inquiry Question 1	62
5.2.2 Inquiry Question #2	63
5.2.3 Inquiry Question #3	64
5.3 Limitations	65
5.4 Discussion and Future Implications.....	66
Appendix A Letter to Superintendent.....	69
Appendix B Email to Staff in Building of Inquiry – Survey and Interview	70
Appendix C Social Studies Department Survey.....	71

Appendix D Survey	75
Appendix E Interview Questions	87
Appendix F IRB Documentation	90
Bibliography	91

List of Tables

Table 1. Student Instructional Model Explanation and Timeline 4

Table 2. Student Cohort Details 6

Table 3. Student Attendance Tracking 7

Table 4. National Standards for Quality Online Teaching – Standards and Descriptions.. 19

Table 5. National Standards for Quality Online Teaching – Indicators (modified)..... 21

**Table 6. Teacher Years of Experience and Total Years of Teaching at Suburban Pittsburgh
High School..... 45**

**Table 7. Alignment of Interview Questions with Guiding Questions, Inquiry Questions, and
National..... 57**

Preface

“Grow.” This single word describes my doctoral program and research experience. Nothing grows alone, and it is with the love, encouragement, and support of my personal and professional community that I have progressed through this program and research.

To my husband, Sean, and our children, Benjamin, Robert, and Jane Louise (who was born during this process!): my most sincere and genuine gratitude for your selflessness, acceptance, and reassurance throughout the doctoral process. Sean was required to perform extra duties so that I could plunge into coursework and research; only through his efforts was success possible. I love you all forever!

To our family: Thank you for understanding that missing activities, parties, random get-togethers, and trips was only a temporary inconvenience for me to reach success in my doctoral program and research. Thank you for always being my champions, motivating me, and challenging me! Thank you for the hours you occupied my children so that I could study and write. Thank you for letting me cry, but also for making sure that I got right back on “the horse.” I love you (almost) always!

To our friends: Thank you for being true to us. Thank you for forcing me to still make a little time for fun throughout the program and research. Thank you for caring for my children as if they were your own, and for occupying Sean, too! Thank you for letting me vent... and then empowering me. I appreciate you and I love you!

To my dad, Thomas D. Carnahan, III, (12/25/1955-05/15/2008): Thank you for being the epitome of a professional – to be both human and kind. Thank you for teaching me discipline, perseverance, and how to properly celebrate ☺. I love you and miss you forever.

To my advisor, Dr. Diane Kirk: Your tenacity, fervor, and knowledge inspire me to be a consummate mother, educator, and mentor. My compliments of and thanks to you are incalculable. I appreciate you!

To my committee, Dr. Robert Isherwood and Dr. Amy Srsic: When my topic changed completely, you vowed to remain on my committee. I am grateful that you did, because through suggestions and conversations with you, my study was more comprehensive. Thank you for being a respected part of my professional network. I appreciate you!

1.0 Introduction

On Friday, March 13, 2020, due to the rapid spread of the COVID-19 virus, Pennsylvania Governor Tom Wolf announced, “I am ordering that all schools in the Commonwealth close for the next two weeks” (Pennsylvania State Government, Office of the Governor, 2020). The abrupt closure of traditional brick and mortar schools required districts to determine a method by which to provide education to students in a safe, remote learning environment. Thus, school districts “opened” virtual learning environments in order to remotely instruct and assess students. Some of the more popular platforms for online learning environments included Zoom and Google Meet to create “class” in combination with Canvas, Edmentum, and Google Classroom as course management systems.

The purpose of this study is to examine teacher perceptions of high school student learning and engagement in the online learning environment during the COVID-19 pandemic. The examination will review planned academic programming, which will provide insight into the instruction provided to students through online learning. The research associated with this study is valuable in order to design, plan for, instruct, and assess students through virtual learning in future situations.

1.1 Statement of the Problem

During the COVID-19 pandemic and the transition to remote learning, teachers in Suburban Pittsburgh School District perceived a decline in student learning and academic engagement.

Engagement is defined as instructional, emotional, and organizational interactions in a classroom, particularly between the teacher and the students (Wang, Hofkins, & Ye, 2020). For the purposes of this study, student engagement is characterized by student academic activity and participation through attendance, contributions during instructional time, and performance on assessments.

Previous community expectations for exemplary practices were unsustainable during asynchronous remote learning. In an educational setting where the teacher and the students do not have simultaneous interaction, asynchronous learning happens. During asynchronous learning, students also do not have any interaction with other students; rather, they work independently and are self-paced.

Beginning on March 16, 2020 and lasting through the school year, Suburban Pittsburgh School District students were provided remote learning without the opportunity for synchronous instruction or assessment. For Suburban Pittsburgh School District students, only asynchronous instruction was available during the spring 2020 COVID-19 shutdowns; therefore, students experienced no teacher-student or student-student face-to-face time.

The district and community expectations of rigor in instruction and assessment posed a challenge to teachers, most of whom were confronting asynchronous instruction for the first time. Teachers differed in how they treated planning for, instructing, and assessing students and student engagement, instead experimenting with methods of instruction and assessment in the asynchronous learning environment. This planning included limiting daily student work to 15 to 30 minutes for each class, whereas, in traditional practice, Suburban Pittsburgh High School class periods are two to three times longer at 45 minutes; that amount of time does not include time students spend completing work outside of each 45-minute class period. Without

synchronous instruction or assessment, teachers evaluated student engagement through what was available to them, which often consisted only of digital submission of work.

An additional change during the spring 2020 semester was the issuance of pass/fail grades, which differed from the typical letter grading system of Suburban Pittsburgh High School. The modification of teachers' techniques in planning, instructing, and assessing was necessary due to the reduction in instructional and assessment times for students. Unwavering, however, were school and community expectations for rigor in instruction and assessment. Due to teachers not being able to perform in the ways that they had in years past, the new remote learning posture changed teachers' responsiveness to school and community norms. The responsiveness in planning was designed to fit the mandatory remote learning environment brought on by the COVID-19 pandemic, but, for some students, the elimination of face-to-face learning nearly eradicated student academic engagement.

During the 2019-2020 school year and throughout the COVID-19 pandemic, Suburban Pittsburgh High School teachers and students experienced numerous instructional settings, methods of participation, and types of learning. Although the school attempted to provide exemplary instruction throughout the pandemic, six changes in instructional settings coincided with challenges to both teacher and student preparedness. The following table illustrates the multiple changes that took place for teachers and students from March 2020 to March 2021.

Table 1. Student Instructional Model Explanation and Timeline

Date	Instructional Setting	Participation	Type of Learning	Other Details
August 2019 through March 13, 2020	In person	All students and teachers participate in person	Synchronous	
March 16, 2020 through June 2020	Remote	All students and teachers participate 100% remotely	Asynchronous only	Mandated closure of school by the State of Pennsylvania. Attendance data not collected
June 2020				Pass/Fail grades issued for all students
August 2020	Remote	All students participate 100% remotely	Synchronous; asynchronous if chosen by the individual teacher	Use of cameras not required of students Attendance data collected
October 2020	Hybrid	Students elect to participate 2-days/week in person, or students elect to participate 100% remotely	Synchronous; asynchronous as determined by the individual teacher	Use of cameras not required of students who participated in remote instructional setting “Present virtual” option for attendance
November 2020	Remote	All students and teachers participate 100% remotely	Synchronous; asynchronous if chosen by the individual teacher	Use of cameras not required of students
January 2021	Hybrid	Students elect to participate 2-days/week in person, or students elect to participate 100% remotely	Synchronous; asynchronous as determined by the individual teacher	All students participate in 100% remote learning on Wednesdays Beginning on January 21, use of cameras required of students who participated in remote instructional setting

Table 1 continued

January 13, 2021 February 24, 2021 March 17, 2021	Intervention and Recovery Learning Services days Remote for Students	All students participate 100% remotely		Students could access their teacher and/or school counselor to: support and address their individual learning needs; obtain additional support; address deficient assignments or assessments; and discuss academic, collegiate, and/or social and emotional needs.
March 1, 2021	Enhanced hybrid 1.0	Students elect to participate in 4-days/week in person, 2-days/week in person, or to participate 100% remotely	Synchronous	ALL students participate in remote learning on Wednesdays
March 29, 2021	Enhanced hybrid 2.0	Students who were participating in 4-days/week in person instruction increased to 5-days/week; options for 2-days/week in person or 100% remote still available	Synchronous	

During the 2019-2020 school year and through the COVID-19 pandemic, as remote learning conditions continued, Suburban Pittsburgh High School offered students a variety of options for participation in instructional settings (Table 1). Table 2 details the participation options available to student cohorts, each of which represents a grouping of students by school participation options during the COVID-19 pandemic.

Table 2. Student Cohort Details

Cohort	Attendance	Who	Other Details
A	2-days/week (Mondays and Tuesdays) in person	Students with last names A through L	
B	2-days/week (Thursdays and Fridays) in person	Students with last names M through Z	
C	Full remote	Any student	
D	4-days/week (Mondays, Tuesdays, Thursdays, and Fridays)	Students with Individualized Education Plans (IEPs) and English Learners (ELs) assigned to attend 4-days/week in person, based on need as determined through team meeting As of March 1, 2021, 4-day/week in-person option open to all students through “Enhanced Hybrid 1.0”	As of March 29, 2021, students who were participating in 4-days/week in person instruction increased to 5-days/week through “Enhanced Hybrid 2.0”

Throughout the assorted instructional settings implemented during the COVID-19 pandemic, Suburban Pittsburgh High School tracked student attendance using various methods. Table 3 details methods of tracking individual student attendance during the pandemic.

Table 3. Student Attendance Tracking

Date	Attendance Tracking	Other Details
March 16, 2020 – June 2020	Attendance data not collected; all students reported as in attendance for state reporting	All students participated virtually; all learning was asynchronous
2020-2021 school year	Attendance data collected	In addition to daily attendance data, each period of attendance data also collected
October 5, 2020 – end of 2020-2021 school year	Attendance data collected “Present Virtual” code introduced	Code used to indicate that student was scheduled to be present in the physical classroom but participated virtually

Consultation with the Pennsylvania Department of Health and the Allegheny County Health Department informed the decision of Suburban Pittsburgh School District to begin the 2020-21 school year with fully remote learning (Suburban Pittsburgh School District, Office of the Superintendent, 2020a). A fully remote learning environment indicates learning that takes place solely in the cyber environment. Unlike the spring semester of 2020, during which only asynchronous instruction was offered, synchronous online instruction and assessment was permitted in Fall 2020. Teachers identified synchronous instruction and assessment as crucial to mitigate student absences and to increase student accountability for engagement. Additionally, student attendance was documented for each class period of each school day (eight periods daily of 45 minutes each), with the exception of lunch and study hall, and the traditional letter grading system (A, B, C, D, E) was restored. Students were not mandated to use the cameras on their devices, which often led to teachers looking at many “black boxes” rather than student faces on a screen.

This study investigates how teachers assess student engagement in the remote learning environment. It correspondingly investigates the skills teachers must demonstrate in order to plan

for, instruct, and assess student engagement in the remote learning environment. Challenges and difficulties in the remote learning environment are considered.

1.2 Why Is It a Problem?

For the purposes of this study, student engagement is defined as the academic activity and participation of students through attendance, contributions during instructional time, and performance on assessment. The academic engagement of students – thoughts, feelings, and behaviors – has “direct correlation to success on assessments, attendance, and relationships” (Combs, 2020). At Suburban Pittsburgh High School, multiple changes in instructional setting and delivery methods during the COVID-19 pandemic affected both students and teachers.

Prior to the COVID-19 pandemic, students at Suburban Pittsburgh High School did not receive any instruction in the online environment; all instruction was face-to-face. Assessments were rarely administered online; when this occurred, the assessments were still completed during regular class time in the building. Compulsory attendance requirements did not include options for remote or asynchronous school attendance options. For these reasons, the rapid switch to online learning left students unfamiliar with expectations for online participation, engagement, and learning.

Teachers in Suburban Pittsburgh School District, also impacted by the rapid switch to online learning, perceived a decline in student participation, academic engagement, and learning in the online environment. Due to school closures associated with the pandemic, teachers had to plan for, instruct, and assess using blended learning, or both in-person and online learning. While teachers familiar with planning, instructing, and assessing in multiple learning modalities

transitioned smoothly to remote learning, other teachers were abruptly and unwillingly forced into planning, instructing, and assessing using blended learning. Traditional measures of student assessment were substituted with less rigorous and more standardized measures, partially attributable to teachers' inexperience with planning, instructing, and assessing in a fully remote setting. At the time of this research, the COVID-19 pandemic persists, and planning, instruction, and assessment are delivered at least partially via "remote learning" by all Suburban Pittsburgh High School teachers. There is currently no consistent method for teachers to plan for, instruct, and assess students in the remote learning environment. Teachers have not been provided with regular collaborative planning time or professional development opportunities, which would benefit the teachers and students if "deliberative and meaningful" (Tichenor & Tichenor, p. 141).

The COVID-19 pandemic presented (and continues to present) a number of challenges to both students and teachers, particularly in the remote learning environment. Since future remote learning is probable, it is imperative that student academic engagement is enriched in the remote learning environment.

1.3 Significance of Problem at Place of Practice

As noted by students, teachers, and parents of Suburban Pittsburgh School District, the challenges associated with the remote and hybrid learning environments were contributing factors to the breakdown in student engagement and attendance. Some of these challenges included technical difficulties faced by students, instructional difficulties faced by teachers, and engagement challenges of students.

1.3.1 Technical Difficulties

Students in the remote learning environment were frequently “kicked out of” or “frozen in” the virtual classroom due to interruptions in internet service or lack of internet bandwidth, which prevented students from being consistently online during virtual class. Students reported trouble hearing conversations between the in-person and the remote learning environments, and also reported challenges when attempting to complete group discussion, activities, or assessments in groups blended between the in-person and remote learning environments.

1.3.2 Instructional Difficulties

Planning and preparing for instruction in two simultaneous models of delivery, hybrid and cyber, was an impediment to teachers during the pandemic. Upon partial return to the brick-and-mortar school, teachers concurrently worked with students in the physical classroom and in the remote learning classroom utilizing Google Meet or Zoom. Teachers expressed difficulties in designing instruction and activities that could be completed both in-person and virtually; in making materials accessible, such as through both physical and virtual documents (e.g., with Google Classroom); in grouping students, such as in groups blended between the in-person and remote learning environments; and in fairly and equitably assessing students in-person versus virtually.

Students – sometimes the majority of the class – resisted the use of the camera and chat features, leaving the teacher to instruct only to “tiny black boxes” and receive no student input. The choice of students not to use the camera and chat features led to fewer student-to-student interactions, including for discussion, tutoring, and group tasks.

A final challenge during hybrid instruction emerged due to teachers working in the fully remote setting – from home – while students participated both in the physical classroom and virtually. In these circumstances, students in the physical classroom were supervised by a classroom monitor; the role of the classroom monitor was to watch students and troubleshoot any classroom technological issues. The teacher of record participated remotely via virtual platforms such as Zoom or Google Meet. The teacher was projected onto a “screen” in the classroom, which students online and in the physical classroom viewed. Students identified this method as challenging because they were still “looking at a screen” to interact with the teacher.

1.3.3 Engagement Challenges of Students

Technical and instructional difficulties challenged students’ engagement in the remote and hybrid learning environments. For students and teachers in Suburban Pittsburgh High School, many changes – up to six from March 2020 to March 2021 – in the instructional setting during the pandemic exacerbated challenges with teachers’ ability to plan for student engagement in the remote environment.

At Suburban Pittsburgh High School, the Social Studies Department expressed concern for poor student engagement in the remote learning environment. For this reason, in the fall of 2020, the Social Studies Department faculty conducted informal surveys of students in order to better understand students’ perceptions of instruction, assessment, and engagement in the remote learning environment. Based on these surveys, the Social Studies Department found that students were not engaged in education while in the remote learning setting. Some students identified reasons for disengagement as distraction; teachers not instructing in a way that is meaningful to the student or not understanding what the teacher expects of the student; social

discomfort from being viewed on the screen, and, therefore, choosing not to use the camera; and general mental health concerns, such as anxiety and depression. Similarly, surveys administered by the central office administration to Suburban Pittsburgh High School teachers indicated that students were not engaged because they were distracted by their surroundings, did not use the cameras on their devices, and did not attend class. In informal comments to the primary investigator, teachers noted that students who used their cameras and the chat feature while participating in the remote learning environment demonstrated greater attention, participation, academic integrity, and performance on classroom-based formative and summative assessments.

As reported by students and parents, the remote learning environment also correlated with increased issues. This correlation included issues with student depression and anxiety. Reasons for student depression and anxiety included worry about families being infected by the virus, isolation from people outside of the home and difficulty adjusting to being at home during lockdown, and financial impact associated with the virus (Gazmararian, Weingart, Campbell, Cronin, & Ashta, 2021). The diminished social, emotional, and mental well-being of students compounded the concerns for student academic engagement. Finally, as indicated by 2020-2021 school year mid-marking and semester grade reports, increased numbers of students received D and E grades when learning in the remote environment.

The shifting instructional modes for teachers and students in Suburban Pittsburgh School District (Table 1) challenged teachers to find a consistent method to plan for, instruct, and assess students while in the remote learning environment. Student academics and achievement suffered due to the challenges of learning in multiple settings. Teacher planning,

instruction, and assessment suffered due to the lack of preparedness of teachers to teach in multiple settings.

1.4 Inquiry Questions

Through this study and intervention implementation, student academic engagement and learning in the remote environment improved through improved teacher planning. Specific inquiry questions for this study included the following:

- 1) How can teachers successfully assess student engagement in the remote learning environment?
- 2) What skills and professional development do teachers require in order to plan for, instruct, and assess student engagement in the remote learning environment?
- 3) What do teachers perceive as modifications that need to be made in the remote learning environment due to challenges and difficulties?

1.5 Definitions of Terms

The following terms provide context for this study and are defined according to the Suburban Pittsburgh School District context.

1. *Assessment* is a formative or summative measure of student learning. Formative assessments gather in-the-moment information regarding student comprehension. Summative assessments evaluate student learning against a standard or benchmark

(Carnegie Mellon University, Eberly Center).

2. *Asynchronous instruction* occurs when the teacher and the students do not have any live-time, simultaneous interaction. Students also do not have any interaction with other students; rather, students work independently and are self-paced.
3. *Barriers* are challenges associated with the remote learning environment and experienced by students or teachers.
4. *Blended learning* is an instructional approach that combines in-person learning and online learning (Graham, 2006). *Blended learning* is synonymous with *hybrid learning environment*.
5. *Classroom monitor* is a substitute teacher hired to supervise students in the physical classroom when the teacher of record participates in instruction via virtual platforms, such as Zoom or Google Meet. In these situations, the teacher is working in the fully remote setting from home. The role of the classroom monitor is to watch students and troubleshoot any classroom technological issues.
6. *Cohort* is a grouping of students by school participation options during the COVID-19 pandemic.
7. *Collaborative professional development* indicates that teachers are working together toward a professional goal. An example of collaborative professional development is teachers working together to plan for a common assessment for all students of one subject.
8. *Differentiated instruction* is the practice of using data from assessments to align instruction to individual student needs – and then actually carrying out the instruction (Goddard, Goddard, & Tschannen-Moran, 2007).
9. *Digital pedagogy* is “...the skill of embedding digital technologies into teaching...[to]

- enhance learning, teaching, assessment, and curriculum” (Kivunja, 2013, p. 131).
10. *English Language Learner (ELL)* is a student whose first language is not English, but who is learning English. ELLs represent 1.32 percent of the Suburban Pittsburgh School District student population.
 11. *Engagement*, or *student engagement*, involves the instructional, emotional, and organizational interactions in a classroom, particularly between the teacher and the students (Wang, Hofkins, & Ye, 2020).
 12. *Enhanced Hybrid 1.0* is a step of the phased reopening plan for Suburban Pittsburgh School, which allows students to attend school in person up to four days each week.
Enhanced Hybrid 2.0 is the final step of the phased reopening plan for Suburban Pittsburgh School, which allows students to attend school in person full-time, five days each week.
 13. *Flipped learning* is a student-centered approach to instruction that inverts traditional lessons by providing content to students outside of the classroom that would usually be taught by the teacher at school (Song & Kapur, 2017).
 14. *Google Meet* is a real-time video and audio service commonly used for meetings and classes. Suburban Pittsburgh High School teachers use this platform to live-stream instruction during remote learning.
 15. *Hybrid learning environment* is an instructional approach that combines in-person learning and online learning. *Hybrid learning environment* is synonymous with *blended learning*.
 16. *Individualized Education Programs (IEPs)* through the Individuals with Disabilities Education Act (IDEA) are developed for children with a wide range of disabilities. Students with IEPs represent 9 percent of the Suburban Pittsburgh School District student population.

17. *Internet hot spot* is a wireless technology device that increases internet accessibility for any technology device with which it is paired. In the remote learning environment, internet hot spots primarily provided students with internet accessibility via a Chromebook.
18. *Madeline Hunter lesson planning model* suggests seven elements to be included in lesson planning (stating objectives, anticipatory set, modeling, checking for understanding, guided practice, independent practice, and closure). Suburban Pittsburgh School District advocates use of this model to achieve optimal student engagement and learning.
19. *Multiple learning modalities* refers to instructional practices that address various learning styles. For example, a lesson may include instruction that appeals to those who prefer visual, auditory, or kinesthetic learning. Similarly, students may be offered a variety of assignment options, choosing the modality that most appeals to their learning style and through which they can best demonstrate learning. Multiple learning modalities is a method of differentiation (see *differentiated instruction*).
20. *Online learning* indicates learning that takes place in the cyber setting. *Online learning* is synonymous with *remote education*, *remote learning environment*, and *virtual learning*. For the purposes of this study, the term most commonly used is *remote learning environment*.
21. *Present virtual "PV"* is an attendance code used to indicate that a student was scheduled to be present in the physical classroom but participated virtually.
22. *Remote education* indicates learning that takes place in the cyber setting. *Remote education* is synonymous with *online*, *remote learning environment*, and *virtual learning*. For the purposes of this study, the term most commonly used is *remote learning environment*.
23. *Remote learning environment* indicates learning that takes place in the cyber setting. *Remote learning environment* is synonymous with *online*, *remote education*, and *virtual*

learning. For the purposes of this study, the term most commonly used is *remote learning environment*.

24. *Student engagement* is defined as the energy and effort that students employ within their learning community, observable via any number of behavioral, cognitive, or affective indicators across a continuum (Bond, 2020). For the purposes of this study, *student engagement* is the academic activity and participation of students in attendance to class, contributions during instructional time, and performance on assessments.
25. *Synchronous instruction* occurs when the teacher and the students are experiencing live-time, simultaneous interaction. During synchronous instruction, students may also experience live-time, simultaneous interaction with other students.
26. *Title I* is a federal program that provides funding to schools to improve academic achievement, especially of disadvantaged students. Two out of 10 Suburban Pittsburgh School District schools, both elementary, are designated as *Title I* schools.
27. *Understanding by Design Framework (UbD)* (Wiggins & McTighe, 2005) offers a planning process and structure to guide curriculum, assessment, and instruction. *UbD* is practiced by Suburban Pittsburgh School District for planning.
28. *Universal design for learning (UDL)* is a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn (CAST Publishing, 2018). For the purposes of this study, *UDL* is considered in planning for *multiple learning modalities*.
29. *Virtual* indicates learning that takes place in the cyber setting. *Virtual* is synonymous with *online*, *remote education*, and *remote learning environment*. For the purposes of this study, the term most commonly used is *remote learning environment*.

30. *Zoom* is a real-time video and audio service commonly used for meetings and classes. Suburban Pittsburgh teachers use this platform to live-stream instruction during remote learning.

2.0 Review of Literature

During the COVID-19 pandemic and the ensuing online learning posture, teachers in Suburban Pittsburgh School District perceived a decline in student learning and academic engagement, defined as instructional, emotional, and organizational interactions in a classroom, particularly between the teacher and the students (Wang et al., 2020). The purpose of this study is to examine teacher perceptions of high school student learning and engagement while in the online learning environment.

The National Standards for Quality Online Teaching (NSQ) provide openly licensed standards for K-12 schools to help evaluate and improve online teaching in both the full remote and blended learning settings (2019). The standards create a framework for schools, districts, and state agencies to support online instruction, and to evaluate teaching and learning.

The Standards are broken into eight categories, outlined in Table 4, for schools to use as applicable to their own needs for online teaching.

Table 4. National Standards for Quality Online Teaching – Standards and Descriptions

A: Professional Responsibilities	The online teacher demonstrates professional responsibilities in keeping with the best practices of online instruction.
B: Digital Pedagogy	The online teacher supports learning and facilitates presence (teacher, social, and learner) with digital pedagogy.
C: Community Building	The online teacher facilitates interactions and collaboration to build a supportive online community that fosters active learning.
D: Learner Engagement	The online teacher promotes learner success through interactions with learners and other stakeholders and by facilitating meaningful learner engagement in learning activities.

Table 4 continued

E: Digital Citizenship	The online teacher models, guides, and encourages legal, ethical, and safe behavior related to technology use.
F: Diverse Instruction	The online teacher personalizes instruction based on the learners' diverse academic, social, and emotional needs.
G: Assessment & Measurement	The online teacher creates and/or implements assessments in online learning environments in ways that ensure the validity and reliability of the instruments and procedures. The teacher measures learner progress through assessments, projects, and assignments that meet standards-based learning goals, and evaluates learner understanding of how these assessments measure achievement of the learning objective.
H: Instructional Design	The online teacher curates and creates instructional materials, tools, strategies, and resource to engage all learners and ensure achievement of academic goals.

The Standards are further defined by indicators that provide detailed guidance to create a highly individualized online learning environment. The indicators, as summarized in Table 5, "...are intended to provide maximum flexibility for the users" (NSQ, p. 6) and can therefore be adopted as applicable to the needs of the teacher and students. For the purpose of this study, focus will be given to Standards B – Digital Pedagogy, F – Diverse Instruction, and G – Assessment and Measurement. These Standards were selected to investigate how teachers assess student engagement in the remote learning environment and the skills teachers must demonstrate in order to plan for, instruct, and assess student engagement in the remote learning environment.

Table 5. National Standards for Quality Online Teaching – Indicators (modified)

	B. Digital Pedagogy The online teacher...	F. Diverse Instruction The online teacher...	G. Assessment & Measurement The online teacher...
1	...uses digital pedagogical tools that support communication, productivity, collaboration, analysis, presentation, research, content delivery, and interaction.	...monitors and interprets learner progress and provides reasonable additional supports to all learners, paying particular attention to learners with identified disabilities or who represent traditionally underserved groups.	...chooses appropriate assessment tools that allow students the opportunity to demonstrate mastery of the content.
2	...incorporates discipline specific technologies, tools, and resources to meet individualized learner needs.	...communicates with appropriate school staff regarding specific accommodations, modification, or needs and works in collaboration with others to address learner needs.	...employs pedagogy and content knowledge to develop and/or effectively implement assessments in ways that ensure the validity and reliability of the instruments and procedures.
3	...uses different types of tools to interact in online courses in order to nurture learner relationships, encourage learner interaction, and monitor and motivate learner engagement.	...uses data (quantitative and qualitative) to identify learners who need additional support services.	...uses strategies to ensure learner academic integrity and the security of learner assessment data.
4	...demonstrates basic troubleshooting skills and addresses basic technical issues as they arise.	...creates alternative formats of course materials, if needed, in order to meet the needs of diverse learners and accommodate alternative means of access.	...implements a variety of assessments that accurately measure learner proficiency.
5	...supports safe digital learning spaces for all learners (e.g., data ownership and privacy expectations, digital identity curation).	...recommends assistive technologies where appropriate to meet mandated needs and address learner preferences.	...evaluates learner readiness and progress using formative and summative assessments and learner feedback throughout the course.
6		...provides additional opportunities for personalized learner growth or enrichment.	...assures alignment between the assignments, assessments, and standards-based learning goals.

Table 5 continued

7		...supports and provides a forum for sharing the varied talents and skills that learners bring to the online environment.	...customizes instruction to personalize the learning experience based on performance and assessment data and learner need.
8			...creates opportunities for learner self-assessment in courses.

For the purposes of this research, attention is given to Standards B, F, and G – Digital Pedagogy, Diverse Instruction, and Assessment and Measurement. These specific Standards and indicators inform this study – to examine high school student learning and engagement while in the online learning environment – while providing flexibility for individual classrooms. These Standards and indicators also provide resources to investigate the questions of inquiry for this study.

The National Standards for Quality Online Teaching are particularly relevant to this study, as the update included recent scholarly research based on the emergent topic of online learning in the K-12 environment. The Standards, utilized by K-12 schools across the United States, provide a nationally accepted benchmark for examination of the online learning experience of Suburban Pittsburgh High School students and teachers during the COVID-19 pandemic.

This literature review is guided by the following questions:

- 1) What attributes are required for exemplary practices in online teaching?

- 2) What do teachers need in order to demonstrate quality online learning experiences for students?

The following sections of this literature review consider the topics of best practices in the remote learning environment, assessment of student engagement, and professional development related to the guiding questions and questions of inquiry.

2.1 Best Practices in Remote Learning Environments

Teachers must create a remote learning environment that demonstrates proper planning and instruction, opportunity for all students to learn, and proper assessment of students, all of which illustrate the need for enhanced professional development in these areas. Based on recommendations for best practice in the remote learning environment prior to and in the wake of the COVID-19 pandemic, teachers must be properly prepared in order to plan, instruct, and assess students for future online learning situations.

2.1.1 Planning and Instruction in the Remote Learning Environment

Challenges experienced by students in the remote learning environment include fewer opportunities to work with or interact with peers; fewer opportunities to engage with faculty; lack of access to technology, such as computers, other devices, and/or internet service; inability to use or access available technology; attendance to synchronous instruction; disruptions, such as from siblings or other preferred options (e.g., gaming, television, and sleeping); and dislike of learning in a non-preferred method (Brion, 2021; Garbe, Ogurlu, Logan, & Cook, 2020; Paulsen & McCormick, 2020; Wang & Chia, 2020).

Garbe, Ogurlu, Logan, and Cook (2020) attributed some student struggles to remote learning not matching the preferred learning styles of individual students. According to the National Standards for Quality Online Teaching Standard F – Diverse Instruction, “the online teacher personalizes instruction based on the learner’s diverse academic, social, and emotional needs” (p. 21). This pedagogical practice is frequently referred to as differentiated instruction: the use of assessment data to plan for and align instruction to individual student needs – and then actually carrying out the instruction (Goddard, Goddard, & Tschannen-Moran, 2007). As a result of the teacher planning and instructing in multiple modalities, or through differentiated instruction, a more inclusive online environment is created for all students to attend to and engage in learning. The importance of using student data from assessments in order to differentiate instruction is explored in a subsequent section of the literature review.

2.1.1.1 Universal Design for Learning

A commonly practiced research-based model of differentiation is Universal Design for Learning (UDL). The UDL model considers three learning components: affective, recognition, and strategic networks, or “the why, what, and how of learning” (Meyer, Rose, & Gordon, 2014). Through this type of planning and instruction, teachers are able to gain insight into student learning by identifying “why, what, and how” of each students’ learning needs. Farrell and Marsh (2016) determined that UDL, when coupled with review of data for individual students, allows teachers to establish appropriate instructional responses. The student-centered, student-specific philosophy of differentiated instruction presents the possibility for increased student learning, achievement, and individual assistance by the teacher, albeit in the remote learning environment. Planning time to review student data and develop instruction and assessments is necessary for teachers to offer

differentiated instruction, such as Universal Design for Learning, to best achieve the NSQ Diverse Instruction Standard.

2.1.2 Assessment of Students in the Remote Learning Environment

Meaningful assessment of student learning is essential for student engagement in the online learning environment. An indicator of the National Standards in Quality Online Teaching Standard G – Assessment and Measurement – dictates, “The online teacher customizes instruction to personalize the learning experience based on performance and assessment data and learner need” (p. 24). When coupled with the NSQ Diverse Instruction Standard, as well as the research on Universal Design for Learning, the use of individual assessment data to inform instruction of students in the remote learning environment can promote student success in a variety of ways.

Prior research includes the phrase “the homework gap” to illustrate student difficulty completing online work, a problem that was heightened during the pandemic (Auxier & Anderson, 2020). Researchers recommended limiting online homework during remote learning situations and suggested instead that teachers evaluate instruction through exit tickets via video means, online polls, or collaborative group work through online forums (Bahmani, 2020; Combs, 2020; Zalaznick, 2020). Through such forms of assessment, data can be collected for both individual students and for groups of students, which can, in turn, inform further instruction. Whole group, small group, or individual student remediation are instructional responses based on utilizing assessment data. Remediation is intended for all students in a classroom who demonstrate need based on review of assessment data (Finnerty, Jackson, & Ostergren, 2019).

2.1.3 Required Skills and Professional Development

According to the National Standards for Quality Online Teaching (2019) Digital Pedagogy – Standard B, “The online teacher supports learning and facilitates presence (teacher, social, and learner) with digital pedagogy” (p. 11). Digital pedagogy refers to “...the skill of embedding digital technologies into teaching...[to] enhance learning, teaching, assessment, and curriculum” (Kivunja, 2013, p. 131). Some of the digital tools have options in addition to audiovisual presentations, such as teacher slides that allow students to take notes, individual student quizzes and polls, and discussion boards (Chai & Wang, 2020). Some platforms also allow for real-time question and response interaction between the teacher and students, with an option for student anonymity when peers see responses.

“Emergency remote teaching” (Adedoyin & Soykan, 2020) due to the COVID-19 pandemic caused many teachers to struggle to provide quality online instruction because they had not been equipped with professional development on digital pedagogy. To develop a successful remote teaching environment, teachers must be educated in how to operate digital technologies. Proficiency in digital pedagogy will promote the online presence of the teacher, foster community, and increase student engagement (Bahmani, 2020). Best practices for student engagement in the online learning environment is discussed in the next section of this literature review.

2.2 Best Practices in Student Engagement

Students may be *actively* engaged or *passively* engaged in the remote learning environment. Active engagement involves the student being focused on tasks and participating during lessons;

passive engagement refers to the student's cognitive attention to instruction (Lekwa, Reddy, & Shernoff, 2019). As Bond (2020) explained, cognitive engagement includes a student's understanding, self-regulation, and deep learning strategies. In the online or remote learning environment, researchers concur that alternate and varied methods of observing and assessing student engagement must be practiced.

2.2.1 Methods of Instruction in the Remote Learning Environment

Standard B, Digital Pedagogy, indicates, "The online teacher uses different types of tools to interact in online courses in order to nurture learner relationships, encourage learner interaction, and monitor and motivate learner engagement." Face-to-face learning provides continuous opportunities for students to interact with peers and teachers in a way that remote learning does not (Paulsen & McCormick, pp. 25-27). It is more challenging for teachers to plan, instruct, and assess students in the remote learning environment. It is also more challenging for students to collaborate in the remote learning environment.

Even in the online or remote learning environment, Bahmani (2020) suggested, "Interacting with other students is helpful for students to organize their thoughts, reflect on their understanding, and find gaps in reasoning" (p. 20). This interaction of both peers and teachers more naturally occurs in the brick-and-mortar school but is a "key element of student engagement" in the online learning environment (Paulsen & McCormick, 2020). To encourage this "key" interaction, the authors suggested facilitating student learning through discussion (a collaborative and interactive session) rather than discourse (a one-sided impartment of information), which promotes a higher level of active engagement from individual students.

Supportive remote learning environments allow students to have meaningful interactions with peers and with the teacher. According to Bond (2020), collaborative learning in the online environment increases enjoyment and participation, and improves student-teacher relationships. Bond (2020) further identified affective student engagement as a student's interest and sense of belonging and positive reactions to teachers, peers, and the learning environment. Garbe et al. (2020) found that a lack of personal connection, social/emotional engagement with peers, peer collaboration, and learning are associated with fully remote learning environments. For these reasons, other researchers maintain the importance of fostering student involvement and teacher availability as imperative to students' social and emotional well-being when learning in the remote environment. Combs (2020) suggested that, "Promoting student engagement, staying accessible, and maintaining and cultivating relationships [are] key in fostering a positive online learning experience, for both the teacher and student" (p. 1). Bahmani (2020) supported the use of both student and teacher video communication to give students social presence and ownership of the course, and Leng (2020) identified teachers as "coparticipants" in the remote learning environment as helpful to building trust and student engagement (p. 10).

In contrast, requiring the use of the camera violates trust built between the student and teacher (Zalaznick, 2020); students cited being uncomfortable when forced to use their screens (cameras) or to record themselves (Garbe et al., 2020). The combination of students accessing education from home, many parents working from home, and many teachers ill-equipped for online teaching left students hesitant to engage in the online setting. It is therefore important for teachers to be familiar with factors not only affecting themselves, but also those impacting their students, that would strain the teacher-student relationship in the online environment.

2.2.2 Assessment of Student Engagement in the Remote Learning Environment

The success of student engagement in remote learning environments is further strengthened through planned assessment. The National Standards for Quality Online Teaching Standard G – Assessment and Measurement state that “the online teacher creates and/or implements assessments in online learning environments in ways that... evaluate learned understanding of how these assessments measure achievement of the learning objective” (p. 24). The remote learning environment provides fewer opportunities for collaborative learning, and students therefore do not experience assessment that is likened to traditional classroom formative assessment, such as discussion, activities, or closures.

Suggestions for observing and assessing student engagement in the online or remote learning environment include the use of end-of-lesson interactions (e.g., “closures,” “exit tickets”); avatars; real-time discussion boards; polls; collaborative learning, including peer and teacher involvement; and video conferencing with both peer and teacher involvement (Bahmani, 2020; Combs, 2020; Zalaznick, 2020). To observe and assess student engagement in the remote learning environment, teachers must be aware of both the active and passive engagement of students. Frequent and quality instructional and behavioral management practices correlate with student engagement (Lekwa et al., 2019). Such classroom management practices could be facilitated through use of interactive Google docs, student responses through Padlet or Flipgrid, or digital escape rooms, all of which can build upon approaches from face-to-face learning (Safi et al., 2020).

To support student engagement in the online learning environment, teachers must assess the active and passive engagement of students. In order to facilitate student engagement, teachers must receive training in best practices in formative and summative engagement in the remote learning environment.

2.2.3 Skills and Professional Development

One indicator of NSQ Standard G – Assessment and Measurement states, “The online teacher evaluates learner readiness and progress using formative and summative assessments and learner feedback throughout the course” (p. 24). Examples of formative and summative assessments of engagement in the remote learning environment are provided. Additionally, student self-assessment is an NSQ suggested method for online teaching. This measurement of student assessment promotes student engagement. To develop a successful remote teaching environment, teachers must be knowledgeable about how to administer appropriate assessments to students. The characteristic of teacher preparedness to assess student engagement is discussed in the following section of the literature review.

2.3 Professional Development

Little (1987) posited that professional development is “any activity that is intended partly or primarily to prepare paid staff members for improved performance in present or future roles in the school districts” (p. 491). To create an online learning environment where students are comfortable to learn and have meaningful interactions with peers and teachers, professional development for teachers is essential. Considerations for professional development for the online teacher include planning, instructing, and assessing in the remote learning environment and the format of the professional development.

2.3.1 Rationale for Professional Development

“Emergency remote teaching,” initiated by the COVID-19 pandemic, starkly contrasts with the usual systematic approach of planning, instructing, and assessing valued in K-12 education. The phrase, coined by Adedoyin and Soykan (2020), suggests the sudden and undesirable predicament in which teachers were forced to operate throughout the pandemic. Emergency remote teaching caused teachers anxiety regarding planning, instruction, and assessment of students; technology and individual abilities; socioeconomic factors of their own and of students; disruptions to themselves and to students; and ability to engage students. For the purposes of this inquiry, teacher anxieties related to planning, instruction, and assessment of students in the remote learning environment will be reviewed. To minimize these anxieties, teachers require professional development focused on planning, instructing, and assessing students in the remote environment.

2.3.2 Teacher Planning, Instruction, and Assessment

In reaction to the pandemic, the University of Central Florida Department of Education identified areas in which support was desired (student engagement, resources and technology, and communication and community building). Online conferences were established through which teachers were able to interact virtually about ways to engage students in the remote learning environment (Safi, Wenzel, & Trimble Spalding, 2020). The conferences focused on planning for instruction and assessment. Participants in this professional development reported a greater level of student engagement after employing techniques, such as breakout rooms and chat features, learned through the collaborative conference professional development sessions.

Other research validates that in the K-12 remote learning environment, more professional development for teachers is necessary to support this type of collaboration (Clausen, Bunte, & Robertson, 2020). Researchers consistently find that ongoing professional development that complements school or district best practices is necessary in order for planning, instruction, and assessment to bridge from the traditional classroom to the remote learning environment (Linton, 2016). Due to “emergency remote teaching” (Adedoyin & Soykan, 2020), K-12 educational staff may not be equipped to deliver professional development specific to best practices in the remote learning environment and may benefit from following a model with which they are more familiar.

2.3.3 Method of Delivering Professional Development

Professional development focused on exemplary teaching practices in the online learning environment will permit teachers to foster quality online learning experiences for students. Professional development on remote learning environments, and, more specifically, on student engagement in remote learning environments, will help teachers and students to be more successful. In both the remote learning environment and in student engagement in the remote learning environment, professional development will help teachers and students to be more successful. Dawson and Dana (2018) recommended that professional development for online educators have similar attributes to professional development for educators in the brick-and-mortar setting. In particular, Dawson and Dana (2018) endorsed professional development for teachers of online learners that adhere to the characteristics of Desimone’s (2009) core features of professional development for teachers of online students. The core features of Desimone’s model are: 1) content focus, 2) active learning, 3) coherence, 4) duration, and 5) collective participation. In theory and practice, these core features of professional development will lead to increased teacher knowledge

and skills, change in instruction, and improved student learning. For the purposes of this inquiry, attention will be paid to active learning, duration, and collective participation. These features of professional development in the brick-and-mortar setting and the remote education environment advocate for teachers to be actively engaged in the professional development, participate in the professional development over a period of time, and actively interact during the ongoing professional development. More explicitly, the development of collaborative learning in the remote environment requires increased attention to specific professional development that enables teachers to be comfortable and confident in not only using collaborative learning but also in using the necessary technology. Brion (2020) suggested that leaders and teachers “focus on people... because doing so made the remote places, programs, and policies intentionally inviting and fostered student engagement and learning” (p. 11). These features – active learning, duration, and collective participation – suggested by Desimone must be learned by the teachers and then modeled for and offered to the students in the remote learning environment.

2.4 Conclusion

The literature suggests that teachers, when properly prepared, are able to plan for, instruct, and assess students in the remote learning environment. The research shows that attributes required for exemplary practices in teaching online learners include presence in the virtual classroom, interaction and collaboration, and differentiated instruction. Both of these attributes should be addressed through meaningful professional development, according to the literature. While scholarly research continues surrounding student engagement and online learning, few studies have linked the two topics in order to recommend best practices of student engagement *and*

teaching in the remote learning environment. By exploring this blended topic, a component of the research will be accomplished. Insight into the teacher's ability to plan for, instruct, and assess students in a remote learning environment may identify strategies for student engagement and learning in the remote learning environment. The next chapter describes the methods and procedures that will be used to gather information from teachers who taught students in the remote learning environment during the COVID-19 pandemic.

3.0 Methodology

The purpose of this study is to examine teacher perceptions of high school student learning and engagement in the online learning environment during the COVID-19 pandemic. The research associated with this study is valuable in order to plan for, instruct, and assess students through virtual learning in future situations. Specific questions of inquiry, outlined in section 1.4, are:

- 1) How can teachers successfully assess student engagement in the remote learning environment?
- 2) What skills and professional development do teachers require in order to plan for, instruct, and assess student engagement in the remote learning environment?
- 3) What do teachers perceive as modifications that need to be made in the remote learning environment due to challenges and difficulties?

This chapter describes the methodology for this inquiry. It includes a review of district and school demographic data, description of participants, instrumentation, and the methods used in data collection and analysis. Current district and school data were reviewed, including surveys conducted with students in the fall of 2020 by the social studies department, to gather information about remote learning during the COVID-19 pandemic. Based on this information and the National Standards for Quality Online Teaching, a survey and an interview were conducted with social studies teachers to identify teacher concerns and struggles with teaching in the online learning environment during the COVID-19 pandemic. These references were used to develop protocols for teachers to plan for, instruct, and assess high school students in the remote learning environment. As a result, the building of inquiry's programming for online teaching will have the capacity to progress and improve.

3.1 Participants

Teachers from the social studies department at Suburban Pittsburgh High School were participants for this inquiry. The team has a departmental goal “to provide the opportunity for every student to develop as knowledgeable and responsible participatory citizens” (Suburban Pittsburgh School District, High School). Social studies teachers were selected as participants for this inquiry due to the inclusive nature of the classrooms and the percentage of students taught. Social studies classrooms include students identified as advanced, average, and special needs populations. The courses taught by the social studies department are largely grouped in heterogeneous student ability levels. The department includes 16 staff members who teach students in grades nine through twelve. One hundred percent of students in grades nine through 11 are required to take social studies courses, while students in grade 12 may choose to take social studies courses as electives. This department also experienced challenges with remote learning and previously administered a survey to students in the fall of 2020 (Appendix C). The teachers desired improvement in remote teaching.

3.2 Instrumentation

An explanatory sequential mixed methods design was used for this study. According to Creswell (2014), an explanatory sequential mixed methods design:

... involves a two-phase project in which the researcher collects quantitative data in the first phase, analyzes the results, and then uses the results to plan (or build on to) the second, qualitative phase. The overall intent of this design is to have the qualitative data

help explain in more detail the initial quantitative results. A typical procedure might involve collecting survey data in the first phase, analyzing the data, and then following up with qualitative interviews to help explain the survey responses. (p. 274)

The following data sources were used for the explanatory sequential mixed methods design: district and school data, one survey of teachers in the social studies department, and interviews with teachers who responded to the survey and agreed to be interviewed.

The review of district and school data, including demographic information and previous research, informed development of the survey. The student survey conducted by the Social Studies teachers at Suburban Pittsburgh High School (Appendix C) provided a baseline description of online teaching and student engagement in the remote learning environment. The results of this survey informed the methodology and tools for this inquiry. The National Standards for Quality Online Teaching Standards B, F, and G – Digital Pedagogy, Diverse Instruction, and Assessment and Measurement –also informed the methodology and tools for this inquiry.

The survey included Likert scale and multiple-choice questions, and responses provided qualitative data for the principal investigator to further develop interview questions. The data is qualitative because the response options provided opinions rather than numeric values. Individual interviews were conducted with social studies teachers, and responses provided qualitative data for the principal investigator to more deeply investigate teachers' personal concerns and struggles with the online environment. The data review, surveys, and interviews were analyzed to develop a protocol, based on best practices, for teaching in the remote learning environment.

The purpose of the survey and interviews was to gain perspective on teacher experiences with student engagement during online learning in the COVID-19 pandemic and to develop a protocol based on best practices in remote learning, student engagement, and professional

development. Surveys and individual interviews are the best methods for gathering data on teacher perspectives. This goal was accomplished by using an explanatory sequential mixed methods design.

3.2.1 District Data Review

Suburban Pittsburgh School District ranks among the top in the nation, state, and region. In recent Niche.com ratings, Suburban Pittsburgh High School was ranked third of 91 public high schools in the Pittsburgh area; tenth of 675 high schools in Pennsylvania, and 286 of 19,532 high schools in the United States. The same ratings placed the district as second in the Pittsburgh area, fifth of 494 in Pennsylvania, and twenty-eighth of 10,760 districts in America (Suburban Pittsburgh School District, Office of the Superintendent, 2020b). The vision of Suburban Pittsburgh School District simplifies the stakeholders' shared values and commitment to distinction: "A relentless pursuit of excellence" (Suburban Pittsburgh School District, 2019).

Suburban Pittsburgh municipality is just six miles from downtown Pittsburgh. The municipality offers tree- and sidewalk-lined streets, trails, and paths as well as parks and recreational facilities. Suburban Pittsburgh provides access to a light rail transit and is identified as both one of the safest places to live in the state and as a "Main Street America" town (Suburban Pittsburgh Municipal Website). Within the municipality is Suburban Pittsburgh School District, which has 10 schools with approximately 5,500 students in grades kindergarten through twelve; Suburban Pittsburgh High School hosts 1,800 of these students. There are seven elementary buildings (grades K-5), two middle schools (grades 6-8), and one high school (grades 9-12). Elementary level students attend "neighborhood schools," which is a unique trait of the district. The district is one of few "walking districts," without bus transportation, as evidenced

by thousands of students on foot en route to district schools each day. The student population is categorized by the following demographics: white (85.99 percent), Asian (5.82 percent), two or more races (3.79 percent), Hispanic (2.49 percent), Black/African American (1.65 percent), American Indian/Alaskan (0.13 percent), and Hawaiian/Pacific Islander (0.13 percent). Less than 1 percent of the district population is identified as homeless (0.11 percent), and 1.32 percent of the student population is identified as English Language Learners (ELLs). Two of the 10 district schools, both elementary, benefit from federal Title I funds, which provide for reading specialists and parent training and resources. Approximately 600 students in the district, or 9 percent, qualify for special education support and services.

The district employs over 700 faculty, staff, and administrators. Seventy-five percent of the professional staff hold a master's or higher degree. The district's current budget is just over \$100 million, with a per pupil cost of \$18, 619. Although the district is not technically a "one-to-one" district, meaning there is a single device (e.g., Chromebook, iPad) distributed to each student, the district provides Chromebooks and Wi-Fi hot spots to any students who request them. At the time of this research, over 2,800 Chromebooks and 600 Wi-Fi hot spots were being used by Suburban Pittsburgh School District students. Other instructional resources are readily available for students, including textbooks, content-specific supplies, and online subscriptions.

Beginning on March 13, 2020 and throughout the 2020-2021 school year, all Suburban Pittsburgh High School teachers experienced various iterations of remote teaching (Table 1.) Due to concerns regarding teaching and student engagement in the remote learning environment, as well as the opportunity for students to attain district expectations, in the fall of 2020 the social studies department conducted a student survey to collect information regarding student perceptions of remote learning. The results of the student survey provided insights regarding

students' participation in remote learning, attention during remote learning, and strategies that aided students to be engaged during remote learning. These insights informed and guided the survey questions for this inquiry via alignment to the National Standards for Quality Online Teaching.

3.2.2 Survey

The goal of the survey was to gain baseline data on teachers' perspectives on teaching in the remote environment during the COVID-19 pandemic. Sixteen members of the social studies department at Suburban Pittsburgh High School were invited to participate in the survey for this inquiry. It was the goal of the principal investigator to obtain participation of all 16 teachers in the survey. In consideration of extenuating personal or professional circumstances, participation of 80 percent of teachers (13 of 16) was deemed acceptable for this study.

The survey instrument (see Appendix D) was created in and administered using Google Forms and was available to teachers for a period of two weeks. The initial section of the survey included demographic questions to determine participants' number of years teaching, years teaching at Suburban Pittsburgh High School, and grade level(s) taught during the COVID-19 pandemic (2019-2020, 2020-2021). The remaining sections of the survey were based on the student survey that was conducted by the social studies department in the fall of 2020 and the National Standards for Quality Online Teaching Standards for Digital Pedagogy, Diverse Instruction, and Assessment and Measurement (Table 4, Table 5). Questions from the student survey provided perspective on information that teachers desired to learn from students in order to inform their practices in the remote learning environment. The National Standards for Quality Online Teaching Standards B, F, and G – Digital Pedagogy, Diverse Instruction, and Assessment

and Measurement – explain best practices and align to the district objectives and were referenced to design survey questions. The survey included 28 questions with responses in Likert scale and multiple-choice formats. The information provided by teachers through the survey was converted into a Google Sheets spreadsheet.

3.2.3 Interviews

Following the survey, the teachers who completed the survey were invited to participate in individual interviews. It was anticipated that 80 percent to 100 percent of the teachers (13-16) would volunteer to participate in individual semi-structured interviews. Semi-structured interviews “incorporate both open-ended and more theoretically driven questions, eliciting data grounded in the experience of the participant as well as data guided by existing constructs within the particular discipline within which one is conducting research” (Galletta, 2013, p. 45). The interviews were designed to provide more in-depth perspective of teacher experiences with teaching remotely during the COVID-19 pandemic, with questions specifically formulated from the survey responses, while still allowing new topics to surface. The semi-structured interviews allowed participants to share qualitative data in the form of individual feedback and personal opinion.

The interview instrument (Appendix E) for this inquiry was modified based on the National Standards for Quality Online Teaching Standards for Digital Pedagogy, Diverse Instruction, and Assessment and Measurement descriptions of best practice in remote teaching; results of the survey conducted with the social studies teachers; and the student survey previously conducted by the social studies department. The individual interviews provided teachers the opportunity to expand on survey responses related to remote learning, student engagement, and professional development.

3.3 Data Collection

School and district data, including the survey conducted by social studies teachers in the fall of 2020, were reviewed and utilized in order to develop survey questions.

All teachers currently employed in the social studies department received an email explaining the purpose of the study and my role as the principal investigator (Appendix B). If necessary, an additional email was sent to the teachers three days after the initial message in order to secure additional respondents.

All completed surveys generated data in Google Forms and Google Sheets. Google Suite provides the ability to analyze responses and create graphs as well as to export data into other formats for additional statistical analysis. All data were anonymous; no personal identifiable information was recorded, and IP addresses were not stored. Pseudonyms were used as necessary to de-identify the data.

Individual interviews were scheduled after the surveys were completed by individuals who a) completed the survey and b) volunteered to participate in a 20-minute individual interview. Questions for the individual interviews were created based on the results of the survey. The primary investigator audio-recorded interviews while also taking notes (with participant permission). The recordings were transcribed using Microsoft dictation software.

3.4 Data Analysis

3.4.1 Survey

The survey data included rating scale questions and multiple-choice questions regarding the teachers' perspectives of teaching in the remote environment during the COVID-19 pandemic. This data was grouped according to the count of each response option based on the qualitative themes of response options in the following categories: teacher demographics, digital pedagogy, diverse instruction, assessment and measurement, and teacher experiences. Google-generated sheets and graphs, produced via completion of the survey, were reviewed to identify trends and patterns in responses. This analysis provided information on teacher perspectives on the online teaching experience. This data also aided in the design of additional questions for the individual interviews.

3.4.2 Interviews

The individual interview data, also qualitative, were analyzed according to the themes of the National Standards for Quality Online Teaching. It was anticipated that the individual interviews would generate additional open responses; participants' unique perspectives would allow the principal investigator to categorize the qualitative data by themes.

Interview data was coded based on the themes of teacher practices in remote learning, perceptions of student engagement, and professional development. Additionally, open coding allowed for new themes to emerge that did not fit into the predetermined themes. This analysis of

the teacher interview responses is most valid in order for the primary investigator to gather primary perspective from the teachers.

3.5 Conclusion

The purpose of the study, including a description of the methodology, was shared with the district superintendent (Appendix A).

The principal investigator summarized, interpreted, and evaluated information provided via surveys and interviews to identify strengths and needs of the online teaching programs. The research categories of online teaching, student engagement, and professional development were used to qualify the strengths and needs. Finally, the principal investigator extrapolated recommendations from scholarly research and developed a protocol for Suburban Pittsburgh High School teachers based on best practices in online teaching, student engagement, and professional development and to support the strengths and needs of the present program.

4.0 Results

The purpose of this study was to examine teacher perceptions of high school student learning and engagement in the online learning environment during the COVID-19 pandemic. The research associated with this study is valuable in order to plan for, instruct, and assess students through virtual learning in future situations.

4.1 Surveys

4.1.1 Participant Demographics, Questions 1, 2, and 3

The survey included three demographic questions. It was completed by 16 high school teachers (grades nine through 12) in the Social Studies Department at Suburban Pittsburgh High School. Based on the demographic data, teachers with 20 or more years of teaching experience represented 68.8 percent of the respondents. Eighty-seven-point six percent of the respondents have taught at Suburban Pittsburgh High School for 10 or more years; seven of the respondents have taught at Suburban Pittsburgh High School for 20 or more years. Table 6 displays participant demographic data, including years of experience.

Table 6. Teacher Years of Experience and Total Years of Teaching at Suburban Pittsburgh High School

Participant	Total number of years as a K-12 teacher	Total number of years as a teacher at SPHS
1	10-19 years	10-19 years
2	20 or more years	10-19 years
3	10-19 years	10-19 years
4	20 or more years	20 or more years

Table 6 continued

5	10-19 years	10-19 years
6	20 or more years	20 or more years
7	20 or more years	10-19 years
8	20 or more years	20 or more years
9	20 or more years	4-9 years
10	10-19 years	10-19 years
11	4-9 years	4-9 years
12	20 or more years	20 or more years
13	20 or more years	20 or more years
14	20 or more years	20 or more years
15	20 or more years	10-19 years
16	20 or more years	20 or more years

4.1.2 Survey Questions 4, 5, 6, 7, and 8

Questions 4, 5, 6, 7, and 8 asked participants to rate their level of agreement or disagreement on topics related to digital pedagogy. Questions referred to the online teacher's:

- use of tools and technologies to meet individual learner needs and interact in online courses
- troubleshooting skills
- support for safe digital learning spaces

A 5-point Likert scale was used (strongly disagree, disagree, neutral, agree, strongly agree). The highest level of agreement came from the statements, “The online teacher uses digital tools (e.g., for communication, collaboration, presentation, research, content delivery, and interaction)” and “The online teacher demonstrates basic troubleshooting skills and addresses basic technical issues as they arise.” One hundred percent of participants (n=16) responded “agree” or “strongly agree” with these statements.

4.1.3 Survey Questions 9, 10, 11, 12, 13, 14, 15, and 16

Questions 9, 10, 11, 12, 13, 14, 15, and 16 asked participants to rate their level of agreement or disagreement regarding diverse instruction. Questions referred to the online teacher's:

- monitoring and interpretation of learner progress
- additional supports for learners
- communication with school staff regarding accommodations or modifications to address learner needs
- use of data to identify learners who need additional support
- creation of alternative formats of course materials
- recommendation of assistive technologies to address learner needs
- opportunities for personalized enrichment
- forum for sharing talents and skills of learners.

A 5-point Likert scale was used (strongly disagree, disagree, neutral, agree, strongly agree). The highest level of agreement came from the statement, "The online teacher provides reasonable additional supports to all learners," which had 100 percent of participants (n=16) respond "agree" or "strongly agree." Contrary to all other respondents, one participant chose "disagree" for the statements, "The online teacher communicates with appropriate school staff regarding accommodations or modifications to address learner needs" and "The online teacher creates alternative formats of course materials to meet the needs of diverse learners." The most varied level of response came from the statement, "The online teacher provides a forum for sharing the varied talents and skills that learners bring to the online environment" with four participants choosing "strongly agree," six participants choosing "agree," five participants (n=16) choosing "neutral," and one participant choosing "disagree."

4.1.4 Survey Questions 17, 18, 19, 20, 21, 22, 23, and 24

Questions 17, 18, 19, 20, 21, 22, 23, and 24 asked participants to rate their level of agreement or disagreement regarding assessment and measurement. Questions referred to the online teacher's:

- choice of appropriate assessment tools
- validity and reliability of assessment instruments
- strategies to ensure learner academic integrity
- variety of assessments
- evaluation of learner readiness and progress using formative and summative assessments
- alignment between assignments, assessments, and standards-based learning goals
- customized instruction based on performance and assessment data
- creation of opportunities for learner self-assessment

A 5-point Likert scale was used (strongly disagree, disagree, neutral, agree, strongly agree). The highest level of agreement came from the statement, "The online teacher assures alignment between the assignments, assessments, and standards-based learning goals" with 15 of 16 participants choosing "strongly agree" or "agree." The lowest level of agreement came from the statement, "The online teacher uses strategies to ensure learner academic integrity" with 10 participants choosing "strongly agree" or "agree" and six participants choosing "neutral," "disagree," or "strongly disagree."

4.1.5 Survey Questions 25, 26, 27, and 28

Questions 25, 26, 27, and 28 asked teachers to rate their level of agreement or disagreement regarding their experiences during remote teaching. Questions referred to:

- students' regular attendance to class
- students' attentiveness during class
- students' use of cameras during class
- features of online learning that helped students to be engaged in learning (e.g., students shared responses in "chat" feature, teacher randomly called on students, and small group work, such as Zoom breakout rooms).

For questions 25, 26, and 27, a 5-point Likert scale was used (strongly disagree, disagree, neutral, agree, strongly agree). The highest level of agreement came from the statement, "During remote teaching, my students regularly turned on their cameras" with 93.8 percent of participants (n=15) responding "disagree" or "strongly disagree." Zero participants chose the responses "agree" or "strongly agree." Similarly, 81.2 percent of participants (n=13) responded "neutral," "disagree," or "strongly disagree" to the statement, "During remote teaching, my students were attentive during class."

For question 28, participants could select up to eight features of online learning that helped students to be engaged in learning. Participants could also provide their own response for features of online learning that helped students to be engaged in learning. Thirteen participants responded that students sharing responses in the "chat" feature was helpful for student engagement. Eleven participants responded that the teacher randomly calling on students was helpful for student engagement. Small group work, such as Zoom breakout rooms, was identified by 10 teachers to

be helpful. Two participants responded that sharing work on a Google Doc (or similar platform) and using polls were helpful to students' engagement.

4.2 One-on-One Interviews

4.2.1 Participant Demographics, Interview Question 1

1. I understand that you have been a teacher at Suburban Pittsburgh High School for 10-19 years. Is there anything else that you would like to share about your career, as it relates to this study?

The one-on-one interviews included the same teachers who participated in the survey, 16 high school teachers (grades nine through 12) in the Social Studies Department at Suburban Pittsburgh High School. Following the survey, interview questions were reviewed and further developed based on the responses from the survey. Two participants offered that their only experience with online learning or teaching prior to the COVID-19 pandemic was when they themselves were learners during college coursework.

4.2.2 Interview Questions 2 and 3

2. Please identify any challenges you experienced during remote teaching that were related to supporting learning and facilitating presence of the teacher and of the learner in the remote environment.

3. Please describe any recommendations that would help to improve these challenges in future situations of remote teaching.

Participants were asked about challenges that related to supporting learning and facilitating the teacher's presence in the remote environment. They were also asked to make recommendations that would help to mitigate these challenges in future remote-teaching situations.

The most frequent answers regarding the challenges experienced during remote teaching related to supporting learning and facilitating teacher presence. These challenges included the need for the teacher to learn the technology required to teach in the remote environment (87.5 percent of participants, n=14) and the difficulty for the teacher to establish and maintain relationships with students, particularly when student use of cameras was not mandated (87.5 percent of participants, n=14).

Regarding recommendations to offset the challenges, the most frequent answers included references to mandatory use of cameras (50 percent of participants, n=8) and training/instruction in the technology for remote teaching (50 percent of participants, n=8).

It is important to mention that teachers' answers included other themes, such as collaborative planning (four participants) and smaller or modified class size in the remote setting (four participants). These responses will be further discussed in section 4.3 Data Analysis.

4.2.3 Interview Questions 4 and 5

4. Please identify any challenges you experienced during remote teaching that were related to personalizing instruction based on the learner's diverse academic, social, and emotional needs in the remote environment.

5. Please describe any recommendations that would help to improve these challenges in future situations of remote teaching.

Participants were asked about challenges they experienced during remote teaching that related to personalizing instruction based on the learner's diverse academic, social, and emotional needs in the remote environment. Participants were also asked to make recommendations that would help to mitigate these challenges in future situations of remote teaching.

The most frequent answer regarding challenges related to personalizing instruction, included participant statements that they failed at diversifying because they didn't do it at all or felt that they didn't do it well (44 percent of participants, n=7). Nine participants said that they didn't know the students at all, and, therefore, they were not able to personalize instruction. Other frequent answers included reliance on the special education teachers (five participants), use of small groups through breakout sessions (five participants), and creation of updated, individualized resources for students (five participants).

The most frequent responses regarding recommendations for improvement included professional development and time for implementation. Participants cited the need for teachers to learn more about the required technology through professional development (44 percent of participants, n=7). In addition, participants cited the need for teachers to have time to personalize remote instruction (31 percent of participants, n=5).

It is important to note that teachers' answers included another theme of flexible scheduling. Participants suggested reimplementing the Intervention and Recovery Learning Services days used during the 2020-2021 school year (Table 1). During these days, students could access their teacher and/or school counselor to support and address their individual learning needs; obtain additional support; address deficient assignments or assessments; and discuss academic, collegiate, and/or social and emotional needs. All students worked asynchronously, and teachers had flexibility in their workday. Two participants cited the need for more ability to build relationships with students

in the remote environment. These participants indicated that the use of cameras by students would help with development of student-teacher relationships and, in turn, the ability of the teacher to personalize instruction. Both participants also indicated that time with students is essential to truly develop relationships and have good instruction.

4.2.4 Interview Questions 6 and 7

6. Please identify any challenges you experienced during remote teaching that were related to creating and/or implementing assessments in ways that ensure the validity and reliability of the instruments and procedures.

7. Please describe any recommendations that would help to improve these challenges in future situations of remote teaching.

Participants were asked about challenges that related to creating and/or implementing assessments in ways that ensured the validity and reliability of the instruments and procedures. They were also asked for recommendations that would help to mitigate these challenges in future remote-teaching situations.

The most frequent answers regarding creating and/or implementing assessments included using more open-ended questions and essay responses as assessments (56 percent of participants, n=9) and teachers' assumptions that students were plagiarizing or cheating on all assessments (44 percent of participants, n=7).

The most frequent answers regarding the recommendations to help navigate these challenges included allowing time for collaboration with colleagues to develop resources and to learn technology (44 percent of participants, n=7) and providing subjective assessments (open-ended questions and essay responses) rather than objective assessments (multiple choice) (31

percent of participants, n=5). One participant commented, “[We] need collaboration with colleagues to plan for assessments. We need time, we know the content” (Participant 1). Another participant remarked, “The honest truth is that teachers need to rethink assessments that are not closed book, closed notes, rather make [it] application based” (Participant 5).

It is important to note that teachers’ answers included more specific responses related to subjective assessments and academic integrity, such as allowing students to use notes and other materials, i.e., an “open notes exam” (three participants) and the time it takes for teachers to grade open-ended questions and essay responses as assessments (three participants).

4.2.5 Interview Questions 8, 9, and 10

8. Please identify and explain any strengths you experienced during remote teaching.

9. Please explain any recommendations that would help to expand these strengths in future situations of remote teaching.

10. What specific skills do teachers need in order to instruct and assess students in the remote environment?

Participants were asked to identify strengths they experienced during remote teaching and how to expand these strengths in future remote-teaching situations. They were also asked to identify specific skills that teachers need in order to instruct and assess students in the remote environment.

The most frequent answers regarding strengths participants experienced in the remote environment included their mastery of the technology (31 percent of participants, n=5) ability to reach out to students to form relationships (25 percent of participants, n=4), and collaboration with colleagues (19 percent of participants, n=3).

The most frequent answer regarding the specific skills that teachers need in order to instruct and assess students in the remote environment included designing instruction and assessment, learning to use technology, and building rapport with students in the remote learning environment. Eighty-one percent of participants (n=13) specified that to obtain these specific skills, teachers need time for collaboration with colleagues.

It is important to note that two participants responded that they had “zero” strengths during remote teaching, but those teachers did provide recommendations for question 9. One participant who shared that she had “zero” strengths recommended that she could have been more successful if she received training how to take videos of herself, such as through Screencastify (Participant 16). The second participant who commented that he had “zero” strengths also recommended that having access to “digital-friendly” tools and resources would have helped him to develop strengths in remote teaching (Participant 10).

4.2.6 Interview Question 11

11. Do you have anything else that you would like to share that would help teaching in the remote environment?

Participants were asked to share additional feedback that would help with teaching in the remote environment. Eleven participants (69 percent of participants) responded to this question.

The most frequent responses included two themes: to let go of what you cannot control but to figure out what is possible (three participants,), and to support teachers in creative ways, such as through collaborative planning, development and use of resources, and reflection in order to make improvements (five participants,). Participant 4 stated, “[We] cannot effectively control a remote environment the way that [we] can in a regular environment... it is not the same. But [we]

cannot give up and need to figure out what is possible.” Participant 8 suggested, “The more the district can support the teachers in their preparation, the better. The training piece is important, but the preparation piece with each other helps [us] get better.”

4.3 Data Analysis Using National Standards for Quality Online Teaching Framework

The goals of this research were to gain perspective in order to design, plan for, instruct, and assess students through virtual learning in future situations; to discover modifications that need to be made in the remote learning environment due to challenges (technical, instructional, and student engagement); to develop protocols by identifying strengths and needs of the online teaching programs; and to extrapolate recommendations from scholarly research.

According to the review of scholarly literature, when properly prepared, teachers are able to plan for, instruct, and assess students in the remote learning environment. Attributes required for exemplary practices in teaching online learners include teacher presence in the virtual classroom, interaction and collaboration, and differentiated instruction. The aforementioned can be addressed through meaningful professional development. It is vital that the professional development for teachers includes active learning, ongoing training, and collective participation of teachers, which can first be learned and then be modeled in the remote learning environment. A positive consequence of this type of professional development is that teachers’ anxieties will be lessened regarding teaching in the remote environment.

The principal investigator aligned the interview questions with supporting literature from the field, inquiry questions for this study, and the National Standards for Quality Online Teaching framework for this study (Standards: B, Digital Pedagogy; F, Diverse Instruction; and G,

Assessment and Measurement). Supporting literature from the field was guided by the following questions:

- 1) What attributes are required for exemplary practices in online teaching?
- 2) What do teachers need in order to demonstrate quality online learning experiences for students?

Specific inquiry questions for this study, as presented in Section 1.4, are:

- 1) How can teachers successfully assess student engagement in the remote learning environment?
- 2) What skills and professional development do teachers require in order to plan for, instruct, and assess student engagement in the remote learning environment?
- 3) What do teachers perceive as modifications that need to be made in the remote learning environment due to challenges and difficulties?

The National Standards for Quality Online Teaching framework guides educators and administrators for planning and implementing successful remote learning environments according to eight standards; Standards B (Digital Pedagogy), F (Diverse Instruction), and G (Assessment and Measurement) were most relevant in analyzing the response data from the surveys and interviews in this study. The alignment of these integral components is organized in Table 7.

Table 7. Alignment of Interview Questions with Guiding Questions, Inquiry Questions, and National

Interview Question	Guiding Question/ Supporting Literature (1, 2)	Inquiry Question (1, 2, 3)	National Standard for Quality Online Teaching (B, F, G)
1			
2	2	1, 2	B
3	1, 2	1, 2, 3	B
4	2	1, 2	F
5	1, 2	1, 2, 3	F
6	2	1, 2	G
7	1, 2	1, 2, 3	G

Table 7 continued

8	1, 2	1, 2	B, F, G
9	1, 2	1, 2, 3	B, F, G
10	1, 2	1, 2, 3	B, F, G
11		1, 2, 3	

4.3.1 Digital Pedagogy

The Standard for Digital Pedagogy states, “The online teacher supports learning and facilitates presence (teacher, social, and learner) with digital pedagogy.” This includes incorporating discipline specific tools and resources for planning, instructing, assessing, and communicating with students.

According to survey and interview data, teachers require technical and instructional skills in order to plan for student learning and engagement in the remote environment. Participants emphasized that student presence in the virtual classroom was imperative. They also indicated that the preferred method of student presence was through using the camera and responding via individual or group responses with the chat feature of the online classroom. Participants further specified that collaboration with colleagues, including time and training, were essential in order for them to become successful educators in the remote learning environment.

4.3.2 Diverse Instruction

The Standard for Diverse Instruction states, “The online teacher personalizes instruction based on the learners’ diverse academic, social, and emotional needs.” This includes monitoring student progress, providing supports, communicating and collaborating with staff to address student needs, and modifying resources available to students. For the purposes of this study,

student engagement is characterized by student academic activity and participation through attendance, contributions during instructional time, and performance on assessments.

According to survey and interview data, teachers require technical and instructional skills in order to instruct and engage students in the remote environment. Participants noted that teachers need to work collaboratively and consider individual student needs in order to provide accommodations to and additional supports for learners. Participants particularly asserted that student attentiveness during class is essential to the teacher's evaluation of individual student needs. Complementary to their observations regarding digital pedagogy, participants cite requisite use of chat and breakout rooms to maintain student engagement. Again, participants indicated that collaboration with colleagues, including time and training, were essential in order for them to become successful educators in the remote learning environment. Teachers require this collaborative time to review student data and develop instruction and assessment necessary to differentiate instruction. The teacher's ability to differentiate instruction for students is, therefore, reliant on the teacher's participation in meaningful professional development.

4.3.3 Assessment and Measurement

The Standard for Assessment and Measurement states, "The online teacher creates and/or implements assessments in online learning environments in ways that ensure the validity and reliability of the instruments and procedures." The teacher measures learner progress through assessments, projects, and assignments that meet standards-based learning goals, and evaluates learner understanding of how these assessments measure achievement of the learning objective. This includes developing assessments that are reliable and allow students to demonstrate mastery

of the content; assuring alignment between assignments, assessments, and learning goals; ensuring academic integrity; and creating opportunities for learner self-assessment.

According to survey and interview data, teachers require technical and instructional skills in order to assess student learning and engagement in the remote environment. Participants specified that alignment of assignments, assessments, and learning goals is essential, as well as ensuring learner academic integrity. An increase in student collaborative classwork and “in person” evaluations (formative and summative) were suggested by participants, rather than traditional or online homework. Implementation of these methods may provide not only meaningful assessment data, but also foster student involvement and teacher availability in the remote learning environment. As a continuation of the above sections regarding digital pedagogy and diverse instruction, participants cited use of technical features for instruction and assessment as indispensable to maintain student engagement. Again, participants indicated that collaboration with colleagues, including time and training, were essential in order for them to become successful educators in the remote learning environment.

4.4 Conclusion

Through this study, participants indicated that teachers require technical and instructional skills in order to plan for, instruct and engage, and assess student learning and engagement in the remote environment. Participants indicated that collaboration with colleagues, including time and training, were essential in order for them to become successful educators in the remote learning environment. The author will offer several other recommendations in the next chapter.

5.0 Summary and Conclusions

This chapter contains a summary of the study, including interpretation of the findings, limitations, discussion, and reflections.

5.1 Summary

The purpose of this study was to examine teacher perceptions of high school student learning and engagement in the online learning environment during the COVID-19 pandemic in order to design, plan for, instruct, and assess students through virtual learning in future situations. The staff's input regarding online teaching, student engagement, and professional development was examined to determine areas of strength and areas of need. The study attempted to answer the following inquiry questions:

- 1) How can teachers successfully assess student engagement in the remote learning environment?
- 2) What skills and professional development do teachers require in order to plan for, instruct, and assess student engagement in the remote learning environment?
- 3) What do teachers perceive as modifications that need to be made in the remote learning environment due to challenges and difficulties?

5.2 Interpretation of Findings

5.2.1 Inquiry Question 1

How can teachers successfully assess student engagement in the remote learning environment?

Inquiry Question 1 sought to identify teachers' perceptions of their own ability to use appropriate resources to engage students in the remote environment. After exploring Question 1 and examining the survey data and interview responses, factors to be addressed were identified through Inquiry Question 2. By examining teachers' perceptions, recommendations can be made for teachers to have time to design instruction and assessment, learn to use technology, and build rapport with students. The research findings illustrate the need for teachers to have professional development specific to designing resources, using technology, and building rapport with students in the remote environment, all to successfully assess student engagement. Participants alluded to the alignment of grading and attendance challenges, referenced in Chapter 1, with the ability to build rapport with students. Specifically, participants mentioned that student absences lessened and grades increased when synchronous online learning was mandated. There is, therefore, a positive correlation between synchronous remote learning and student engagement.

Scholarly literature reveals that, when properly prepared, teachers are able to plan for, instruct, and assess students in the remote learning environment. The attributes required for these practices can be addressed through professional development. Therefore, the author recommends future professional development be considered to strengthen the teachers' ability to design resources, use technology, and build rapport with students in the remote environment. The teachers must first learn the skills, then model the skills in the remote environment. Additionally, the requirement of students to participate in synchronous, remote instruction must be mandated by the

district or by the state in order to mitigate student absences. This expectation must be clearly communicated with students and families, and resources must be provided so that all teachers and students have access to teaching and learning. The sustainability of these recommendations is addressed in the following section.

5.2.2 Inquiry Question #2

What skills and professional development do teachers require in order to plan for, instruct, and assess student engagement in the remote learning environment?

Inquiry Question 2 sought to obtain teachers' input regarding specific skills and recommended professional development in order for them to plan for, instruct, and assess student engagement in the remote learning environment. After exploring Question 2 and examining the survey data and interview responses, recommendations can be made for teachers to have time to design instruction and assessment, learn to use technology, and build rapport with students. The research findings support the necessity for teacher proficiency in the National Standards for Quality Online Teaching in the areas of Digital Pedagogy (Standard B), Diverse Instruction (Standard F), and Assessment and Measurement (Standard G) in order to operate a successful online classroom where students are engaged. Targeted professional development in these Standards is recommended by the author in order for teachers to be equipped with skills in technology, instruction, and student engagement to successfully teach in the remote environment. Professional development sessions using a commonly developed protocol to plan for, instruct, and assess students in a remote learning environment is essential for student engagement and success in the remote learning environment. Training should be offered in a format that is familiar to the teachers in order to facilitate the greatest benefits (Dawson & Dana, 2018). For Suburban

Pittsburgh School District, the Understanding by Design (UbD) model should be modified to be appropriate for guiding curriculum, instruction, and assessment in the remote learning environment.

The previous recommendation and this recommendation are short-term solutions that have long-term sustainability through ongoing professional development. As resources and technology are updated, teachers will benefit from additional training. Furthermore, resources must be made available to both teachers and students in order to ensure that everyone is provided with equal access to deliver and receive the education in the remote environment. This may require school and state-wide policies and mandates in order to acquire the resources for all.

5.2.3 Inquiry Question #3

What do teachers perceive as modifications that need to be made in the remote learning environment due to challenges and difficulties?

Inquiry Question 3 sought to obtain teachers' attitudes, beliefs, and perceptions regarding necessary modifications in the remote learning environment due to the challenges and difficulties they experienced during the COVID-19 pandemic. After exploring Question 3 and examining the survey data and interview responses, recommendations can be made for technological and instructional training of teachers through specific, meaningful professional development. The research findings indicate that the teachers' inability to form relationships with students in the remote learning environment inhibited their ability to efficiently and effectively instruct and assess students. Participants also acknowledged depression and anxiety experienced by both themselves and their students while in the remote learning setting. Scholarly literature consistently finds that ongoing professional development that complements school or district best practices is necessary

in order for planning, instruction, and assessment to bridge from the traditional classroom to the remote learning environment (Linton, 2016). Additionally, quality instructional practices that build upon approaches from the traditional educational setting correlate with positive student engagement (Lewka et al., 2019; Safi et al., 2020). The author recommends for teachers to be actively engaged in professional development that is delivered in the remote setting in order for teachers to be comfortable and confident in collaborative learning and necessary technology. Teachers who participate in this type of ongoing professional development will possess the skills necessary to facilitate a remote learning classroom with fewer challenges and difficulties than their experience during the COVID-19 pandemic. The author also recommends that mental health supports be provided to students and staff, and that staff receive additional training in responding to student mental health needs while in the remote learning setting.

These recommendations are short-term solutions that have long-term sustainability through ongoing professional development and funding. Teachers will benefit from additional training in instructional and social-emotional capacities. The funding will provide for the training for teachers and for resources for teachers and students. Again, this may require school and state-wide policies and mandates.

5.3 Limitations

Limitations exist for this study. The sample size, educational content area represented, single stakeholder group, and organizational system mandates are the most notable limitations. The sample size for this study included 16 participants. All participants were teachers in the high school social studies department at a single building. Only one stakeholder group – teachers – was

represented in this research. The research was limited to mandates of the organizational system, including policies related to student attendance, instruction and assessment, and teacher responsibilities.

Further research may benefit from increasing the sample size to allow for more responses and feedback. The limited sample size minimized differences in teacher responses for the survey and interviews. Future research may consider the experiences and input of teachers in other content areas and in other buildings or districts. With a larger sample size – across multiple content areas, instructional levels, buildings, or districts – research may involve additional comparisons. Future research may benefit from involvement of additional stakeholder groups, such as students, parents, and administrators, to gain a range of response data regarding experiences in the remote learning environment. Future research may be precluded from policies directly responsive to the COVID-19 pandemic and may expand research findings.

5.4 Discussion and Future Implications

Teachers' ability to plan for, instruct, and assess students will strengthen student engagement and learning in the remote environment. Teacher presence in the virtual environment, interaction and collaboration with colleagues, and differentiated instruction are exemplary practices for teaching in the remote learning environment. Professional development for teachers will stimulate teacher confidence in providing an online environment where technical and instructional methods strengthen the engagement of students. Abundant research exists surrounding student engagement and online learning, yet few studies link the two topics. Feedback from teachers who participated in emergency remote teaching due to the COVID-19 pandemic is

still needed, particularly regarding progress in supporting teacher preparedness to instruct in the remote learning environment and students to engage in the remote learning environment. The data for this inquiry signify that professional development for designing instruction and assessment, learning to use technology, and building rapport with students are areas of improvement to continue to study.

Educational and societal communities have varied expectations of a successful remote learning environment. At the site of inquiry, the expectation of rigor and excellence in instruction was perpetuated during the COVID-19 pandemic. Currently the site of inquiry and other settings are not held to a state or federal standard for the method by which remote learning occurs. Consequently, the manner of instruction, assessment, and student engagement varies greatly across districts. Additional research is needed and should be targeted at the implementation of protocols for online teaching and student engagement.

University level teacher preparatory programs may need to review current curriculum, instruction, and assessment of students in pre-service teaching programs. This recommendation is relevant based on the implication that future teachers will instruct in both the brick-and-mortar and remote settings. New teachers exiting university teacher preparatory programs must be proficient with skills in order provide academic work and access to all students in the multiple settings. Pre-service teaching programs must develop curriculum to instruct pedagogical skills – including traditional methods and remote learning procedures – to achieve balance for future classrooms.

At the site of inquiry, technology was made available to students and staff in order to provide access to learning and teaching in the remote environment. In other settings, however, barriers to accessing technology may have implications on the success of instruction and student engagement in the remote learning environment. Data from this study revealed that it is essential

that proper access to technology be afforded to all learners and teachers in the remote environment. Emergency funding from the federal government was provided to the site of inquiry, and other districts, to support teaching and learning in the remote environment. Yet, there was limited funding earmarked to address the components of instruction, assessment, and student engagement. Rather, the bulk of funding provided teachers and students with technology. Additional research is necessary to review the use of funding for the remote learning environment.

The results of this study will be shared at the inquiry site. The findings of the survey and one-one-one interviews, as well as recommendations, will be shared with Suburban Pittsburgh School District. Given specific recommendations related to the inquiry questions, school leaders in the district should understand the value of making changes that strengthen teaching and learning in the remote environment and consider the recommendations for improvement generated from the research.

Appendix A Letter to Superintendent

Dear Dr. [REDACTED]

My name is Lorien Moyer and I am the Unit 2 Principal at [REDACTED] High School. I am a doctoral student at the University of Pittsburgh. I am currently working to evaluate the impact of remote learning on student engagement in order to make recommendations for improvements based on my research.

I would like to provide you with information in order to gain permission for data collection and analysis. I propose to proceed with my evaluation by conducting surveys and interviews with social studies teachers in grades 9-12 at [REDACTED] High School. I selected the social studies teachers previously conducted a survey of students regarding experiences with remote learning during because they encounter in their classes a large sample of the student population. I plan to learn more from teachers about their experience with online teaching during the COVID-19 pandemic. All participants will receive an email explaining the process, an invitation to participate, and an explanation of the intended use and anonymity of the results.

I will be utilizing a web-based survey through Google Forms with questions asking participants to rate observations and experiences of teaching through the online platform during the COVID-19 pandemic. The participants will need to sign into their Google accounts to access the survey, but email addresses will be excluded from data analysis. This sign-in is only being utilized to ensure that there is only one response per district email address.

I will also be conducting one interviews with each participant who responds to the survey. These interviews will be conducted at the convenience of the interviewees with questions formulated from the results of the surveys. These interviews will be recorded, with participant permission.

All results will be kept confidential and any identifying responses will be eliminated from the data reports. Any district identifiers will also be removed from data.

Thank you for your continued support! Please let me know if you have any questions or concerns about my inquiry plan.

Sincerely,



Lorien Moyer

Appendix B Email to Staff in Building of Inquiry – Survey and Interview

Dear Teachers,

My name is Lorien Moyer and I am the Unit 2 Principal at ██████████ High School. I am a doctoral student at the University of Pittsburgh, and I am currently working to evaluate the impact of remote learning on student engagement in order to make recommendations for improvements based on my research. I am writing to invite you to participate in a survey and interview in order for me to gain a better perspective of the teacher experiences with teaching in the remote learning environment.

Student engagement is characterized by academic activity and participation of students through attendance to class, contributions during instructional time, and performance on assessment. The preparedness of teachers to successfully plan for, instruct, and assess students in the remote learning environment correlate to student engagement. As part of the evaluation of ██████████ High School experiences, a survey and a one-on-one interview will be conducted to assess teacher experiences during the covid-19 pandemic. The data gathered from the survey and interviews will help to provide information that will help to build a positive learning environment.

The survey and interview are entirely voluntary. They will help to identify positive and negative aspects of past experiences with remote teaching and learning, and to inform future changes.

The survey will be administered using Google Forms and will be distributed via district email. Following completion of the survey, individuals who completed the survey will be asked to participate in an interview. The interview will be scheduled at a convenient time and date for you, and by participating you are consenting to be recorded during the session. You can end your participation at any time or choose to skip any questions. All of your responses are confidential, and data will be kept private. I will not publish any quotes that might put anyone's employment at risk. Transcripts will use pseudonyms to ensure confidentiality.

There is no direct benefit to you for study participation. You may withdraw from the study at any time. Data will be collected and retained for continued use unless you request that data be destroyed. Data will be stored securely by 1) using a secure server for written documents (Google Drive) and b) a locked office at ██████████ High School for data, documents, and artifacts that cannot be stored online.

If you have any questions or concerns about the survey, interview, or research, please feel free to contact me directly at ██████████. Thank you in advance for your help; your participation is greatly appreciated. Please respond to this email if you are willing to participate in the survey and interview and be recorded.

Sincerely,



Lorien Moyer

Appendix C Social Studies Department Survey

The data on the following pages was developed, administered, and collected by the social studies department at Suburban Pittsburgh High School in the fall of 2020.

High School Student

Survey

Please complete this form to provide your input regarding your experiences as a High School student while learning from home. Your responses are anonymous and you will only be able to respond one time.

* Required

1. Please indicate your grade at MTLHS: *

Mark only one oval.

- Freshman - Grade 9
 Sophomore - Grade 10
 Junior - Grade 11
 Senior - Grade 12

2. I regularly attend every class while learning from home. *

Mark only one oval.

- 1 2 3 4 5
Never Always

3. Please rate your attention during class while learning from home: *

Mark only one oval.

- 1 2 3 4 5
I really struggle to pay attention in class and never follow along with the tasks. I always pay attention in class and con

4. I regularly turn on my camera. *

Mark only one oval.

- 1 2 3 4 5
Never Always

5. Which of the following help you to be engaged in learning while at home? (check all that apply) *

Check all that apply.

- Small group work (such as Zoom breakout rooms)
- Large group work (such as discussions involving student input)
- Lecture by teacher
- Independent work
- Teacher randomly calls on students
- Students share responses in chat (either to group or privately to just teacher)
- Students are required to turn cameras on
- Use of emojis
- Use of "raise hand" feature
- Other:

6. Please rate your completion of homework and class assignments while learning from home: *

Mark only one oval.

	1	2	3	4	5	
I never turn in assignments (homework or class work).	<input type="radio"/>	I always turn in assignments (homework and class work).				

7. Which of the following best describe the daily amount of time out-of-class you spend completing school work on a device: *

Mark only one oval.

- 0-1 hour
- 1-2 hours
- 2-3 hours
- 3 or more hours

8. Please consider the following statement and rate your level of agreement with the statement: I am caught up with all tests, quizzes, projects, and homework in my classes. *

Mark only one oval.

	1	2	3	4	5	
I totally disagree- I have many incomplete tests, quizzes, projects or homework assignments in my classes	<input type="radio"/>	I fully agree				

9. The amount of coursework that I receive while learning from home: *

Mark only one oval.

	1	2	3	4	5	
Overwhelming	<input type="radio"/>	Reasonable and Manageable				

10. Please provide any additional feedback about learning from home.

.....

.....

.....

.....

(continued)

11. Prior to Thanksgiving break, I participated in learning through: *

Mark only one oval.

Hybrid

Cyber Learning Academy (Remote)

This content is neither created nor endorsed by Google.



Appendix D Survey

The data on the following pages was developed to gain baseline data of the perspective of teacher experiences with teaching in the remote environment during online learning of the COVID-19 pandemic.

Teacher Survey for Lorien Moyer's Research

The goal of this survey is to gain perspective into teacher experiences using online learning during the COVID-19 pandemic and to develop a protocol based on best practices in remote learning, student engagement, and professional development.

The survey is entirely voluntary. It will help to identify teachers' past experiences with remote teaching and learning, and to inform future changes. Participants can end his or her participation at any time or choose to skip any questions. There is no direct benefit to the participant for study participation.

All participant responses are confidential, and data will be kept private. Data will be collected and retained for continued use unless the participant requests that data be destroyed. Data will be stored securely by 1) using a secure server for written documents (Google Drive) and b) a locked office at [REDACTED] High School for data, documents, and artifacts that cannot be stored online.

If you have any questions or concerns about the survey, please feel free to contact me directly at [REDACTED]

Please respond to questions in the following section.

Teacher Demographics

1. Number of years (total) as a K-12 teacher:

Mark only one oval.

- less than 1 year
- 1-3 years
- 4-9 years
- 10-19 years
- 20 or more years

2. 2. Number of years (total) as a teacher at this high school:

Mark only one oval.

- less than 1 year
- 1-3 years
- 4-9 years
- 10-19 years
- 20 or more years

3. 3. Grade level(s) taught in in the 2019-2020 and/or 2020-2021 school years (select all that apply):

Mark only one oval.

- Grade 9
- Grade 10
- Grade 11
- Grade 12
- N/A

Digital
Pedagogy

"The online teacher supports learning and facilitates presence (teacher, social, and learner) with digital pedagogy."

Please respond to statements in the following section.

4. 4. The online teacher uses digital tools (e.g. for communication, collaboration, presentation, research, content delivery, and interaction).

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

5. 5. The online teacher incorporates specific technologies, tools, and resources to meet individualized learner needs.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly Agree

6. 6. The online teacher uses different types of tools to interact in online courses.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly Agree

7. 7. The online teacher demonstrates basic troubleshooting skills and addresses basic technical issues as they arise.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly Agree

8. 8. The online teacher supports safe digital learning spaces for all learners.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly Agree

Diverse
Instruction

"The online teacher personalizes instruction based on the learner's diverse academic, social, and emotional needs."

Please respond to statements in the following section.

9. 9. The online teacher monitors and interprets learner progress.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly Agree

10. 10. The online teacher provides reasonable additional supports to all learners.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly agree

11. 11. The online teacher communicates with appropriate school staff regarding specific accommodations or modifications to address learner needs.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly Agree

12. 12. The online teacher uses data to identify learners who need additional support services.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly Agree

13. 13. The online teacher creates alternative formats of course materials to meet the needs of diverse learners.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly agree

14. 14. The online teacher recommends assistive technologies (e.g. audio books, dictation tools) to address learner needs.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly agree

15. 15. The online teacher provides additional opportunities for personalized learner growth or enrichment.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly agree

16. 16. The online teacher provides a forum for sharing the varied talents and skills that learners bring to the online environment.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly agree

Assessment
and
Measurement

"The online teacher creates and/or implements assessments in online learning environments in ways that ensure the validity and reliability of the instruments and procedures. The teacher measures learner progress through assessments, projects, and assignments that meet standards-based learning goals, and evaluate learner understanding of how these assessments measure achievement of the learning objective."

Please respond to the following statements.

17. 17. The online teacher chooses appropriate assessment tools, which allow students the opportunity to demonstrate mastery of the content.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly agree

18. 18. The online teacher develops and/or implements assessments in ways that ensure the validity and reliability of the instruments.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly agree

19. 19. The online teacher uses strategies to ensure learner academic integrity.

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

20. 20. The online teacher implements a variety of assessments that accurately measure learner proficiency.

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

21. 21. The online teacher evaluates learner readiness and progress using formative and summative assessments.

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

22. 22. The online teacher assures alignment between the assignments, assessments, and standards-based learning goals.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly agree

23. 23. The online teacher customizes instruction based on performance and assessment data, as well as individual learner need.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly agree

24. 24. The online teacher creates opportunities for learner self-assessment within courses.

Mark only one oval.

- Strongly disagree
 Disagree
 Neutral
 Agree
 Strongly agree

Teacher Experiences

Please respond to statements in the following section.

25. 25. During remote teaching my students regularly attended class.

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

26. 26. During remote teaching, my students were attentive during class.

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

27. 27. During remote teaching, my students regularly turned on their cameras.

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

28. 28. During remote teaching, the following helped students to be engaged in learning (check all that apply).

Check all that apply.

- Small group work (such as Zoom breakout rooms)
- Large group work (such as discussions involving student input)
- Lecture by teacher
- Independent/individual work
- Teacher randomly called on students
- Students shared responses in "chat" feature (either to group or privately to teacher)
- Students were required to turn on cameras
- Students used "raise hand" feature

Other: _____

This content is neither created nor endorsed by Google.

Google Forms

Appendix E Interview Questions

This data was developed to gain more in-depth perspective of teacher experiences with teaching during online learning of the COVID-19 pandemic with questions specifically formulated from the survey responses, while still allowing for new topics to surface.

The goal of this interview is to gain a more in-depth perspective of teacher experiences with student engagement during online learning of the COVID-19 pandemic and to develop a protocol based on best practices in remote learning, student engagement, and professional development.

The interview is entirely voluntary. It will help to identify teachers' past experiences with remote teaching and learning, and to inform future changes. Participants can end his or her participation at any time or choose to skip any questions. There is no direct benefit to the participant for study participation.

All participant responses are confidential, and data will be kept private. Data will be collected and retained for continued use unless the participant requests that data be destroyed. Data will be stored securely by 1) using a secure server for written documents (Google Drive) and b) a locked office at [REDACTED] High School for data, documents, and artifacts that cannot be stored online.

If you have any questions or concerns about the interview, please feel free to contact me directly at [REDACTED].

Teacher Demographics

1. I understand that you have been a teacher at Suburban Pittsburgh High School for ## years. Is there anything else that you would like to share about your career that you would like to share, as it relates to this study?

Digital Pedagogy

2. Please identify any challenges you experienced during remote teaching that were related to supporting learning and facilitating presence (of the teacher and of the learner) in the remote environment.
3. Please describe any recommendations that could be done differently or would help to improve these challenges in future situations of remote teaching.

Diverse Instruction

4. Please identify any challenges you experienced during remote teaching that were related to personalizing instruction based on the learner's diverse academic, social, and emotional needs in the remote environment.
5. Please describe any recommendations that would help to improve these challenges in future situations of remote teaching.

Assessment and Measurement

6. Please identify any challenges you experienced during remote teaching that were related to creating and/or implementing assessments in ways that ensure the validity and reliability of the instruments and procedures.
7. Please describe any recommendations that would help to improve these challenges in future situations of remote teaching.

Teacher Experiences

8. Please identify and explain any strengths you experienced during remote teaching.
9. Please explain any recommendations that would help to expand these strengths in future situations of remote teaching.
10. What specific skills do teachers need in order to instruct and assess students in the remote environment?
11. Do you have anything else that would help teaching or learning in the remote environment?

Appendix F IRB Documentation

Approved

Entered IRB: 10/1/2021 3:23 PM
Initial approval: 10/12/2021
Initial effective: 10/12/2021
Effective: 10/12/2021
Last updated: 10/12/2021 9:34 AM

STUDY21090147: Remote Learning and Student Academic Engagement

Principal investigator: Lorien Moyer
Submission type: Initial Study
IRB coordinator: Dana DiVirgilio
Meeting:
Primary Contact: Lorien Moyer

Review Type: Exempt - Approved
Study Risk: No greater than minimal risk
Letter: [STUDY21090147 Correspondence.pdf\(0.01\)](#)
Regulatory authority: 2018 Requirements

Next Steps

[View Study](#)

[Printer Version](#)



Bibliography

- Adedoyin, O. B., & Soykan, E. (2020). COVID-19 pandemic and online learning: The challenges and opportunities. *Interactive Learning Environments*, published online September 2, 2020. <https://doi.org/10.1080/10494820.2020.1813180>
- Auxier, B. & Anderson, M. (2020). *As schools close due to the coronavirus, some U.S. students face a digital 'homework gap.'* Pew Research Center. <https://www.pewresearch.org/fact-tank/2020/03/16/as-schools-close-due-to-the-coronavirus-some-u-s-students-face-a-digital-homework-gap/>
- Bahmani, S. (2019). Increasing social presence in online learning [Poster Presentation]. University of Wisconsin. [https://www.wisconsin.edu/opid/download/wtfs_19-20/Bahmani-WTS-Poster-April-2020\(2\).pdf](https://www.wisconsin.edu/opid/download/wtfs_19-20/Bahmani-WTS-Poster-April-2020(2).pdf)
- Bond, M. (2020). Facilitating student engagement through the flipped learning approach in K-12: A systematic review. *Computers & Education*, 151. <https://doi.org/10.1016/j.compedu.2020.103819>.
- Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., & Kerres, M. (2020). Mapping research in student engagement in educational technology in higher education: A systematic evidence map. *International Journal of Educational Technology in Higher Education*, 17(1), 1-30. <https://doi.org/10.1186/s41239-019-0176-8>.
- Brion, C. (2021). Creating intentionally inviting school cultures during crisis. *Journal of Interdisciplinary Studies in Education*, 10(1), 160-181. Retrieved from <https://www.ojed.org/index.php/jise/article/view/2585>.
- Carnegie Mellon University, Eberly Center. *Assess teaching & learning*. Retrieved from <https://www.cmu.edu/teaching/assessment/basics/formative-summative.html>.
- CAST Professional Publishing (2018). *Universal design for learning guidelines version 2.2*. <https://doi.org/10.1177/2379298120974959>
- Clausen J., Bunte, B., & Robertson, E. (2020). Professional development to improve communication and reduce the homework gap in grades 7-12 during COVID-19 transition to remote learning. *Journal of Technology and Teacher Education*, 28(2), 443-451.
- Combs, R. (2020). Success plan for the online learning experience: Student engagement, teacher accessibility, & relationships. *Middle Grades Review*, 6(2). <https://scholarworks.uvm.edu/mgreview/vol6/iss2/11>

- Creswell, J. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage Publications.
- Dawson, K., & Dana, N. F. (2018). Professional development for K-12 online teachers. *Handbook of research on K-12 online and blended learning*, 243-266. Retrieved from <https://dl.acm.org/doi/pdf/10.5555/2811036.2811051>
- Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher*, 38(3), 181-199. <https://doi.org/10.3102/0013189X08331140>
- Farrell, C. C., & Marsh, J. A. (2016). Metrics matter: How properties and perceptions of data shape teachers' instructional responses. *Educational Administration Quarterly*, 52(3), 423-462. <https://doi.org/10.1177/0013161X16638429>
- Finnerty, M. S., Jackson, L. B., & Ostergren, R. (2019). Adaptations in general education classrooms for students with severe disabilities: Access, progress assessment, and sustained use. *Research and Practice for Persons with Severe Disabilities*, 44(2), 87-102. <https://doi.org/10.1177/1540796919846424>
- Galletta, A. (2013). *Mastering the semi-structured interview and beyond: From research design to analysis and publication*. New York University Press.
- Garbe, A., Ogurlu, U., Logan, N., & Cook, P. (2020). COVID-19 and remote learning: Experiences of parents with children during the pandemic. *American Journal of Qualitative Research*, 4(3), 45-65. <https://doi.org/10.29333/ajqr/8471>
- Gazmararian, J., Weingart, R., Campbell, K., Cronin, T., & Ashta, J. (2021). Impact of COVID-19 pandemic on the mental health of students from 2 semi-rural high schools in Georgia. *Journal of School Health*, 91(5), 356-369. <https://doi.org/10.1111/josh.13007>
- Goddard, Y. L., Goddard, R. D., & Tschannen-Moran, M. (2007). A theoretical and empirical investigation of teacher collaboration for school improvement and student achievement in public elementary schools. *Teachers College Record*, 109(4), 877-896.
- Graham, C. R. (2006). Blended learning systems: Definition, current trends and future directions. In C. J. Bonk & C. R. Graham (Eds.), *The handbook of blended learning: Global perspectives, local designs* (pp. 3-21). Pfeiffer.
- Leng, L. (2020). The role of philosophical inquiry in helping students engage in learning. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.00449>
- Lewka, A., Reddy, L., & Shernoff, E. (2019). Measuring teacher practices and student academic engagement: A convergent validity study. *Journal of School Psychology*, 34(1), 109-118. <http://dx.doi.org/10.1037/spq0000268>

- Linton, J. (2016). Electronic learning communities as a support for building relationships with students in a statewide virtual high school. *Journal of Online Learning Research*, 2(4), 419-445.
- Meyer, A., Rose, D. H., & Gordon, D. (2014). *Universal design for learning: Theory and practice*. CAST Professional Publishing.
- Paulsen, J., & McCormick, A. C. (2020). Reassessing disparities in online learner student engagement in higher education. *Educational Researcher*, 49(1), 20-29. <https://doi.org/10.3102/0013189X19898690>
- Pennsylvania State Government, Office of the Governor. (2020, March 13). *Governor Wolf announces closure of Pennsylvania schools* [Press Release]. Retrieved from <https://www.governor.pa.gov/newsroom/governor-wolf-announces-closure-of-pennsylvania-schools/#:~:text=Today%2C%20Governor%20Tom%20Wolf%20announced,gather%20input%20on%20this%20decision>
- Safi, F., Wenzel, T., & Trimble Spalding, L. (2020). Remote learning community: Supporting teacher educators during unprecedented times. *Journal of Technology and Teacher Education*, 28(2), 211-222.
- Song, Y., & Kapur, M. (2017). How to flip the classroom – “Productive failure or traditional flipped classroom?” Pedagogical design, *Educational Technology & Society*, 20(1), 292-305. Retrieved from <https://www.jstor.org/stable/pdf/jeductechsoci.20.1.292.pdf>
- Suburban Pittsburgh Municipal Website, Prospective Residents. *Prospective residents*. Retrieved from <https://www.mtlebanon.org/2384/Prospective-Residents>
- Suburban Pittsburgh School District, Office of the Superintendent. (2020, August 13). *School board approves Dr. Steinhauer’s recommendation for a phased opening of schools starting in full remote* [Press Release]. Retrieved from <https://www.mtlsd.org/about-us/district-news/details/~board/district-news/post/school-board-approves-dr-steinhauers-recommendation-for-a-phased-opening-of-schools-starting-in-full-remote>
- Suburban Pittsburgh School District, Office of the Superintendent. (2020, October 19). *MTLSD tops 2021 Niche.com rankings* [Press Release]. Retrieved from <https://www.mtlsd.org/about-us/district-news/details/~board/district-news/post/mtlsd-tops-2021-nichecom-rankings>
- Suburban Pittsburgh School District, High School. *High school departments*. Retrieved from <https://hs.mtlsd.org/academics/departments>
- Suburban Pittsburgh School District. (2019, January 22). *Strategic plan 2019-2025* [Image]. Retrieved from <https://www.mtlsd.org/about-us/strategic-plan>

Tichenor, M., & Tichenor, J. (2018). The many sides of teacher collaboration. *Kappa Delta Pi Record*, 54(3), 139-142. <https://doi.org/10.1080/00228958.2018.1481663>

Virtual Learning Leadership Alliance and Quality Matters. (2019). *National standards for quality online teaching* (3rd ed.). Retrieved from <https://www.nsqol.org/wp-content/uploads/2019/02/National-Standards-for-Quality-Online-Teaching.pdf>

Wang, J., & Chia, I. (2020). Engaging students via Nearpod® in synchronous online teaching. *Management Teaching Review*, 00(0), 1-9. <https://doi.org/10.1177/2379298120974959>

Wang, M., Hofkens, T. & Ye, F. (2020). Classroom quality and adolescent student engagement and performance in mathematics: A multi-method and multi-informant approach. *Journal of Youth and Adolescence*, 49, 1987-2002. <https://doi.org/10.1007/s10964-020-01195-0>

Wiggins, G., & McTighe, J. (2005). *Understanding by design*. (2nd ed.). Association for Supervision and Curriculum Development (ASCD).

Zalaznick, M. (2020). 3 alternatives to requiring video in online learning. *District Administration*. December 4, 2020. Retrieved from <https://districtadministration.com/require-video-online-learning-student-privacy-equity-alternatives/>