American Journal of Qualitative Research
2023, Vol. 7 No. 2, pp. 19-40
https://doi.org/10.29333/ajqr/12974

AMERICAN JOURNAL OF QUALITATIVE RESEARCH
ISSN: 2576-2141

Surviving COVID Isolation: A Phenomenological Study Exploring High School Teachers' Lived Experiences in a Rural Setting

Karen Marie Collier[1]
North Carolina State University, USA

ABSTRACT
In March 2020, much of the United States shifted to virtual learning with little preparation. Many people tried to adjust to the new normal of quarantine and create a sense of regularity, especially in education. To understand teachers' experiences during this time, a phenomenological study was used to explore the sudden transition to virtual learning for two teachers at a lower socioeconomic, rural high school in the southeastern United States. Through semi-structured interviews, the teachers recounted their personal experiences during the virtual learning transition in the Spring of 2020. They shared their experiences teaching virtually and concerns over students' academic growth, as well as physical and mental health. The teachers provided a creative artifact representing Remote Learning as a secondary data source. As interviews and artifacts were analyzed to derive meaning from their experiences, the study discovered the essence of the teachers' experiences during the remote transition. Teachers accepted a survival mentality as they were overwhelmed with responsibilities and arduous tasks. Disappointment and sadness surfaced in the teachers as students displayed apathy towards assignments, yet they discovered happiness in increased social interactions with their students. Teachers acted as mentors for students, guiding them through the educational transition while focusing on students' physical and mental well-being. The study's findings can be utilized to develop high-quality, equitable remote education models by identifying assistive and inhibitive factors.

KEYWORDS: learning during COVID, remote learning, sociocultural theory, phenomenological study.

With the onset of COVID, the southeastern United States shifted to virtual learning with little preparation. On March 13, 2020, many teachers left school unaware that it was their last day teaching face-to-face (Hobbs & Hawkins, 2020). Teachers also lacked training and technology at home to teach effectively (Hobbs & Hawkins, 2020). Students departed with limited knowledge of the coming months and were ill-prepared with limited technological devices, internet access, and experience with virtual learning platforms (Hobbs & Hawkins, 2020; Turner et al., 2020). The mental anguish of the quarantine negatively affected students' morale, posing additional barriers to teachers in dealing with not only the technological obstacles but the pessimistic outlook held by many students (Solomon, 2020). Current academic research examining the potential learning gaps created by the pandemic focuses on university settings.

[1] Corresponding Author: A Doctoral Candidate in Science Education at North Carolina State University, Raleigh, NC 27695, USA. E-Mail: kmfann@ncsu.edu

University-based studies provided insight into designing better remote learning models, including how to support better social interactions between classmates and the instructor, differentiation in assignment design, and remotely implementing activities or kitchen science labs (DeKorver et al., 2020; Kalman et al., 2020; Nguyen & Keuseman, 2020; Riley & McNeil, 2020). Prior research can be applied to high school settings, while this study fills gaps in the research by focusing on high school teachers' lived experiences. Through high school teachers' experiences, the essence of this phenomenological study can provide additional insight into methods for ensuring high-quality, equitable education during remote learning.

Exploring teachers' experiences during the transition and deriving the phenomenon's essence provides insight into improving remote learning models. These improvements may be vital to future quarantines or environmental catastrophes. Developing equitable remote learning protocols will be crucial to decreasing learning gaps between socioeconomic levels and maintaining consistent education for all students.

Statement of Purpose

It is believed that the social isolation from the regular educational environment during the 2020 Spring academic transition created a phenomenon that induced a wide array of emotions, ranging from fear and stress to joy and success. This phenomenological study aims to understand the essence surrounding teachers' lived experiences during the sudden transition to virtual learning during the COVID pandemic for educators at a lower socioeconomic, rural high school in the southeastern United States. Semi-structured interviews were conducted with two high school teachers to allow educators to recount their personal experiences during the virtual learning transition in the Spring of 2020. Teachers also produced a creative artifact to represent their perception of remote learning. Findings from this study can be utilized to improve remote education models by identifying assistive and inhibitive factors. For this study, the primary research question was,

1. What were high school teachers' lived experiences during the sudden departure from the school building and the rapid transition to virtual learning in a lower socioeconomic, rural community?

A subset of research questions that further guided the analyses include:

a) What were the primary emotions teachers felt during these experiences?
b) How did remote learning impact their teaching strategies?
c) What effect or changes did teachers discern in their students during remote learning?
d) What role did teachers perceive for themselves during remote learning?

Literature Review

In Vygotsky's sociocultural theory, knowledge is co-created with the help of more knowledgeable participants, such as peers, parents, or teachers (Youmans, 2020). With the onset of remote learning, teachers and students were physically separated through quarantine and mentally isolated by limited technology, limiting students' accessibility to their more knowledgeable others.

Remote Transition

Youmans (2020) analyzed how learning under crisis is unique to other distance learning opportunities and described the changes surrounding quarantine in a university setting. Many students worked increasing hours due to parents' lay-offs and cared for younger siblings. Students had limited access to technology and often shared devices between siblings and working parents. Youmans (2020) found that many students struggled with finding a quiet place to work. Increased stress and anxiety from the pandemic affected teachers and students, ultimately negatively impacting students' participation and performance in remote learning.

The instructional model used during the COVID pandemic is described by Hodges et al. (2020) as Emergency Remote Teaching, where the primary objective "is not to recreate a robust educational system but rather to provide temporary access to instruction and instructional support in a manner that is quick to set up and is reliably available during emergency or crisis" (p. 6). In prior research, professors demonstrated compassion by creating flexible timeframes with assignment extensions and provided opportunities for informal communication at the start of the class to promote learning and social networks (Youmans, 2020). To accommodate complex schedules, students were provided with the option to complete synchronous classes asynchronously through recorded lectures.

Students' Perspectives during the Remote Learning Transition

Riley and McNeil (2020) described the difficulties experienced in the sudden educational conversion during COVID for undergraduate chemistry students. The phenomenological study established that the transition created stress and anxiety in students, further strained by the lack of social interactions with classmates and instructors. Students expressed the need for flexible assessments, such as open-ended group projects rather than closed-book examinations. The study suggested recording synchronous lectures, frequent instructor communication, structured group activities, opportunities to practice testing software, and flexible final assignments to improve student success.

Jeffery and Baurer (2020) also explored students' experiences during the remote transition with undergraduate chemistry students and found that social components in virtual learning improve learning success. The study determined that students' laboratory experiences transitioned from the decision-rich, first-person environment to less satisfactory passive observer experiences without hands-on involvement. Students lost rich peer communication networks, as with study groups and in-class learning. The forfeiture of these activities depleted student interactions and decreased instructors' motivation to engage and persist. The study determined that the loss of social interactions negatively influenced the remote transition for the students.

Over 15,000 high school students in Ecuador were surveyed about their access to remote learning, time use, and mental health during the COVID pandemic (Asanov et al., 2021). Students in the study established similar daily routines around education though differences emerged based on gender, wealth, and time spent on household tasks and working. Students shared that their two primary concerns were the closure of the schools and social isolation, with 16% indicating mental health scores related to depression.

Assistive and Inhibitive Factors of Remote Learning

Technological barriers and the loss of social connections were negative factors for many students and instructors during the remote learning period. Kollalpitiya et al. (2020) found that integrating social aspects into the remote learning experience could improve students' success (i.e., synchronous components and collaborative assignments). In the study, students were more engaged in synchronous lectures but struggled to attend classes with complex schedules and lacked a quiet location. The two most significant challenges reported by students were time management and the learning environment.

Other research has established that adaptability, dedication, and self-awareness factored into higher student success (Kalman et al., 2020). Students who possessed time management skills and the availability of a quiet workplace were associated with better school performance. In the study, researchers concluded that instructors should provide insight into studying, time management, organization, and locating resources to assist students in remote learning.

Reiterating the necessity for social interaction, Ewing and Cooper (2021) determined that almost all parents, teachers, and students preferred to be in the classroom. From forty interviews with parents, students, and teachers in Australia, the study determined that social isolation was a major challenge for students. Engaging students was a primary concern for teachers, but students felt less engaged with teachers and peers through the remote learning period.

Teaching in Remote Learning

During the remote learning transition, stress negatively influenced students' learning experience, exemplifying that instructors need to be flexible with students and pay attention to students' well-being (Dietrich et al., 2020). Online learning initially targeted motivated students with time or location constraints, not students living in quarantine during a pandemic. Researchers proposed that teachers need to support students' mental well-being during challenging times by imparting life skills (i.e., autonomy, resilience, adaptability, collaboration, and emotional intelligence). The study also acknowledged that the educational system must support teachers with the appropriate equipment, tools, and working environment during a remote learning period.

Virtual support communities for educators have arisen to assist in overcoming the hurdles of online teaching. In an analysis of a Facebook community, Strategies for Teaching Chemistry Online, DeKorver et al. (2020) discussed approaches for teaching chemistry online. The virtual community was developed to assist teachers with technological insight and pedagogical strategies for virtual learning. The group collectively navigated an emergency shift of chemistry coursework to an online format. The success of remote learning relies on applying technology to specific content and pedagogy and recognizing that it varies between disciplines.

Similar to the online learning communities, another trend seen in remote learning was the implementation of kitchen-laboratory exercises. For science teachers, kitchen labs are a strategy to incorporate inquiry learning during the remote transition. Nguyen and Keuseman (2020) presented an overview of kitchen science during COVID. Kitchen labs reproduced the advantages of open-inquiry, in-person labs while providing positive, cost-effective learning experiences with everyday objects. Students reported positive learning experiences, making the course more rewarding for instructors.

Theoretical Framework

Vygotsky's sociocultural theory posits that social relationships are the basis of higher mental function, and there is a transformation process for activities and experiences to become internalized, first socially and then internally (Wertsch, 1985). Vygotsky believed there is an interdependence between individual and social processes in learning and development (Scott & Palincsar, 2013; Wertsch, 1993).

As part of sociocultural theory, zone of proximal development (ZPD) is the distance between what individuals accomplish independently and what they accomplish when assisted by a more capable other, either an adult or peer (Vygotsky & Cole, 1978). Language and interactions between individuals facilitate and mediate higher mental function within the ZPD (Carter & Jones, 1994a, 1994b). The more capable others assist by modeling, explaining, discussing ideas, providing encouragement, and focusing attention (Carter & Jones, 1994a, 1994b). As learners participate in group activities, they acquire new knowledge and strategies.

Wertsch (1993) identified that human action, both individually and socially, involves both tools and signs. These semiotic tools include language, mnemonic devices, diagrams, maps, computers, calculators, and schemes. The semiotic tools facilitate the co-construction of knowledge and act as the mechanism to internalize future independent problem-solving (Scott & Palincsar, 2013; Wertsch, 1993).

Researchers can better understand learning gains through student-teacher interactions by studying remote classrooms' sociocultural context. Through the theoretical lens of ZPD and sociocultural theory, this study focuses on the impact of social isolation on peer-instructor interactions and student learning. This research moves beyond the transmission of knowledge and explores the language, social interactions, and contexts of the social aspects of remote learning through the teacher's perspective.

Methods

Research Design

Phenomenology studies people's conscious experiences, focusing on the experience and its transformative nature (Merriam & Tisdell, 2015; Schram, 2003). This type of study emphasizes understanding the individual's subjective experience, often of intense human experiences (Merriam & Tisdell, 2015; Moustakas, 1994). The lived experiences of a phenomenon are described by several individuals, concentrating on commonalities between the individuals (Creswell & Poth, 2018). Using a phenomenological approach (Creswell & Poth, 2018), the current study focused on deriving the experience's meaning of teaching during the remote transition for two high school science teachers. As with most phenomenological studies, interviews were used as the primary method to obtain the essence of the meaning of the experience (Merriam & Tisdell, 2015).

Prior to the interviews, the researcher reviewed their experiences as a high school teacher during remote learning to become more familiar with personal prejudices, viewpoints, and assumptions held towards remote learning. The researcher's prior beliefs were bracketed to not interfere with understanding the structure of the phenomenon and avoid biases (Merriam & Tisdell, 2015).

Through semi-structured interviews, teachers were asked to share their experience teaching virtually and their concerns about students' physical and mental health and academic growth. The participants provided a creative artifact representing *Remote Learning* as a secondary data source.

The interviews and artifacts were analyzed to derive meaning and develop themes from the teachers' experiences during the remote transition.

The phenomenological approach gathered information from the teachers to develop a textual description of what was experienced and a structural description of how it was experienced (Creswell & Poth, 2018). These descriptions were incorporated into a composite description, or the phenomenon's essence (Creswell & Poth, 2018). The study endeavored to reduce the individuals' experiences with the phenomenon to a universal essence to understand the experience.

Sample Selection

Through purposeful sampling, Seth and Marie (both pseudonyms) were selected as participants in the study and had 16 and 6 years of teaching experience, respectively. Both teachers earned undergraduate degrees in Biology and were first-generation college students. Seth and Maire were natives of a rural county in the southeastern United States, where they taught and taught their entire teaching careers at the study's school.

During the Spring of 2020, Seth taught three sections of Biology, and Marie taught one section of Earth and Environmental Science and two sections of Physical Science. The class sizes ranged from 25-30 students for all the classes. Seth had elementary-aged children at home during the pandemic, completing the school year remotely. Earlier in the Spring semester, Marie had a baby and planned to return from maternity leave at the end of March.

The area in which the study was conducted is a rural area with a strong agricultural heritage. The school was classified as Title I, a classification for lower-income areas to receive additional federal funding, and 99.6% of the students qualified for free and reduced-price lunch (National Center for Education Statistics [NCES], n.d.). At the high school, 43% of the student population identified as a minority for race and ethnicity, with 28.5% as Hispanic students, 9.7 % as African American students, and 3.5% as two or more races (NCES, n.d.). The median household income for the county in 2020 was $42,807, and only 60% of households had broadband access (My Future NC, 2020). In 2020, 10% of the 25–44-year-olds in the county had earned a bachelor's degree, and 23% had less than a high school diploma (My Future NC, 2020).

The study site was selected because of its lower socioeconomic status. Under normal circumstances, the teachers and students in rural, socioeconomically disadvantaged areas have more challenges than in more urban, well-developed areas due to less access to technology and poor internet service. The requirements of virtual learning amplified these conditions. Being in a rural area made access to resources, such as a library or assistance from a classmate, even more cumbersome due to fewer resources and lower population density.

The researcher was a prior high school teacher colleague of the two teachers in the study and was aware of the difficulties encountered during remote learning. In the Fall of 2020, the teachers were contacted by phone, followed by a formal email, to invite them to participate in the study.

Data Collection

IRB approval was obtained from the university-based IRB office. Participants in the study provided consent and agreed that the information they shared during the interviews and their creative artifacts to be used in this study.

Interviews

Interviews were independently conducted with semi-structured, open-ended questions. Interviews lasted approximately an hour and were conducted virtually using Zoom in mid-October 2020 by the researcher. Semi-structured interviews provided a structured format for exploring the participants' experiences but allowed conversations to arise spontaneously. The interviews were recorded and transcribed by Zoom. The initial transcripts were compared to the audio files and field notes to correct misinformation. A thorough review of the transcripts increased the documents' trustworthiness. In addition, detailed field notes were taken during both interviews and compared to the transcripts for reliability. Participants' names and other identifying factors were replaced with pseudonyms for ethical purposes.

Creative Artifacts

The participants were asked to create an artifact representing *Remote Learning*; the participants were told they could create, draw, paint, or find something that embodied this concept. As supported by previous research (Brown, 2019), participants may have been able to express their embodied experiences with greater richness and depth than with words.

Figure 1
Seth's Artifact (Gustave, D., 1861)

> *Virgil is guiding Dante through the nine levels of Hell, showing how man is pulled off course and can fail to reach the goal. In regards to remote learning, I am guiding the students and these levels represent the problems they face. Traveling through the dark because no one has lit the path before us and just when you think it cannot get any worse, there is another level that proves otherwise.* (Seth)

Along with the artifact, the participants were asked to describe their artifact. The goal was for both participants to independently describe their remote learning experience as a teacher and how it impacted their classroom as teachers and their students (Figure 1, Figure 2).

Figure 2
Marie's Artifact

> *I've done a rough sketch where I have bubbles over my head with all the thoughts. Then bubbles coming out of the computer with all the emails, public complaints, terrifying Covid news. It was actually a little cathartic drawing that out, like a little therapy session.* (Marie)

Data Analysis

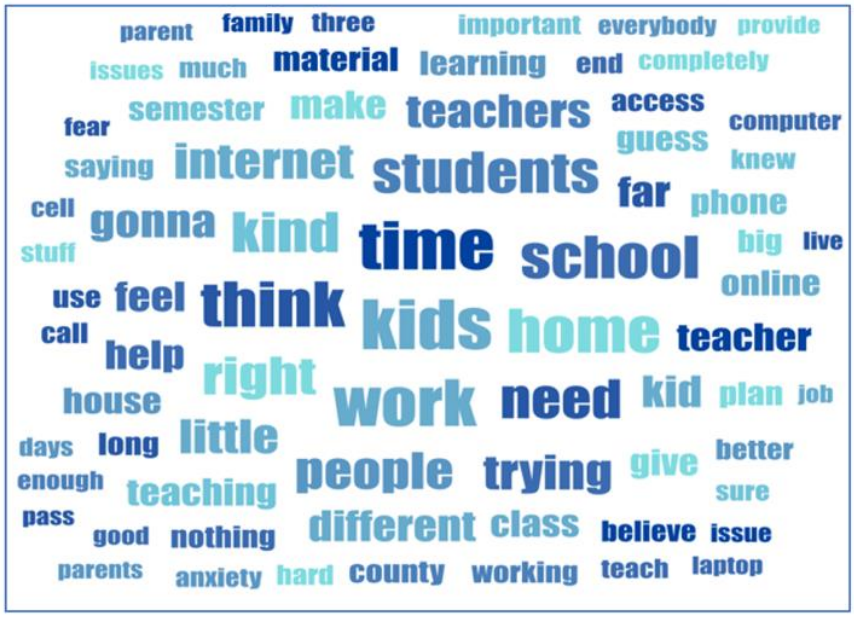
After multiple readings of the interviews, significant statements were highlighted in the transcripts, and statements expressing how the individuals experienced the phenomenon were identified through horizontalization. These statements created broader units of meaning or themes, which provided a foundation for interpretation by clustering statements and removing repetition. From the themes, a textual description was created from statements of what the participants experienced with remote learning, including verbatim examples. Structural descriptions were created to express how the experience happened and reflected the setting and context in which the phenomenon was experienced. A composite description was developed from the textural and structural descriptions of the phenomenon while incorporating both parts. The composite description represents the essence of the experience and the culminating aspects of a phenomenon.

For coding purposes, the Atlas.ti coding program was utilized. An inductive coding methodology (Thomas, 2006) with emotional codes was applied to the significant statements and the participants' artifacts. Primary emotional codes specified the textual descriptions, and the structural descriptions were segmented into secondary emotional codes. The primary emotional codes included: arduous, disappointment, fear, frustration, happiness, inadequate, ineffective, sadness, and worry. Arduous was used to identify statements representing events that were very difficult or challenging tasks, whereas disappointment represented occurrences when things did not

turn out as expected. Fear was used for statements containing feelings of dread or bad things to come, while frustration represented aggravation, failed attempts, or unsuccessful events. Happiness was used with statements expressing joy or feeling elated, while inadequate described the lack of necessary resources. Ineffective was used to identify statements representing not meeting expectations or being unsuccessful at completing a task. In contrast, sadness was used to identify statements of despair, missed events, or gloomy feelings.

Figure 3

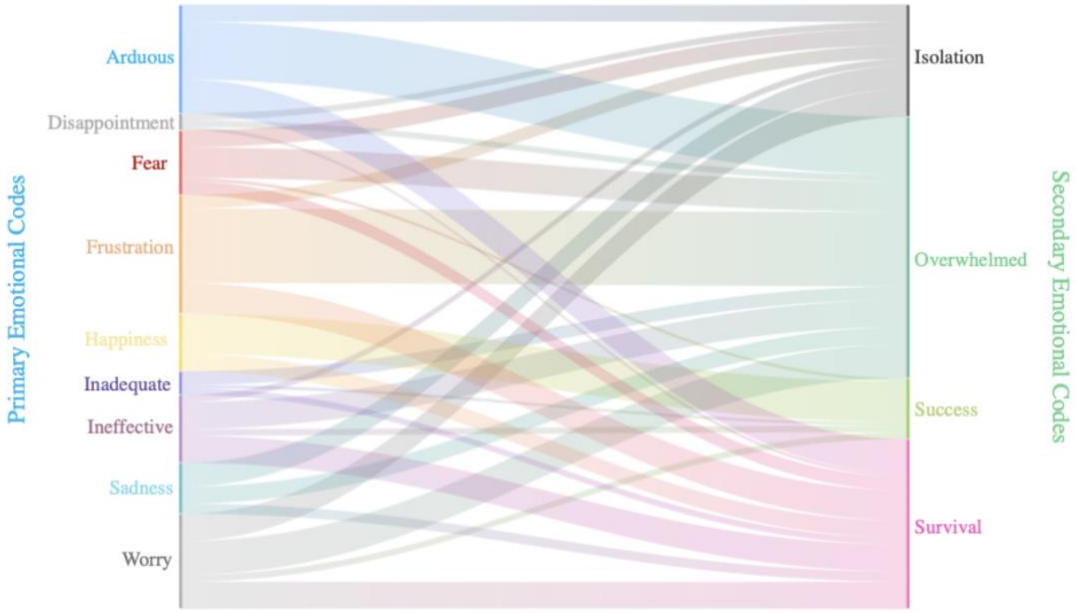
Word Cloud from Interviews and Creative Artifact



For the structural codes, the secondary emotional codes included: isolation, overwhelmed, success, and survival. Isolation was used for statements that represented feeling alone, whereas overwhelmed represented feeling unable to complete tasks or having too many things to do. Survival was used to identify statements representing events of doing what is necessary to get through, whereas success was used to identify accomplishments. The statements were coded with primary and secondary codes for the two interviews and artifacts. Utilizing Atlas.ti, two data graphics were created. As seen in Figure 3, a word cloud was developed from the highlighted texts to represent the phenomenon's essence (Figure 3). In addition, a Sankey Diagram was created to connect the textual description, on the left of the diagram, to the structural descriptions, on the right of the diagram (Figure 4).

Overwhelmed was the most prominent secondary emotion experienced by the teachers and most often linked with the primary emotions of arduous, worry, fear, and ineffective (Figure 4). Survival was the second most common secondary emotion and was repeatedly associated with the primary emotions of arduous, ineffective, and worry. These secondary emotions encapsulated many of the teachers' negative experiences throughout the remote learning period. Despite the difficult circumstances, teachers expressed success as the third secondary emotion, connected to the primary emotion of happiness. Isolation was the least present secondary emotion teachers experienced, corresponding to the primary emotions of worry and sadness.

Figure 4
Sankey Diagram of Emotional Codes



Positionality Statement

Being reared in a rural school system with high teacher turnover rates and lacking resources created a passion for providing equitable opportunities in my rural community. As a rural educator, I experienced remote learning. The sudden transition was mentally and physically exhausting and magnified by the isolation from peers and students. When I left my classroom due to the pandemic, I also left that day as a teacher as I embarked on a new path as a Ph.D. student in Science Education. Lacking the ability to formally leave my classroom or say goodbye to students and fellow teachers created an overwhelming sense of sorrow as I experienced the transition. The teachers interviewed were colleagues I had interacted with as a teacher, creating an area of bias as a researcher in this study.

Validity, Reliability, and Ethics

The researcher employed several mechanisms to minimize biases and to increase the study's validity. Prior to conducting interviews, the researcher bracketed their experiences to separate the researcher's personal feelings and opinions related to remote learning. Bracketing their personal experiences also helped identify biases that may influence data interpretation for data analysis. The dance of bracketing pre-understanding while using personal experiences as insight is described as "striving for reductive focus and reflexive self-awareness" (Finlay, 2008, p. 1). Bracketing is a complex issue in this study as the researcher is a previous teacher utilizing a semi-structured interview as the primary data source. Though the questions are open-ended, the interview's tone and flow indicate the researcher's pre-understanding. Reading the interviews several times before any analysis assisted in developing a deeper understanding of the concepts while increasing the study's validity.

To further improve the study's validity, member checking was employed for an initial analysis of the interview transcripts and a finalized data analysis. Participants were given a copy of the manuscript along with the documents created from the analysis, such as the Sankey diagram,

for review. Feedback was requested from the participants, along with inquiries about any modifications or additions they wished to contribute. Incorporating an artistic method as a second data source balances the struggle Finlay (2008) described as reflexivity restraining pre-understanding and retaining a wonder and openness to the world. Triangulation was used by incorporating the creative artifact to develop a more comprehensive understanding of the phenomenon while supporting the validity of findings from the participants.

To improve the reliability of the study, the researcher took detailed field notes throughout the interviews. In addition, the interviews were recorded and transcribed by Zoom. The research used the audio recording and field notes to verify the automated transcription produced by Zoom. During the analysis process, the field notes and transcripts were utilized. A concern for this study is that only one researcher conducted the analysis. However, colleagues at the university were consulted frequently for guidance throughout the study.

For the study, potential biases were abundant for the researcher, who taught high school during the remote transition and previously knew the study's participants. The researcher sought out feedback from colleagues at the university for the interview questions. In a semi-structured interview, the participants were provided with questions to guide the discussion. However, they had the opportunity to discuss other concerns or areas of interest not specified in the questions. During the interviews, the researcher minimized the amount they shared and restricted their contributions to the conversation to the scripted questions or follow-up questions to comments the participants shared. The researcher avoided discussing their perceptions, feelings, or opinions on remote learning with the participants. In doing so, the researcher minimized influencing the tone and direction of the interviews.

Results

From the two interview transcripts and two artifacts, 216 significant statements were extracted. The codebook includes significant statement examples relating to their codes and associated definitions (Table 1).

Arranging the statements into clustered meanings resulted in four themes, visible on the right side of the Sankey Diagram (Figure 4) and in the Frequency Table (Table 2). The primary emotions experienced by teachers culminated in the four complex secondary emotions that encompassed the remote transition and were identified as the themes for this study: isolation, overwhelmed, survival, and success.

Theme 1: Isolation

Isolation was a recurrent theme associated with sadness, disappointment, arduous, fear, and worry for the participants. The highest occurrence of isolation with primary codes occurred with sadness and worry, with 7 and 8 statements, respectively. The sudden, drastic changes created feelings of isolation associated with sadness for teachers. When teachers left on a Friday in March, they left their classroom not to return as classroom teachers for an indefinite amount of time. Seth lamented, "Well, there were some chapters that were never closed; you just didn't see people again." This removal of normal constructs created complex emotions for teachers in the face of isolation.

> *During this time, efforts were made to connect with students and maintain a sense of normalcy, as when the high school conducted graduation within social distancing guidelines. They [the students] weren't able to stay after*

> *and take pictures with their teachers or stay after and take pictures with each other. It was very, very rigid. We had to get in and get out. They lost a lot of social time that they would have normally got and a lot of experiences that they will not get to have.* (Marie)

Though the educational community joined for a celebratory event, the loom of isolation hovered over people's minds. In addition, in recounting what teachers missed most pre-transition, both reflected on student interactions, signifying isolation and deep sadness. When asked what he missed most, Seth recounted, "The kids, the everyday interaction with the kids. Just talking with them and finding out what's going on in their life. You know, just building that relationship with them." A crucial aspect of education is the interactions with fellow students and teachers within the school building. The scarcity of these connections created feelings of sadness and frustration that culminated in isolation.

Table 1

Codebook for Teacher Interviews and Artifacts

Codes	Definitions	Examples
Primary Emotional Codes		
Arduous	Very difficult; challenging tasks	"It was hard to get up with all the parents. "
Disappointment	Things did not turn out as expected.	"I think I'm gonna, you know, go back. In our minds, are like all things going back to normal. But that normal doesn't exist right now."
Fear	Feeling of dread or bad things to come.	"You have the fear factor of the unknown. It's never happened in your lifetime."
Frustration	Aggravated; failed attempts; unsuccessful	"The parents may not be supportive. They're like, you know, just put them back in [school]. You need to teach them. A lot of wasted time."
Happiness	Feeling joy; elated	"My classroom was like a second home. "
Inadequate	Lack of necessary resources	"You've got to give us the time and you've got to give us the resources, and you've got to make sure that our kids have those resources."
Ineffective	Not meeting expectations; being unsuccessful at completing tasks	"So, the time constraints, everything changed so fast, all the time. And we didn't have enough time to get anything in order, to do anything successfully."
Sadness	Despair over missed events; gloomy	"[I] Miss talking to adults."
Worry	Concern over the unknown	"I don't know what to do after I contact these kids, what I'm supposed to do, what was the next step?"
Secondary Emotional Codes		
Isolation	Feeling alone. Not seeing friends, coworkers, or classmates.	"There were some chapters that were never closed, you just didn't see people again."
Overwhelmed	Feelings of unable to complete necessary tasks.	"Me, mentally? Lord have mercy. … I feel like that snake that is eating its tail."
Survival	Just doing what is necessary to get through.	"Nothing was constant. So, it was constantly treading water trying to stay afloat."
Success	Accomplishment	"So, it allowed me to work from home at my own pace."

Table 2

Frequency of Primary Emotional Codes to Secondary Emotional Codes

	Secondary			
Primary	Isolation (*n* = 26)	Overwhelmed (*n* = 48)	Success (*n* = 33)	Survival (*n* = 34)
Arduous (*n* = 35)	**5**	**17**	0	**10**
Disappointment (*n* = 10)	2	2	0	1
Fear (*n* = 31)	**5**	**9**	1	**4**
Happiness (*n* = 20)	0	0	**12**	**5**
Inadequate (*n* = 32)	0	**4**	1	2
Ineffective (*n* = 53)	2	**8**	2	**8**
Sadness (*n* = 11)	**7**	**5**	0	3
Worry (*n* = 37)	**8**	**10**	2	**8**

Theme 2: Overwhelmed

Overwhelmed developed as a theme from the documents that displayed the highest frequency. As a secondary code, overwhelmed was associated with the primary codes of arduous, fear, ineffective, and worry. The greatest occurrence was arduous and worry at 17 and 10 statements, respectively. The transition required drastic changes to daily routines with a litany of requirements. Teachers and students felt disbelief as they were overwhelmed by their new normal. When recounting what he initially thought, Seth shared, "Like things are going back to normal. But that normal doesn't exist right now. And so that's, I think, is going to be a big shocker for days; I don't think it's clear."

In addition to the sudden transition, teachers struggled to complete the required tasks within the context of their new normal. Many teachers had children at home they were supporting with schooling while assisting in the students' transition to virtual platforms. All the while, teachers and students both lacked quality internet service and often experienced technology inadequacies, which surmounted in feeling overwhelmed.

> *So that's a big issue, the management of the work. And as a teacher, when I'm teaching my kids [students] at school, I'm teaching them all the same subject at the same time. If you're a parent and you've got multiple kids, how are you teaching one English and the other one a different subject?* (Seth)

In addition to the plethora of new responsibilities, school responsibilities now invaded their personal lives as the workday extended into the night.

> *I still had everything else to take care of [at home], and that line between work and home was completely erased. I could start at seven in the morning, trying to contact parents, and still be working on that stuff at seven in the evening when my husband was getting home from work. All of the papers were still sitting right on the table. Remind messages were still coming in from students at different times. There was no way to close the door and not see it.* (Marie)

In these difficult times, teachers were utterly overwhelmed by the pressure to juggle teaching and personal responsibilities, causing them to sacrifice their personal time and space to educate students during the pandemic.

Theme 3: Survival

The theme of survival was associated with arduous, ineffective, success, and worry. The overlap for survival occurred with 10 statements for arduous and 8 statements for both ineffective and worry. Many teachers felt they were only surviving and could not expend the time or energy to complete the required tasks with great skill and accuracy. Maintaining a minimalist education style was difficult for these teachers, who generally excel within their classrooms and develop numerous robust relationships with students.

> *Everything changed so fast, all the time. And we didn't have enough time to get anything in order, to do anything successfully. It was extremely stressful, and it made you feel like you just were completely failing and not doing your job.* (Marie)

As teachers scrambled to teach virtually, students were overwhelmed by the educational transition.

> *They [students] were not prepared, and you're [teachers are] just like scrambling, you know. I try to get kids to know how to use the internet and their computer, which is really mind-boggling because they're such a generation of technology. So, it's not that they lack the ability; they're just not used to the platforms.* (Seth)

Teachers set up virtual classrooms, facilitated students' mental and physical well-being, and made numerous attempts to motivate students during difficult times. However, some students struggled with the educational transition. Seth recounted, "They [students] quit. I didn't even give them a zero [for missing assignments]. I just said you need to redo the quiz. I need your work. Some of them are just, they're just shutting down." However, teachers kept trying to reach their students beyond the curriculum and assist their mental well-being.

> *Anytime I met with the kids, I was constantly telling them, I know that we're all, you know, having to isolate, but you can go outside. Like we got to go outside; you maybe can go for a walk or something.* (Marie)

The Spring 2020 semester was a tumultuous time, and teachers maintained a survival mentality to proceed through the changes and worked to facilitate their students' emotional well-being. Marie even described the semester as "treading water trying to stay afloat."

Theme 4: Success

Despite the plethora of negative emotions, feelings of success were enduring and connected to happiness, overlapping with 12 statements. Teachers felt successful at learning new technologies and being able to interact with students virtually. Marie described success as "Just being able to survive. Being able to log on sometimes or answer that phone and maybe sound happier than what

we feel on the inside was a success. And I was just surviving; that is successful." These feelings reassured teachers that virtual learning could be done well if teachers were provided with the correct supplies, enough time, and appropriate preparation.

Teachers were highly adaptable to the online format despite its arduous nature and became quite adept in the nuances of virtual learning. Reflecting on his success, Seth shared, "I have gotten familiar with Google classrooms, using the platform and working through the software. And I can tell the kids or even some of the other teachers how to put stuff up there." The teachers' resilience under challenging circumstances created feelings of happiness and success. As teachers learned how to reach their students virtually, they also created feelings of success while breaking isolation barriers.

> *It was more of they're getting to see another human being that's not inside their house. And they're getting to have a conversation because we would sometimes have conversations that didn't always have anything to do with what we were looking at that moment. But I think that was just as important in that moment.* (Marie)

Despite the drudgery circumstances, teachers learned the new technological platforms and developed virtual classrooms. These accomplishments allowed teachers to reach their students on a psychological level and offer comfort in times of fear and isolation. While describing his creative artifact (Figure 1), Seth responded, "I am guiding the students, and these levels [of Hell] represent the problems they face. Traveling through the dark because no one has lit the path before us." As teachers navigated difficult times, many emotions arose in response to the circumstances. Throughout all the trials and tribulations, teachers did not falter or resign to defeat but guided their students with the impromptu development of remote learning models with abundant success.

Phenomenological Essence

The transition educators undertook in the Spring of 2020 created emotional waves that greatly impacted their physical and mental well-being. Fear and worry raged in their minds with concerns over the virus and how to transition to virtual platforms. Being from a lower socioeconomic area, technological devices and internet access were not abundant, creating inadequate educational environments. Teachers were overwhelmed with responsibilities on extended workdays that blurred the lines between personal and professional life. Bombarded by arduous tasks, teachers accepted a survival mentality and relinquished their higher standards for lower-quality methodologies. Disappointment and sadness surfaced in teachers' unrealized efforts as many students resigned to not completing assignments. However, happiness and success were discovered in increased social interactions. With an outlook toward another year of remote learning, teachers experienced happiness in the inopportune training they had in the Spring transition and gained an array of skills for virtual education. Throughout the remote transition, teachers acted in a mentor role for students. They guided them through the educational transition while maintaining a primary focus on the physical and mental well-being of their students.

Discussion

As described in Vygotsky's sociocultural theory (Scott & Palincsar, 2013; Wertsch, 1985), learning occurs in a social environment with the assistance of more knowledgeable peers, parents, or teachers. It is believed that the social isolation from the regular educational environment during the 2020 Spring academic transition created a phenomenon that induced a wide array of emotions. Consequently, a phenomenological methodology was used in this study to focus on the process, meaning, and understanding of the teachers' lived experiences during the Spring 2020 remote transition.

Teachers' Primary Emotions During Remote Learning

The breadth of emotions the teachers expressed mirrored the level of complexity of the remote transition, including arduous, disappointment, fear, happiness, inadequate, ineffective, sadness, and worry. These emotions were used as the primary emotional codes for the teachers' interviews and creative artifacts in the study. On a secondary level of emotional coding, teachers displayed emotions of isolation, overwhelmed, success, and survival.

The most common emotions shared by the teachers were the negative emotions of being ineffective and overwhelmed, reiterating the struggle teachers experienced in shifting to remote learning with little preparation. Both teachers experienced the difficulty of the circumstances wherein many of the tasks they attempted to accomplish only failed. Educators were expected to transition to remote learning over a weekend with no training, no additional resources, and no preparation, leaving teachers feeling overwhelmed. Prior research has established that teachers and students experienced similar negative emotions during remote learning, including apathy, stress, anxiety, and depression (e.g., Asanov et al., 2021; Jeffery & Baurer, 2020; Riley & McNeil, 2020; Youmans, 2020). Despite the array of negative emotions, both teachers revealed moments of happiness and success as they relished the accomplishments they experienced and the social connections they were able to maintain with their students.

Vygotsky's sociocultural theory posits that language and interactions between individuals facilitate and mediate higher mental functions (Scott & Palincsar, 2013), aspects that were severely inhibited through remote learning. Many negative emotions Seth and Marie experienced can be attributed to the physical and psychological distance imposed by remote learning. As teachers attempted to implement new technology, their learning of new skills was likely inhibited by the isolation from their coworkers, their more knowledgeable others. In addition, as students attempted to participate in remote learning, the social isolation contributed to students' stress, anxiety, and apathy, all of which negatively impacted the emotional disposition of teachers. As the teachers increased social interaction with their students, more positive feelings were expressed, along with greater feelings of accomplishment and learning from students.

Remote Learning's Impact on Teaching Strategies

Seth and Marie felt that they were only surviving and could not expend the time or energy to complete the required tasks with great skill and accuracy, a difficult decision for teachers who typically excel in their classrooms. With the realization that the need to maintain social interactions with students exceeded the importance of discussing the curriculum, both teachers focused on their students' mental and physical well-being. Seth and Marie not only attempted to impart knowledge from the state-mandated curriculum, but they prioritized their students' mental well-being. Both teachers attempted to motivate and encourage their students during these difficult times. Seth

reached out to students who failed to complete tasks and encouraged them to work on missing assignments. Maire frequently shared strategies with her students for managing their feelings and overcoming the impact of isolation by encouraging physical activity and venturing outside whenever possible.

A common occurrence in prior research and the current study is the importance of maintaining social relationships with students. Ewing and Copper (2021) shared that social isolation was a primary contributing factor to students' negative feelings and created additional challenges for students. Similarly, Asanov et al. (2021) believed the occurrence of depression was potentially connected to the pandemic's social isolation. Despite the tumultuous nature of the Spring 2020 semester, both teachers excelled at reaching their students. Though they maintained a survival mentality regarding the curriculum, Seth and Marie worked diligently to facilitate measures to assist students in improving their students' emotional well-being.

In addition to social components, teachers in the study may have benefited from incorporating more activities for their students. Both teachers felt that the overwhelming circumstances caused them to lower their standard of teaching to a more survival mentality, and many of the interactive components typically incorporated in their classrooms were eliminated. Seth did not include experiments or demonstrations during the Spring transition or the following semester. The hurdles with safety, time, and resources were too challenging to include those aspects in his virtual classroom. Marie shared it would have been difficult but possible to prepare lab supply bins to send home with students, and financial support would have greatly facilitated that process. Safety was the primary concern for Marie since many of the students were home without their parents. Marie did not incorporate labs during the Spring but did so in the consecutive remote learning semester. Marie used her document camera to allow students to see experiments conducted as demonstrations. She converted the measurements to kitchen-style ones and focused on activities that could be repeated in their kitchens. The demonstrations were a positive experience for Maria, allowing her to incorporate more hands-on science during a remote learning period.

As Nguyen and Keuseman (2020) shared, kitchen science labs can provide positive, cost-effective learning experiences and reproduce the advantages of open-inquiry, in-person labs. If teachers in the study had the additional resources, energy, and time to incorporate these types of activities in the initial period of remote learning, their students might have benefited from the interactive elements with potential social gains if conducted synchronously or with family members. As Wertsch (1993) shared, incorporating the signs and tools could positively affect the students as they facilitate the construction of knowledge and aid future independent work. Incorporating kitchen labs and other interactive elements can potentially improve students' educational gains in addition to their psychological well-being through increased social interaction.

Remote Learning's Effect on Students

During the remote transition, teachers in the current study were not only separated by space but were separated by time, with many lessons occurring asynchronously. Poor internet access and deficits with technological skills contributed to students' struggles; some students were limited to only using a cell phone to complete their assignments. The cumbersome nature of the synchronous lesson and the isolation of the asynchronous aspects created negative feelings for many students, including frustration, stress, anxiety, and apathy. The loss of socialization between students and the teacher also negatively impacted the mental well-being of teachers and students, which was a probable contributor to the decreased work ethic in students. As prior research has found, teachers share the need for social aspects to improve learning success (Jeffery & Baurer, 2020; Kollalpitiya et al., 2020).

With the array of negative feelings and technological barriers, a concern for Seth and Marie was how they could effectively educate their students. Similar concerns have arisen in prior research regarding the negative experiences with passive observer learning, especially with asynchronous aspects of remote learning (Jeffery & Baurer, 2020). Seth and Marie shared that they had difficulty reaching students, as many students were completely disengaged while others felt utterly overwhelmed. Students attributed their lower levels of participation to working more since their parents had less work or needing to take care of younger siblings during the day since daycares and elementary schools were closed. Prior research has shown that students struggle to complete assignments due to limited computer access when devices have to be shared between siblings and inadequate internet access (Kalman et al., 2020; Youmans, 2020). These barriers created defeatist feelings for teachers and students alike and negatively affected students' completion of assignments and overall grades in high school, mimicking research findings from universities (e.g., Riley & McNeil, 2020; Youmans, 2020).

Ewing and Cooper (2021) found that teachers were limited to a peripheral role in students' learning, especially with asynchronous components. The lack of social involvement negatively skewed the student's ability to learn by removing or severely restricting the impact of the more knowledgeable other. During the remote transition, students lacked almost all access to classmates and were severely limited in contact with teachers. However, the teachers' and students' success can be attributed to the relationships built prior to their departure and teachers' continual efforts to maintain those relationships during remote learning.

Teachers' Perceived Role During Remote Learning

Throughout the remote transition, teachers acted in a mentor role for students and guided them through the educational transition while focusing primarily on their students' physical and mental well-being. Though distance and time separated the teachers from their students, Seth and Marie sought mechanisms to continue in their role as the more knowledgeable others for their students, improve their students' educational opportunities, and guide the adolescents through the atrocities of living through a pandemic. Seth and Marie shared positive feelings of happiness and success when social aspects were incorporated into the classrooms. Both teachers maintained a concern for their students' mental well-being and made concerted efforts to assist students as much as possible during this time.

As Vygotsky shared, the more capable peer or adult greatly contributes to students' education through modeling, explaining, discussing ideas, providing encouragement, and focusing attention (Carter & Jones, 1994a, 1994b). These aspects were either grossly diminished or entirely lost with remote learning. The students' increased stress, the lower completion rate of assignments, and most likely, lower levels of learning can be attributed to the lack of social interaction and loss of guidance from more capable others, including teachers and peers. As Seth shared, "I am guiding the students…Traveling through the dark because no one has lit the path before us." As teachers navigated difficult times, teachers did not falter but guided their students through the period of remote learning models with ample success. As Dietrich et al. (2020) shared, teachers' roles extend beyond education; these individuals are responsible for imparting life skills and assisting students psychologically during difficult times.

Limitations of Study

The implications of this study are limited to a rural lower socioeconomic high school. The impacts of remote transition may have been less cumbersome for teachers in an urban school or a school with better technological access. As this study focused solely on high school teachers, it is unclear if their experiences were similar to teachers in lower grade levels. It was assumed that most adolescents could navigate virtual platforms independently, minimizing their parents' role. If parents of younger children offered additional assistance, the stress students experienced might have been lessened while possibly increasing student participation. Considering these possible circumstances, the remote learning experiences for teachers in earlier grade levels may have been more positive. However, if parents of younger children were less involved, those experiences may have been negative, as with the high school teachers. To better understand the remote learning experience during the COVID pandemic, it would be ideal to interview people at various levels of education (i.e., elementary, middle, and high school) in different roles (i.e., parents, students, and administrators).

Conclusions and Implications

In Vygotsky's sociocultural theory, education is a collective of social components that play an integral part in knowledge acquisition (e.g., Asanvo et al., 2021; Ewing & Copper, 2021; Jeffery & Baurer, 2020; Youmans, 2020). Those components were stripped away in the Spring of 2020 and replaced with virtual platforms. The effects were devastating for teachers and students and related to similar findings in undergraduate communities (e.g., Jeffery & Baurer, 2020; Kollalpitiya et al., 2020; Youmans, 2020). Social isolation was the most debilitating factor for teachers during the remote transition. From Vygotsky's sociocultural theory, the loss of more knowledgeable others negatively impacted students' learning and mental well-being. Overwhelming circumstances created numerous negative emotions, but success and even happiness were discovered in virtual learning communities in the face of a pandemic.

Incorporating social aspects in virtual learning corresponds with student success and overall well-being (Jeffery & Baurer, 2020). Teachers must assist with students' socialization (Dietrich et al., 2020) and act in a mentoring role during a crisis (Kalman et al., 2020). During traumatic events, teachers need to provide more compassion, support, predictable structure, and a more profound sense of community (Youmans, 2020). Successfully employing virtual platforms is achievable, but improved planning will avoid the obstacles experienced in the 2020 Spring transition.

Teachers advocated for virtual learning to be incorporated into typical learning environments to prepare students for times of crisis, as with floods or hurricanes common in the southeastern United States. Furthermore, virtual schooling could be an alternative learning opportunity for students. It is evident from teachers' interviews that more preparation and technological resources need to be provided for the educational community to create effective and equitable virtual learning environments, as was mentioned in previous literature (Dietrich et al., 2020).

Future research should explore the educational transition from the students' perspective or complete a comparative analysis of an urban area to develop a more holistic understanding of remote learning. A comparison study could explore the virtual learning environment from the Spring to the Fall of 2020 to explore the changes and what was learned over the next semester. Information from this study and future research can influence education policies and practices during crisis events. Quality models need to be developed to implement sound practices for virtual learning for high-quality, equitable education, especially during times of global crisis.

Acknowledgments

The author would like to thank Dr. Jenn Ayscue, Assistant Professor at NC State University, for her guidance and support in completing this project.

Conflict of Interest

The corresponding author states that there is no conflict of interest.

References

Asanov, I., Flores, F., McKenzie, D., Mensmann, M., & Schulte, M. (2021). Remote-learning, time-use, and mental health of Ecuadorian high-school students during the COVID-19 quarantine. *World Development, 138*, Article 105225. https://doi.org/10.1016/j.worlddev.2020.105225

Brown, N. (2019). Identity boxes: Using materials and metaphors to elicit experiences. *International Journal of Social Research Methodology, 22*(5), 487–501. https://doi.org/10.1080/13645579.2019.1590894

Carter, G., & Jones, M. G. (1994a). Relationship between ability-paired interactions and the development of fifth graders' concepts of balance. *Journal of Research in Science Teaching, 31*(8), 847–856. https://doi.org/10.1002/tea.3660310807

Carter, G., & Jones, M. G. (1994b). Verbal and nonverbal behavior of ability-grouped dyads. *Journal of Research in Science Teaching, 31*, 603–619. https://doi.org/10.1002/tea.3660310604

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design choosing among five approaches* (4th ed.). SAGE Publications. https://doi.org/10.1002/tea.3660310604

DeKorver, B., Chaney, A., & Herrington, D. (2020). Strategies for teaching chemistry online: A content analysis of a chemistry instruction online learning community during the time of COVID-19. *Journal of Chemical Education, 97*(9), 2825–2833. https://doi.org/10.1021/acs.jchemed.0c00783

Dietrich, N., Kentheswaran, K., Ahmadi, A., Teychené, Y., Bessière, Y., Alfenore, S., Laborie, S., Bastoul, D., Loubière, K., Guigui, C., Sperandio, M., Barna, L., Paul, E., Cabassud, C., Liné, A., & Hébrard G. (2020). Attempts, successes, and failures of distance learning in the time of COVID-19. *Journal of Chemical Education, 97*(9), 2448–2457. https://doi.org/10.1021/acs.jchemed.0c00717

Ewing, L. A., & Cooper, H. B. (2021). Technology-enabled remote learning during COVID-19: Perspectives of Australian teachers, students and parents. *Technology, Pedagogy and Education, 30*(1), 41–57. https://doi.org/10.1080/1475939X.2020.1868562

Finlay, L. (2008). A dance between the reduction and reflexivity: Explicating the "phenomenological psychological attitude." *Journal of Phenomenological Psychology, 39*(1), 1–32. https://doi.org/10.1163/156916208X311601

Gustave, Dore. (1861). *Inferno Canto XXI* (Engraved print). https://commons.wikimedia.org/wiki/File:Gustave_Dore_Inferno_Canto_21.jpg

Hobbs, T. D, & Hawkins, L. (2020, June 5). *The results are in for remote learning: It didn't work.* The Wall Street Journal. https://www.wsj.com/articles/schools-coronavirus-remote-learning-lockdown-tech-11591375078

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020, March 27). The difference between emergency remote teaching and online learning. *EDUCAUSE Review*, 2020. http://hdl.handle.net/10919/104648

Jeffery, K. A., & Bauer, C. F. (2020). Students' responses to emergency remote online teaching reveal critical factors for all teaching. *Journal of Chemical Education, 97*(9), 2472–2485. https://doi.org/10.1021/acs.jchemed.0c00736

Kalman, R., Esparza, M., & Weston, C. (2020). Student views of the online learning process during the COVID-19 pandemic: A comparison of upper-level and entry-level undergraduate perspectives. *Journal of Chemical Education, 97*(9), 3353–3357. https://doi.org/10.1021/acs.jchemed.0c00712

Kollalpitiya, K. Y., Partigianoni, C. M., & Adsmond, D. A. (2020). The role of communication in the success/failure of remote learning of chemistry during COVID-19. *Journal of Chemical Education, 97*(9), 3386–3390. https://doi.org/10.1021/acs.jchemed.0c00772

Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation*. John Wiley & Sons.

Moustakas, C. (1994). *Phenomenological research methods.* SAGE Publications.

My Future NC. (2020). *County data and resources.* https://dashboard.myfuturenc.org/county-data-and-resources/

National Center for Education Statistics. (n.d.). *Common core of data 2020-2021, 2021-2022 school years.* U.S. Department of Education. https://nces.ed.gov/ccd/schoolsearch/

Nguyen, J. G., & Keuseman, K. J. (2020). Chemistry in the kitchen laboratories at home. *Journal of Chemical Education, 97*(9), 3042–3047. https://doi.org/10.1021/acs.jchemed.0c00626

Riley, J. P., & McNeil, W. S. (2020). Student experiences of emergency remote teaching: Impacts of instructor practice on student learning, engagement, and well-being. *Journal of Chemical Education, 97*(9), 2486–2493. https://doi.org/10.1021/acs.jchemed.0c00733

Schram, T. H. (2003). *Conceptualizing qualitative inquiry: Mindwork for fieldwork in education and the social sciences*. Prentice-Hall.

Scott, S., & Palincsar, A. S. (2013). *Sociocultural theory.* Education. com.

Solomon, S. (2020, September 3). *Distance learning poses a challenge to young students' mental health amid coronavirus*. ABC10. https://www.abc10.com/article/news/local/distance-learning-students-mental-health/103-dd25247b-4f9a-4a14-ba0f-4db3e1e91c4c

Thomas, D. R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation*, *27*(2), 237-246.

Turner, C., Adame, D., & Nadworny, E. (2020, April 11). '*There's a huge disparity': What teaching looks like during coronavirus.* NPR. https://www.npr.org/2020/04/11/830856140/teaching-without-schools-grief-then-a-free-for-all

Vygotsky, L. S., & Cole, M. (1978). *Mind in society: Development of higher psychological processes*. Harvard University Press.

Wertsch, J. (1985). *Vygotsky and the social formation of mind*. Harvard University Press.

Wertsch, J. V. (1993). *Voices of the mind: Sociocultural approach to mediated action*. Harvard University Press.

Youmans, M. K. (2020). Going remote: How teaching during a crisis is unique to other distance learning experiences. *Journal of Chemical Education, 97*(9), 3374–3380. https://doi.org/10.1021/acs.jchemed.0c00764

Notes on Contributor

Karen Collier is a doctoral candidate in Science Education at North Carolina State University. She taught high school science for 13 years in rural North Carolina prior to beginning the Ph.D. program. Her research interests include enhancing students' educational experiences through hands-on labs and activities, understanding college success factors for students who are often underrepresented (i.e., first-generation and underrepresented minorities) to improve collegiate success, and providing high-quality professional development opportunities for in-service teachers, especially in rural areas.

ORCID

Karen Collier, https://orcid.org/0000-0002-6634-5525

Manuscript received October 6, 2022
Final revision received November 14, 2022
Accepted November 23, 2022