‘Because COVID Ruined Everything’: The Impact of Learning Modalities and Accommodations on Students with Disabilities during the COVID-19 Pandemic

Shawna Bendeck[1]

1 Colorado State University, Fort Collins, CO, USA shawna.bendeck@colostate.edu

Abstract

Children with disabilities rely on access to special education services and accommodations, physical, occupational, and speech therapies, and medical interventions. However, these accommodations are not provided equally across all students. The COVID-19 pandemic brought these disparities to light, as untested forms of at-home, virtual, and hybrid learning were implemented. Limited in-person learning affects students with disabilities, as many cannot participate fully in these modifications. While parents have long fought for services and accommodations for their children, alternative educational delivery became the norm during the pandemic. This study examines how K-12 education was delivered to students with disabilities during the pandemic, the benefits and challenges these modalities created, and how we can implement future changes to improve educational access for students who require special education. Interviews with teachers and parents were conducted to understand educational impacts on students. Findings address these modalities' positive and negative aspects and their impacts on educational outcomes using a social vulnerability framework. This research informs K-12 policy and recommends we consider how accommodations can assist students during a national health crisis and how they can be utilized in times of stability to decrease social vulnerability.

Keywords: Special Education, Students with Disabilities, Virtual Schooling, Pandemic, Educational Inequities, Social Vulnerability

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Introduction

Students with disabilities make up approximately 14% of all public-school children (NCES 2020). Special education services are mandated by the Individuals with Disabilities Education Act (IDEA). Our most vulnerable students rely on access to educational accommodations, as well as to physical, occupational, and speech therapies, one-on-one or small group instruction with specialists, and other accommodations as required by their specific physical or learning disabilities (Griffith 2015). However, while our school systems attempt reasonable access to assistance, these services are not provided equally across all students. In addition, disparities exist in access to funding for these services, impacting the distribution of educational services and accommodations (Broege and Anderson 2020).

The COVID-19 pandemic brought these disparities to light. In the spring of 2020, school districts were scrambling to devise ways to educate students while the country was under lockdown and quarantine orders. Without research on appropriate educational delivery during a pandemic or federal guidance on maintaining standards, schools were left to devise their educational delivery methods. Strategies included a mix of at-home, virtual, in-person, or hybrid learning (Hedges and Tipton 2020). Unfortunately, changes to these methods occurred frequently, causing uncertainty for students, families, and educators.

These untested methods have impacted students with disabilities. For example, limited in-person learning affects children with disabilities, many of whom cannot fully participate in these modifications. In addition, without IDEA providing strict standards for educational delivery, some schools opted to reduce special educational services for students, potentially violating Individualized Education Plans (IEPs) that were put into place prior to the pandemic outbreak. Research on this population and their experiences with educational delivery is needed to determine the impacts these changes had on students and best practices for future policy. While current literature does not address the pandemic context, this study draws on a social vulnerability framework. It shows that children with disabilities are at increased risk of educational and developmental regression during school shutdowns and delivery modifications due to their unique physical, psychological, and educational vulnerabilities.

This study examines how primary education has been delivered to children with disabilities during COVID-19. In this current pandemic landscape, all students receive accommodations and modifications for continued learning. However, many children with disabilities have long needed and fought for accommodations that are not always provided. How have pandemic-induced changes increased or decreased educational access for students with disabilities? How can we now reduce vulnerability by maintaining changes that created advantages for students going forward and adjusting those methods that created barriers?

Qualitative in-depth interviews were conducted with a pilot sample of special education teachers and parents of children receiving special education services. Interviews focused on educational delivery methods, accommodations made for students, and how these changes improved or restricted access to education. The data were analyzed for factors of social vulnerability. While educational vulnerability is the primary focus, physical and psychological vulnerabilities are also noted. Although there may be positive and negative aspects to these delivery methods and accommodations, we need to consider how modifications can best assist students during a national health crisis and how they can be utilized in times of stability to reduce social vulnerability. This research adds to our understanding of children with disabilities as a socially vulnerable population and informs K-12 policy as to the impact of the pandemic on these students and necessary adjustments going forward.

Theoretical and Empirical Background

COVID-19

The COVID-19 pandemic turned our social system and institutions upside down beginning in the spring of 2020. Between January of 2020 and June of 2021, over 33 million cases of illness were reported, and over 600,000 lives were lost in the United States alone (CDC 2021). Due to the nature of the virus spread, health agencies worldwide recommended measures to reduce exposure, including staying at home, quarantining, social distancing at a minimum of 6 feet, wearing protective facial masks, cleansing with hand sanitizer, and regularly disinfecting surfaces. Many of these protective measures were mandated by state or local governments.

These mandates led to government, business, factory, and school shutdowns. While some occupations transitioned to a work-from-home status, many workers around the country were laid off, as their places of work were unable to maintain employees during a shutdown (Koenig 2020). Other workers were essential to our continued functioning as a society, such as health care professionals, police officers, grocery store workers, and food processing employees, and the work continued to be on-site (Koenig 2020). These changes to our workforce led to adjustments for the working population and their families. Households adapted to having all members at home, including children. Home became a space to live and work, learn, and play throughout the quarantine period (Prime, Wade, and Browne 2020).

School buildings shut down during the pandemic, and learning was conducted from home during the remainder of the spring semester and into the following school year (Hedges and Tipton 2020). Vulnerability to the virus existed primarily for the elderly and those with preexisting health conditions (CDC 2020). Children were less susceptible to early forms of the virus, yet they could carry and transmit it to others (CDC 2020). As children could increase the spread of the virus to those at risk, it was determined that school buildings must close. During the spring of 2020, approximately 124,000 schools were shut down across the United States. These closures impacted an estimated 55 million students (EW 2020; NCES 2020).

While it remains to be seen whether these changes constitute a 'new normal' or whether we will return to pre-pandemic lifestyles, some evidence suggests these shifts are permanent. In December 2020, a vaccine became available in the United States to protect against infection. Nevertheless, portions of the population resisted vaccination, reducing the likelihood of reaching herd immunity and returning to 'normal.' As additional virus variants evolve, continued health and safety precautions are in place.

Workplaces and school buildings continue to adjust to community infection and hospitalization rates. Families continue to face uncertainty and upheaval. In addition, current research finds that the workforce may be making a permanent shift towards work-from-home and hybrid work options. A recent study found that 54% of working adults would prefer to continue working from home after the pandemic ends (Parker, Horowitz, and Minkin 2020). Workplaces are now adjusting to these preferences. Parents are also choosing homeschooling and virtual education options for their children, even as school buildings re-open. Homeschooling rates jumped from 3% before the pandemic to over 19% by May 2021 (US Census Bureau 2021). As these trends point towards a 'new normal,' research on students with disabilities will remain pertinent.

Children with Disabilities and Special Education

Children between the ages of 3 and 21 receiving special education services make up 14% of all public-school children in the United States in grades pre-K through 12th grade (NCES 2020). Students are eligible for special education services when a disability hinders their academic performance. Specific learning disabilities make up 33% of this population. These include disorders that impede the ability to "listen, think, speak, read, write, spell, or do mathematical calculations," such as perceptual disabilities, brain injury or dysfunction, dyslexia, and aphasia (NCES 2020). Other common diagnoses include speech or language impairments (19%), other health impairments (15%), autism spectrum disorders (11%), developmental delays (7%), and intellectual disabilities (6%) (NCES 2020).

Special education services are codified by the Individuals with Disabilities Education Act (IDEA), which mandates that a "free and appropriate public education" (FAPE) be provided to all students with disabilities (Griffith 2015). Services may be provided within an integrated classroom, for example, with the help of a paraprofessional, outside support with individualized or small group learning with a special education teacher, or in specialized learning environments for children with disabilities. Beyond educational supports for math, reading, and writing, children with disabilities may also receive speech, physical, or occupational therapies, or medical interventions, as needed to address their specific needs and individualized education plan (IEP) (Griffith 2015).

It is required by law that schools comply with the goals and services implemented within the IEP. However, services and accommodations for students with disabilities are not provided equally to all students. For example, studies found that accessibility to special education services is inequitable based on race and class disparities (Broege and Anderson 2020). In addition, funding for schools and special education programs varies depending on one's zip code. Funding per student ranges between $7,600 and $24,000 per year, depending on state allocations and local property taxes, which fund public schools (US Census Bureau 2018). These funding disparities impact the availability of resources for schools that allow them to provide education to all students.

Services for special education are more costly than for the average student and require additional funding (Griffith 2015). However, this funding is difficult to assess at the state level, as the federal government does not require state funds to be used for special education, and these figures are not commonly reported (Griffith 2015). Federal funding for special education is mandated by IDEA and is provided to states through grants. IDEA requires the government to pay 40 percent of average per-pupil funding for each student receiving special education services. However, during 2019-2020, these grants paid out less than half the required amount (UNESCO 2020b). This decreased funding has consequences for special education students. Comparing schools with varying special education funding levels, one study found that schools with more significant funds correlated with greater academic growth and a lessening of achievement gaps (Cruz et al. 2020). Funding disparities may partially cause the current shortage of certified special education teachers. This shortage has increased due to added stress from the pandemic and the backlog of evaluations and paperwork (Jones 2021; Natanson, Strauss, and Frey 2021; MacFarlane, Leslie, and Piper 2021).

COVID-19 and Special Education

It is estimated that at least 90% of school children globally were affected by school shutdowns during the pandemic. This includes 50.8 million children in the United States (UNESCO 2020). School children in the United States missed an average of 54 days of instruction during 2020 (Christakis, Van Cleve, and Zimmerman 2020). Missed schooling negatively impacts educational outcomes, such as performance on standardized reading and math tests, high school graduation rates, and enrollment in higher education (Gibbs et al. 2019; Hernandez 2011). Research has also found that learning gaps increase during the summer months when schools are not in session (Alexander, Entwisle, and Olson 2007; Downey, von Hippel, and Broh 2004; von Hippel, Workman, and Downey 2018). These achievement gaps tend to be highest for lower socioeconomic status groups, racial

and ethnic minorities, and students with disabilities (Carey 2002; Downey et al. 2004). Educators are currently concerned about the learning gaps they are observing in students due to school shutdowns during the coronavirus pandemic (Broege and Anderson 2020; Jarrett and Pomrenze 2020; Kuhfeld and Tarasawa 2020).

These issues are exacerbated by disability status. A school-aged child with a disability relies on education as a means of development and growth. Missing days of instruction places a more significant disadvantage on students who rely on educational and therapeutic services provided by the schools. While many schools converted education to at-home, virtual, or hybrid forms of learning, children receiving special education may not have equitable access to these learning modalities due to their disabilities (Davis 2020, Jones 2021). In addition, the pandemic exposed internet access issues based on geographic location and socioeconomic status. However, questions of educational access remain for those students with disabilities who are unable to see the computer screen due to vision impairments, hear their teacher through the laptop speaker due to hearing impairments, or cannot physically access or respond because of physical or cognitive limitations (Bekiempis 2020; McNerney 2020).

During natural disasters, studies on special education students found that children with disabilities are often ignored during disaster planning and response (Ronoh, Gaillard, and Marlowe 2015). It appears that during the pandemic, this same lack of planning persisted. When school buildings initially shut down in the spring of 2020, schools in some states chose to delay a shift to virtual schooling modalities. These educators were concerned that by providing virtual schooling for general education students, they may violate IDEA if they could not translate services for children with disabilities in the same way. Other schools asked parents to sign waivers that allowed the school to withhold special education services for their children and violate their IEPs (Broege and Anderson 2020). Some schools face legal ramifications related to services withheld during the pandemic (Karami 2021).

Social Vulnerability Framework

Examining children with disabilities within a social vulnerability framework (Peek and Stough 2010) helps to understand educational experiences and outcomes during the pandemic. This framework views disasters as an intersection of natural hazards and human action (Cutter et al. 2008). The risk is unevenly distributed throughout a population during a disaster based on social, political, and economic factors (Wisner, Gaillard, and Kelman 2012). Peek and Stough identify children with disabilities as socially vulnerable and high-risk groups due to physical, psychological, and educational vulnerabilities, and a clustering of vulnerability factors, such as age, "geographic location, family structure, socioeconomic status, physical and mental ability, stage of development, and nationality" (2010:1261).

Peek and Stough (2010) argue that children with disabilities are at high risk due to physical, psychological, and educational vulnerabilities during a disaster. Children with disabilities are often medically or cognitively compromised, placing them at greater risk of physical harm. For example, moving a medically vulnerable child can place the child at risk. Children with sensory processing disorders, such as autism spectrum disorder, may experience additional challenges as their environments and routines become unpredictable and they are unable to cope with those changes (Boon et al. 2011). While the COVID-19 pandemic led to home-based quarantine rather than displacement, these same physical risks are relevant. When one considers the work of Peek and Stough, we know that children with disabilities are a socially vulnerable group. "…the age of the child intersects with other personal and social characteristics, such as his or her geographic location, family structure, socioeconomic status, physical and mental ability, stage of development, and nationality" (2010:1261). In the case of the pandemic, children with medical complications may be more at risk of COVID-19 infection. They may also lack access to medical services and providers. In addition, children with cognitive delays may have greater difficulty adjusting to quarantine and a breakdown of their routine.

Children with disabilities also experience psychological vulnerability during a disaster (Kronenberg et al. 2010; Peek and Stough 2010). Children with disabilities rely heavily on their caregivers to provide physical, communicative, and emotional supports. However, caregivers suffer from increased anxiety, posttraumatic stress disorder, or depression during a disaster, affecting their ability to care for their child and potentially causing psychological harm (Appleyard and Osofsky 2003). This is intensified for children with disabilities, as their parents experience a higher level of trauma and stress due to their child's needs, increased demands, and the lack of support available during a disaster. These conditions hold true for the pandemic. Parents experienced increased social isolation, stress, and anxiety during lockdowns and school closures. (Prime et al. 2020). Outside caregivers were absent from the child's life due to social distancing measures. These factors add additional psychological risk for the child with a disability. Fortunately, research has found that

while children may experience short-term trauma during a disaster, they tend to adapt over time and recover with the proper supports in place (Masten 2001; La Greca et al. 2010).

Educational vulnerability is also enhanced for children with disabilities. These children are at higher risk of losing educational gains when school is disrupted due to disaster (Peek 2008). Research has found that children with disabilities have increased educational demands and behavioral issues following a crisis. While educational services can help mitigate these issues, special education services are often the last to be reinstated after a disruption (Peek 2008). Following a disaster, teacher shortages occur, and educators are often overwhelmed by the increase in students' educational and socio-emotional needs and their own experiences and attempts to recover (Osofsky, Osofsky, and Harris 2007). Students with disabilities then suffer academically, and the learning gap increases for this population. This is also true of other developmental skills, as essential speech, occupational, and physical therapy services are disrupted (Peek and Stough 2010).

The COVID-19 pandemic illustrates these educational vulnerabilities. While school buildings were not damaged during the pandemic, they had to shut down, and education was disrupted. Teachers struggled with their students and adjusted to new teaching modalities and increased workload. Adding to these conditions, students with disabilities require educational accommodations and more personal attention from educators, yet these services were likely to be reduced or entirely restricted during this time. A recent study found that children with disabilities are at a high risk of educational regression during the pandemic (Darmody, Smyth, and Russell 2021). This is due to reduced educational services and parental feelings of being overwhelmed, stressed, and fearful (Asbury et al. 2021). Parents facing these challenges may be unable to cope and provide the additional educational support their child needs.

Accommodations Paradox

A paradox exists in the changes and accommodations made during the pandemic at a societal level for school children. Students were able to continue learning through virtual schooling or hybrid options. Electronic devices were sent home with students to allow them access to education. School districts provided Wi-Fi hotspots to communities lacking internet access. The transition was quite immediate and widespread. However, while children with disabilities are vulnerable to school disruption, we know from past research that people with disabilities are not always afforded appropriate accommodations. Why does this paradox exist? Why are accommodations readily available for the masses during the pandemic yet challenging to modify for those with disabilities during a national health crisis?

This paradox leads us to consider the educational delivery methods and accommodations available to children requiring special education during the pandemic. These changes may be equal to those offered to general education students in some cases. In other cases, an extension of services and accommodations was made to provide equitable educational access. Moreover, in other cases, services were restricted. In examining these teaching modalities and accommodations, we must assess the nature of these changes, their impacts on access to education, and their effects on social vulnerability factors. The following research questions guide this study:

Research Questions

> How have changes to education during the pandemic impacted the social vulnerability of students with disabilities?
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> In what ways has education been provided equitably or inequitably to students with disabilities during the pandemic?
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> How have delivery methods and accommodations improved or restricted access to education for students with disabilities and affected student learning and growth?
>
> What changes to educational delivery methods are needed to reduce the vulnerability of children with disabilities and decrease learning gaps during a health crisis?

Methods and Data

This study was conducted as a pilot study to a dissertation research project. To carry out this pilot study, interviews were conducted with educators and parents of students with disabilities. These interviews provided valuable insights into the educational delivery methods and accommodations provided to students with disabilities during the pandemic, the benefits and challenges of these changes, and the impact these methods had on education for students.

Qualitative in-depth interviews were conducted with teachers and parents of students with disabilities and qualifying for special education services. Qualitative interviews allow for a depth and breadth of

data to be uncovered (Weiss 1994) and provide a method of understanding individuals, groups, and phenomena within their natural settings (Ravitch and Carl 2016). From this data, we can examine educators' educational strategies and accommodations to assist children during the pandemic and how these changes impacted educational outcomes. Interviews with parents further identified the accessibility of those strategies and their impact on their children.

For these initial pilot interviews, educators and parents represent a purposive sample that matches the needs of the study (Ravitch and Carl 2016). Participants were recruited by email and through respondent-driven sampling. Respondents shared information regarding the study with others in their social networks and directed interested educators and parents to the researcher. Through this social networking strategy, fifteen individuals participated in the study and provided invaluable information regarding educational delivery methods and accommodations for children with disabilities during the pandemic. Interviews also aided in testing and revising the interview questions for the larger research project.

Five interviews were conducted with educators. Of those educators, three worked in special education classrooms with between 3-5 students. Ms. Haley and Ms. Lindsey are paraprofessionals working with elementary and middle school-age students, respectively. Ms. Sue is a certified special education teacher working with middle school and high school-age students. These educators work with students with the most severe cognitive and physical disabilities requiring a wide array of medical and therapeutic interventions. Disabilities included hearing and vision impairment, Down syndrome, an autism spectrum disorder, cerebral palsy, and Rett syndrome. A fourth interview was conducted with Mr. Henry, a special education teacher at an elementary school. Mr. Henry provides external and internal support for integrated students with less severe disabilities such as attention deficit and hyperactivity disorder (ADHD), dyslexia, and an autism spectrum disorder. A fifth interview was conducted with Ms. Penny, vice-principal of an elementary school, knowing procedures and decision-making during COVID-19. These individuals represent a wide array of experiences with special education and delivery methods during the pandemic.

Ten interviews were conducted with parents or other caregivers. Seven of these interviews were with mothers of children with disabilities. In addition to interviews with parents, caregivers included a grandmother, a full-time nanny, and a student learning facility worker. The students discussed in these interviews represent a range of disabilities and severity of needs. These included attention deficit disorders, autism spectrum disorder, Down syndrome, sensory processing disorders, dyslexia, and other unidentified cognitive delays. Table 1 describes the fourteen children with disabilities that focus on parent and caregiver interviews. Pseudonyms were used to protect the identity of the participants and their children.

Interviews with educators focused on educational needs and education delivery for children with disabilities who qualify for special education services. Educators were asked questions about their delivery methods during the pandemic and their accommodations for students receiving special education. They were also asked about the challenges and benefits of those methods. Interviews with parents and caregivers focused on their observations of educational delivery for their children, the changes they experienced throughout the pandemic, how they and their children adapted to these changes, and the impact these modifications had on their child's learning and educational growth.

Due to the pandemic, in-person interviews were not advised, breaking social distancing guidelines. Instead, all interviews were conducted using an online video platform to maintain safety and health precautions. Interviews were recorded and transcribed following the interview. Interview data were analyzed using MAXQDA. Data coding went through several rounds of thematic coding to discover patterns of similarity and difference within categories (Saldaña 2016). Specifically, educational delivery methods and accommodations discussed in the interviews were identified, along with the interviewee's experiences and observations of these methods. The analysis also focused on the outcomes of these methods for students with disabilities.

Results

Interviews with educators and parents focused on the teaching modalities utilized during the pandemic for working with special education students. The first modality implemented for many schools was at-home learning, guided by asynchronous, virtual 'classroom' assignments, often through a classroom application or prerecorded lectures from the teacher. Another modality utilized was virtual delivery of education, whereby a teacher would interact with students through an online video platform. Third, some students in special education classrooms were provided on-site education. This was due to either the school district maintaining open school buildings

Table 1: Child and Family Characteristics for Caregiver Interviews*

Child	Sex	Race	Age	Grade	Household Members	Caregiver at Home	Diagnoses	School District Per Pupil Funding
Angie	F	W	6	K	mother, father	Yes	ADHD	15,000
Grace and Reggie	F, M	H	10, 13	5th, 8th	mother, father	Yes	dyslexia, ADHD	11,000
Judy	F	W	5	pre-K	mother, father, brother (6)	Yes	sensory processing disorder, ADD	11,000
Kaitlyn and Tanya	F, F	W	5, 7	K, 2nd	mother, grandmother, nanny	Yes	Down syndrome	11,150
Patrick and Steven	M, M	W	9, 10	3rd, 4th	mother, father	Yes	ADHD	18,000
Charlie	M	NA	5	pre-K	mother, father, brother (15), brother (13), sister (2)	No	developmental issues, ADD	14,200
Breanna	F	W	8	2nd	mother, father	Yes	ADD, physical disability	12,000
Jimmy and Nat	M, M	B	9, 12	4th, 7th	mother, sister (7)	Yes	ADHD, dyslexia, autism	12,000
Sasha	F	AA	9	3rd	mother, father	Yes	dyslexia	12,000
Chris	M	W	12	6th	mother, father	unknown	autism	unknown

* All names used are pseudonyms to protect confidentiality; Ages and Grades in School reported for the 20/21 school year; Race: W = white non-Hispanic, B = black or African American, H = Hispanic, AA = Asian American, NA = Native American; School District Funding = Average per-pupil funding (does not include special education funding due to this data being unreported)

throughout the pandemic or to exceptions made for children with disabilities. A fourth teaching modality was a hybrid form of education, in which students would alternate between in-person, virtual, and asynchronous learning days to reduce the number of children in the classroom at any given time. Finally, some students received home-based instruction and therapeutic services with a special education teacher or therapist.

To begin, it must be noted that educators and parents observed advantages and disadvantages with each of these teaching modalities across children. Students with and without disabilities benefitted and struggled through these transitions. Educators and parents also noted their own positive and negative experiences and emotional responses. The following results from interviews will highlight the impacts on students with disabilities.

Asynchronous At-Home Learning

Asynchronous learning was common in the spring of 2020 following initial school closures. Announcements from the Center for Disease Control and public health departments led governors and state department of education superintendents to order school building closures throughout their states. These decisions led to sudden school shutdowns as teachers, students, and their families went into lockdown. All educators and parents interviewed reported that their students experienced asynchronous learning during this time. For some, this change was announced prior to the transition after spring break. This timing allowed schools to coordinate with students and parents prior to the transition.

Jimmy's mother reported that her children brought home packets of schoolwork, math books, and

school-provided laptops just before spring break began. This allowed the transition to asynchronous learning to occur smoothly, and education continued from home following the break. In addition, she shared that her children's teachers and school principal communicated via email before the transition and clarified expectations. While there was a learning curve, as teachers and students were not experienced with at-home learning, she felt that the available resources and assignments decreased the uncertainty and anxiety.

Grace and Reggie's mother reported that the switch to at-home learning was not announced until the end of spring break and the change was sudden and unexpected. Her children were unprepared, and it took the course of a few weeks before all needed school resources and supplies were available to Grace and Reggie. This created uncertainty for the family, stress on herself and her children, and anxiety regarding her children's progress. She explained, "I think they were not prepared. Obviously, nobody was prepared for it." She later stated, "I expected we were going to have to do a lot of teaching, and I was really nervous."

While some parents reported that early preparation was helpful, some educators expressed doubts that the efforts were effective. For example, Ms. Penny claimed the preparation process was chaotic, stressful, and took much effort from herself and the staff. Mr. Henry explained the transition this way, "That Monday after spring break was a rude awakening. I mean, everyone was scrambling with what had just happened and trying to set up shop for the remainder of the school year, which was nine weeks. So, man, it was just, I mean, it was like trying to find whatever in a dark room. I mean, everyone was kind of in the same boat."

Following the initial transition period, at-home learning was particularly difficult for children receiving special education services. For children with attention deficit disorders, lack of motivation and focus played a role. Patrick and Steven's mother reported that her children would not engage in the activities and assignments. While her sons enjoyed school and were motivated by peers in the classroom, learning from home without those forms of support and motivation created a struggle. She described Steven's fourth-grade schedule. He was required to watch 30-minute lessons and then complete his work independently. "He just can't sit independently, like self-guided through homework. He has to have someone there and when I'm here, I'm also working so it's really hard to help him with everything."

Grace and Reggie's mother reported that her daughter, Grace, was required to watch prerecorded videos from her teacher. She said, "She needed a bit more motivation. She would get frustrated. 'Well, I don't understand what the teacher is saying.' And it wasn't a live teacher that she could ask. It was a prerecorded video." Grace's mother worried that this teaching method was detrimental to her daughter's learning, and she was frustrated with the changes that caused Grace to struggle. Speaking of her daughter's kindergarten class, Angie's mother stated, "She wouldn't pay attention. She kept running off to get toys." When asked about the challenges they faced, she responded, "Getting her to sit down, even for 20 minutes. Angie has trouble focusing. I think the positive peer pressure of being at school is helpful for her if other kids are sitting down." Angie's mother was disappointed that her daughter's first experience with school was negative.

Educators had similar experiences with asynchronous learning. While school administrators expected them to create asynchronous content for students with disabilities, they reported that most students did not complete the assignments. For students with severe disabilities, adult assistance is required to complete schoolwork. While in school, these students would receive one-on-one attention from teachers and paraprofessionals. Special education teachers observed that many parents were unable or unwilling to complete these assignments with their children due to a lack of skills, time, or motivation. They observed a decline in skills from their students. Ms. Sue expressed her frustration that her students were falling behind. "It's just how far we've seen these kids come and the progress that they've done. And you're like, 'yes, I'm so proud of you. This is awesome'. And then they go back to square one. And you're like, darn, because we work so hard to get to that point. You're not frustrated at the kids because it's not their fault. But you're frustrated with the whole situation." Ms. Haley also expressed frustration at the situation, noting that they were required to put so much time into developing virtual content, but this effort felt wasted. "We'd create Seesaw [online classroom platform] activities, but it takes a while to create a Seesaw activity, but it's like half the time we'd create an activity and they wouldn't use it. And so, it's just felt like a big waste of time for a lot of it. And our kids, they're just super confused. They didn't know what was going on."

One example that was brought up frequently was pod books for communication with students who have hearing or speech impairments, autism spectrum disorder, or other cognitive delays. These books contain pictures representing words that a child can point to and express their thoughts. A shared learning goal for these students is to better communicate with others using these tools. During at-home learning, as parents were working from home, educators observed that their communication tools were no longer used.

When students later returned to in-person learning, Ms. Lindsey explained that her students were struggling with these tools, and communication skills had decreased during at-home learning. “It's hit or miss whether or not our parents use their communication devices at home… They won’t sit there and pull out their pod book and scan with them for 10 minutes... So, we come back, and our kids are like, ‘I don't want to use my pod book. I don't want to listen to you scan through those things’.” When asked about their learning, Ms. Lindsey replied, “They stopped all IEPs and things like that [during the pandemic]. And so, everything just kind of came to a stop. It was harder once we came back to in-person, because not only did everything else stop, their learning stopped. They were not improving like they should be.”

While at-home learning created barriers for students with disabilities, some students benefited from learning asynchronously. Jimmy, a child with dyslexia, experienced positive effects. His online assignments provided benefits such as speaking and recording an answer to a question rather than writing or typing. While children with dyslexia struggle with writing, using a laptop to complete work reduced this barrier. Jimmy’s mother reported he had improved without this writing barrier and could better express what he had learned back to his teacher. This was also motivating to students who struggle with attention deficit disorder. Sasha’s mother observed that her child was more motivated to complete assignments that allowed for vocal responses. This speak and record method removed the pressure to spell and form sentences correctly. Instead, she could focus on the content of her answers and show what she had learned.

Synchronous Virtual Learning

While much of the initial learning in the spring of 2020 was asynchronous, synchronous learning also became common as a way for teachers to connect virtually with students, provide socio-emotional support, and connect students with their peer groups. Teachers set up virtual meetings and held them through Microsoft Teams or Zoom platforms. Students connected to the virtual classroom to meet with their teachers and classmates. Parents reported that these meetings were sporadic and based on teacher and student availability. However, these meetings became scheduled occurrences to bookend asynchronous learning activities with time. Eventually, synchronous learning took place for many students over the entire school day and took on a more academic approach. This continued to be a standard educational delivery method during the 2020/2021 school year, with full daily schedules and virtual classroom meetings required for all students.

Educators and parents reported that virtual learning was a struggle for students with disabilities. Every caregiver interviewed described challenges for their children in maintaining attention and focus, becoming distracted by the images on the screen, hearing and speaking through the laptop speaker and microphone, and being able to access multiple platforms during virtual schooling to keep up with their teachers. For example, students with attention deficit disorder struggle with sitting still and paying attention for long periods, especially when learning through a virtual platform. All caregivers described the difficulties in keeping their children engaged. Judy’s mother described it this way, “When COVID hit, they tried to do online [schooling], she just cannot do that. So, we were not really able to do anything with her. She had to stop all her extra speech therapy that she was getting. They tried to do it by Zoom, and she would just run around the table.”

Children with more significant disabilities, such as Down syndrome, may have very little connection to learning through a virtual computer screen. Kaitlyn and Tanya’s nanny reported that they could not understand the requirement to sit in front of the computer for long periods. Kaitlyn, a kindergartner, would refuse to participate, leaving the computer as soon as she could manage to get away. Charlie’s foster mother reported that Charlie would also run away. “He also has ADHD, and he wouldn’t sit still to do online schooling. I can’t even get him through online visits with the caseworker or online telehealth visits.” Early experiences with school and learning are vital for development, yet these virtual experiences cannot provide that learning.

In addition to classroom learning, many children with disabilities require additional therapeutic services to address physical limitations. These services are difficult to provide through virtual platforms. For example, physical therapy is necessary for children with Down syndrome to increase their mobility. Kaitlyn and Tanya could not see their physical therapist in person during virtual learning. Their nanny reported that both girls experienced a decrease in mobility over time. Ms. Haley reported similar results. One of her students required physical therapy, but he was not receiving these services. “You could notice that his knees were weaker because you could tell he just wasn't using them at home. He was sitting in his chair a lot. So, he'd stand up and his knees would buckle towards each other. So, we lost some of that progress, just because the muscles, they weren't being moved.”

Judy attended a special education pre-kindergarten classroom prior to the pandemic. Her

mother was asked how Judy responded to online learning. She immediately laughed and said, "She didn't." Judy would consistently run away from the iPad during virtual class time or her virtual therapy sessions. She turned it into a game. Judy's mother reported that while her daughter was making good progress prior to the pandemic and was expected to be integrated into a general education classroom in the fall, her daughter's progress had degraded due to virtual schooling. This parent chose to take her children out of the public school and place them in a pandemic pod with a tutor to combat the issue. Unfortunately, she could not find anyone specializing in special education, and Judy did not receive special education or therapeutic services. Judy was unable to progress to kindergarten as previously planned due to this regression. Her Judy's mother stated, "And so that's just really frustrating that I feel like she needed this help so that she would be where she needs to be. And she wasn't able to get it. Because COVID ruined everything." Therefore, Judy could not progress to kindergarten as previously planned due to this regression.

While all parents observed negative consequences of virtual learning for their children's educational growth and development, some noted positive benefits. Chris's mother explained that her son, who has autism, responded well to virtual learning. Chris struggles with social interaction and behavioral issues. Prior to the pandemic, he often got in trouble for his behavior, and he did not enjoy school. His mother explained that he now liked school as he was more comfortable learning and communicating online. Chris was no longer getting in trouble at school and was able to stay focused on learning throughout the school day. Breanna's caregiver described her improvement in learning. The removal of distracting peers appeared to be a benefit, and Breanna could better focus on the academic aspects of school. Jimmy and Nat's mother also reported that Nat was doing well in his classes. He had trouble with communication and socialization. Virtual learning had removed these obstacles and allowed him to engage in learning.

In-person Learning

For some students with disabilities, accommodations were made to re-open classrooms, while general students were still participating in other forms of virtual learning. These decisions to allow in-person learning were made considering the needs of the individual students. Jimmy was invited to attend on-site virtual learning at his school. This was due to his learning disabilities, ADHD, and dyslexia. His teachers identified him as a student who would benefit from in-person accommodations. His classroom teacher continued to teach virtually, but Jimmy was able to have an educator in-person to help him log into class, stay on task, and answer questions. In addition, his special education teacher was on-site and met with him twice a day for in-person support. Jimmy's mother reported that this extra assistance helped her son maintain his learning and make progress. In-person social experiences with other students also boosted his mood and mental health. She also noted that her stress level decreased, and she could help her other children with school work, knowing that Jimmy was getting the additional help he needed at school.

For some special education classrooms, special permission was provided to allow in-person learning to continue during the pandemic. In-person learning presented its own set of challenges for children with disabilities. Teachers in special education classrooms discussed the struggle with social distancing for their students. Many students have severe physical, cognitive, and medical disabilities; thus, social distancing between student and teacher is impossible. Teachers and nurses in the classroom were required to wear N-95 masks, gloves, and medical gowns when in close contact with students. These protective measures were required to reduce the spread of the virus, yet they posed obstacles to connecting with students. For example, Ms. Lindsey explained that a student with severe autism struggled with hearing her when she was wearing a mask. She described that he must see her mouth moving when she speaks to understand what she is saying due to his sensory needs. Wearing a mask caused him to struggle. "He doesn't understand, 'why can't I see your face? Why can't I see you talking to me? You know, why do you have this on?' So, he'll grab my mask and try to pull it off because he wants to see my face, he wants to get that input, he wants to see, you know, your mouth moving as you're talking to him." Ms. Lindsey later described the challenges for the hearing impaired. "And those level three medical masks because it makes you super muffled to talk to the kids. I've got two kids who are almost completely deaf, but they do have some hearing. And so, with that mask being super muffled, they do struggle to hear you and understand you."

While there were challenges to in-person learning for this population, teachers reported that it was worth the extra hardships and barriers. In-person learning allowed these teachers to maintain connections with their students, complete their lessons, and make progress towards IEP goals for each student. This progression was not achievable during other forms of learning modalities. As Mr. Henry explained, "Being in person, I mean, there's no substitute in so many ways, you know?" Later, Mr. Henry discussed the dip in educational growth during the year. Test scores in the middle of the 2020/2021 school year decreased

significantly, yet they rebound once in-person learning restarted. He explained, “they didn't demonstrate much growth for that middle of the year. But at the end of the year, the numbers were higher. I didn't see one student go down. It kind of shows, you know, that second semester coming back to in-person education, I think students are really resilient, to begin with. I think they needed to come back to school and get their footing, and then things kind of just came back to normal reading levels.”

Hybrid Learning

The accommodations made during hybrid learning were similar to at-home, virtual, and in-person learning. Hybrid schedules created a routine that fluctuated between all three teaching modalities. Nevertheless, hybrid learning also presented unique challenges to students with disabilities. For example, hybrid working schedules of special education teachers, therapists, and nurses caused inconsistencies in care. Teachers in a classroom for students with disabilities reported that because nurses and students might attend school on alternating days, some students could not have a nurse available to tend to their medical needs. Physical, speech and occupational therapists were also unavailable to conduct therapy with all students.

In some cases, these specialists were only on-site the opposite days as the student due to the hybrid schedule requirements and low staffing. This created issues in which some students received services consistently, while others did not receive required services for the entire duration of hybrid learning. Ms. Sue explained, “For some of my kids, their muscles weren't getting stretched the way they should have been. They weren't getting out and walking like they should have been. They weren't working on daily life skills or occupational therapy. Because their therapists just didn't come in on those days. They came in on the days that we weren't there. So that was another part that was hard about hybrid.”

Hybrid schedules also affect the consistency of learning. Students with significant disabilities require constant, repetitious learning to acquire basic skills. For example, teachers explained that children with severe cognitive disabilities require a lesson to be read to them several times over days or weeks before they grasp new concepts. During hybrid learning, this created retention problems as teachers could not focus on concepts consistently or practice skills with their students daily. In addition, as described previously, teachers observed that students did not participate in learning on at-home or virtual school days. This led to students actively learning for only two days a week, not enough time to build new skills. Ms. Haley expressed the problem this way, “To this population, routine, routine, routine. Moreover, normality is super, super important. So, with the constant change of routines that we're doing, whether it's going to hybrid school, or online, or having to do all these new protocols and changing up the school routine that they've been doing for the past 10 years, depending on what age group I'm working with. It's frustrating. It's confusing. It just kind of throws everything off.”

Skill regression was also caused by the fluctuating schedules between school and learning at home. Ms. Sue explained that a student in her class was on a different sleep schedule at home. His mother would allow him to sleep late in the day while she worked from home during the pandemic. This caused problems two days a week when he attended school. He was unable to stay awake and alert in the classroom. While parents appreciated the days when their children could attend school, special education teachers reported that hybrid schedules were almost more detrimental to student growth and progress than virtual learning. One paraprofessional reported that each day with her students felt like starting over. “It felt like all the work we had just put in for the semester, it felt like it's all just going away, washed away, because they weren't learning anything. They were just going backward on everything that they had learned, everything that I had worked toward, was going backwards.”

Home-Based Learning

Home-based services were provided for one family in this study sample. Kaitlyn and Tanya’s nanny described how therapists from the school district would visit them at home throughout the summer months following the start of the COVID-19 pandemic and later in the Fall of 2020. This included speech, occupational, and physical therapists. Each week, these school-based therapists would come to their home, donning masks, and work with Kaitlyn and Tanya to meet their IEP goals. This occurred once or twice a week per therapist, depending on the child’s IEP. Their nanny reported that these services immensely helped the children maintain progress, and she was thankful that the school provided these at-home services.

In subsequent interviews, teachers and parents were asked if home-based services were an option in their school districts. None of the other 14 participants had heard of this option, yet many parents expressed their desire for these services. While these home-based services may not be feasible for all schools to provide, they appear to help maintain growth for students with disabilities. Judy’s mother explained how she attempted to find home-based services for her

daughter. However, her school district was not offering this as an option. She voiced frustration that she could not find a private-pay therapist to come to her home, and the therapists Judy was seeing before the pandemic had discontinued their services due to health and safety concerns. It was upsetting for her to see Judy's progress diminish without the availability of services in her county or from her local school district. When asked about her greatest frustration, she answered, "Not getting the extra help and resources Judy needs. And so, falling further behind or noticing, oh, she's needing help with her fine motor skills, and there's no access to help. And just thinking there could be a way to do it, it's not impossible." Judy's mother lamented that home-based learning could be possible with the correct planning and protections in place, but her school district did not offer them.

Caregiver Experiences and Emotional Responses

Interview data suggest that children with disabilities experienced educational vulnerability due to the changes in schooling during the Covid-19 pandemic. In addition to these factors, interviews also indicate that parents experienced increased stress, anxiety, and depression. These changes in parental mental health are essential to examine, as they influence psychological vulnerabilities in children and magnify the educational vulnerabilities previously discussed. Moreover, as parents of children with disabilities, these issues may be magnified due to their children's greater physical, emotional, and educational care needs.

Parents discussed the increased stress and feelings of being overwhelmed due to the pandemic, the conditions of lockdown, and the increased pressure of managing their child's education from home. Grace and Reggie's mother was candid about her feelings, "I felt like there were a lot of days that I was really, it's just depressing, you know. It was scary and I didn't want the kids to feel anxiety for me, but I was feeling anxious. I thought, what does this mean? What's going to happen? How long is this going to go on? It was overwhelming." Charlie's mother, who continued to work outside of the home during the pandemic, expressed feelings of being overwhelmed when she learned her son would be on a hybrid schedule, "You know, the day that they sent out the email saying that school was going online. The following week, I sat in my car and cried for 45 minutes, because I was like, how am I going to do this? How am I going to stay home with him and do half days? I can't work from home? That's not even possible with my job."

Some parents explained that they felt like giving up. For example, Angie's mom described the difficulties for her and her husband in creating work-from-home schedules and managing Angie's schooling. She said, "It was too much to manage even between my husband and I. [Schooling] was too much for us to have to manage while also doing our work, even if we took breaks from our work. It was just too much." Judy's mother felt the same way. She took her children out of school to learn from home because of the challenges of virtual schooling. "It's just way too frustrating and stressful." As schools began to re-open, another added stress for working parents was the uncertainty of whether their children might need to suddenly stay home due to virus exposure in the classroom. This added stress, tension, and conflict to the home for Charlie's mother. "It's really stressful. When we've had to be home unexpectedly, tension runs really high. No one seems to get along in the household. Everyone's just kind of at each other because we're all trying to balance everything."

Many parents expressed frustration over not being able to do more for their child and feeling a sense of worry and guilt over this impact on education and development. Charlie's mother worried about leaving her older children home alone during virtual schooling while she went to work. "They were home a lot by themselves during the day trying to do the online schooling. We definitely saw a huge dip in their grades. Both kids kind of started struggling academically, which they never had before." She explained that because she and her husband had to work outside the home, they could not help their children with learning. She felt guilt over their educational struggles but did not see another option.

Patrick and Steven's mother was able to work with her children but felt exhausted by the process. "Just getting them to even get their work done is such a battle every day. And we're exhausted. My husband and I are exhausted. And when we are on the kids to get their work done, then they get exhausted and so we're all tired and crabby." When asked about their biggest challenges as a family, she answered, "Stress and emotional, and just the guilt of wondering, you know, are my kids going to be so far behind when they get back to school?" Judy's mother expressed confusion and helplessness over how to help Judy with learning during the pandemic. Without professional support, she feared Judy was falling further behind. "So that's hard for me because I don't know how to help her."

During interviews with parents, feelings of isolation and a lack of social support were exposed as they explained their need for support in caring for and educating their child with disabilities. Feeling a lack of support also affects one's own mental health and can add to the stress and anxiety during the pandemic. Grace and Reggie's mother explained that the hardest thing about the pandemic was not having contact with

family. “We can't have contact with my family, which has been really hard. I broke down the other day… We used to go to my parent’s house every day practically. We'd go over and hang out with my sister and her kids all the time. And now we have no contact.” She later described an incident when she could not help her children owing to a migraine. She asked her parents to come to her aid, but they refused due to health concerns. Not having that social support system was a difficult experience.

Judy’s mother described a similar loss of support. When asked about her most difficult challenges during the pandemic, she answered, “Not seeing my parents. We didn’t see my parents or my grandparents or my sister for five months. I think we would just see each other on our porches or drive by and say hi. And we’re a pretty close family, so that was really hard. Just feeling kind of alone in it. That was the hardest.” This lack of support was also due to postponed special education and therapeutic services. Judy’s mother described the loss of progress. “That’s also really frustrating because Judy’s supposed to start kindergarten in August and I don’t think she’s ready. I think she’s now a year behind.” The loss of family and social support systems and professional educators had placed a burden on Judy’s family.

Discussion and Conclusions

Changes in educational delivery modalities were widespread during the COVID-19 pandemic. These modalities, including at-home, virtual, in-person, hybrid, and home-based, all created various challenges for educators, students, and their families. While the data are not yet available, educators are concerned about a potential learning gap or decrease in growth during the pandemic. While all children were affected by these transitions, children with disabilities are vulnerable to greater impacts on learning and development. In addition, these impacts increase the educational gap separating children with disabilities from those without disabilities.

This study draws on a framework of social vulnerability. Peek and Stough (2010) note that the literature on social vulnerability includes work on adults with disabilities and children, but there is still a lack of research on children with disabilities. This study examines the factors that place this population at risk and expands the framing of social vulnerability to the pandemic context. Throughout the COVID-19 pandemic and school building closures, these children have faced an increased risk to educational and developmental learning loss, and additional physical and psychological vulnerabilities may exacerbate that.

These unique challenges were identified through interviews with educators and parents of children receiving special education services during the pandemic. Students with learning and cognitive disorders had trouble paying attention during online lessons and struggled with learning on their own. Motivation fell for this group of students, and some were unable to understand lessons, complete assignments, and keep up with their peers. Other students struggled academically due to hearing, vision, or other physical impairments, limiting their access to virtual learning. Students needing speech or occupational therapy fell behind in their progress without in-person access to therapists.

Educational and physical vulnerabilities intersect, leading to increased risk. While physical factors were not the focus of this study, these vulnerabilities are evident within the pandemic setting. The COVID-19 virus targets those with preexisting conditions. Some children with disabilities are physically at greater risk of infection and hospitalization. This fact may impact a parent’s decision-making regarding whether to send their child back to school as they re-open, causing continued disruption in learning. As mentioned previously, those with physical limitations struggled with learning at home and online. Children with physical limitations could not see, hear, or access a computer screen. Due to conflicting hybrid schedules, others requiring medical and therapeutic interventions went without continuous care from a school nurse or therapist.

Finally, psychological vulnerabilities emerged from interviews with caregivers. During the pandemic, parents struggled to meet their child’s increased physical, emotional, and educational needs. This heightened senses of stress, anxiety, loneliness, and guilt. Parents admitted they were worried about their child’s progress and their ability to educate their child independently while juggling their work-from-home schedules. Without social support systems and educational professionals to rely on, parents felt alone and inadequate. The struggles parents face impact their children and may cause psychological harm and a more significant barrier to educational growth.

While children with IEPs should have access to legally mandated learning accommodations, this is not always the case. Parents must advocate and fight for testing and the provision of adequate services and accommodations. These services are not provided equitably as research found they are dependent on factors of race, gender, class, and school funding. Due to this study’s small sample, it is unclear whether these factors play a role in these students' educational experiences. However, comparisons can be made regarding the effects of various teaching modalities for students receiving special education compared to those who do not receive services. Yet, even for students receiving special education services prior to

the pandemic, not all schools could provide additional accommodations during school closures. For example, children like Judy, Patrick and Steven, and Charlie were not offered special education services during the pandemic. This may have been due to limited funding, resources, or planning in their school district. Like Kaitlyn and Tanya, Jimmy, and Sasha, other students continued to receive services from therapists and special education teachers.

The COVID-19 pandemic brings an inequitable paradox to light. While accommodations and modified learning modalities are difficult for children with disabilities to come by, all children received alternative forms of education during the pandemic. Schools were mandated to make changes to protect the health of their communities. Transitions may have been challenging and bumpy along the way, but schools made the necessary adjustments. In addition, while schools made these changes universally, equitable modifications were not always provided. As shown, while all students were provided alternative modalities for learning, students with disabilities were often unable to access these modalities due to physical, cognitive, or developmental challenges.

To decrease a widening learning gap during a disaster or health crisis, we can start by identifying factors that influence outcomes for children with disabilities. We can address these factors with careful planning. The social vulnerability framework identifies multiple factors that create intersecting vulnerabilities for children with disabilities during a disaster. One such factor is the inaccessibility of educational services (Peek and Stough 2010), an issue that is particularly relevant to the pandemic context. Proper planning and protection for this population are needed to limit exposure to physical, psychological, and educational vulnerability (Peek and Stough 2010). While risk is amplified, appropriate modifications and services can be implemented to reduce disruption to educational and developmental growth. This begins by identifying those students who most need alternative learning modalities and then providing the appropriate accommodations. For example, during a pandemic, exceptions for in-person learning may be essential for children with disabilities, as they are most at risk. Increased funding for home-based interventions would also increase access to education and decrease gaps in learning.

This study also suggests that some strategies used during the pandemic should be continued, as they provided increased access for students with disabilities. While each phase of learning created disadvantages, there were also accommodations that enhanced educational access for children with disabilities. Children with learning disorders, such as dyslexia, found that completing writing lessons using dictation or spell checkers helped them complete assignments with greater ease and confidence in their schoolwork. Providing computers to these younger children for writing assignments may reduce the barriers to completing assignments. Some students on the autism spectrum or with behavioral disorders benefited from fewer distractions and confrontations with peers in the classroom, improving their mental health and interest in learning. These benefits are worth considering as we transition to post-pandemic schooling. While the educational changes during the pandemic widened the learning gap, some changes improved learning and could be maintained. These findings can inform educational learning policy during crises and times of social order for those with disabilities.

While this is a pilot study, the data gathered from educators and parents help establish how learning modalities disproportionately impact students with disabilities. As stated, race, gender, and class factors were not accounted for and should be addressed with a larger, representative sample. Data on special education funding was also not analyzed as this data is not currently available for all school districts represented in the sample. Future research can also examine reading and math scores and changes in learning gaps for students with disabilities during the pandemic. It is also important that comparative studies examine different learning modalities and their positive or negative impacts on students. Finally, continued research on children with disabilities as a socially vulnerable population is needed during the pandemic to understand the impacts of school closures on these students and their families. By understanding these impacts, we can discover ways to reduce vulnerability and educational inequities and limit stress and psychological harm on these children and their caregivers.

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Author Biography

Shawna Bendeck is a doctoral candidate and instructor in the Department of Sociology at Colorado State University. Her research focuses on the sociology of disasters, youth and families, social inequality, community resilience, and social networks. Her concern for equity in education has led to her dissertation research examining the effects of the pandemic on education for children with disabilities and on family wellbeing. Her other projects include community-based participatory research with youth, studies of virtual social connections and their impact on mental health, and her thesis research on life outcomes for emancipated foster care youth.