THE COLLECTIVE PERCEPTIONS OF K-12 SPECIAL EDUCATION TEACHERS DURING THE COVID-19 PANDEMIC

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ABSTRACT

In the spring of 2020, nearly every school aged student and K-12 teacher across the United States was forced to participate in remote educational activities online, prompting an unexpected departure from the status quo in public education. This was a result of government mandated social distancing practices, as a mitigation strategy for combating the global pandemic induced by the novel coronavirus. Most school districts were compelled to repurpose their daily practices by rapidly planning to ascertain resources for the implementation of an emergency remote education initiative. These unprecedented events presented many challenges for educators, especially given most had no formal training for conducting online instructional delivery utilizing various technologies. Special education teachers in particular confronted a unique set of challenges when considering how to support the complex needs of diverse learners. This included student support for engagement with access to technology, knowledge of various applied technological pedagogical skills, teacher preparation, technical training, ongoing professional support, interactions with stakeholders, and individual social emotional well-being. The purpose of this study was to determine how special education teachers perceived various aspects of their experiences, when teaching remotely during the COVID-19 pandemic. A survey was designed to measure these perceptions containing aligned items to the domains of the technological pedagogical and content knowledge (TPACK) framework. The COVID-19 Special Education Teacher Survey (C-SETS) was a 42 item questionnaire set on a 5-point Likert scale that contained an additional open-ended question. It was administered online and completed by 280 participants, across 46 states, primarily via a social media platform. While the results
demonstrated that special education teachers overall were technically skilled, had
increased communication with parents/caregivers, and gained skills for future practices,
there was a significantly insufficient level of preparation, a deficit with various
pedagogical skills using technology, less collaboration with IEP team members,
inconsistent student engagement, varying access to technology, a lack of technical
training, ongoing professional development and support, contributing to social
emotional stress, anxiety and fatigue. Aspects of these findings were particularly evident
in historically under resourced districts and those that did not participate in technology
infrastructure initiatives, where an overwhelming majority of the statistically significant
differences, with the exception of respondents’ level of educational attainment, were
attributed to school characteristics. Implications for future teacher preparation, technical
training, ongoing professional development, and best practices are presented.

_Keywords_: Special Education, COVID-19, Teacher Preparation, TPACK,
Emergency Remote Education, Digital Divide, SEL, Educational Technology, Students
with Disabilities, Technical Training, Professional Development, Social Media, Facebook,
Pandemic, C-SETS
DEDICATION

This is dedicated to all of the students that I have had the privilege to serve, in partnership with their parents, caregivers, families and in collaboration with the countless exceptionally dedicated professionals all of whom have taught me so much along the way. Additionally, this is dedicated to my wife Samantha, our daughter Delaney Mae, my parents Carol Rocamora Ph.D. and James A. Katowitz M.D. who have inspired me, provided unwavering support and blessed me with unconditional love.
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as a special education teacher along with something you used to say at the beginning of the semester in your courses. You would tell students that you looked forward to learning with and from us, reminding me of the value that we can learn something from everyone we encounter, a mindset that I apply in every human interaction that I have in this world. I want to thank you for your mentorship, as I am grateful to you for seeing something in me that I had not quite found until this cathartic experience and metamorphosis into the next phase of my career and life. I look forward to our ensuing endeavor of setting your poetry to music!

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CHAPTER 1
INTRODUCTION

The Global Pandemic and School Closures

The coronavirus or COVID-19 was declared a global pandemic on March 11th, 2020 by the World Health Organization (WHO, 2020). This prompted an unexpected departure from life as we know it for a significant portion of the world’s population. In a rapid progression, many nations succumbed to extensive shelter in place orders by government and public health officials who mandated social distancing as a mitigation strategy for combating the virus (Viner et al., 2020). Pervasive lock down orders resulted in the shuttering of numerous non-essential businesses, organizations, public facilities and educational institutions.

These events forced students, teachers, and related personnel of educational establishments across the planet to abruptly vacate their typical scholastic environments. In order to further prevent a widespread outbreak, most countries implored its citizenry to quarantine by remaining in their homes with exceptions made for the procurement of necessities, such as food or medicine, and for those designated as essential workers (Bozkurt & Sharma, 2020; Viner et al., 2020). This required many people to evaluate the feasibility of working remotely while possibly caring for school aged children who were obliged to engage in learning from the confines of their homes. Widespread school closures in nearly every country around the world impacted over an estimated 1.5 billion students, spanning from early childhood to higher education, and 63 million teachers, triggering an unprecedented state of emergency in education (Bozkurt et al., 2020; UNESCO, 2020; Walters, 2020).
This global health crisis ignited an international predicament in education, where a multitude of long-term implications remained hypothetical and unknown. While it was widely agreed that school closure requirements initially were a necessary step to slow the transmission of the virus, many social and economic issues arose from this new reality (Munro & Faust, 2020; Viner et al., 2020). Shifts in the learning environment, daily routines, pedagological approaches, educational modalities, student engagement, socialization, access to services, and other necessary resources presented significant challenges for all affiliated stakeholders (Lynch, 2020).

The pandemic amplified a host of prevailing societal inequities that have been the focus of ongoing advocacy for basic human rights. These included: social equality and justice, systematic and institutional discrimination, access to nourishment such as food and potable water, adequate housing, healthcare, safety, and access to a 21st century education with integrated components of technology (Lynch, 2020; Schuck & Lambert, 2020). The abrupt closures exasperated many inequity dynamics between the haves and have nots of society, expanding the existing gaps to a range of assets, many of which were accessible via schools (Bozkurt et al., 2020).

Beyond typical educational practices, schools were established hubs for several resources, offering conduits to a variety of services and supports. This was particularly applicable in school community settings, spanning from early childhood to secondary, where such reinforcements were especially vital for those individuals who were economically disadvantaged and under-resourced. Schools commonly provided sources of nutrition, which often accounted for a significant portion of a student’s daily nourishment (Van Lancker & Parolin, 2020). Additional resources may have included:
access to behavioral health services, social and counseling services, medical attention or care, after school programs, athletics, recreational activities, adult education programs, access to internet, computers and other technology. Schools were an inherently safe space where students could socially engage with others as a meaningful aspect of their education and development. Moreover, many parents or guardians relied on schools so that they were able to attend to their work related or other responsibilities. Finally, numerous schools offered a continuum of special education programming that provided resources, coordinated supports and related services for students with disabilities (SWD). However, the disruptive forces of this once-in-a-century pandemic on these educational ecosystems completely distressed customary access to schools, compelling families in communities across the globe to reimagine their daily lives, in the interest of public health and safety (Kuhfeld et al., 2020).

Adapting to a New Normal with Technology

Educational professionals were placed in a quandary when confronting the unforeseen complexities in departure from the familiar custom of student learning in traditional brick and mortar settings. Impacted parties had to reconfigure their daily schedules, convert living spaces, and secure the necessary technological resources for instruction and learning in an altered reality for schooling (Cheng, 2020). At this juncture, many across the world viewed these circumstances as temporary while preparing to ride out the pandemic in hopes that the virus would become contained and a return to the status quo would be imminent. Nevertheless, most nations had to hastily identify the necessary strategies to address public health concerns, economic issues and
how to temporarily repurpose activity in an overwhelming portion of the education sector using technology.

In the United States (US), government, state and local officials implemented policies in response to COVID-19 that inexorably led to mass closures of educational establishments from pre-K to the university level. This prompted school officials, administrators, and teachers to formulate alternatives to the traditional face-to-face instruction model being put on pause (Kennedy, 2020). A majority of the 13,000 K-12 school districts across the nation scrambled to formulate plans to shift the instructional modality for remote delivery. Over 124,000 public and private school closures required several million educational professionals, roughly 55 million students and their families to rely on technology to participate in various learning activities, a majority of which were offered online (Young & Donovan, 2020). However, remote access to technologies remained an established barrier to meaningful engagement for many students in America and beyond, highlighting a substantial global issue in 21st century education known as the digital divide (Archambault & Borup, 2020).

**The Digital Divide**

An overwhelming majority of public schools nationwide had some form of high-speed broad band internet access and technological devices available for onsite learning. However, the consequences of COVID 19 highlighted the many challenges and inequities for millions of students in the US. This remained an issue despite existing 1:1 programs that date back decades and span worldwide, where the aim was to provide a ratio of computing devices to students, hence the name 1:1 computing initiative, or device initiative, as an equity of educational access for all enterprise (Richardson et al., 2013).
Varying estimates suggest up to nine million public school students in America lacked in home access to both the internet and a digital device, excluding cellular technologies (Fishbane & Tomer, 2020). There were an additional one million students who did not possess a laptop, computer, or tablet at home despite having adequate access to the internet, and additionally between five-six million students who had access to digital devices, but did not have sufficient access to high speed internet, perpetuating a connectivity gap. In total, close to 30% of public school students remained at risk when confronting what is referred to as the “homework gap” where dis-connectivity and or a lack of access to an appropriate technological device impeded students’ ability to participate in online academic activities, perpetuating the achievement gap (Auxier & Anderson, 2020; Bauer et al., 2020; Riddle, 2020). This lack of digital access affected a combined 16.9 million students, where a disproportionate representation of African Americans, ethnic minorities and Native Americans accounted for the majority of students without access to the necessary technology for remote learning (Riddle, 2020; Yoo et al., 2021). Moreover, a substantial number of those impacted were also individuals of low socioeconomic status who live across urban and rural communities (Fishbane & Tomer, 2020; Lai & Widmar, 2021; Mitchell, 2020b).

During the initial phase of the mandated shutdown and ensuing school closures, efforts were made to address the needs of those individuals who were lacking technological resources. School district and outside organizations rallied to acquire and distribute the necessary devices to those students in need. Certain internet providers and technology companies temporarily offered free access to services and content in order to promote equitable digital access for millions of students nationwide (Walters, 2020).
However, a potential issue for this free access was that most school districts’ digital infrastructure and data were managed internally by information technology (IT) staff. This put many unknowingly at risk for being victims of data mining or collecting personal data of students and others as a cost for access to free software (Williamson et al., 2020). While tens of thousands of laptops and tablets were distributed in many districts across the country, supply shortages and delays impeded efforts to fully provide the overwhelming number of students who remained deprived of these essential tools to access their education. Moreover, high speed broadband internet continued to be inaccessible for many in urban settings and particularly for those in certain rural communities where this technology was not readily available (Lai & Widmar, 2021). Consequently, many students confronted barriers with engaging in their schooling from home, where they were required to remotely participate in online distance learning.

**Emergency Remote Education**

The terms online, virtual, remote and distance learning have increasingly become a familiar part of the mainstream lexicon as a result of widespread exposure to Educational Technology (ET). A multitude of terms have been publicly used interchangeably by media outlets and various stakeholders in education with varying connotations (Greer et al., 2014). Due to the events of 2020, much of the world had become privy to the expanding terminology of the ET nomenclature which continued to be broadly applied despite having different constructs and specific meanings (Bozkurt & Sharma, 2020; Toquero, 2020). Online, remote, distance, virtual, digital, cyber, hybrid, blended, distributed, mobile or m-, and e-, are among a myriad of descriptors that are often used interchangeably with secondary terms such as: teaching, instruction, learning,
pedagogy, and education. Clarification was necessary to deter any confusion or disagreement over the applications of such terms, particularly during the pandemic.

Experts within the assorted inner circles of academia deliberated over the appropriate description for the COVID-19 induced status of global education. Some had described this period as emergency remote teaching (ERT) or instruction (ERI), but a more encompassing term was introduced- Emergency Remote Education (ERE) (Bozkurt & Sharma, 2020; Hodges et al., 2020; Shuck & Lambert, 2020; Toquero, 2020; Trust & Whalen, 2020). Scholars stressed the importance to delineate between ERE and the assorted paradigms as the latter were established, nuanced, and rigorously designed constructs of ET pedagogy. Varying modalities required intensive teacher preparation and extensive intentional planning with multifaceted features utilizing assorted media platforms. Conversely, ERE was dictated by the urgent necessity to swiftly transition from a traditional in person learning format to an all virtual context.

Three characteristics that defined ERE were determined by the nature of being forcibly organized in response to a crisis, considered temporary and not optional (Bozkurt et al., 2020). Moreover, the limited timeframe impeded the formation of a robust and intentional scheme where potential budgetary shortfalls, limited digital infrastructures, human capital assets, and overall lack of expertise with developing this type of programming increased the potential to negatively impact students and educational professionals (Bozkurt & Sharma, 2020). The time period of ERE during the pandemic varied across districts and states. For some, this lasted until the end of the academic school year in 2020, with in person learning resuming in the fall. For others this period extended through various junctures of the following 2020-21 school year, where there
were staggered openings based on certain criteria, guidelines, and decisions from various public health, governmental and school officials. School districts offered various options for students, including fulltime in person, fully remote, or hybrid, where there was a combination of face-to-face and remote schooling.

**Rapid Planning**

As the seasons were transitioning to spring, in March of 2020, there was little time to plan, strategize, identify, gather and distribute resources. Some school districts and officials were more prepared than others as they had the existing digital infrastructure or had consulted with established entities, such as higher education institutions with remote education experience, to help inform design and implementation (Will, 2020). Other districts had to embrace wider challenges by evaluating existing resources and securing funding to purchase the necessary digital licensing for tools such as a learning management system (LMS) platform, additional digital academic programming content and videoconferencing applications (Lim, 2020; Young & Donovan, 2020). K-12 public school administrators and teachers had to expediently determine curricular plans, schedules, digital resources, approaches for instruction, student materials, assessment methods, and communication protocols for students and families. Some schools created hardcopies of materials for students to utilize which required coordinated efforts to formulate and disperse. Materials were either retrieved from schools, sent home via the postal service, or in some instances hand delivered by school personnel (Mitchel, 2020b).

Several factors of this pandemic pedagogy construct confounded teachers (Schwartzman, 2020). They had to make the inevitable adjustment to provide instruction in a different environment away from the familiarity of their classrooms. Many teachers
had their own children, were caregivers for others, and had additional responsibilities in the home setting. Additionally, most teachers had never provided remote instruction online and many had less familiarity with a range of digital technologies and how to maximize their utility with fluency for instructional purposes (Gudmundsdottir & Hathaway, 2020). Teachers also faced the daunting task of executing a novel form of instruction, while engaging with students and families who were simultaneously experiencing an unprecedented set of circumstances and similar challenges. Evidently, teachers required significant support, technical training, and ongoing professional development during this phase of ERE. This was particularly vital for those professionals providing supports for individuals receiving specialized services (Mitchell, 2020a).

**Special Education**

Substantial challenges persisted for all associated stakeholders when contemplating how to meet the diverse needs of SWD in this educational paradigm shift to ERE. Concerns emerged regarding how educational teams would attempt to implement a given student’s 504 plan or individualized education program (IEP) remotely (Friedfel, et al., 2020a). This highlighted a multitude of issues including the use and role of technologies, adapting service delivery models and methods for the provision of specially designed instruction with supports. These may have included considerations for how to coordinate related services, special education assistants or paraprofessionals, behavioral health services, medical supports, music, art or other therapies and more general assistance that typically required in-person interaction. Additional concerns regarding accessibility, accommodations, modifications, assistive technology, opportunities for inclusion and socialization presented challenges for IEP teams to adjust and conform to
the construct of ERE. Methods and procedures for progress monitoring had to be repurposed to measure growth, while potentially accounting for regression and recoupment. Procedural issues regarding certain mandated legalities such as how to hold IEP meetings, conduct evaluations remotely that typically required in person standardized assessment procedures, and considerations for possible ERE related amendments to an IEP needed clarification from local and state policy makers (Smith, 2020). It was necessary to sustain parental involvement, not only to help support SWD with their participation and engagement during ERE but to potentially develop distance/hybrid learning plans as an addendum to a student’s IEP, to specify or adapt certain accommodations, modifications and aspects of programming that were unique to this modality of education. Lastly, there was a lot of trepidation for supporting students with multifaceted needs who received more intensive programing with supports and especially for those who resided in underserved communities. These individuals were considered to be the most vulnerable and at risk due to this unique interruption in services.

The necessity for expedient solutions, particularly in the special education sector, was enmeshed in a host of shifting policies regarding education, health, safety, economics, coordinated access to resources, and the role of technology in daily life. A wide-range of questions emerged across these issues and topics impacting all stakeholders in ERE. What educational opportunities and resources were available to SWD and how could they be accessed? To what extent was technology and access to the internet for SWD available and if so, how was it utilized? How were supplementary aids, supports, and services to be provided in a manner to ensure health and safety for all stakeholders? How would the potential interruption or absence of these supports and
services impact SWD? What was the economic and logistical impact on related service providers, vital 1:1 assistants, behavioral health supports, private duty nurses, personal care assistants, additional contracted workers, respite care and other home supports that had been temporarily put on hold? How did these issues economically and logistically impact families with SWD and those who provided support?

The daunting matter of potential psychological implications on stakeholders posed additional questions about the social emotional impact of ERE. How did the necessity to ensure health and safety by remaining sheltered in place at home affect individuals emotionally and with their interactions with others? What impacted those relationships, and what were the consequences? How did economic factors impact access to resources and relations with others? How did ERE affect one’s overall functioning? It was clear that this temporary phase was going to have different implications for all stakeholders in special education. SWD, families, teachers, related services providers, support staff, school administrators, outside agency partners, and policy makers all had different experiences and perspectives as a result of this complex event and how it was perceived.

**Research Questions**

A focus on the perspectives of special education teachers during the pandemic afforded an examination of certain issues related to how these educational challenges were addressed for this subdiscipline of education. Adjustments had to be made when considering how to deliver content, shifting pedagogically, and embracing the utilization of technology while balancing one’s own social emotional well-being. Broader questions specific to special education teachers were considered: What were the technological
resources that were available for special education teachers to utilize and how much professional development, training or teacher preparation was afforded? How did special education teachers approach service delivery of interventions, supports, instruction, and coordinated interactions with students, families and other members of the educational support team? How did ERE impact special education teachers’ ability to design, plan, deliver and assess instruction or interventions? What was the overall student participation, engagement, communication, and socialization including that with parents or caregivers?

Questions ranging from knowledge specific to teacher preparation with technology, pedagogy, content, supporting SWD remotely, access to technology, communication and interaction with stakeholders, to teachers’ overall mental health or well-being, suggested an overarching research question. What were the collective perceptions of emergency remote education for K-12 special education teachers during the COVID 19 pandemic? This encompassed questions specific to teachers’ overall perceptions related to their experiences, degree of teacher preparation, efficacy, supporting and communication with various stakeholders. This broad question can be deconstructed into more targeted research questions with specific units of analysis, including an adaptation of the primary question from the Archambault and Crippen (2009) study:

1. What was the perceived knowledge related to technology, pedagogy, and content, including the combinations of these domains, for K-12 special education teachers implementing emergency remote education, during the COVID-19 pandemic?
2. To what extent were special education teachers provided adequate preparation, training and appropriate professional development to execute their responsibilities during emergency remote education?

3. To what degree did special education teachers support, interact and communicate with colleagues, students with disabilities, and their caregivers during emergency remote education?

4. How did special education teachers perceive their experiences implementing emergency remote education during the COVID-19 Pandemic?

These questions highlighted several issues for special education teachers. Obstacles with technology which may have ranged from access to resources, to level of experience with operating digital equipment, systems, software or the ability to run various applications. Perceptions of pedagogy involved instructional and service delivery approaches that required most teachers to repurpose their methodology in concert with how various content may have influenced such choices. Challenges may have occurred with how SWD utilized technology, accessed content, participated in online activities, engaged with others, and completed assignments, which may have further been confounded by issues with communication between special education teachers, SWD and parents or caregivers. Finally, sufficient training and teacher preparation, not just for technological aspects of ERE, but also to address the multifaceted elements of special education compliance and service delivery while nurturing the social and emotional learning needs of others was vital for teachers. Teachers undoubtably endured stress and anxiety challenging their self-regulation when performing various educational tasks.

Finally, among all of the questions posed, it is necessary to consider what positive
outcomes may have emerged from ERE pertaining to the integration of technology into future educational practices. Additional sub research questions will be presented in the methods section in order to identify more targeted and specific elements for analysis.

**Statement of Purpose**

The field of special education continues to evolve concomitantly with the rapid advances and infusion of technology across many facets of society. In response to the global crisis in education caused by COVID-19, it was necessary to examine various aspects of how special education teachers were prepared pedagogically to deliver content utilizing technologies, and how the application of such knowledge impacted the implementation of specialized instruction, supports, communication, interaction and overall functioning during ERE. An enhanced understanding of these elements distinguishes various areas to consider for future teacher preparation, technical training, ongoing professional development, and best practices. This will lead to more preparedness overall, for prospective educators, in-service teachers and potential future crisis scenarios. There is an opportunity to use the knowledge gained from these experiences to innovate and repurpose best practices while enhancing equitable access to a 21st century education. The subsequent review of the literature will confirm that there is limited research examining the technological, pedagogical and content knowledge of K-12 special education teachers within the context of online remote education. Moreover there have not been any studies conducted of such perceptions during the COVID-19 Pandemic.
CHAPTER 2
LITERATURE REVIEW

Educational Technology

Educational Technology (ET) is a multifaceted discipline that is rooted in the early 20th century with theoretical underpinnings derived from several disciplines including: education, psychology, behavioral science, sociology, communications, computer science, engineering, artificial science, and media studies (Luppicini, 2005). The philosophical, methodological, and technical aspects of ET gradually developed via complex progressions with historical underpinnings that can be traced back several centuries (Saettler, 2004). The evolution of more recent technologies, such as the advent of the computer, internet, and digital media, has greatly influenced expansive and transformative growth in this sub-discipline of education (Woods et al., 2011).

Members of the Association for Educational Communications and Technology (AECT) Definition and Terminology Committee endeavored through a lengthy and rigorous process to arrive at the following definition: “Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources” (Januszewski, & Molenda, 2008, p.1). ET is a dynamic and multidimensional field of inquiry and practice where a gamut of technologies are employed to promote positive learning outcomes through an array of pedagogical approaches (Luppicini, 2005).

Contexts

There has been extensive investigation across the various domains for digital learning and instruction. Research is particularly prevalent at the higher education (HE)
level where online programing is more pervasive than its K-12 counterparts, serving as a systematic model while being at the forefront of addressing matters for SWD (Burdette et al., 2013). As a distinct paradigm of ET, distance education has a long history predating digital technologies. This can be tracked back to as early as the 1850s where some of the first known asynchronous course activities utilized the postal service. Subsequent iterations advanced to other formats such as television, radio and print media (Anderson & Rivera-Vargas, 2020). In the 21st century, distance education occurs almost fully online, where students and the instructor are separated by space and/or time. This modality is intentionally planned and thoroughly designed to promote an authentic learning experience through a combination of asynchronous and synchronous online components (Roman et al., 2020). While students may engage in self-directed learning activities at their own pace, there are collaborative interactions embedded into most course designs, promoting opportunities for socialization with peers or conferencing with their instructor to receive feedback (Park & Shea, 2020).

Online learning refers to content that is accessed via some sort of network, typically the internet, which can occur in the physical classroom setting or remotely (Burdette et al., 2013). Online education has asynchronous and synchronous components, where there is more interaction with both peers and teachers. In the hybrid or blended model, also less widely referred to as distributed learning, students receive a combination of in person and online, usually remote, instruction; both this model and online learning are more socially interactive than distance education (Anderson & Rivera-Vargas, 2020; Nortvig et al., 2018). While socialization and engagement across these modalities vary depending on the program design, it has been argued that most student outcomes are
comparable to traditional schooling, spanning from traditional brick and mortar K-12 settings to HE, cyber virtual charter, hybrid (Greer et al. 2015).

In 2019, the National Center for Education Statistics (NCES) estimated that over seven million students in HE, or 35.3%, participated in some form of hybrid/blended, or fully online learning. Close to 20% of K-12 public schools and 30% of charter schools offered a portion of courses that are fully accessible online (NCES, 2019). In addition to private organizations that offer fully online programs that served K-12 learners across the US, an estimated 300,000 students in the public sector were enrolled fulltime in an online, digital, virtual or cyber school, some of which are managed by charter organizations based on projections from the 2019 NCES data. This is noteworthy because the educational impact of the pandemic for this segment of the population, who were already fully participating in these programs, was likely different compared to those who were obliged to participate in the emergency remote education (ERE) contingency where a majority of the systems and institutions did not have an established ET infrastructure.

**School Choice**

Enrollments in charter schools and other digital online programs had been trending upward over the past decade as parents were searching for other educational opportunities in lieu of traditional public schools (Collins et al., 2015). As a form of school choice, many parents sought to have their students participate in their schooling through a cyber charter school or other public online virtual offerings. Beck, Egalite and Maranto (2014) surveyed parents and students who attributed behavioral issues and bullying as a reason why SWD chose to enroll in a cyber charter claiming a greater overall satisfaction with teaching, learning and school culture compared to their prior
school settings. SWD may have experienced bullying or other social issues that impacted their ability to function in more typical settings. The cyber format caused SWD to experience different social interactions online, alleviating stress from peers or embarrassment. This was due in part that SWD were afforded opportunities and access to learn at their own pace with certain accommodations like having classes digitally recorded (Beck et al., 2014). Cyber charter and other online domains offered convenient access for those students who lived in rural communities that may not have certain programming readily available without having to endure long commutes (Beck, et al., 2016; Mann et al., 2016).

Kotera et al. (2019) conducted a study of university level SWD in HE that confirmed similar reasons for attending classes online. SWD attributed the flexible and accessible nature of online learning as a matter of convenience while being able to meet their adult responsibilities. There was a reported level of greater satisfaction compared to in person learning, with less stress overall making it easier to manage the various aspects of participation. Some of the factors attributed to SWD participating in educational activities remotely influenced parents’ choice to home school. Similar issues applied to homeschooling where there remains some ambiguity with how laws protect the rights of SWD and governs the responsibilities of states. There is not any uniformity that stipulates how public school districts may provide supports or services. Parents sought an alternative in consideration of having their SWD’s unique needs met while trying to avoid the potential for exposure to negative peer interactions e.g., bullying (Carlson, 2020). While students and families may have had options when it came to enrolling in various programs and educational settings, there were more limited choices for preschool
aged children with disabilities or those students who may have had more significant medical issues.

Early intervention (EI), early childhood (EC) and homebound instruction for SWD are special education services that, aside from center based EI and EC programs, occur in the home setting. The latter is typically offered to those who have chronic or acute medical conditions, pregnancy or significant behavioral health issues that prevent them from being able to participate in their education in a typical learning environment i.e., a school. Parents or caregivers assume a lot of the responsibility with supporting students who require homebound instruction where the role of technology is evolving and not consistent across the board as a matter of policy (Shaw et al., 2014). Similarly, this responsibility applies to homeschooling, but is different in that parents are choosing to assume this role while the utilization of the internet in this context has transformed access to content and pedagogy (Jolly & Matthews, 2020; Ray, 2019).

As technologies have been progressively integrated into programming across the vast landscape of 21st century educational modalities, issues and challenges for SWD emerged. Carnahan and Fulton, (2013) suggested there was a significant research gap pertaining to a host of issues for SWD who were enrolled in online programs, such as the lack of direct in person teacher support and the increased demand for parental support. Studies conducted in the Commonwealth of Pennsylvania showed significant increases in enrollments not only for individuals from rural districts and underperforming students, but for SWD in cyber charter schools. Mann et al. (2016) examined cyber charter school enrollments along an urban-rural continuum in the state and found that SWD, in addition to rural students, were significantly more likely to attend compared to their urban,
suburban, and town counterparts. As enrollments grew, issues of economic impact on districts arose, with concerns for student performance and educational equity. This was due to higher enrollment numbers of SWD, students from schools with higher participation rates in the free and reduced-price lunch program, and ethnic disparities in enrollment spanning from online programs to brick and mortar charters (Mann et al., 2016). The Carnahan and Fulton (2013) study examined the characteristics of SWD enrolled in public online programs compared to their brick and mortar counterparts in Pennsylvania. Inconsistencies with performance and lack of research to address the needs of SWD enrolled in these schools during that period of time suggested a need to develop policies to address online program and curricular adaptations, content modifications, and accommodations to avoid the potential for significant legal ramifications (Carnahan & Fulton, 2013).

The following year, Wang and Decker (2014) examined issues of digital equity in Ohio’s virtual schools, which included all of the aforementioned public educational modalities utilizing online technologies. SWD and economically disadvantaged students were overrepresented while ethnic minorities and students with limited English proficiency (LEP) were underrepresented. The findings of this study, similar to those in Pennsylvania, highlighted the need for more research, clarifications legislative policies and digital equity issues including access for SWD (Wang & Decker, 2014). Collins et al., (2015) conducted a literature review that examined comparable issues with cyber charter equity, access and legal compliance on a broader scale. Similar findings with equitable access and inclusion were framed as social justice concerns. It remained unclear whether the applicable law had explicit language to afford equitable access for online
educational domains. In 2017, 84% of states did not have established or well-defined policies regarding IEP implementation in online settings (Tindle et al., 2017). Several recommendations regarding state and federal compliance matters, policies, placement considerations, and law for cyber schooling were presented. There was a recommendation that the IEPs include explicit language on how instruction is to be delivered and to make adaptations to meet the unique learning needs on an individual with a disability in the digital realm (Collins et al., 2015). Over the ensuing five years preceding the pandemic, advances in technology, ET pedagogy and increased participation for SWD in technological activities precipitated an expansion of research in the field.

**Special Education Research in Educational Technology**

A range of issues for SWD in ET have been researched within the various educational contexts. An account of issues and concerns regarding how to provide special education services during the pandemic were introduced in the previous chapter. Drawing from the existing literature, an assortment of topics related to special education in ET will be presented, and how they comport with issues that manifested in the ERE construct. A theoretical model will be presented with an analysis of pertinent studies. Finally a review of the most current research pertaining to ERE, published during the span of 2020-21, will be discussed in order to outline a basis for conducting this study. Special education topics in ET and issues in ERE can be grouped into the following overarching categories: Policy and Legalities, Access to Technology, Socialization, and Teacher Preparation. It is necessary to highlight the existing research and practices that guide the delivery of online special education services, as it is an established niche that requires specific training, for which most teachers of ERE did not have advanced preparation.
Policy and Legalities

The components of this category overlap as many elements of policy, compliance and programming are regulated by existing law and policy. It has been established that there were issues with enrollments across educational domains questioning equitable access for SWD (Collins et al., 2015). In ERE, challenges persisted with how to adapt service delivery models to a fully online remote learning construct, especially for programming that provided more intensive supports. This required IEP teams to consider repurposing goals, accommodations, modifications, related services, interventions, and amount of time for support during this phase. Procedural uncertainties with how to amend plans, conduct evaluations, adjust services, hold meetings virtually and get team signatures digitally were barriers that necessitated clarification from local and state policy makers (Friedfel et al., 2020b).

The rights of SWD are protected by established federal laws. The Rehabilitation Act offers protections for SWD who do not require special education services but need accommodations to access their learning environment which are specified in a 504 plan (Rice & Carter, 2015). The provision of special education and related services is protected by the Individuals with Disabilities Education Act of 2004 (IDEA) which stipulates that every child is guaranteed a Free Appropriate Public Education (FAPE) in the Least Restrictive Environment (LRE) (Jameson et al., 2020). Based on these legal requirements, federal, state, local, and district policy makers were charged to provide guidance for how the laws that protected SWD would be applied in the ERE construct (Friedfel et al., 2020a; Gavin, 2020; Jameson et al., 2020).
Legal confusion surfaced as school closures were occurring simultaneously amidst some preliminary mixed messaging from the U.S. Department of Education (DOE). A day after COVID 19 was declared a pandemic, on March 12th, 2020, the DOE provided a guiding document for local educational agencies (LEA) and other stakeholders titled “Questions and Answers on Providing Services to Children With Disabilities During a COVID-19 Outbreak.” The first question posed was: “Is an LEA required to continue to provide a free appropriate public education (FAPE) to students with disabilities during a school closure caused by a COVID-19 outbreak?” (USDOE, 2020a, p. 2). A portion of the response seemed to suggest that a district or school would not have to provide special education and related services if educational opportunities or services were not provided to the general education population during the pandemic school closure: “If an LEA closes its schools to slow or stop the spread of COVID-19, and does not provide any educational services to the general student population, then an LEA would not be required to provide services to students with disabilities during that same period of time” (DOE, 2020, p. 2). Some legal interpretations speculated that schools may not have to implement IEP’s remotely, if online activities were designated as enrichment and not of an instructional nature (Gavin, 2020).

Subsequently, the DOE’s Office of Civil Rights (OCR) offered a memo of clarification nearly ten days later that stipulated more definitively that schools should “not opt to close or decline to provide distance instruction, at the expense of students, to address matters pertaining to services for students with disabilities” (USDOE, 2020b, p.1). Moreover, it was stipulated that a FAPE must be provided while recognizing that certain supports and services may not be feasible. It was recommended that IEP teams
collaborate by meeting to review plans, make considerations for amendments to include accommodations for online learning, and/or to create a temporary distance learning plan as an attachment to the IEP. There was also guidance for how teams could make determinations regarding possible compensatory education services to be provided once schools reopen for onsite learning (Agoratus, 2020a; Garcia & Morrow, 2020).

While it was clarified that services were required to be offered as mandated by IDEA, it was clear that it was going to be problematic for teams to implement IEP’s and offer a full continuum of supports during ERE. Teams were going to have to address each student’s programmatic needs on an individual basis to consider adaptations. If a SWD became infected with the COVID-19 virus, it could warrant a change of placement and cause an IEP team to weigh the benefits of homebound services, which is also a protection under section 504 of The Rehabilitation Act. However, students who were medically vulnerable and continued to participate in educational activities online, while a school was open, would not be considered a change of placement if it was deemed temporary in response to an emergency. Additional guidance from the DOE was for LEAs to ensure that online technologies were accessible for SWD and compatible with assistive technology (Friedfel et al., 2020b).

**Technology Access**

The integration of technology in education for SWD has been extensively researched. There were wide-ranging studies that examined the utilization of technologies for various types of interventions which ultimately led to enhanced access to educational environments. Technology access connotes several meanings based on context and it is necessary to discuss the following entities: Accessibility, Access to Technology, Web
Accessibility, Assistive Technology, and Digital Literacy in order to better understand how this impacted the functioning of SWD who may have lacked universal accessibility.

**Accessibility**

The Rehabilitation Act of 1973, IDEA (2004), and The Americans with Disabilities Act (ADA) of 1990 offer protections for accessibility which was a concern for stakeholders during ERE (Alvarez, 2020; Burgstahler, 2017). Depending on the application and context, accessibility connotes different meanings which can lead to misperceptions based on interpretation. Accessing learning environments involves identifying the appropriate accommodations to ensure accessibility to a physical setting and academic content. IEP’s and 504 plans specify the necessary and sufficient conditions a SWD requires to gain such access (Katowitz & Thurman, 2017). Additionally, teams may have to make modifications to ensure access to content which also applies to digital formats. The shift in conditions from face-to-face to a remote contingency required teams to reevaluate what adjustments may have been needed to promote this form of accessibility in the home setting.

**Access To Technology**

Technology accessibility continued to be a significant barrier for those who may have lacked a remote learning device or access to the internet (Catalano, 2014). The extent of how the digital divide had impacted a portion of the SWD population during ERE remained unclear but was nonetheless an essential and fundamental necessity for all students to be able access their education. The pandemic shined a spotlight on the existing digital divide issue spawning many initiatives to distribute technological devices and create expanding access to the internet (Archambault & Borup, 2020). Other
available resources such as mobile device technologies, referred to as m-learning, had been utilized in classrooms, but was considered an accessibility barrier with several remote applications necessary to participate in various online educational activities (Ishtaiwa et al., 2015). Many digital content platforms required more advanced technologies, where programs were designed to be accessed using a laptop, computer or tablet and required high speed broadband internet which had greater operational capabilities than cellular technologies (Bozkurt, 2020).

**Web Accessibility**

The usability of applications and web based content is a topic that has been a source of research and advocacy. Digital accessibility is considered an issue of equitable access safeguarded by the ADA and Section 508 of the Rehabilitation Act of 1973. Section 508 established the Web Content Accessibility Guidelines (WCAG) for online content to be perceivable, operable, understandable, and robust (Goodrich, 2016; Pittman & Heiselt, 2016; Smith & Basham, 2016). Researchers utilized the principles of Universal Design of Learning (UDL) by developing methods that could be employed in conjunction with the WCAG standards to evaluate the accessibility of digital content (Cifuentes, 2016; Smith & Basham, 2014;). Moreover, the purpose of such tools was to inform digital program developers and other stakeholders how to gauge content accessibility (Basham et al., 2016). This was particularly significant because some of the platforms offered in ERE did not meet these standards, inhibiting equal access, by further excluding, limiting and isolating SWD from engagement with content (Bozkurt et al., 2020).
**Assistive Technology**

In general terms, IDEA (2004) stipulates that assistive technology is used to support functioning for SWD (Thomas et al., 2019). Certain applications of assistive technology (AT) can be utilized to gain access to other technologies, such as technological devices that can access the internet. Some individuals may require both assistive technology and accessible technologies to have complete and equitable access to digital content (Shaheen & Lohnes Watulak, 2019). ERE impacted those who utilized AT and received supports with their operation, especially diminishing access for those who required 1:1 in person support. Some students were unable to bring equipment home, e.g., individuals who were deaf or hard of hearing and utilized FM systems, further presenting barriers to access (O’Neill & Duncan). Smith et al. (2020) conducted an international survey of practitioners and educators supporting the use of AT that found a better response and preparedness was needed as existing systems were not ready to address the needs for those who required remote supports and services.

**Digital Literacy**

Another context for with technology access intersects with the concept of digital literacy. This refers to the ability to physically operate technological devices, run applications, and navigate software as a fundamental set of skills to gain access to digital content (Alsalem, 2016). Digital literacy (DL) is commonly thought of in a rudimentary manner e.g., being able to turn on a computer, use a mouse and a keyboard. However, DL expands beyond basic functional skills to engage in content. Eshet (2004) developed a conceptual framework for DL skills that contained: photo-visual literacy; the ability to read or interpret, reproduction literacy; the ability to reproduce and create, branching
literacy; the ability to navigate digital media, information literacy; the ability to evaluate, and socio-emotional literacy; the ability to socially interact with others in a virtual setting. These elements required individuals to apply a range of skills from technical functional, cognitive processing, socio-emotional to interpersonal, in order access, engage and perform tasks in virtual environments. Cihak et al. (2015) taught functional DL skills to high school students with intellectual disability (ID). Findings supported teaching DL skills can lead to more inclusive opportunities for SWD, by increasing access to digital educational settings and opportunities for employment. During ERE certain individual students may have required additional supports to be able to navigate and access digital content. A certain baseline of DL was necessary for parents and caregivers alike to have been able to have helped SWD participate and engage in remote online educational activities (Bozkurt et al., 2020).

**Socialization**

A major consequence of the pandemic on society was the impact on face-to-face human interactions due to sustained home confinement (Petretto et al., 2020). Various IEP team members that typically provided face-to-face supports were displaced, disrupting opportunities for socialization. This put a strain on all stakeholders, particularly for those parents and caregivers who had to provide assistance for individuals with complex needs, shifting the dynamic of parental involvement and collaboration. Service delivery methods and supports had to conform to digital modalities with the exception of vital medical services (Bozkurt et al., 2020). Special education assistants, behavioral health supports, related services, including school psychologists, nursing, school counselors, speech, occupational, hearing, vision, and physical therapists
transitioned to providing services and supports fully online. Shifted formats for social interaction impacted IEP team collaboration, service delivery, parents as learning coaches, social presence, and realities for inclusion.

Socialization encompasses an assortment of human interactions that can be described as a socially interactive process where an individual learns how to adaptively function within a group, by acclimating to its norms, with a shared influence on perceptions and behaviors (Richardson et al., 2017). The ability to adjust to an altered setting with a different arrangement of contingencies posed a significant challenge for all stakeholders in ERE as they were pressed to coordinate the delivery of a continuum of services remotely. SWD were involuntarily displaced from their typical learning environments, separating them from the familiarity of their routines, supports and face-to-face interactions. Individuals may have experienced the unintended trauma of being socially isolated and dissociated from human contact outside of their homes (Agoratus, 2020b).

**Collaboration**

An aspect of socialization in the ERE construct is the necessity for multidisciplinary collaboration and communication with all stakeholders. This hallmark function of the IEP team was especially important in order to coordinate and plan for addressing the needs of individual students. Teams had to rely on technology to establish communication modalities, where telecommunications, direct messaging, and videoconferencing were all choices for real time interaction (Garcia & Morrow, 2020). Decisions had to be made regarding what services could be provided and how, based on available technologies. Those who established effective communication protocols may
have been able to devise some form of a distance learning plan or considered IEP amendments. This may have included elements like a schedule, accommodations, adjusted goals, behavioral strategies, hyperlinks on the internet for resources, and log in information for academic and other platforms to be utilized synchronously or asynchronously. Other resources may have been instructional videos recorded by members of the educational team, the use of video modeling, social stories or instructions for caregivers on how to utilize special equipment or assistive technology (Bozkurt et al., 2020).

Service Delivery

The nature of the social distancing restrictions due to COVID-19 made in-person services unfeasible, in most instances, ruling out home visits. This directly impacted those services and supports that required a hands-on approach with close proximity and for functional support, or assistance with equipment. If viable, videoconferencing was considered the best option to offer supports remotely for those who had access, requiring adaptations for practitioners, parents and SWD. Most socialization occurred online where videoconferencing was the most widely used form of synchronous communication during ERE (ASHA, 2020; Fronapfel & Demchak, 2020). SWD had to adjust to a different form of human interaction with the individuals whom they typically engage in the school setting, as opportunities for socialization transformed to a virtual space.

The provision of special education with related services often requires a lot of hands-on support with multisensory engagement and social interaction. Individuals with more complex needs typically receive supports from a variety of personnel such as: a 1:1 or teacher’s assistant, therapeutic support staff, behavioral health clinician, behavior
analyst, social worker, interpreter, health aide or nurse (Cox, et al., 2020; Dennehy, 2020). Additionally, SWD receiving related services may have had social interactions with specialists providing speech, occupational, hearing, vision, physical therapies or counseling services. Special education teachers depended on collaboration with these professionals along with administrators, general education teachers and parents to effectively coordinate programming and supports.

**Learning Coach**

Socialization for parents or other caregivers of SWD in the home setting required adjustments when having to assume the role of a teacher, special education assistant, or other support provider. This ongoing assistance presented challenges which had the potential to impact the dynamic between the adult, learner and educational professionals. Some parents were constrained by their knowledge base of special education and technology practices, or by limitations due to other responsibilities that may have reduced their availability to attend to their students (Petretto et al., 2020). Parents had essentially assumed the role of a learning coach which has a defined set of responsibilities in virtual education. Learning coaches are typically parents or other family members who are designated (and sometimes trained) to facilitate online educational activities for SWD. They are responsible for assisting with maintaining the learning environment, supporting with engagement, time management, and especially actively communicating with educational personnel (Coy, 2014). In ERE many parents or caregivers were forced to embrace this role where educational team members heavily relied on their participation and facilitation. Ongoing communication was especially imperative between both parties.
to maximize the opportunities for SWD to participate and remain engaged in online learning activities.

**Social Presence**

Social presence is an established theoretical concept that has since been applied to virtual contexts. It refers to one’s ability to perceive others in an online environment and has an evidence base for promoting positive learning outcomes (Alamri & Tyler-Wood, 2020; Dahlstrom-Hakki, 2020). Researchers have identified several characteristics or sub-constructs of social presence that align with elements of socialization. Copresence refers to a shared awareness of others affording the opportunity to have a reciprocal exchange. Intimacy, or emotional closeness is the mutual bond and connectedness within a given social interaction. Immediacy refers to the tempo of an exchange where increased latency to responses impacts outcomes (Akcaoglu & Lee, 2018; Richardson et al., 2017).

Social presence describes the sense of being with another which could have been problematic for some SWD in ERE. Some individuals may not have been able to understand copresence when seeing a teacher, therapist or peer on a screen (Mykota & Remoundos, 2017). There may have been barriers to meaningful reciprocal communication impeding the ability to foster a sense of connectedness. A latent response may have been caused by technical issues, occurring when using direct messaging, with email, or by a delayed response with feedback which could have triggered frustration or a behavioral outburst. The challenge was to help SWD adapt to these types of virtual interactions because it was vital for generalizing social skills and enriching their social presence. Moreover, opportunities to have SWD engage in additional interactions, like peer-to-peer correspondence, helps alleviate the isolation of asynchronous learning.
activities where individuals were more distanced from social connections. When engaged in online activities Kotera et al., (2019) found that social presence helped SWD manage feelings of anxiety, frustration, stress, insecurity and isolation. Alamri and Tyler-Wood (2017) surveyed SWD in HE who participated in online learning. They found that increased academic outcomes were attributed to the social presence and interaction between the instructor and learner. SWD who could adjust to the restrictions of ERE, by remaining connected and engaged with others, would likely have benefited from this form of socialization while enhancing their interpersonal communication skills.

**Inclusion**

Inclusive practices promote increased opportunities for SWD to have interactions with others. IDEA (2004) mandates that SWD are included to the fullest extent possible in the least restrictive environment (LRE) with their non-disabled peers. During ERE, it was important for SWD to continue to participate in learning activities and possibly engage with their peers of that environment. This was achievable if the design of the digital classroom offered opportunities for various activities involving peer-to-peer interactions. General education teachers were charged to not only plan for a different context for their classes, but also had to consider how to ensure those students with IEPs were included with the appropriate accommodations and modifications. This further illustrates the importance of collaboration with all stakeholders to facilitate the engagement for SWD with the general education curriculum and prospects for socialization.
Teacher Preparation

Studies with pre-service teachers have been pervasively disseminated in the ET literature (Scott, 2021). Vasquez and Serianni (2012) suggested that “Teacher preparation programs, however, have not kept pace with the exponential growth of online teaching or the need for pre-service preparation of teachers for virtual classrooms” (p.39). Moreover, Trust and Whalen (2020) stated that the “global pandemic exposed a significant gap in teacher preparation and training for emergency remote teaching, including teaching with technology to ensure continuity of learning for students at a distance” (p. 189). Hager and Fiechtl, (2019) described an online alternative teacher preparation program designed to train emerging special education teachers in response to shortages in rural districts, utilizing videoconferencing technology to provide coaching in the field. Technological training and access to resources are considered necessary to avert challenges when supporting SWD virtually (Smith, 2020). Teachers required various forms of professional development during ERE to enhance technological, content and pedagogical knowledge.

Pedagogy

Teacher preparation programs are responsible for developing various competencies, skills and strategies such as instructional approaches, planning, presentation, classroom management, motivating students, methods for assessment, communication protocols with students and parents (Cox & Graham, 2009). UDL is an example of a pedagogical approach which incorporates presentation (representation), motivation (engagement), and communication (expression) and can enhance online experiences (Smith et al., 2016). Special education procedures including planning and identifying accommodations, modifications or specially designed instructional methods
are a type of pedagogy for SWD (Smith, 2020). Williamson et al. (2020) referred to the term ERE when describing a pandemic pedagogy, where teachers were required to adapt and apply their knowledge to a different context. There were additional skills related to pedagogy that required adaptations to operate during ERE including assessment, data collection, state testing, and progress monitoring.

**Assessment and Data Collection**

The context of the virtual environment posed challenges for assessment and data collection. School psychologists were hindered by the inability to deliver a battery of standardized assessments that were typically administered face-to-face. Moreover, they relied on classroom observations as a necessary component to inform an evaluation. These barriers also applied to related service providers and behavioral specialists, where some evaluations and assessments required hands-on activities and in-person observations to assess how one interacted with the physical or social environment (Shire et al., 2020). Some evaluations and assessments were put on hold due to the inability to appropriately conduct testing due to these constraints, while others made attempts to move forward using videoconferencing, if available, or telephone communications which was more limiting.

Similar concerns were presented with educational testing for annual IEPs which is often performed by teachers as well as other forms of assessment (i.e., formative and summative). In ERE, stakeholders had to consider how to provide or adapt accommodations to apply to the digital realm. Modifications of digital content were also a challenge as they required a lot of planning and collaboration. Many teachers in the emergency pedagogical framework were creating their own digital content with very
limited time to turn it around. The complexities of identifying, formulating, and modifying materials or content was a difficult task especially given the time constraints. Platforms and applications had varying capabilities, where some had built in features for learners with special needs. These content programs had allowed teachers to create modified assessments, and provide accommodations, but required substantial professional development to operate effectively.

**State Testing**

Some states offer their annual standardized assessments online, and other states administer assessments to be completed in a paper-and-pencil format. The Every Student Succeeds Act (ESSA), formerly the No Child Left Behind Act (NCLB) requires each state to administer annual assessments to all students, including SWD, to measure academic progress. However, at the outset of the COVID pandemic, states had the option to apply for waivers to suspend testing based on DOE guidance. All 50 states were ultimately granted waivers, but concerns persisted (DOE, 2020c). It was unclear how school closures had impacted student learning, growth, progress and achievement. Moreover, it was not known how this would affect future performance on statewide standardized assessments in 2021 and beyond, further sparking some debate to reconsider this type of testing, including permanent elimination.

**Progress Monitoring**

Data collection for progress monitoring was problematic for special education teachers and other related personnel during the pandemic. Certain IEP goals required face-to-face assessment in person where many of the necessary materials remained in school buildings. Some IEP goals had to be put on hold unless there were amendments,
leading to incomplete progress reports. This raised legal concerns of educational benefit, possibly leading to issues of regression and recoupment. During this period of time, teachers were confronted with students’ potential loss of skills that were possibly exasperated by teachers’ level of technological capabilities. The shift to online learning meant adjustments for data collection methods that relied on technologies to measure progress. This exemplified how teachers were required to support with enhancing their knowledge of integrating technologies with educational practices.

**Theoretical Framework: TPACK**

In 2006, Mishra and Koehler adapted Schulman’s (1986) Pedagogical Content Knowledge (PCK) model to include technology as an integral knowledge base necessary for the practice of teaching in the 21st century. The collective notion that teachers should know what they are teaching (content) and how to teach it (pedagogy) was expanded by incorporating the manner in which technology is utilized to facilitate educational processes (Anderson & Putman 2020; Mishra & Koehler, 2006). Technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK) are three distinct foundational domains in this framework that are not just exclusively viewed in isolation, as represented in Figure 1, but in various overlapping amalgamations. The seven elements within this model outline assorted combinations of skills that accentuate specific instructional components that can be delineated and measured. The intersection of these knowledge bases are necessary to understand how they are comprised, the manner in the way they interact, and how these combined elements are applied to promote effective instruction within a given context (Mishra & Koehler, 2006; Koehler & Mishra, 2013; Schmidt et al., 2009; Shulman, 1986).
When these pillars of knowledge overlap in pairs, three additional subdomains emerge (Cox & Graham, 2009). PCK is the interaction between a teacher’s understanding of content and pedagogy. Chai et al. (2011) describes PCK as the “knowledge of adopting pedagogical strategies to make the subject matter more understandable for the learners” (p. 597). PCK connotes the practice of how to teach based on a given content area. When combining methodology with curricular knowledge, it is necessary to have an understanding of learning styles in order to identify potential areas of need. This informs how to explicitly plan, represent, and adapt instructional delivery, related to subject matter, in order to meet the varied needs of diverse learners (Archambault & Crippen, 2009; Koehler & Mishra, 2009; Mishra & Koehler, 2006; Shulman, 1986).
Technological content knowledge (TCK) refers to the relationship between technology and content where the technical tools that are selected directly impact the degree of engagement, functioning and performance for a learner (Cox & Graham, 2009; Koehler & Mishra, 2009; Schmidt et al. 2009). Cox and Graham, (2009) describe TCK as the “knowledge of how to represent concepts with technology” (p. 64). Technological pedagogical knowledge (TPK) refers to the manner in how technologies are utilized to engage students during learning activities (Anderson & Putman, 2009; Mishra & Koehler 2006). Cox and Graham, (2009) discuss how TPK involves skills that require teachers to apply pedagogical knowledge to the utilization of what they describe as emerging technologies. TPK is viewed independent of a given subject matter as it can be applied across most content areas but can influence instructional practices depending on the chosen technologies (Cox & Graham, 2009; Sahin, 2011).

Technological pedagogical content knowledge (TPACK) is the seventh component within this theoretical model as depicted in the center of Figure 1 (Koehler & Mishra, 2009). The union of these domains is the core of this framework, culminating in a construct that fuses the inter-relational nuances of pedagogy, content and technology (Angeli & Valanides, 2009). TPACK can be described as a convergence of knowledge encompassing technologies that are adaptively applied to the teaching of concepts within a contextual realm (Anderson & Putman, 2020). TPACK involves a multi-dimensional process of methodically teaching subject matter with integrated technologies. This model offers a way for educational preparation programs to evaluate what necessary knowledge components need to be taught to pre-service teachers (Benton-Borghi, 2013; Cappuccio et al., 2016; Chai et al. 2013; Sahin, 2011; Schmidt et al., 2009 Valtonen et al., 2020).
The framework can also be used to gauge professional development, in-service teacher evaluation, and self-evaluation for practicing teachers (Archambault & Crippen, 2009; Giannakos et al., 2015; Koh, Chai, Tsai, 2012; Scott et al., 2021).

**TPACK Research**

The TPACK model has been the impetus of extensive scholarship including numerous survey instruments that have been developed since its inception (Anderson & Putman, 2020; Scott, 2021). Scott (2021) conducted a review of 233 articles, published over a span of 15 years, that utilized self-assessment TPACK surveys of pre-service and in-service faculty. The reviewed designs were either mixed method or quantitative, where only two were related to special education. The aim of the study was to provide a comprehensive resource to help scholars locate valid and reliable TPACK self-assessment instruments that could be utilized in their research. A link was provided to a complete dataset containing 45 fields with a range of information e.g., publication details, survey design, purpose, and analyses (Scott, 2021).

Scott (2021) identified the most commonly used and adapted instruments through an exhaustive review of the literature, which included an analysis of survey lineage. Schmidt et al. (2009) designed a 75 item survey with a 5-point Likert scale for pre-service teachers that has been replicated or adapted by numerous authors, culminating in a myriad publications (Scott, 2021). Due to a small sample size, a factor analysis could not be conducted on the entire survey, but the researchers were able to determine internal validity and reliability on 47 items (Schmidt et al., 2009). Subsequent iterations of the Schmidt et al., (2009) instrument were able to achieve multi factor solutions such as those
adapted by Koh, Chai and Tsai (2010-2019) who have “extensively studied using factor analysis” (Scott, 2021, p. 130; Scott & Nimon, 2020).

Archambault and Crippen (2009) developed a 24 item instrument with a 5-point Likert scale to measure the TPACK of nearly 600 in-service K-12 online distance educators in the U.S. In a subsequent study using the same survey and data set, Archambault and Barnett (2010) were unable to extract all seven corresponding factors. Yurdakul et al., (2012) highlighted the challenges that previous researchers faced with designing an instrument that can distinctly measure aspects of each domain within the model, due in part to the notion there is some overlapping aspects. In response, a scale was developed, by Yurdakul et al. (2012), to measure TPACK as a unified entity which extracted a four-factor structure. The TPACK-deep scale contains 33 items using a 5 point Likert scale that was administered to 995 pre-service teachers in Turkey. While the Yurdakul et al. (2012) theoretical structure and instrument vary in design from the other models that contain seven components, it was among the earliest to successfully run both an Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Sahin (2011) formulated a survey that advanced through five phases of development that validated a 47-item survey using a 5-point Likert scale. The instrument was designed to measure all seven of the domains of TPACK for pre-service teachers. Subsequent studies conducting CFA and EFA-CFA analyses have all extracted 7-factor solutions (Scott, 2021).

One team of scholars conducted extensive research, spanning a decade, to design and develop a valid and reliable TPACK instrument (Scott, 2021; Scott & Nimon 2020). Chai, Koh and Tsai (2010) derived a measure to survey 889 pre-service Taiwanese
teachers which extracted four factors. The following year, Chai et al., (2011) were able to extract all of the factors affiliated with each of the seven TPACK domains. This team of researchers continued to refine their survey instruments achieving similar results, conducting factor analyses, with two separate studies of practicing teachers in Singapore. Koh et al. (2012) conducted a study that used a structural equation modeling approach to examine the perceptions of practicing teachers’ pathways to TPACK (Koh et al., 2012). Subsequently, Koh et al., (2014) published a study that measured teachers’ constructivist-oriented perceptions of TPACK, where knowledge and meaning were considered to be based on a learner’s perceptions and interpretations of their experiences. Both studies utilized a 7-point Likert scale containing 30 and 32 questions respectively, and had some identical items, where the latter contained adapted constructivist-oriented items from the Archambault & Crippen (2009) and Schmidt et al. (2009) surveys.

Some researchers endeavored to conceptualize TPACK by combining other variables and constructs for further investigation. Chen and Jang (2019) examined the relationship between TPACK and self-regulation (SR) to study how SR may promote enhanced teacher knowledge and learning. They administered two adapted TPACK and SR surveys to 386 secondary in-service science teachers in Taiwan. Overall they found a strong correlation between the SR and TPACK scores, highlighting the critical role that SR plays in teacher functioning and ongoing development. SR contained four dimensions for this study: planning capability, reflecting capability, monitoring and controlling capability, and information and communications technology (Chen & Jang, 2019). Huang and Lajoie (2021) built upon this research by investigating the self-regulated learning (SRL) of 70 English as a Secondary Language (ESL) teachers in China, a majority of
whom were university students. The aim was to analyze participants’ digital lesson planning processes to determine global SRL process patterns as they relate to TPACK achievements and the same characteristics or patterns when comparing groups based on levels of performance. Goal setting, monitoring and reflection were among the SRL events that were analyzed. A rubric for lesson plans was created to evaluate TPACK. Statistical analysis results indicated that those who had higher levels of achievement were “likely to adaptively perform self-regulative activities in knowledge acquisition to ensure better learning consequences” (Huang & Lajoie, 2021, p. 13).

Benton-Borghi (2013) sought to infuse the UDL and TPACK models, noting that the merger would promote enhanced “collaboration between general and special education” teachers (p. 246). The author challenged researchers and teacher preparation programs to view the TPACK model through a UDL lens as it would help inform practices for all stakeholders and promote inclusive practices (Benton-Borghi, 2013). Marino et al. (2009) proposed an enhanced TPACK framework to include AT. This conceptualization had foundational elements of UDL and AT as a distinct dimension of TK. This design was also aimed at promoting an aspect of pre-service teacher education, augmenting certain skills in order to better prepare future educators to be able to meet the needs of diverse learners (Marino et al., 2009). The enhanced TPACK model with AT was among the earliest peer-reviewed published articles that incorporated special education.
There are a limited number of studies that have examined the TPACK of special education teachers in the literature (Anderson & Putman, 2020; Huang et al., 2020). Tournaki and Lyublinskaya (2014) utilized the Schmidt et al. (2009) instrument to measure TPACK of graduate pre-service special education teachers, in a course, when integrating technology with mathematics and science. They focused on TCK, TPK, and TPACK, finding significant gains in each domain as well as with PCK. The same researchers published another study with the same population but utilized a different model of design where they analyzed a sample of lesson plans integrating technology. According to a factor analysis of the rubric that the authors designed, four factors of TPACK were extracted, among the first confirmed with pre-service special education teachers in the literature (Lyublinskaya & Tournaki, 2014). Kaplon-Schilis and Lyublinskaya (2019) conducted a long-term single group study over the course of four semesters with graduate level pre-service elementary special education teachers. The aim of this research was to determine whether the three pillars and central construct of the TPACK model could be independently measured and then relationally analyzed. This study developed and validated external measures for the constructs of TPACK and TK, PK, and CK, where there were two content areas for mathematics and science. It is noteworthy that the study found that increases in the core knowledge of TK, PK, or CK did not always affect an increase in TPACK (Kaplon-Schilis & Lyublinskaya, 2019).

Anderson et al. (2017) conducted a qualitative study with 14 pre-service teachers to explore the decision making processes and experiences as it relates to TPACK and technology integration. As a component of a fieldwork assignment for a special education
class, this group of early childhood education majors participated in a variety of focus groups and interviews to report their experiences of using apps on iPads with SWD. The analysis suggested that this experience afforded pre-service teachers the opportunity to experiment with technology integration while orienting and reflecting on the alignment with various aspects of the TPACK model (Anderson et al., 2017). Courduff et al. (2016) conducted a qualitative study to understand the processes for technology integration of 10 in-service special education teachers. A theoretical model was used to interpret qualitative data to assess TPACK and technology acceptance. Findings suggested that beyond the apparent knowledge within the domains, there were certain dispositions or character traits and attitudes, such as determination and perseverance that led to successful application of skills to integrate technologies into instruction (Courduff et al., 2016).

Ciampa (2017) conducted a single-site case study with three special education teachers in an urban elementary setting. The purpose of the study was to help support teachers with integrating technology specifically during literacy instruction. The findings supported an increase in TPACK competence as well as confidence, a variable not typically evaluated or measured in other studies (Ciampa, 2017). Anderson and Putman (2020) conducted a qualitative study with eight special education teachers to investigate their “experience, confidence, beliefs and knowledge of technology integration” (p. 39). Similar to Ciampa (2017) the findings of this study confirmed the influence of confidence on various TPACK domains. This had implications both for teacher preparation programs and professional development initiatives (Anderson & Putman, 2020).
Cappuccio et al. (2016) conducted a study to determine digital competencies of 91 in-service teachers enrolled in a special education certification course in Italy. The participants completed a digital competency survey and aspects of the TPACK model were incorporated into a e-portfolio that was designed to assess digital competence. This included four dimensions, where five of the domains were distributed across the technological, ethical pedagogical, and cognitive domains. The fourth domain was awareness, which included social (or self) awareness. Results supported that all participants gained knowledge and increased digital competence with completion of the e-portfolio where the highest scores were found in the awareness dimension (Cappuccio et al., 2016). A study conducted in Cyprus utilized the Yurdakul et al. (2012) TPACK-deep instrument to survey 60 special education teachers. The aim was to examine the TPACK levels based on variables such as age, education level, and teaching experience. The results confirmed that the overall TPACK levels for special education teachers were high, with only one significant difference observed based on teaching experience (Dimirok & Baglama, 2018)

Hill and Uribe-Florez (2020) conducted a mixed methods study to explore the TPACK of 60 rural middle and high school mathematics and special education teachers in the U.S. The quantitative results, based on a survey developed by Zelkowski et al. (2013) indicated that on average the scores were low for TK and high for PK and CK. The qualitative results identified themes based on responses to open ended questions: Conceptual Understanding, Teaching Strategies, Time, Student Engagement, Resources, Teacher Knowledge, and Teacher Attitudes. Notably, teachers reported on the impact of technology on engagement for students, and how teacher attitudes in the form of
perceptions and beliefs, or lack of confidence, could be a barrier. Other barriers for technology integration and utilization discussed were access, in the form of devices and internet, other resources and time (Hill & Uribe-Florez, 2020).

Huang et al. (2020) adapted the Chai et al. (2011) survey to measure the TPACK of in-service special education teachers of students with visual impairments (SVI); 134 taught in Taiwan and 281 taught in China, totaling 415 participants. The model constructs were modified and validated with a five-factor solution. The results indicated that the Chinese teachers had overall higher levels of TPACK, with the exception of one survey item. Some limitations resemble some of the other quantitative studies include potential issues with self-assessment measures. Certain biases had the potential to confound the results such as social desirability and self-confidence (Huang, 2020).

A study was published during the pandemic that examined the construct of TPACK within the context of COVID-19. Hall et al. (2020) conducted research on 61 pre-service teachers who were enrolled in a technology integration course. They participated in a qualitative study where they analyzed, discussed and reflected on the digital divide that was amplified during the pandemic. The participants engaged in a web-based interactive three-part module. The modules contained videos, choices of articles to read and tasks with writing prompts for a discussion board, video response board. A thematic analysis revealed that this learning experience not only promoted certain aspects of TPACK in the digital divide, but an “awareness of societal contexts for technology integration” (Hall et al., 2020, p. 438). The emphasis was less focused on the domains of the model, but instead within the contextual setting in which it operates. A shared critical perspective emerged in recognition of the digital inequities caused by forced technology
integration during the pandemic. The realities of this societal crisis placed an emphasis on the construct of context and its influence within the TPACK model.

**TPACK Research Gaps**

Based on the work of Scott (2021) and a review of other survey articles, the literature contains an established set of TPACK surveys that have been validated and adapted throughout a span of 15 years, since the inception of this model in 2006. Moreover, numerous researchers have replicated and modified various surveys to measure different aspects of TPACK based on contexts and populations. However, of the expansive body of articles that have been published on this topic, a miniscule number are related to special education teachers and their practices. A search in March of 2021, using Temple University Library’s online data bases, yielded over 2200 peer reviewed articles using TPACK as a search term. The results yielded less than 20 retrievable articles that are related to special education. Three of the articles, from this review, were conducted internationally, and of the remaining eight articles, seven were qualitative and or related to the pre-service teacher population. The remaining article was a mixed methods study whose participants were middle and high school mathematics and special education teachers. None of the articles that were reviewed conducted quantitative studies with in-service K-12 special education teachers in the US. This study endeavored to survey this population within the context of ERE during the COVID-19 pandemic.

**Articles Published During the COVID-19 Pandemic**

Multiple articles were published throughout the pandemic chronicling a range of perspectives, experiences and barriers from various stakeholders across the global educational landscape. While there were limited studies in time and scope, researchers
were able to examine a range of issues from pedogeological challenges, technological issues, computer literacy, teacher preparation, preparedness planning, supporting students with disabilities, communication protocols, and psychological experiences (Akour et al., 2020; Almazova et al., 2020; Bergdahl & Nouri, 2020; Cheng, 2020; König et al., 2020; Niemi & Kousa, 2020; Talidong & Toquero, 2020). As the literature was progressively disseminated, insights, guidance and updated concepts such as new terminology emerged. For instance, the article that offered the term ERE was a collective effort by multiple authors reflecting on the global outlook and educational landscapes of over 30 countries, impacted by the pandemic, containing suggestions for how to address a range of issues (Bozkurt et al., 2020). Other sources i.e., legal briefs, policy briefs, governmental reports, periodicals, editorials, media outlets such as television or newspapers, magazines, and online publications were all sources of information providing real time reporting on issues, recommendations and critical analyses.

“School’s Out, But Class’s On,” was China’s educational response to the pandemic which impacted 270 million students and 20,000 teachers (Cheng, 2020, p. 513). This was touted as the world’s largest online educational initiative that utilized technologies to sustain education. There were national standards and requirements during this period of time all stakeholders. Standards for teaching online, learning online, improving online platforms, identifying various online resources, educational television outlets, and integrating a variety of public health matters including safety, epidemic prevention, mental and physical health for needs for teachers and students. Challenges were identified based on a departure from the traditional context of in person learning. Teaching methods were challenged to meet varying learning styles that were impacted by
the need to adapt instructional resources to an online format. The response to the barriers was to formulate a cohesive plan that identified various technical resources and supports. Strengthened guidance for teachers was necessary to provide technical support and training to address a host of technical and pedagogical issues. This was necessary for students’ participation, engagement and overall well-being. Consistent communication was encouraged between schools and families as schools had developed guidance for families to formulate home study and living plans. Schools were guided to promote the physical and mental health of students during this quarantine, which included shortened learning times, with breaks from looking at screens and encouragement to exercise. Cheng (2020) recognized that the impact of these circumstances was an opportunity to examine potential educational reforms as the increased integration of technology during ERE has transformed instructional practices.

Bergdahl and Nouri, (2020) examined the insights from teachers transitioning from traditional teaching to ERE in Sweden where the findings could inform future preparedness planning. Results from 153 teachers from pre-K to higher education demonstrated readiness or lack thereof was related to technical and pedagogical competencies. The four research questions presented thematically align with this proposed study: “How are teachers and schools preparing the transition into distance education? What digital tools are used to meet the needs of distance education in extra-ordinary situations? What are the pedagogical activities that distance education in extra-ordinary situations require? What are the challenges (or positive experiences) of distance education in extra-ordinary situations, as identified by teachers?” (Bergdahl, & Nouri, 2020, p.2). Some teachers noted some of the positive outcomes during ERE were
increased attendance and participation particularly with their students who were
considered more typically socially withdrawn, who were more technically inclined, or
their students with autism.

Eighty-seven Russian university teachers were surveyed to gain their perspective
of online teaching during the COVID-19 Pandemic. The researchers were examining how
the teacher challenges and experiences delineated their preparedness for online
instruction. The findings suggested that the level of computer literacy was the most
significant challenge, followed by university IT support, teacher preparedness to
implement online instruction, and student preparedness to engage in online learning. It
was widely agreed by the respondents that due to the methodological differences between
traditional in person and online teaching that “psychological, technological,
methodological support and teachers’ professional development programs are of vital
importance to ...ensure efficient online education”(Almazova et al., 2020, p.1). Akour et
al. (2020) surveyed 382 university teachers in Jordan to analyze how the COVID-19
pandemic and what they referred to in their title as “Emergency Distance Teaching”
impacted the overall mental health and well-being of its faculty. Results demonstrated
that nearly 70% of respondents had some form of mild to moderate or severe distress
(Akour et al., 2020).

Similarly, Gudmundsdottir and Hathaway, 2020 designed an online teacher
readiness survey administered to 1186 teachers worldwide, the majority of whom were
from Norway (48%) and the U.S. (20%). The measure contained eight open-ended
questions to gauge readiness and offer perspectives. The results for the U.S. revealed that
92% of teachers had never taught an online course. While this study does highlight the
need to prepare teachers for online instructional activities, it also confirmed the resilience and adaptability that teachers embraced during such challenging times (Gudmundsdottir & Hathaway, 2020). Talidong and Toquero (2020) designed an online survey to assess how teachers in the Philippines cope with anxiety during the Covid-19 pandemic. 218 Filipino teachers provided basic information before answering questions that targeted perceptions, practices, and experiences, including preventative strategies and attitudes toward psychological stress or anxiety. Some results revealed nearly 98.2% observed social distancing measures as a preventative measure and 93.1% had positive attitudes toward spending time with family doing a variety of activities. As a way to deal with anxiety, nearly 75% spent increased time on social media, while 78.8% pursued a new hobby. This article offered a glimpse of the social and emotional well-being of teachers, however it is unclear if any of the participants in this study were fully engaged in delivering online remote instruction as it was in a developmental phase at the time it was written (Talidong & Toquero, 2020).

Niemi and Kousa (2020) conducted a mixed method study of teacher and student perspectives at a Finnish high school. Short surveys were administered with open ended questions. Statistical analysis indicated that there were successes with distance teaching, i.e., ERE. Analysis of the open ended questions revealed challenges for all stakeholders. Students expressed difficulties with workloads, stamina and motivation to remain engaged. Teachers desired more authentic interactions with students to promote academic progress and recognized that some pedagogical adjustments needed to be made. Teachers also had an increased planning workload suggesting that online remote instruction
requires more time to scheme and design compared to in person learning (Niemi & Kousa, 2020).

König et al. (2020) developed a survey to measure how teachers had adapted to ERE during the pandemic. Eighty-nine participants ranging from primary to secondary schools in Germany included 8% who worked at special needs schools. The findings showed that 90% reported consistent communication with parents and students. However, 70% neglected to use digital instruments for online instruction and a mere 20% of teachers provided online lessons at least once a week. TPK was one of the competencies that was analyzed and this study found that it predicted providing task differentiation and maintaining social contact. Therefore “teachers who performed better in the test also reported having maintained communication and delivered online adaptive teaching more frequently during school closure” (König et al., 2020, p. 617). Similarly, enhanced communication was the recommendation of Schuck and Lambert, (2020), who conducted a study on Teacher experiences during what they described as ERT and how that impacted communication and socio-emotional functioning for all stakeholders, as well as pedagogical challenges for special education teachers with implications for needed supports for resources, enhanced collaboration and Social Emotional Learning (SEL).

Rap et al. (2020) designed a survey that was distributed anonymously via teacher social network groups on various social media platforms. It was completed by 193 chemistry teachers in Israel, representing 25% of the Israeli secondary chemistry teacher population. The survey included multiple choice and open ended questions that was developed based on the TPACK framework to identify challenges, needs, and the necessary pedagogical elements for online ERE. The challenges teachers faced were
pedagogical elements, technological elements, student engagement, participation, and achieving direct contact with students. Nearly 50% of participants lacked knowledge of digital tools and required assistance. Seventy-five percent reported less interaction with their students. The researchers used the results to identify knowledge components for future development and support, offering uploaded video tutorials and written guides to a website (Rap et al., 2020) This is one of the only studies published during the COVID-19 Pandemic that attempted to measure multiple TPACK constructs.

Van der Spoel et al. (2020) conducted a mixed methods comparative study to measure the expectations and experiences of online teaching spanning a month in the early stages of the Covid19-pandemic in the Netherlands. 200 Dutch educators responded to a survey that was posted to the online professional social media platform, LinkedIn. The survey was administered before online instructional activities commenced, and a post-test survey was distributed to those who had completed the first a month later. The findings confirmed that teachers with prior awareness and practice with technology had more positive experiences during ERE. Of the expected and experienced effects, professionalism, increased flexibility for students, and teachers were among the positive. The most significant negative aspect that was experienced was the lack of interaction. Finally, teacher experiences during the pandemic increased their intention to integrate technology into future instructional endeavors upon return to in person learning (Van der Spoel et al. 2020).

Jameson et al. (2020) examined the impact and implications on the provision of special education services and the ability for LEA’s to provide FAPE, particularly in rural segments of the population. The recommendations were for more training for teachers to
provide this type of support, for educational and outside agencies to team up to support in an interdisciplinary manner, and for more planning for remote learning with an emphasis on resuming in person learning to ensure FAPE without significant loss in time, services and potential regression (Jameson et al., 2020). Another procedural aspect was examined by Stifel et al. (2020) where the ethical, legal and safety considerations for school psychologists to conduct tele-assessments was examined. Despite recommendations from National Association of School Psychologists to avoid conducting standardized assessments for evaluations remotely during the pandemic, the backlog of students who required evaluations in conjunction with the legal requirements forced considerations for various procedures. There was discussion of safety protocols and the need for schools to rely on systems such as Multi-Tiered Systems of Supports (MTSS) to address the potential inundation of referrals upon return to in person learning, as the backlog of evaluations was undoubtedly going to put a lot for stress on these systems. (Stifel et al., 2020).

Finally, Hall et al. (2020) conducted a study with preservice teachers during the pandemic to increase their awareness and understanding of various aspects of the digital divide. While recognizing the implications for the necessity of teacher preparation programming to develop technological pedagogical skills, this study highlighted the technoeethical dynamics that needed to be considered contextually when addressing the digital gaps in society, particularly in underserved and under resourced communities of low socioeconomic status (SES). This included considerations for how existing social and systemic inequities influenced a need to pursue a more robust approach to integrating technologies, beyond equipping students with technological equipment, broadband and
infrastructure required for access, to more targeted instruction in digital skill development for all stakeholders for how to utilize the technology in a purposeful and meaningful manner (Hall et al., 2020).

Summary

This literature review first established an overview of the research and background in the field of Educational Technology. Contextual descriptions were necessary to illustrate the various settings where digital instruction and learning occur. An examination of the research regarding school choice for SWD in online remote contexts highlighted issues of equity, access, performance, service delivery, and the utilization of technologies, with a heavy concentration of research in higher education settings. This was noteworthy to illuminate how these issues persisted across contexts for those who could not choose their educational environments as a result of the COVID-19 pandemic. A majority of educational stakeholders were forced to rely on technologies, which posed unique challenges for SWD. Several of the special education related research topics in ET were examined to highlight how they function within the context of ERE. Challenges with policy, legalities, technology access, socialization, and teacher preparation revealed the multitude of complexities that all stakeholders confronted during this modality of pandemic education. A robust scope of knowledge and skills were necessary for teachers to be able to provide instruction and supports for SWD during ERE. Scare research exists, however, examining special education teachers’ preparation for these contexts or how these variables impacted their ability to function. Moreover, there is not any research that studies K-12 special education teacher’s technological, pedagogical or content knowledge during the COVID pandemic.
The TPACK model was introduced to provide a framework on how to conceptualize and gauge such knowledge. An overview of the research and development of various instruments to measure the domains of TPACK were explored. Additional studies with differing methods and other theoretical considerations expanded the body of research. Roughly half of the articles focused on pre-service teachers with a heavy concentration in HE across multiple countries around the world (Scott, 2021). It was established that less than one percent of the articles published on TPACK are related to special education. Currently there are not any quantitative research studies that survey the TPACK of K-12 in-service special education teachers in the U.S. Furthermore, there are not any studies published during the pandemic that examine special education teachers perceptions’ throughout ERE during the pandemic. This study aimed to examine the TPACK, preparation, interactions and experiences of in-service K-12 special education teachers through an exploration of their collective perceptions of emergency remote education during the COVID-19 pandemic.
CHAPTER 3

METHODS

Design

A survey was developed to examine the collective perceptions of K-12 special education teachers implementing emergency remote education during the COVID 19 pandemic. The questionnaire incorporated adapted survey items that were validated from existing published TPACK studies (Archambault & Crippen, 2009; Giannakos et al., 2015; Koh et al., 2012; Sahin, 2011; Schmidt et al., 2009). This questionnaire was converted to a digital format and then was administered online where it was accessed by special education teachers. Established survey research employing the Technological Pedagogical and Content Knowledge (TPACK) model was utilized as the principal framework to delineate the dimensions of knowledge that were measured. This aligns with the primary research question:

*What was the perceived knowledge related to technology, pedagogy, and content, including the combinations of these domains, for K-12 special education teachers implementing emergency remote education (ERE), during the COVID-19 pandemic?*

Certain items were designed to evaluate special education teachers’ preparedness, technical training, and professional development while utilizing technologies to provide special education services remotely during the pandemic, and how the application of such knowledge and skills impacted the implementation of instruction, supports, communication, and interaction with various stakeholders. This addressed both the secondary and tertiary research questions:
To what extent were special education teachers provided adequate preparation, technical training and appropriate professional development to execute their responsibilities during emergency remote education?

To what degree did special education teachers support, interact and communicate with colleagues, students with disabilities, and their caregivers during emergency remote education?

Additional survey items were included to target student access to technology, connectivity, and engagement. Moreover, specific questions were included to gauge special education teachers’ perceptions of their experiences and socio-emotional functioning during ERE, which pertains to the quaternary research question:

How did special education teachers perceive their experiences implementing emergency remote education, during the COVID-19 Pandemic?

A final item was included with an optional open-ended response to ascertain any positive outcomes or practices that may have emerged, from special education teachers’ experiences during ERE, pertaining to the integration of technology into future practices.

**Participants**

This study was designed specifically for certified special education teachers, or those who were teaching on an emergency certification, permit, or other designation to provide special education services to K-12 students in public schools across the United States. Participants had to have taught prior to and during the pandemic, where the newest special education teachers to the field had to have begun in the 2019-20 school year. Members of this group had to have specifically taught students receiving special education services remotely and online during the pandemic, excluding any teachers who
typically delivered online instruction fulltime e.g., cyber or virtual school instructors. Moreover, the participants were special education teachers who had been required to provide emergency remote instruction, in departure from traditional face-to-face in person instruction.

**Recruitment**

Special education teachers were recruited to participate in an online survey via personal email addresses, text message, various public and private special education teacher groups on the social media platform Facebook. This researcher had a professional or personal affiliation with the recipients of the survey links that were distributed via text message and email. This ensured that the identity and status of these participants as certified special education teachers was verifiable.

A link to the survey was posted to various public and private, or closed, special education Facebook group pages, specific to special education teachers teaching in the United States. International groups, and those that included parents, such as special education support or information pages, were not solicited. A complete list of the Facebook groups that participated can be viewed in Appendix A. Participants who completed the survey via a public Facebook group needed to be further vetted, based on their demographic information and/or other responses to make the determination of their status as certified special education teachers.

Before distribution of the survey to the private groups on Facebook, a group specific screener was completed to request entry into the group, subject to administrative review. A brief description of the study was initially presented to the group administrator(s) and/or moderator(s), along with a request to post the survey link for their
members to voluntarily complete. Additional information was disclosed about the researcher’s status as a doctoral candidate at Temple University and special education teacher in Philadelphia. If permitted to join the group, and no response to the initial request to post was provided, group administrators were contacted via Facebook Messenger to express gratitude for being accepted and a request to post the survey. A similar message provided an introduction to the researcher, scope of the project and request for how the survey may be shared, that is whether the administrator would post it or have the researcher create a post for their group. There was a suggested description provided for those administrators who were willing to post the link themselves for participants to complete the survey. Appendix B contains the language used in these messages and suggested posting message. A recognized benefit for the utilization of these closed groups on social media was that group membership provided an initial screening indicator, as these groups required an administrative review to gain acceptance (Reagan et al., 2019). If the administrator posted or gave approval to post, the survey was shared to the group, and in instances where there was not a response, the survey was posted to a given group page, after waiting for a period of up to 72 hour hours without a response.

**Setting**

The impact of the COVID-19 pandemic set the stage for the context of this study. The nature of the online setting was somewhat ubiquitous as all of the participants were interacting with students using digital technological devices via the internet, presumably from their homes. Yet this setting was potentially somewhat varied as individual environments may have contained extraneous factors such as distractions from other household members or technical challenges. Some participants may have been teaching a
portion of students who were attending daycare facilities or resource centers as a result of access to connectivity or childcare necessities. These dynamics presented additional layers that teachers confronted, accentuating a deviation from a contextual uniformity. Hall et al. (2020) discussed the importance to consider context, an established construct of the TPACK framework, and the impact of digital equity issues within societal contexts that were exacerbated during ERE. Thus it was important to consider how various stakeholders prepared, responded, and functioned within this pandemic context. Respondents were being asked to reflect on their perceptions during ERE as the pandemic was still ongoing. They were being recruited at a time, toward the end of the summer of 2021, where they had endured the initial onset of the pandemic teaching through the spring of 2020, experienced a full year of teaching for the school year of 2020-21, and anticipating a new school year with a host of unknowns.

Survey Instrument

The COVID 19 Special Education Teacher Survey (C-SETS) was adapted from a set of replicated surveys reviewed in the literature (Archambault & Crippen, 2009; Koh et al., 2012; Sahin, 2011; Schmidt et al., 2009). Permission was sought from one of the authors of the Archambault and Crippen (2009) study. Consent was granted to adapt and modify the items from the survey for this project. Items for this study were designed to address aspects of special education practices and pedagogy as well present some pre-pandemic questions for comparative analytic purposes.
The design of the survey contained 42 items using a 5-point Likert scale with responses:

1. Strongly Disagree = SD
2. Disagree = D
3. Neither Agree/Disagree = N
4. Agree = A
5. Strongly Agree = SA

The survey items were designed to measure aspects of knowledge within the domains and sub-domains of the TPACK model, while responding to the research questions, some of which targeted other elements of special education teachers’ experiences teaching remotely during the COVID-19 pandemic. Additional items and concepts were applied from two other studies by Chen and Jang (2019) and Yurdakul et al. (2012). The Koh et al. (2012), Sahin, (2011), and Schmidt et al. (2009) studies contained wording of items that were similar across studies, although the Koh et al. (2012) study was on a seven-point Likert scale. Moreover, these studies were particularly utilized as a foundation for validation and reliability procedures. The Archambault and Crippen, (2009) study was the principal survey that was utilized for adaptation, specifically because it surveyed practicing in-service K-12 teachers. While these were fulltime online instructors who taught virtually and were not providing special education services, certain item responses provided comparative benchmarks for various perceptions of knowledge by the participants across the TPACK domains, which were utilized for comparative analyses in the discussion chapter.
**Items By TPACK Domain**

Seven survey items were classified in the Technology Knowledge (TK) domain where four items were designed to determine technological skills as it pertained to online remote education with resolving technical issues and operating technologies, e.g., “I had the technical skills to operate computer programs, software applications and web-based platforms during the COVID-19 pandemic,” all adapted from similar items from four previous TPACK studies of Archambault and Crippen (2009), Koh et al. (2012), Sahin (2011) and Schmidt et al. (2009). This addressed the sub research question: How much technological knowledge did special education teachers have during emergency remote education? There were two items related to digital access for students e.g., “I supported students who consistently did not have access to a laptop, computer, or tablet during online remote learning,” and an item regarding in-service teacher preparation: “I received training and ongoing professional development to enhance my skills with operating technological equipment, software, programs applications and/or web-based platforms.” This last item was designed to answer the research question:

*To what extent were special education teachers provided adequate preparation, training and appropriate professional development to execute their responsibilities during emergency remote education?*

There were five additional items across four other domains related to the construct of teacher preparation, two of which were further extended by the sub research question:

*Prior to the pandemic what training and professional development did special education teachers receive to prepare for online remote instruction?* These specifically targeted perceptions prior to the pandemic e.g., “Prior to the pandemic, I received training in
utilizing content based software programs for general education curricula, remedial/intervention programming and/or alternative content.”

The next domain of Pedagogical Knowledge (PK) contained items in response to the sub research question: *What was the pedagogical knowledge of K-12 special education teachers during emergency remote education?* Two PK items targeted special education teaching practices e.g., “I was able to use a variety of approaches, strategies and methods when teaching students with disabilities,” which aligned with PK survey items from Archambault and Crippen (2009), Koh et al. (2012), Sahin (2011), and Schmidt et al. (2009). Two items targeted knowledge of special education case management and policies: “I understood the adjusted policies and procedures for remotely evaluating, assessing and/or formulating IEPs, progress reports...” and the second was specific to preparation, “I received professional development during the pandemic regarding special education case management policies and procedures.” The last two items related to aspects of communication e.g., “I communicated more frequently with parents and caregivers, prior to the pandemic.”

The Content Knowledge (CK) domain contained three items pertaining to preparation with content training, planning, and administrative support. One item gauged the ability to align content with core or alternate standards, and one with selecting content aligning with two CK items from the Archambault and Crippen (2009) study. These questions address the sub research question: *What was the content knowledge of K-12 special education teachers during emergency remote education?*
The TPACK sub domains contained combined knowledge constructs with items that aligned to the topics of the aforementioned questions. Pedagogical Content Knowledge (PCK) items ranged from gauging perceptions of effectiveness, “Prior to the COVID-19 pandemic, I was more effective with planning and delivering specially designed instruction with accommodations and modifications when applicable,” and training “During the pandemic, I was provided training and ongoing professional development in how to teach content,” exclusive of utilizing technologies. Three items were specific to the sub research question: How did special education teachers perceive their experiences implementing emergency remote education, during the COVID-19 Pandemic? These items were designed to gauge respondents’ social-emotional perceptions based on their experiences with planning, teaching and how this may have impacted their time: “Prior to the pandemic, I felt less stress or anxiety when planning and teaching content,” and “I sacrificed more leisure time to plan for teaching tasks or special education case management duties during COVID-19 compared to before the pandemic.”

Technological Content Knowledge (TCK) items were designed to gauge perceptions of using technologies to teach content. Two items were related to knowledge and the application of digital content programs, one of which was specific to preparation, and aligned with survey items from the Archambault and Crippen (2009), Koh et al. (2012), Sahin (2011) and Schmidt et al. (2009) studies: “During the COVID-19 pandemic, I used an online learning platform, adaptive learning program and/or other technology based programs to teach content to students with IEPs, such as Nearpod, Lexia, iReady, Prodigy Math, Seasaw, Unique Learning System etc.” Three items related
to student technological access, where two gauged access to necessary devices for learning and one item included the utilization of digital content programs: “During the COVID-19 pandemic, my students utilized technology based intervention programs, such as iReady, Lexia, & Unique Learning System.”

Technological Pedagogical Knowledge (TPK) contained five items that measured the ability to utilize technologies for instructional practices that were adapted from the surveys of Archambault and Crippen (2009), Koh et al. (2012), Sahin (2011) and Schmidt et al. (2009). Two items were specific to using videoconferencing technologies, two were related to special education practices of specially designed instruction and assessment, and an item associated with the utilization of learning management systems: “I was able to effectively use a learning management system (LMS) e.g., Blackboard, Canvas, Google Classroom or Schoology, to organize materials and administer assignments during the pandemic. Three additional items pertain to interactions with stakeholders posed in the third research question:

To what degree did special education teachers support, interact and communicate with SWD and their families during emergency remote education?

These items measure three different aspects of communication and interaction: IEP team participation, support from a parent or caregiver during online learning to assist students, and with parent/caregiver correspondence “My communication with parents/caregivers increased during the pandemic.”
TPACK is the final domain which is a unification of the other constructs in the framework. Each of the six items pertained to the aforementioned topics and constructs, such as two gauging the utilization technologies to strategically teach content, including an item targeting Universal Design for Learning (UDL). An item targeted ongoing teacher preparation, social emotional perceived experiences with planning, and interactions with the degree of IEP team collaboration during the pandemic. Finally there was one item that also provided an open response after participants selected an answer the last question on the C-SETS: “I learned something from remotely teaching content online with technology that I will use in my future practices for in person learning.” This is specifically related to the last sub research question: *What aspects derived from the methodical use of technology to teach content during emergency remote education will special education teachers apply to future practices?*

**Demographic Information**

Survey participants were asked to provide two types of demographic information. Respondent Characteristics: gender, age, race/ethnicity, years of experience, level of education, certification designations, including any additional credentials or certifications, grade/age(s) taught, disability classification(s) of their students, and their professional concentration in the form of support type. School Characteristics: designate the state they in which they serve, district locale, if they work in a charter, if their school receives Title I funding, the degree to which they supported ELL, if they teach virtually fulltime (screener item), if their school provided issued devices for learning at home prior to the pandemic, if their school participated in an initiative to provide a device for home learning during the pandemic, and if their school participated in a connectivity initiative.
during the pandemic. Respondents were asked to specify the district locale where they taught, based on the NCES Locale Classifications and Criteria, and had the option to disclose the name of their district, but were not required to do so after designating their locale. Participants had the option to provide their email address, solely to enter to win one of ten $25 Amazon Gift Cards, but were not required to disclose that or any other personal identifying information. This was stipulated via a privacy disclosure statement Research Subject Consent Form (Appendix C) ensuring that all individual responses were kept confidential and anonymous.

**Procedures**

**Online Survey**

The C-SETS was converted from its original form in Microsoft Word to the platform Google Forms. This was a free service that permitted the items to be arranged into sections that had a viewable progress bar. After obtaining IRB approval from Temple University, the language for the research consent form was copied into Google Forms with a consent box that acknowledged reading the information. The Research Subject Consent Form can be viewed in Appendix C. Participants were not able to advance to the next window until this was selected. All 42 items required a response, along with most of the demographic items, unless denoted optional. There were also some items in the demographic section that provided optional “other” designations where participants could specify a detail in their own words e.g., “If "Other" for role of support and services, or if you would like to offer an additional description, please provide below.”

The questions were arranged in a manner to avoid certain biases and to promote a more fluid experience for participants. Certain items, for instance, that pertained to
“PRIOR” to the pandemic were arranged consecutively, and some of the responses which may be perceived to require more cognitive processing or reflection were intentionally spaced out. Certain words were put in all caps such as “DURING” or “PRIOR.” but remain arranged in their TPACK domain groupings which can be viewed in Appendix D.

An authentication mechanism was added to deter online hacking, cyber or spam bots from disrupting the survey administration process (Reagan et al., 2019). Completely Automated Public Turing test to tell Computers and Humans Apart (CAPTCHA) is an authentication program that is owned by google where a question is asked for an individual e.g., to select all items in an array of nine boxes that shows a picture of a designated object or item. Google forms, however, did not permit CAPTCHA to be employed on FORMS, and an alternate mechanism was utilized. A CAPTCHA code generator was inserted at the end of the survey, which had a six character code that was designated to regenerate every five minutes.

Pilot

The C-SETS was first piloted with six certified special education teachers from a large urban school district all who had worked professionally with this researcher. Five of the six survey participants had experience teaching during the pandemic and the sixth was the former Deputy Chief of Special Education Services within this large urban school district who had performed various duties during the pandemic. Two of the five teachers were also Special Education Compliance Monitors, which is essentially a Special Education Coordinator within a school who is semi administrative and has the designation to lead IEP meetings. The five teachers represented different support types:
Learning Support, Autism Support, Emotional Support, Multiple Disabilities Support, and Inclusion. Each pilot participant agreed to being observed while taking the survey.

The videoconferencing platform Zoom was utilized for five participants, and a sixth participated via phone. The Zoom pilot participants shared their screen so that they could be observed completing the questionnaire. They were encouraged to make comments, provide feedback and ask questions. All of the participants agreed to have the sessions recorded for purposes of review. Each session lasted up to an hour and provided minor revisions, with the exception of one session that lasted two hours and provided the most targeted revisions of language specific to a series of the items. Ultimately each pilot participant provided valuable and necessary feedback regarding certain items, and what they were targeting. The feedback also helped confirm the usability ease of the platform, the navigability, the manner in which the items were presented, and the overall timing. None of the completed surveys from the pilot were included in the sample for analysis.

Launch

The survey was launched in August of 2021, and remained open for six weeks. Google Forms permits to have all responses populate in Google Sheet, which is compatible with Microsoft Excel. An identical version of the survey was assigned or shared to each media type i.e., a survey was designated for email participants, text message participants, and one each for every public and private group on social media. A Quick Response (QR) code was also generated for participants to be able to scan the code onto their phone, via its camera, so that they could access the survey via that method. This was posted on this researcher’s Facebook page. Each of those survey delivery types had their own response sheet that could be monitored, as it was updated in real time when
respondents made submissions of a fully completed survey. There was also a question that asked participants to select a checkbox in response to: “How did you learn about this survey?” This was another way to verify how participants accessed the questionnaire. At the conclusion of the survey, the forms were combined in Excel for analysis.

**Analyses**

A series of power analyses were conducted to determine the necessary sample population size. A free downloadable software program designed by Faul et al. (2009) was utilized to perform a range of statistical power analyses based on the effect size. According to Hunt’s (n.d.) researcher’s guide to power analysis, the alpha variable is typically set to .05 and the power is set to .8. The power analyses were performed based on the design and types of statistical analyses that were going to be used to answer the research questions. Given the parameters of an alpha value of .05, power value of .95, and an effect size based on a partial eta squared value of .25, the projected sample size of N=251 would be needed to conduct a comparison of means test.

After the data was collected, it was transferred from multiple Google Sheets to one single excel page. That was then loaded into the Statistical Package for the Social Sciences (SPSS) program, version 28. A series of statistical analyses were performed in order to render results for discussion. Univariate descriptive statistics were generated to draw certain conclusions about the participant population responses as a whole. Responses were classified into groupings based on how they align with the research questions and with the domains of the TPACK model. A Principal Components Analysis was utilized to reduce the dimensions of the survey in order to determine how the survey response items correlated within a given component. A Cronbach's Alpha Reliability
Coefficient was conducted to determine internal consistency and reliability for each identified component. A post hoc one-way analysis of variance, or ANOVA, was performed to determine whether there were any statistically significant differences between the means of subsets of the participant population based on the demographic information provided. These procedures follow a combination of those from previous TPACK studies conducted by Archambault and Crippen (2009), Giannakos et al. (2015), Koh et al. (2012), Sahin (2011), and Schmidt et al. (2009). Additionally, a TPACK study by Schmid et al. (2021) provided a foundation for conducting the ANOVA on the independent variables. Moreover, a justification for using the ANOVA to compare the means of two different independent variable groupings that contain two subgroups, in addition to three or more, as a method to arrive at the same $p$ value and evading potential statistical errors was supported (Brady et al., 2015; Emerson, 2017; Thompson et al., 1999). Finally, the voluntary open-ended responses were informally analyzed, along with the statistical analyses, and are presented in the results section (Creswell, 2012).
CHAPTER 4

RESULTS

Descriptive Analyses

Initial Sample

The Covid-19 Special Education Teacher Survey (C-SETS) was completed by 309 special education teachers residing across 46 states in America, as illustrated in Figure 4.1. A total of 29 surveys had to be discarded as one was completed by a state special education director, 10 were completed by teachers who exclusively provided early childhood services, seven were completed by fulltime virtual special education teachers for whom this survey was not intended, five were completed by first year teachers, and six surveys were completed by related services providers, consisting of four speech therapists, an occupational therapist, and a physical therapist. Ultimately, the sample size rendered for analysis contained 280 respondents.

Figure 4.1

Respondents By State
Source Data and Response Rate

The C-SETS was distributed to 63 perspective participants via email and text messaging. This did not account for any potential forwarding by recipients subsequent to the launch of the survey, as there were not any mechanisms to track such activity. Given the available data, 35 surveys were submitted, which constituted 12.5% of the total respondent sample, yielding an approximate response rate of 55.5%. None of these submissions were discarded as they met the participant eligibility criteria for this study.

The remaining respondents completed the survey, via a link posted public and private special education group pages, on the Facebook social media platform. Participants accessed the link across 36 of the 52 that were solicited, producing 274 submitted surveys, out of which 245 met the participant eligibility criteria. The total number of members across the 36 participating Facebook groups added up to 172,739. Despite requests to group administrators, survey post performance data were not made available for the entire social media portion of the sample to assess how many of these groups’ members were active when the survey links were posted, and clicked upon to gauge a rate of participation. Thus, there was not a way to determine to a cumulative response rate for social media, which will be further examined for discussion.

The private Facebook group Twinkl produced 81 completed surveys, of which 14 had to be discarded for not meeting the participant eligibility criteria. This resulted in a total of 67 surveys which provided the most responses of any source, accounting for 23.9% of the participants of this study. A total of 30 groups, including a scanned QR code posted on a page, produced between 1-8 respondents, yielding a cumulative percentage of 35% of the participants of this study. A majority of the study participants
(52.5%) can be attributed to six groups ranging from 10-67 responses. Figure 4.2 illustrates a distribution of sources for this study, across email, text message, and social media groupings based on a range of respondents. While all sources were able to be identified and verified for eligibility, a cumulative response rate was unobtainable for the entire sample based on the available data which will be further examined in the discussion section. Every submitted survey across the entirety of the sample contained no missing items. A complete list of participant groupings can be viewed in Appendix A.

**Figure 4.2**

*Study Sources*
Demographics

Respondent Characteristics

A total of 268 participants or 95.7% identified as female, 3.2% as males and 1.1% of individuals preferred not to specify their gender identity. The birth year of the respondents spanned from 24-71 years old with a range of 47 years, where the mean age was 46 years old and the mode was 45.

The race and ethnicity of the sample consisted of 81.1% of respondents who identified as Caucasian. 7.1% identified as African American, 2.5% as Hispanic, Latino, Latina, or Latinx, 1.4% identified as American Indian, Indigenous American or Alaska Native, 1.4% identified as Asian, 2.1% indicated a preference to not specify, and two participants selected other, but did not make a specification, accounting for .7% of the sample. One participant identified as Native Hawaiian or Pacific Islander accounting for .4% of the sample and the remaining 3.3% represented nine respondents’ varying bi or multiracial designations.

Ninety-five percent of the study’s participants were certified special education teachers, with the remaining 5% indicating as teaching on an emergency certification, permit, or other designation to provide special education services. Additionally, 33.5% indicated at least one secondary certification. Participants’ educational attainment spanned from a bachelors designation to those who earned a doctoral degree, where 23.9% held bachelor’s degrees, 57.1% held a master’s degree, and the remaining 18.9% comprised of 38 respondents who held multiple advanced degrees, seven who were enrolled in a doctoral program and eight who had earned a doctorate. This last grouping was combined, as reflected in Figure 4.3, and labeled Multiple Advanced Degrees.
Special education teacher experience spanned from 2-40 years of service. Years of teaching experience was combined into four sub groupings for statistical analysis, based on the NCES Schools and Staffing Survey (SASS) design (NCES, 2011). The years of teaching experience groupings were: Less than 4 years, 4–9 years, 10–14 years, and 15 or more years. Figure 4.4 depicts these groupings where the largest subgroup contained 141 participants with 15 or more years of experience, accounting for 50.4% of the sample. The remaining groupings contained 45 respondents with 10–14 years of teaching experience, which is 16.1% of the sample, 56 participants with 4-9 years representing 20% and 38 teachers with less than four years of experience which is 13.6% of the respondents.
Reported responses from grades taught indicated that special education teachers supported students with disabilities across a varying range spanning the K-12 continuum. A majority of respondents supported students across multiple grades and grade bands, with 20 special education teachers, or 7.1% of the sample, indicating that they exclusively taught a single grade, ranging from K-10, with a mode of no more than two respondents. Figure 4.5 illustrates how grades taught were arranged into six subgroupings for statistical analyses. The largest subgroup of 106 participants, or 37.9% of the sample, were classified as Elementary, with grades ranging K-5. 40 participants taught Middle School grades 6-8, representing 14.3% of the sample and K-8 had 36 respondents, or 12.9%. There were three designations for those supporting students on the secondary level resulting in 38 respondents each for the Secondary and Secondary-21 subgroupings,
both accounting for 13.6% of the sample respectively, and the last designation of K-21 was comprised of 22 respondents, representing the smallest percentage at 7.9%.

**Figure 4.5**

*Grades Taught*

![Bar chart showing grades taught](chart.png)

The survey participants indicated providing services to students who were eligible under one or more of the 13 IDEA (Individual with Disabilities Education Act) classifications. Utilizing a “select all that apply” response choice, 94% of the respondents reported supporting students with various combinations of these designation labels, and 17 respondents indicated supporting students with a single identifier. Table 4.1 depicts the number of participants who indicated the classification types of the students they supported and the number in parenthesis indicates the number of respondents who specified exclusively supporting students of one particular designation. The table also
contains two additional designations: students who had been indicated as medically fragile, and students who had been identified as gifted.

**Table 4.1**

*Student Classifications*

<table>
<thead>
<tr>
<th>Classification</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism</td>
<td>261 (11)</td>
</tr>
<tr>
<td>Deafness</td>
<td>15</td>
</tr>
<tr>
<td>Deaf-blindness</td>
<td>15</td>
</tr>
<tr>
<td>Emotional disturbance</td>
<td>133 (1)</td>
</tr>
<tr>
<td>Hearing impairment</td>
<td>71</td>
</tr>
<tr>
<td>Intellectual disability</td>
<td>229 (1)</td>
</tr>
<tr>
<td>Multiple disabilities</td>
<td>167 (4)</td>
</tr>
<tr>
<td>Speech or language impairment</td>
<td>178</td>
</tr>
<tr>
<td>Specific learning disability</td>
<td>165</td>
</tr>
<tr>
<td>Other health impairment</td>
<td>205</td>
</tr>
<tr>
<td>Orthopedic impairment</td>
<td>74</td>
</tr>
<tr>
<td>Traumatic brain injury</td>
<td>62</td>
</tr>
<tr>
<td>Visual impairment including blindness</td>
<td>66</td>
</tr>
</tbody>
</table>

**Additional Designations**

<table>
<thead>
<tr>
<th>Classification</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Medically Fragile</td>
<td>66</td>
</tr>
<tr>
<td>Gifted/Intellectual Giftedness/Talented</td>
<td>11</td>
</tr>
</tbody>
</table>

*Note.* Parentheses contain respondents exclusively supporting the indicated classification.

The types of supports, typically provided to students prior to the pandemic, varied amongst respondents where a majority were delivered in more restrictive environments across educational settings. This was arranged into eight subgroupings, consisting of various student classification combinations, educational environments and support types, which is illustrated in Figure 4.6. There were 15 respondents that indicated the provision of services in private schools, exclusively for students with special needs, and eight disclosed providing services either in a medical or homebound setting, accounting for 8.2% of the sample. The majority of respondents provided services in the public school setting. A combined 67.2% of the sample provided supports in self-contained
environments across multiple service delivery designations, where 22.5% reported providing Autism Supports/Services (AS), 20.7% provided Life Skills Supports/Services (LSS), 20.4% supported students with multiple disabilities in conjunction with other complex needs designations, and 3.6% provided Emotional Supports/Services (ES). The remaining two subgroups AS/ES/LSS and Academic Push In/Pull Out offered resource room and inclusive supports in the least restrictive environment, representing a combined 24.6% of respondents.

**Figure 4.6**

*Support Type*

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**School Characteristics**

The characteristics of the typical school setting for respondents, prior to the pandemic, were defined by a series of demographic questions to gauge locale and allocated resources, including those for technologies. Seventy-six percent of the participants indicated their schools received Title I funding, 5.3% respondents indicated that they worked in a charter school, and 133 participants, or 46.7%, opted to disclose the
identity of their district, where 107 different named school districts were represented in the sample across the country. Figure 4.7 illustrates the school district locale designations as defined by the NCES (2019), where 35.4% of special educations teachers taught in a large city, 19.6% taught in a suburban setting, 14.3% taught in a midsize city, 13.2% taught in a rural setting, 11.8% taught in a small city setting, and 5.7% taught in a town setting. This sample compares to the national percentage distribution as reported across four aggregated locales where 13.2% of special educations teachers taught in a city, 11.9% taught in a suburban setting, 11.8% taught in a town, and 11.6% taught in a rural setting (NCES, 2019).

**Figure 4.7**

*School District Locale*

![School District Locale Chart]

Participants indicated whether they supported English Language Learners (ELL) and what percentage of their caseload contained ELL, which is shown in Figure 4.8. This spanned a range from 101 participants not supporting ELL which comprised of 36.1%, to
over 75% of students supported were ELL, representing 1.8% of the respondent sample. The largest subgrouping of 116 participants, accounting for 41.4% of the sample population, indicated less than 25% of students supported were ELL, 17.1% indicated supporting between 25-50% ELL, and 3.6% supported between 50-75% ELL.

Figure 4.8

*English Language Learners*

Participants responded to yes/no questions to gauge two aspects of a given school’s technological infrastructure, including student access to technology, and existing remote learning opportunities. Prior to the pandemic, 30.4% indicated their school’s offered online courses that students could attend in person, 16.8% indicated that their schools offered online courses remotely, and 14.2% offered both. Prior to the pandemic, 32.5% reported that their schools provided school issued devices to students for learning, known as a 1:1 computing or device initiative. During the pandemic, that figure increased
to 83.9% of the survey sample, which is depicted in Figure 4.9. Moreover, 80.7% reported that their schools participated in initiatives to promote or enhance internet connectivity for their students during the pandemic.

Figure 4.9

Technology Access Prior & During
Survey Group Item Means

Technological Perception Means

The C-SETS contained 42 items on a 5-point Likert scale that were rearranged into seven groupings, based on their alignment with the research questions for this study. The first grouping contained 10 items that were designed to measure specific construct elements within the primary research question:

*What was the perceived knowledge related to technology, pedagogy, and content, including the combinations of these domains, for K-12 special education teachers implementing emergency remote education during the COVID-19 pandemic?*

These items were designed to measure the application of skills related to respondents’ technological knowledge (TK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPACK), aligning with the sub research question:

*How much technological knowledge did special education teachers have during emergency remote education?*

The means and standard deviation of the 10 items in the Technological Perceptions group are presented in Table 4.2 and arranged in descending order. This grouping contained the two highest mean values in the entire data set, which were items that measured the utilization of videoconferencing technologies for small group or individual instruction ($M = 4.43, SD = 1.027$), and the ability to operate its components ($M = 4.41, SD = .875$). The lowest mean value of the group was for participants’ ability to guide students to utilize accessibility features for software programs, applications, and web-based content ($M = 2.98, SD = 1.184$).
All of the forthcoming item labels presented in the proceeding tables contain abbreviated wording of the questions, condensed for the purposes of presentation and visual analysis. Each item also contains an acronym for its corresponding domain within the TPACK model. Refer to Appendix D for the complete wording of each survey item as it was presented to the respondents. Note that the ordering of items were arranged by their classification within a given TPACK domain before being reordered online.

**Table 4.2**

**Technological Perception Means**

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video small group (TPK)</td>
<td>4.42</td>
<td>1.027</td>
</tr>
<tr>
<td>Videoconferencing (TPK)</td>
<td>4.41</td>
<td>.875</td>
</tr>
<tr>
<td>Learning system (TPK)</td>
<td>3.92</td>
<td>1.192</td>
</tr>
<tr>
<td>Computer skills (TK)</td>
<td>3.90</td>
<td>.991</td>
</tr>
<tr>
<td>Web program skills (TK)</td>
<td>3.77</td>
<td>1.103</td>
</tr>
<tr>
<td>Assessment online (TPK)</td>
<td>3.48</td>
<td>1.179</td>
</tr>
<tr>
<td>Resolve own issues (TK)</td>
<td>3.40</td>
<td>1.294</td>
</tr>
<tr>
<td>Special instruction (TPACK)</td>
<td>3.40</td>
<td>1.181</td>
</tr>
<tr>
<td>Technical support (TK)</td>
<td>3.07</td>
<td>1.241</td>
</tr>
<tr>
<td>Accessibility features (TPK)</td>
<td>2.98</td>
<td>1.184</td>
</tr>
</tbody>
</table>

*Note. Refer to Appendix D for survey item wording (Parentheses indicate TPACK Domain)*

**Instructional Perception Means**

This group contained five items associated with the survey respondents’ perceptions of their instructional practices during emergency remote education. These items were designed to measure the application of skills related to respondents’
pedagogical knowledge (PK), content knowledge (CK), pedagogical content knowledge (PCK), and TPACK. This aligned with two sub research questions:

*What was the pedagogical knowledge of K-12 special education teachers during emergency remote education?*

*What was the content knowledge of K-12 special education teachers during emergency remote education?*

The means of the Instructional Perceptions group are presented in Table 4.3, in descending order by value. The item with the highest mean was for how special education teachers perceived their effectiveness with planning and delivering specially designed instruction prior to the pandemic ($M=4.06$, $SD=1.062$).

**Table 4.3**

*Instructional Perception Means
5 Items of the C-SETS (N=280)*

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior effective plan/teach (PCK)</td>
<td>4.06</td>
<td>1.062</td>
</tr>
<tr>
<td>Teaching methodology (PK)</td>
<td>3.47</td>
<td>1.255</td>
</tr>
<tr>
<td>Core alternate standards (CK)</td>
<td>3.37</td>
<td>1.156</td>
</tr>
<tr>
<td>Universal Design Learning (TPACK)</td>
<td>3.13</td>
<td>1.149</td>
</tr>
<tr>
<td>Behavior interventions (PK)</td>
<td>3.07</td>
<td>1.289</td>
</tr>
</tbody>
</table>

*Note.* Refer to Appendix D for survey item wording (Parentheses indicate TPACK Domain)
Preparational Perception Means

Eight items contained within this component addressed the research question:

*To what extent were special education teachers provided adequate preparation, training and appropriate professional development to execute their responsibilities during emergency remote education?*

These items were designed to assess teacher preparation and gauge ongoing technical training, professional development and support during ERE. Items were drawn from all but one of the TPACK domains, technological pedagogical knowledge (TPK). Two items were designed specifically in response to the sub research question:

*Prior to the pandemic what training and professional development did special education teachers receive to prepare for online remote instruction?*

This grouping contained the lowest mean value of the entire dataset. Special education teachers indicated their perception that their school or district thoroughly outlined a scope and sequence for content that was delivered during the pandemic \((M=2.25, SD =1.144)\). Table 4.4 displays the means of the Preparational Perceptions group.

**Table 4.4**

*Preparational Perception Means*

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content scope and sequence (CK)</td>
<td>2.25</td>
<td>1.144</td>
</tr>
<tr>
<td>PD special education policies (PK)</td>
<td>2.50</td>
<td>1.312</td>
</tr>
<tr>
<td>PD teaching content during (PCK)</td>
<td>2.52</td>
<td>1.227</td>
</tr>
<tr>
<td>PD using technology to teach (TPACK)</td>
<td>2.74</td>
<td>1.322</td>
</tr>
</tbody>
</table>
Table 4.4 (continued)

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior training technology programs (TCK)</td>
<td>2.80</td>
<td>1.207</td>
</tr>
<tr>
<td>Technology training and PD (TK)</td>
<td>3.14</td>
<td>1.278</td>
</tr>
<tr>
<td>Administrative support (CK)</td>
<td>3.16</td>
<td>1.384</td>
</tr>
<tr>
<td>Prior PD teaching content (CK)</td>
<td>3.28</td>
<td>1.180</td>
</tr>
</tbody>
</table>

Note. Refer to Appendix D for survey item wording (Parentheses indicate TPACK Domain)

**Interactional Perception Means**

This grouping contained five items specifically designed to measure interactions with parents/caregivers and IEP team members relating to the research question:

*To what degree did special education teachers support, interact and communicate with colleagues, students with disabilities, and their caregivers during emergency remote education?*

The means for this grouping are reflected in Table 4.5 with the highest item mean for parent communication increased during the pandemic ($M=4.15$, $SD =1.094$).

Table 4.5

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent communication increased during (TPK)</td>
<td>4.15</td>
<td>1.094</td>
</tr>
<tr>
<td>Collaborated more IEP team prior (PK)</td>
<td>3.49</td>
<td>1.238</td>
</tr>
<tr>
<td>IEP team participation increased (TPK)</td>
<td>3.27</td>
<td>1.341</td>
</tr>
<tr>
<td>Collaborated more with IEP team (TPACK)</td>
<td>2.61</td>
<td>1.228</td>
</tr>
<tr>
<td>Parent communication more frequent prior (PK)</td>
<td>2.51</td>
<td>1.133</td>
</tr>
</tbody>
</table>

Note. Refer to Appendix D for survey item wording (Parentheses indicate TPACK Domain)
**Experiential Perception Means**

Four items gauged special education teacher stress, anxiety, and use of time for planning, teaching, and special education case management duties. These items addressed the research question:

*How did special education teachers perceive their experiences implementing emergency remote education, during the COVID-19 Pandemic?*

Three items were aligned to PCK and one was aligned to TPACK. Special education teachers indicated sacrificing more leisure time to plan for teaching tasks or special education case management duties during the pandemic ($M=4.24$, $SD=1.110$), and felt less stress or anxiety when planning and teaching content prior to pandemic ($M=4.04$, $SD=1.156$) which is depicted along with the other means in Table 4.6.

**Table 4.6**

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacrificed more leisure time (PCK)</td>
<td>4.24</td>
<td>1.110</td>
</tr>
<tr>
<td>Felt stress teaching (TPACK)</td>
<td>4.04</td>
<td>1.156</td>
</tr>
<tr>
<td>Less stress when planning prior (PCK)</td>
<td>4.02</td>
<td>1.244</td>
</tr>
<tr>
<td>Spent more time planning prior (PCK)</td>
<td>2.51</td>
<td>1.194</td>
</tr>
</tbody>
</table>

*Note.* Refer to Appendix D for survey item wording (Parentheses indicate TPACK Domain)

**Student Technological Access Perception Means**

Two TK and TCK items in this grouping measured student access to technology. Special education teachers indicated their perceptions for their students’ connectivity, access to a technological device, and if their students participated via cell phone. The means for this group are presented in Table 4.7.
Table 4.7

Student Technological Access Perception Means

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to a technological device (TCK)</td>
<td>3.74</td>
<td>1.262</td>
</tr>
<tr>
<td>No internet access (TK)</td>
<td>3.03</td>
<td>1.618</td>
</tr>
<tr>
<td>Participation via cell phone (TCK)</td>
<td>3.02</td>
<td>1.606</td>
</tr>
<tr>
<td>No access to a technological device (TK)</td>
<td>2.88</td>
<td>1.504</td>
</tr>
</tbody>
</table>

Note. Refer to Appendix D for survey item wording (Parentheses indicate TPACK Domain)

Innominate Item Means

Six remaining items were not classified within the previous groupings as they were designed to measure certain characteristics that did not have component loadings, when dimension reduction procedures were performed, as reported in the next section. One item measured parental/care giver support ($M=2.80$, $SD=1.243$). Another measured special education teacher identifying and selecting content for their students during the pandemic ($M=4.41$, $SD=.829$).

Two TCK items measured the utilization of web-based content platforms, and one item gauged special education teachers’ knowledge of the adjusted policies and procedures for special education case management. The final survey item was designed to respond to the sub research question:

*What aspects derived from the methodical use of technology to teach content during emergency remote education will special education teachers apply to future practices?*

This item aligned with the TPACK domain and asked special education teachers to indicate their perception for: *I learned something from remotely teaching content*
online with technology that I will use in my future practices for in person learning (M=4.24, SD=1.046). Innominate Item Means are summarized in Table 4.8. An optional open-ended response proceeded this final item on the questionnaire with the prompt:

*Please provide details or additional comments about any aspect(s) from remotely teaching content online with technology, that you may utilize in your FUTURE practices. Additionally, please feel free to describe interactions with any stakeholder(s) and/or any other thoughts you may be willing to share from your experiences during the COVID-19 Pandemic.*

This was completed by 117 respondents (41.7%). An informal analysis will be presented in the final section of this chapter, with samples of special education teachers’ perceptions of their experiences arranged into collective themes for further analysis.

**Table 4.8**

**Innominate Item Means**

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent/caregiver technology support for students (TPK)</td>
<td>2.80</td>
<td>1.243</td>
</tr>
<tr>
<td>Understood adjusted IEP policies and procedures (PK)</td>
<td>3.59</td>
<td>1.221</td>
</tr>
<tr>
<td>Students utilized technology intervention programs (TCK)</td>
<td>3.22</td>
<td>1.477</td>
</tr>
<tr>
<td>Utilized an online learning platform (TCK)</td>
<td>3.95</td>
<td>1.399</td>
</tr>
<tr>
<td>Had to identify and select content for students (CK)</td>
<td>4.41</td>
<td>.829</td>
</tr>
<tr>
<td>Learned from remote teaching for future practices (TPACK)</td>
<td>4.24</td>
<td>1.046</td>
</tr>
</tbody>
</table>

*Note. Refer to Appendix D for survey item wording (Parentheses indicate TPACK Domain)*
Inferential Analyses

Principal Components Analysis

Component Group Results

A principal components analysis (PCA) was conducted on the C-SETS to reduce the dimensions of the dataset into significantly correlated components for further analysis, following the procedures of Sahin (2011) and Schmidt et. al. (2009) when testing a TPACK survey for validity and reliability. A PCA was performed on six of the seven groupings presented in the previous section, to test these variable groupings. The parameters set for this analysis required factor extractions based on eigenvalues greater than 1 and component coefficient loadings greater than .5 (Koh et al., 2012). A Varimax rotation was used on analyses that extracted more than one component, permitting the option to produce more simplified solution structures. A correlation matrix was generated for each solution revealing significant values within each component which is presented in Appendix E.

Technological Perception PCA. The Technological Perception grouping resulted in two components loading, using a varimax rotation. Table 4.9 contains the results of this analysis where each item is listed along with the component loadings. A two component solution without rotation extracted values ranging .572-.731 and accounted for less of the component variance. The two component solution with a Varimix rotation accounted for 55.36%, of the variance, with factor loadings ranging from .531-.877.
Table 4.9

Technological Perception Principal Components Analysis
10 items of the C-SETs (N=280)

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Component Loading 1</th>
<th>Component Loading 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video small group (TPK)</td>
<td>.567</td>
<td></td>
</tr>
<tr>
<td>Videoconferencing (TPK)</td>
<td>.656</td>
<td></td>
</tr>
<tr>
<td>Learning system (TPK)</td>
<td>.531</td>
<td></td>
</tr>
<tr>
<td>Computer skills (TK)</td>
<td></td>
<td>.877</td>
</tr>
<tr>
<td>Web program skills (TK)</td>
<td></td>
<td>.871</td>
</tr>
<tr>
<td>Assessment online (TPK)</td>
<td>.724</td>
<td></td>
</tr>
<tr>
<td>Resolve own issues (TK)</td>
<td></td>
<td>.749</td>
</tr>
<tr>
<td>Special instruction (TPK)</td>
<td>.688</td>
<td></td>
</tr>
<tr>
<td>Technical support (TK)</td>
<td>.575</td>
<td></td>
</tr>
<tr>
<td>Accessibility features (TPK)</td>
<td>.757</td>
<td></td>
</tr>
</tbody>
</table>

Note. Refer to Appendix D for survey item wording (Parentheses indicate TPACK Domain)

Instructional Perception PCA. Results for this group are presented in Table 4.10.

The component loadings ranged from .565-.812, and there was no rotation because this was a one component solution with only a single factor with an eigenvalue over one. This applies to the subsequent components with one loading. A previous solution was performed with the item: Had to identify and select content for students, which was excluded from being included with this component as it had a factor loading less than .5. This was also the case for the next grouping with this item.
## Table 4.10

*Instructional Perception Principal Components Analysis*

5 items of the C-SETS (N=280)

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Component Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior effective plan/teach (PCK)</td>
<td>.565</td>
</tr>
<tr>
<td>Teaching methodology (PK)</td>
<td>.756</td>
</tr>
<tr>
<td>Core Alternate Standards (CK)</td>
<td>.744</td>
</tr>
<tr>
<td>Universal Design Learning (TPACK)</td>
<td>.812</td>
</tr>
<tr>
<td>Behavior interventions (PK)</td>
<td>.590</td>
</tr>
</tbody>
</table>

*Note.* Refer to Appendix D for survey item wording (Parentheses indicate TPACK Domain)

**Preparational Perception PCA.** This group had seven items ranging from .635-.810 as presented in Table 4.11.

## Table 4.11

*Preparational Perception Principal Components Analysis*

8 items of the C-SETS (N=280)

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Component Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD using technology to teach (TPACK)</td>
<td>.809</td>
</tr>
<tr>
<td>PD teaching content during (PCK)</td>
<td>.805</td>
</tr>
<tr>
<td>Technology training and PD (TK)</td>
<td>.728</td>
</tr>
<tr>
<td>Content scope and sequence (CK)</td>
<td>.685</td>
</tr>
<tr>
<td>Prior PD teaching content (CK)</td>
<td>.658</td>
</tr>
<tr>
<td>Administrative support (CK)</td>
<td>.638</td>
</tr>
<tr>
<td>Prior training technology programs (TCK)</td>
<td>.630</td>
</tr>
<tr>
<td>PD special education policies (PK)</td>
<td>.590</td>
</tr>
</tbody>
</table>

*Note.* Refer to Appendix D for survey item wording (Parentheses indicate TPACK Domain)
**Interactional Perception PCA.** This was a two component loading, where the unrotated solution had a range .500-.754 on a single component and the rotated solution produced higher values across four variables with a range .368-.838 across two components. Results for this group are reflected in Table 4.12 where the two component solution accounted for 61.07% of the variance explained. The item collaborated more with IEP team prior to the pandemic was included in this component because it increased the alpha value which is reported in Table 4.15.

**Table 4.12**

*Interactional Perception Principal Components Analysis*  
5 items of the C-SETS (N=280)

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Component Loading 1</th>
<th>Component Loading 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent communication increased during (TPK)</td>
<td>.836</td>
<td></td>
</tr>
<tr>
<td>Collaborated more IEP team prior (PK)</td>
<td>.368</td>
<td></td>
</tr>
<tr>
<td>IEP team participation increased (TPK)</td>
<td>.760</td>
<td></td>
</tr>
<tr>
<td>Collaborated more with IEP team (TPACK)</td>
<td>.838</td>
<td></td>
</tr>
<tr>
<td>Parent communication more frequent prior (PK)</td>
<td>.881</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Refer to Appendix D for survey item wording (Parentheses indicate TPACK Domain)

**Experiential Perception PCA.** Results for this group are reflected in Table 4.13. The component loadings ranged from .582-.786, and there was no rotation because this was a one component solution with 45.71% of the variance explained for this component.
Table 4.13

Experiential Perception Principal Components Analysis
4 Items of the C-SETS (N=280)

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Component Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacrificed more leisure time (PCK)</td>
<td>.743</td>
</tr>
<tr>
<td>Felt stress teaching (TPACK)</td>
<td>.768</td>
</tr>
<tr>
<td>Less stress when planning prior (PCK)</td>
<td>.590</td>
</tr>
<tr>
<td>Spent more time planning prior (PCK)</td>
<td>.582</td>
</tr>
</tbody>
</table>

Note. Refer to Appendix D for survey item wording (Parenthesis indicate TPACK Domain)

**Student Technological Access Perception PCA.** The loadings for this one component solution ranged from .607-.790, and there was no varimax rotation. Results for this group are reflected in Table 4.14 where the percentage of variance explained was 50.12%.

Table 4.14

*Student Technological Access Perception Principal Components Analysis
4 Items of the C-SETS (N=280)*

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Component Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>No internet access (TK)</td>
<td>.790</td>
</tr>
<tr>
<td>Access to a technological device (TCK)</td>
<td>.735</td>
</tr>
<tr>
<td>No access to a technological device (TK)</td>
<td>.688</td>
</tr>
<tr>
<td>Participation via cell phone (TCK)</td>
<td>.607</td>
</tr>
</tbody>
</table>

Note. Refer to Appendix D for survey item wording (Parentheses indicate TPACK Domain)
Component Correlations

A correlation matrix was generated with each solution of the PCA. The Pearson’s correlation coefficients within each component matrix contained correlated \( r \) values where coefficients above \( .1 \) were considered significant. The criteria utilized for interpreting the strength of the correlation for the absolute value of \( r \) was \( 0.00 - 0.10 \) indicating a negligible relationship, \( 0.10 - 0.39 \) a weak correlation, \( 0.40 - 0.69 \) a moderate correlation, \( 0.70 – 0.89 \) a strong correlation, and \( 0.90-1.00 \) a very strong correlation (Schober, Boer, & Schwarte, 2018). The component correlation matrices tables can be viewed in Appendix E.

Reliability Testing

A value for Cronbach’s alpha coefficient was calculated for internal consistency on each of the six identified components from the PCA. Values were interpreted where \( \alpha < 0.5 \) was unacceptable, \( 0.5 < \alpha > 0.6 \) poor, \( 0.6 < \alpha > 0.7 \) questionable, \( 0.7 < \alpha > 0.8 \) acceptable, \( 0.8 < \alpha > 0.9 \) good, and \( \alpha > 0.9 \) is excellent (George & Mallery, 2003).

Table 4.15 contains a summary of the solutions performed for inter-item reliability across these groupings. Preparational and Technological Perceptions produced two reliable components that were good, Instructional Perception had an acceptable value, Technology Access Perception had a questionable value, and both Experiential Perception and Interactional Perception were on the cusp of having questionable values.

Component Summary

An exploratory inquiry was performed on 36 rearranged C-SETS items aligned to address the research questions of this study, in order to determine the internal validity and reliability of the constructs based on the component loadings and correlations. Table 4.15
represents a summary of these findings which includes the PCA ran across these groupings, the number of survey items per component, number of loadings, percentage of variance explained, and reliability testing values.

Table 4.15

<table>
<thead>
<tr>
<th>Component Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Component</strong></td>
</tr>
<tr>
<td>Technological Perception</td>
</tr>
<tr>
<td>Preparational Perception</td>
</tr>
<tr>
<td>Instructional Perception</td>
</tr>
<tr>
<td>Technological Access Perception</td>
</tr>
<tr>
<td>Experiential Perception</td>
</tr>
<tr>
<td>Interactional Perception</td>
</tr>
</tbody>
</table>

Post Hoc Mean Comparisons

A one-way analysis of variance (ANOVA), was employed to determine if there were any statistically significant differences between the item means of a given component and combinations of two or more independent variables (Brady et al., 2015; Emerson, 2017; Thompson et al., 1999). These analyses were conducted in response to a post hoc question:

*Were there any significant differences in the survey responses based on the demographic characteristics of special education teachers?*

All of the independent variables were classified into two demographic characteristic categories and not tested as composites. Eight Respondent Characteristics (RC) were tested: gender, age, race/ethnicity, years of experience, educational attainment,
grade(s) taught, disability classification(s) of students, and support type. Seven School Characteristics (SC) were tested: Title I funded, school locale, charter school, supported English Language Learners (ELL), participation in a 1:1 computing/device initiative prior to the pandemic, participation in a 1:1 computing/device initiative during the pandemic, and, participation in a connectivity initiative during the pandemic.

A Tukey’s Honestly Significant Differences (HSD) post hoc analysis was performed on tests with three or more independent variables to determine which groups were statistically different. All of the components were tested and additional comparisons of means testing were conducted on significantly correlated items of the innominate items. ANOVA effect sizes were interpreted using the eta-squared value, where $\eta^2 = 0.01$ indicated a small effect, $\eta^2 = 0.06$ indicated a medium effect, and $\eta^2 = 0.14$ indicated a large effect (Lakens, 2013).

Significant results for RC and SC are reported in a series of tables below, where all seven SC independent variables produced 58 of the 63 significant differences across all of the components and three innominate items. Table 4.16 represents the ANOVA results for RC, where only one of the eight independent variables yielded significant values from one of the six components. Five significant differences within three items were observed of the educational attainment variable across special education teachers with bachelor’s, master’s and multiple advanced degrees. The corresponding TPACK domain labels for the survey items were not included in the proceeding ANOVA tables.
Table 4.16
One-Way Analyses of Variance for Educational Attainment in Technological Perception

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Bachelor’s</th>
<th>Master’s</th>
<th>Multi Adv</th>
<th>F(2,277)</th>
<th>η2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Video small group</td>
<td>4.09</td>
<td>1.215</td>
<td>4.56</td>
<td>.916</td>
<td>5.039*</td>
</tr>
<tr>
<td>Assessment online</td>
<td>3.09</td>
<td>1.300</td>
<td>3.59</td>
<td>1.135</td>
<td>4.855*</td>
</tr>
<tr>
<td>Technical support</td>
<td>2.79</td>
<td>1.213</td>
<td>3.51</td>
<td>1.171</td>
<td>5.520*</td>
</tr>
<tr>
<td>Technical support</td>
<td>3.04</td>
<td>1.243</td>
<td>3.51</td>
<td>1.171</td>
<td>5.520*</td>
</tr>
</tbody>
</table>

*p<.05: Multiple Advanced Degrees = (Multi Adv) Refer to Appendix D for survey item wording

Significant differences across six SC variables were observed. Table 4.17 represents ANOVA results comparing schools that did or did not receive Title I funding.

Table 4.17
One-Way Analyses of Variance for Title I Funding

<table>
<thead>
<tr>
<th>Survey Item by Component</th>
<th>Yes Title I</th>
<th>No Title I</th>
<th>F(1,278)</th>
<th>η2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Technological Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer skills</td>
<td>3.69</td>
<td>1.131</td>
<td>4.01</td>
<td>.977</td>
</tr>
<tr>
<td>Preparational Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior PD teaching content</td>
<td>2.88</td>
<td>1.209</td>
<td>2.55</td>
<td>1.240</td>
</tr>
<tr>
<td>Experiential Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More time planning prior</td>
<td>3.40</td>
<td>1.242</td>
<td>3.79</td>
<td>.978</td>
</tr>
<tr>
<td>Technological Access Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No internet access</td>
<td>3.15</td>
<td>1.603</td>
<td>2.64</td>
<td>1.621</td>
</tr>
</tbody>
</table>

*p<.05: Note. Refer to Appendix D for survey item wording
Table 4.18 represents the ANOVA results across school district locales, where 3 significant differences occurred between large city and rural school districts, and one difference between small city and midsize city school districts.

### Table 4.18

*One-Way Analyses of Variance for School District Locale*

<table>
<thead>
<tr>
<th>Survey Item by Component</th>
<th>Large City</th>
<th>Rural</th>
<th>F(5,274)</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Instructional Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core alternate standards</td>
<td>3.58</td>
<td>1.107</td>
<td>2.95</td>
<td>1.393</td>
</tr>
<tr>
<td>Preparational Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology training and PD</td>
<td>3.43</td>
<td>1.188</td>
<td>2.65</td>
<td>1.358</td>
</tr>
<tr>
<td>Content scope and sequence</td>
<td>2.54</td>
<td>1.172</td>
<td>1.86</td>
<td>.787</td>
</tr>
<tr>
<td>Innominant Items</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understood adjusted IEP policies and procedures</td>
<td>3.15</td>
<td>1.252</td>
<td>3.97</td>
<td>1.045</td>
</tr>
</tbody>
</table>

*p<.05: Note. Refer to Appendix D for survey item wording*

Table 4.19 represents the ANOVA results for special education teachers who taught at charter schools, where 3 significant differences were observed.
Table 4.19

*One-Way Analyses of Variance for Charter Schools*

<table>
<thead>
<tr>
<th>Survey Item by Component</th>
<th>Yes Charter</th>
<th>No Charter</th>
<th>F(1,278)</th>
<th>η2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Preparational Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PD Special Ed procedures</td>
<td>3.33</td>
<td>1.447</td>
<td>2.45</td>
<td>1.290</td>
</tr>
<tr>
<td>Experiential Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More time planning prior</td>
<td>3.33</td>
<td>1.113</td>
<td>2.46</td>
<td>1.184</td>
</tr>
<tr>
<td>Technological Access Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participation via cell phone</td>
<td>3.87</td>
<td>1.060</td>
<td>2.97</td>
<td>1.620</td>
</tr>
</tbody>
</table>

*p<.05: Note. Refer to Appendix D for survey item wording

Table 4.20 represents the ANOVA results for special education teachers who taught English Language Learners compared to those who did not, where two significant differences were reported.

Table 4.20

*One-Way Analyses of Variance for Schools with English Language Learners*

<table>
<thead>
<tr>
<th>Survey Item by Component</th>
<th>Between 25-50% ELL</th>
<th>Less Than 25% ELL</th>
<th>Did Not Support ELL</th>
<th>F(4,275)</th>
<th>η2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Technological Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special instruction</td>
<td>2.92</td>
<td>1.412</td>
<td>3.66</td>
<td>1.071</td>
<td></td>
</tr>
<tr>
<td>Tech Access Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participation via cell</td>
<td>3.32</td>
<td>1.530</td>
<td>2.61</td>
<td>1.618</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05: Note. Refer to Appendix D for survey item wording
Table 4.21 represents the ANOVA results for schools that participated in 1:1 computing/device initiatives prior to the pandemic compared to those that did not. Eight significant differences across four components are presented.

**Table 4.21**

*One-Way Analyses of Variance for School Participation in a 1:1 Computing/Device Initiative Prior to the Pandemic*

<table>
<thead>
<tr>
<th>Survey Item by Component</th>
<th>Yes 1:1 Device Prior</th>
<th>No 1:1 Device Prior</th>
<th>F(1,278)</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Technological Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment online</td>
<td>3.71</td>
<td>1.118</td>
<td>3.36</td>
<td>1.193</td>
</tr>
<tr>
<td>Accessibility features</td>
<td>3.22</td>
<td>1.133</td>
<td>2.87</td>
<td>1.193</td>
</tr>
<tr>
<td>Instructional Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core alternate standards</td>
<td>3.63</td>
<td>1.132</td>
<td>3.24</td>
<td>1.150</td>
</tr>
<tr>
<td>Preparational Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PD teaching content during</td>
<td>2.74</td>
<td>1.272</td>
<td>2.41</td>
<td>1.194</td>
</tr>
<tr>
<td>Content scope and sequence</td>
<td>2.53</td>
<td>1.139</td>
<td>2.12</td>
<td>1.126</td>
</tr>
<tr>
<td>PD using technology to teach</td>
<td>2.97</td>
<td>1.370</td>
<td>2.62</td>
<td>1.288</td>
</tr>
<tr>
<td>Prior training technology</td>
<td>3.10</td>
<td>1.283</td>
<td>2.66</td>
<td>1.145</td>
</tr>
<tr>
<td>Technological Access Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to a tech device</td>
<td>3.98</td>
<td>1.211</td>
<td>3.62</td>
<td>1.273</td>
</tr>
</tbody>
</table>

*p<.05: Note. Refer to Appendix D for survey item wording
Table 4.22 represents the ANOVA results for schools that participated in 1:1 computing/device initiatives during the pandemic compared to those schools that did not. Twenty-four significant differences across four components and three innominate means produced the highest number of values of the independent variables in this study. All 10 items of the Technological Perception component contained significant mean differences. This variable also yielded the highest amount of items across the three other components and the innominate items grouping.

**Table 4.22**

*One-Way Analyses of Variance for School Participation in a 1:1 Computing/Device Initiative During to the Pandemic*

<table>
<thead>
<tr>
<th>Survey Item by Component</th>
<th>Yes 1:1 Device During M</th>
<th>Yes 1:1 Device During SD</th>
<th>No 1:1 Device During M</th>
<th>No 1:1 Device During SD</th>
<th>F(1,278)</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technological Perception</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer skills</td>
<td>3.97</td>
<td>.940</td>
<td>3.51</td>
<td>1.160</td>
<td>8.318*</td>
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<td>1.137</td>
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<td>1.248</td>
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<td>Video small group</td>
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<td>.016</td>
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<td>Resolve own issues</td>
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<td>Videoconferencing</td>
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<td>4.04</td>
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Table 4.22 (continued)

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<tr>
<th>Survey Item by Component</th>
<th>Yes 1:1 Device During</th>
<th>No 1:1 Device During</th>
<th>( F(1,278) )</th>
<th>( \eta^2 )</th>
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<td>( M )</td>
<td>( SD )</td>
<td>( M )</td>
<td>( SD )</td>
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<td>Technological Access Perception</td>
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<td>Access to a tech device</td>
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<td>Innominate Items</td>
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<td>Tech intervention programs</td>
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<tr>
<td>Understood adjusted IEP policies and procedures</td>
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<td>Online learning platform</td>
<td>4.07</td>
<td>1.319</td>
<td>3.36</td>
<td>1.654</td>
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</tbody>
</table>

*p < .05: Note. Refer to Appendix D for survey item wording

Table 4.23 represents the ANOVA results for schools that participated in connectivity initiatives during the pandemic compared to those that did not. Thirteen significant differences across four components and three innominate means are shown.
Table 4.23

One-Way Analyses of Variance for School Participation in a Connectivity Initiative During the Pandemic

<table>
<thead>
<tr>
<th>Survey Item by Component</th>
<th>Yes Connectivity During</th>
<th>No Connectivity During</th>
<th>F(1,278)</th>
<th>η2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
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<tr>
<td>Technological Perception</td>
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<tr>
<td>Assessment online</td>
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<td>1.147</td>
<td>3.15</td>
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<td>3.06</td>
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<td>Preparational Perception</td>
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<tr>
<td>Prior PD teaching content</td>
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<td>Prior training tech programs</td>
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<td>IEP team collaboration prior</td>
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<td>IEP participation increased</td>
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<tr>
<td>Technological Access Perception</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Access to a tech device</td>
<td>3.84</td>
<td>1.237</td>
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<td>Innominate Items</td>
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<td>Tech intervention programs</td>
<td>3.31</td>
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<td>Online learning platform</td>
<td>4.06</td>
<td>1.348</td>
<td>3.50</td>
<td>1.526</td>
</tr>
</tbody>
</table>

*p<.05: Note. Refer to Appendix D for survey item wording
Open-Ended Response

The final item on the survey was an optional open-ended response to a prompt related to the last question asking participants to reflect on their experiences and describe what aspects of teaching remotely with technologies they may apply in future practices. An informal analysis was employed to organize responses based on the themes that aligned with the constructs for interpretation in order to establish the collective perspectives among the respondents (Creswell, 2012). A sample of the responses are presented, and a complete list of the open-ended responses can be viewed in Appendix F. All identifying information was removed for this analysis to maintain anonymity of responses and is not included in the appendix.

One hundred seventeen responses were arranged for informal analysis using Microsoft Word and Excel. The find feature in word was utilized to identify the higher frequency of certain words that may be affiliated with the constructs or survey domains. Clustering of words indicated certain tropes, though some were applied to more than one context. After reviewing each response, several sub themes emerged that aligned with the research questions, TPACK model, and the components that were validated by the PCA. The sub themes were: parental involvement, communication, student participation, internet access, other technology issues, digital competency, instructional practices using technologies across a variety of platforms, student engagement, environmental factors domestically and district wide, technology access, social emotional expression, training/PD, and future practices. Respondents offered a range of perspectives, recounting their experiences and sharing their perspective as they related to specific aspects or combinations of these sub theme elements. These interrelated elements have
been combined into seven overarching themes: technological issues, parent involvement, student engagement, instructional practices using technologies, preparation, social emotional expression, and future practices.

**Technological issues**

Issues with technology involved access to devices, internet, and digital competency. The word technology appeared 26 times, access 21 times, and combinations of, internet, connect(ion/ivity) as it relates to technology, Wi-Fi, and hotspot appeared 21 times.

During the March 2020 shutdown my students didn't have access to technology. Our area is economically poor. Many did not or could not access internet service. If internet service could be accessed, technology such as computers, chrome books, laptops were not available. Parental support was not always forthcoming. Our children suffered greatly educationally during this time. There were issues with internet or hot spot connections. At times a student would have to use one of his parents iPhones to connect.

Other teachers offered a different perspective:

Our Community Outreach office did an excellent job ensuring students had laptops and they even worked with Comcast to get some families access to Wi-Fi. All of my students were supplied with an iPad and internet during the pandemic. The school system I work for provided chrome books and hotspots for students that did not have internet and ways to participate with remote learning.

Digital competency was a common theme where respondents expressed that a lot of their students were unable to access educational activities as a result:

The primary impediment to my instruction online during the pandemic was that most students lacked any computer skills and could not understand vocal directions to engage with content. My students were not able to operate their Chromebooks on their own and relied on the support from their parents at home. They also had difficulty using [the] computer to go from one platform to another.
Whereas another respondent shared: “We already used 1-to-1 iPad technology with easily-adaptable reading assignments”

**Parental Involvement**

Aside from the word “student,” which appeared 126 times across responses, the word “parent” was next highest frequency word with 63 appearances and two for caregiver. Different sub themes emerged from teachers expressing various perspectives from increased communication, parent participation, and support, to a lack of support from parents due to other responsibilities or shortfalls with digital competencies to offer guidance. Composited segments of responses illustrate these ranging perceptions. For increased participation and communication:

> Communication is key throughout all aspects of teaching, So many problems were solved and avoided when I talked with parents. I was usually in contact with parents weekly. I did communicate more with my parents either by phone, email, or even in zoom. I know so much more about my student home situations (good and bad). It brought me to have a better relationship with the families.

For IEP meetings:

> Parent correspondence/attendance to meetings are quicker online, I was able to get parents to attend virtual IEPs online easier. I want to continue to use zoom as an option for IEP meetings to increase parent participation. Some parents seemed more engaged and actually attended meetings because they were able to be phone conferenced in, as opposed to having to come into the school building.

Other responses expressed challenges with support and competency:

> Some parents were very difficult to get ahold of due to their demanding work schedules. Many parents did not take remote learning seriously. My students’ parents struggled with having their child on all day and having to assist them. Many didn’t know how to operate an iPad.
Other participants shared:

I teach students with severe/profound needs. The parents didn’t realize all that their students were capable of when we worked together as a team. I had families who joined in and supported adapting surroundings and helping students become more engaged, successful, & accountable. [I] develop[ed] stronger relationships with families and to give them ideas of how to work with their children. All in all I think the parents and students did the best they could but it was a difficult situation in which to teach.

**Student Engagement**

A series of environmental, technological, and functional factors perceived by special education teachers to have impacted student engagement:

My students had difficulty in sitting in front of the computer and staying focused. Some of my students would literally get up and leave the computer. The biggest obstacle was getting students to join the Google Meets and participating in class. My students also do not attend to a screen for long periods of time.

[A] majority of the time there were TVs on, siblings and parents interrupting, video games being played etc. with their attention elsewhere or distracted. I felt like I was not helping them at all. The noise level and distractions they had to try to filter out was relentless and overwhelming for most. I work...in a heavily Hispanic population. Blended families might reside in one home or apartment so finding a quiet space was also a major problem.

My students focus for 10-20 minutes, then need a break. Virtual learning was horrible for the low functioning autism or ID students. some students...could not participate at all when we were teaching remotely, complete work, or use Google Classroom. My students are unable to access tech without assistance...I have MD/VI/Blind and Deafblind students. Because I teach medically fragile/ severe/ profound, technology is NOT how you teach this population. We tried all kinds of things, but it just wasn’t a good situation.
**Technological Instructional Practices**

Participants shared about their experiences using technologies for instructional purposes. There were a lot of interrelated aspects from the aforementioned themes. Some responses expressed different hardships, and others provided positive accounts of what was effective:

The technology I was given to teach from was inadequate for what I needed. We were also expected to simultaneously teach remote learners and in person learners at the same time. Training parents of students with severe disabilities on resolving technological issues and supporting me to perform mandatory assessments was an ongoing struggle.

Most teachers spent their own money to buy iPads and pencils to teach, so students could effectively see problems worked out on their screen. I learned how to write with a mouse but took additional time to make it legible. I created most of my own activities and spent hours researching ways to help my students learn new material and work in IEP goals.

I learned that less can mean more during online teaching. I used lots of slideshows and more effectively used Schoology to make things accessible to students. I also used apps like Notability and interactive games. I often made how to videos with step by step instructions.

**Preparation**

Below is a sample of responses regarding training and professional development:

I was not offered any training on how to use technology or virtual platforms. PD... was a joke... and asynchronous so they didn’t help much at the district level. All the PDs at the school level were for the regular education teachers. So while they can say they offered trainings, they weren’t very useful. I learned more from YouTube and Tik Tok than I did from my district.

There was only special education training regarding virtual ARD procedures and verbiage for IEPs during a virtual setting. No information on how to TEACH special education students from home. Quite a challenge.
We were given an online platform... promised formal training but the professionals were not able to work us into their schedule and we started the school year blind. They ended up putting a self-paced learning guide...for us to use. Teachers were so overwhelmed with everything else many didn’t complete the training.

**Social Emotional Expression**

There were a variety of responses that conveyed the emotions of the respondents as they recalled their experiences. There were minimal positive comments, some of which were presented and others pertaining to future applications. A majority of the comments related to words such as: difficult, stress, hard, mental health, tired, frustrated, overwhelmed, and struggle(d), appearing 32 times across the responses:

Teaching did not go well in March 2020 when we had to quickly go to distance learning. Many of our students didn’t have internet, or parents worked so they couldn’t come on my zoom meetings during the day...Consequently, I was "working from 8 am until 10 pm.

Teaching virtually was the hardest thing that I had ever done. I spent endless hours planning lessons and doing daily logs every day. [It] was a constant struggle. I felt uncomfortable with technology even though I had more training than most older teachers.

It was stressful trying to troubleshoot problems with logging into programs... Documentation of services was extremely stressful and difficult to keep up with. I saw students fall behind during the pandemic. Some students found themselves at risk due to abuse and poverty, heightened by pandemic stress. This cannot happen again.

Teaching during the pandemic was extremely stressful for me. It didn’t appear to me that staff and their mental health was important to administration. Many teachers were [not] well during the pandemic and no one seemed to care!

Overall I feel we as a school really did our best, but again there were a lot of both positive and negative experiences through the last year.
**Future Practices**

This last theme was directly linked to the prompt of the open-ended question and final survey question: *I learned something from remotely teaching content online with technology that I will use in my future practices for in person learning.*

“I now plan to use online resources that I didn't know about prior to the pandemic. Boom Cards, Pink Cat Games, and Education.com have great resources that can help these students practice their skills at home with their parents.”

I will utilize Nearpod for my future classes. It's a great online tool. I didn't use so many online tools in my teacher life than last school year, during the pandemic. I had to use my private time to learn how to use everything online.

I want to continue to use zoom as an option for IEP meetings to increase parent participation.

I have a better understanding of Google Classroom, Zoom and Google Meet. I will continue to use the aforementioned platforms during my professional career.

I did develop a virtual classroom that I will continue to use. My morning meeting slides and videos will be used in the future.”

The use of BOOM cards was beneficial for students in the classroom to reinforce skills learned. These same students then became familiar with the program to use during virtual days to continue practicing learned skills.

I will continue to use Remind messaging, Canvas assignments & Zoom for additional ways to engage with parents and students.

My school district was not a 1:1 computer device district prior to COVID-19. Post pandemic we will remain a 1:1 device district so students will be able to learn more computer skills and tech. I will use Flipgrid and Nearpod in my future practice.
Open-Ended Response Summary

The open-ended responses provided a real world reflection, personifying many of the measured elements within the constructs of the C-SETS instrument. Participants offered a range of perspectives based on the perceptions of their experiences teaching remotely during the COVID-19 pandemic. These informal analytic results are synthesized in the next section for an interpretation of how the data responded to the research questions of this study. A discussion will be presented on the implications for the field including how these findings comport with previous research, what limitations emerged from this study, and what the recommendations are for both future best practices and inquiry.
CHAPTER 5
DISCUSSION

Review

The aim of this study was to ascertain the collective perceptions of K-12 special education teachers’ experiences teaching remotely with technology during the COVID-19 pandemic. This was for the purpose of informing future teacher preparation programming, technical training, professional development, and a host of best practices. Based on the data that were collected and analyzed, the interpretations of these results demonstrated that all of the research questions have been satisfied with critical implications. Special education teachers demonstrated a range of technical knowledge and skills during Emergency Remote Education (ERE) but lacked preparation with technical training and ongoing professional development for remote pedagogies, content planning and a range of special education practices. Parent communication increased, while collaboration with IEP team members decreased. Special education teachers reported sacrificing leisure time by spending more time planning, while encountering emotions of stress and anxiety. Student access to technologies was one of the significant impediments for engagement which correlated with Title 1 funded and under-resourced districts. Engagement also was impacted by a lack of student digital competency, caregiver support at home, and other environmental factors e.g., distractions from other household members or availability of preferred items in the home setting. Several of the special education teachers’ school characteristics produced multiple significant differences in responses, where only the respondent characteristic of educational attainment revealed a small number of differences.
Special education teachers reported convincingly that they will apply a skill or aspect that they learned using technologies during ERE to their future practices. The implications based on interpretations of these results are outlined along with how they relate to previous research. Recommendations for best practices are presented and then limitations are discussed proceeded by recommendations for future research. A brief summary of ‘how we got here’ is necessary to set the stage for the process of interpreting the results.

**Study Foundation**

At the onset of the global pandemic in 2020, millions of educators worldwide confronted an unexpected endeavor to conduct educational activities remotely. Most were not prepared for this juxtaposition to using technologies for instructional delivery. Special education teachers particularly confronted a unique set of complexities when striving to serve the unique needs of diverse learners. In the United States, K-12 special educators were thrust into the act of providing ERE with little time to prepare, limited resources, indeterminate programming, and distant support. Eighteen months later, 280 special education teachers from across the country shared their experiences by participating in this study to address the overarching question:

*What were the collective perceptions of emergency remote education for K-12 special education teachers during the COVID 19 pandemic?*

**Research Design**

In order to answer this and other targeted research questions, a survey was developed to measure various aspects of these experiences. The aim was to gauge how teachers perceived their technical skills, instructional delivery, overall preparation,
including on-going professional development (PD), administrative support, interactions with stakeholders, social emotional well-being, perceptions of student access to necessary and sufficient technologies for engagement, knowledge of pandemic special education case management policies and procedures, and perhaps most importantly, what teachers may have learned or utilized that they would apply in future practices.

This survey was designed to measure each of these constructs by adapting existing validated measures that could target these items into measurable units of analysis (Koh et al., 2012; Sahin, 2011; Schmidt et al., 2009). Central to this pandemic educational construct, the utilization of technologies in the ERE context was the catalyst to explore the field of Educational Technology (ET) research. An exhaustive review of the literature, which included an in depth exploration of special education research in ET, revealed the Technological Pedagogical and Content Knowledge (TPACK) paradigm. Over 2000 studies spanning 15 years had been conducted using this model to measure knowledge and skills utilizing technologies to teach content. Out of the hundreds of survey studies published, barely over a dozen were related to special education. None examined in-service K-12 special education teachers, and there were not any published survey studies that had been administered during the pandemic. Four validated TPACK surveys along with aspects and items from three other studies were adapted and applied to assist the design and formulation of the COVID-19 Special Education Teacher Survey (C-SETS) (Archambault & Crippen, 2009; Chen & Jang, 2019; Hall et al., 2020; Koh et al., 2012, Sahin, 2011; Schmidt et al., 2009; Yurdakul et al., 2012). Additional items were included to determine certain demographic information and then the survey was distributed, mostly on the social media platform Facebook as an effective method for
expansive recruitment (Reagan et al., 2019). Statistical analyses were performed to establish that the sample was representative, to examine the survey item means, determine the validity and reliability of the items and components within the instrument, and to determine which items of the measure had significant differences within a given independent grouping variable. An informal analysis on an open-ended response provided additional data to support and draw additional conclusions.

**Population Sample**

The C-SETS was completed by a diverse sample of special education teachers across the US, representing nearly every state in the union, and over 100 different school districts, including charters, from rural to urban, and affluent to Title I funded. Respondents supported students with all exceptionalities as defined by IDEA, every support type, from inclusion, to self-contained, to homebound, all grades including combinations, and many supported English Language Learners. Participants had diverse educational backgrounds, years of experience, age, race and ethnicity. While the sample overwhelmingly identified as female, there was a small sample of male participants, in a profession where women hold 76% of the positions (NCES, 2019). These demographic entities were converted into independent variables based off the survey responses for post hoc analyses.

**Survey Instrument Components**

The survey items were categorized into the seven TPACK domains, where a majority were designed to measure specific constructs within that model. Those items were then rearranged to align with the constructs that comported with the research questions of this study, for which six components were validated through a series of
exploratory statistical tests. Those components were: Technological Perception, Instructional Perception, Preparational Perception, Interactional Perception, Experiential Perception, and Student Technological Access Perception. The Innominate Items group included six items that did not load onto one of those components, but still provided meaningful data to support various claims in response to the research questions. The C-SETS produced a wide range of results that answered the research questions of this study.

**Interpretation of Results**

**Interpretation By Component**

An interpretation of the results for each component will be presented in the order it was presented in Chapter 4. Certain items from each component will be elucidated to demonstrate that the outcomes satisfy the research questions, while providing new evidence to make various claims and confirm certain assumptions. The ensuing discussion will present the implications of these findings, recommendations for best practices, limitations, and future research.

**Technological Perception**

The first two components of the C-SETS contained items that were designed to answer the first research question:

*What was the perceived knowledge related to technology, pedagogy, and content, including the combinations of these domains, for K-12 special education teachers implementing emergency remote education, during the COVID-19 pandemic?*

Responses from this component addressed the sub research question: *How much technological knowledge did special education teachers have during emergency remote education?* The results from the validity testing demonstrated that this component was
valid and reliable. Twenty-four statistically significant differences amongst the eight independent variables were identified based on the analysis of variance (ANOVA) and post hoc analyses procedures that were performed. This construct had the highest number of significant differences across the components of this study.

**Videoconferencing.** There were ten items in the Technological Perception component that measured a range of perceived technical skills, producing two of the highest item value means within the dataset. Overall, these results demonstrated that respondents had the greatest skills with using videoconferencing platforms such as Zoom or Google Meet ($M=4.42$), and with the ability to operate its components ($M=4.41$). There were two significant differences where bachelor’s degree holders and respondents of schools that did not participate in a 1:1 computing/device initiative during the pandemic (1:1 CID) indicated less agreement with these skills. Considering most remote educational activities were accessed via video-conferencing platforms, it was probable that this would have been among the higher values.

**Computer Equipment.** Respondents’ perceived knowledge of their technical skills to operate computer equipment ($M=3.90$), where a majority of teachers felt comfortable operating computer equipment. This core Technological Knowledge (TK) skill, necessary to function in the developed 21st century educational context, was established for a majority of the sample. There were only two significant differences within School Characteristic (SC) independent variables, where special education teachers from Title I funded schools and non-participants of a 1:1 CID indicated less agreement with their technical skills to operate computer equipment.
**Operating Software.** The results for operating digital content ($M=3.77$) and operating a learning management system (LMS) ($M=3.92$) demonstrated that respondents perceived that they possessed the knowledge and technical skills to operate various computer programs, online applications and digital platforms. Further analysis of identical items in the Archambault and Crippen (2009) study, “Examining TPACK Among K-12 Online Distance Educators in the United States” provided a comparative benchmark for discussion across components. In this instance, the ability to operate a LMS ($M=3.77$) and operate digital content ($M=3.44$) values were lower. This may be attributed in part by how the progressive advancements in technology, proceeding the time of that study, increased the availability and utilization for the typical consumer. Technology became more pervasive in developed societies, promoting exposure and engagement which impacted digital competencies.

This can be further illustrated when considering an aspect of the 12 year gap between these two studies. In 2009, the iPhone was in its 3rd generation with estimates of 28 million users worldwide, where ten generations later, the iPhone had surpassed a billion users and accounted for over half of the U.S. market share in 2020 (Dean, 2021). In this time frame, an exponential amount of people incorporated “smart phone” technologies, like the iPhone, into their daily lives, essentially being equipped with a portable mobile device that functions like a computer and fits in one’s pocket. This changed the way people integrated technologies across aspects of their lives, increasing engagement, while expanding their overall utilization. The baseline for fundamental TK was likely influenced overtime by these factors along with the emergence of online digital content platforms. While these values demonstrated the technical knowledge and
skill of the C-SETS respondent population, results for respondents’ Technological Pedagogical Knowledge (TPK) reveal other findings. Moreover, special education teachers from schools that did not participate in 1:1 connectivity initiatives and 1:1 CID indicated less agreement with these skills.

**Technological Pedagogical Issues.** The TPACK item *conducting assessments online using technologies* ($M=3.48$), and TPK item *using technologies to implement specially designed instruction* ($M=3.40$) means suggest that the C-SETS survey participants were not as knowledgeable or comfortable with these skills. The Archambault and Crippen (2009) study means for online assessment ($M=3.79$) and specialized instruction ($M=3.76$) were higher than the C-SETS participants suggesting a higher benchmark for TPK as a result of more experience and training, especially since the participants from the sample of the study were fulltime online teachers. Regardless of the gaps in technological advancements or TK abilities, the C-SETS participants perceived less pedagogical knowledge of two vital practices for special education teachers i.e., assessment and specially designed instruction. One respondent expressed their perception in the open ended response regarding online assessment: “It was difficult to assess what the students were actually understanding and retaining.”

The difference amongst the C-SETS sample for TPK, TPACK, including conducting assessments online using technologies and implementing specially designed instruction virtually, expanded significantly between schools that had not participated in 1:1 computing/device initiative programs prior to the pandemic (1:1 CIP), non 1:1 CID participants, non-connectivity initiative participants, schools with a higher concentration
of English Language Learners (ELL), and special education teachers with bachelor’s degrees demonstrated less agreement or knowledge and skills pertaining to these items.  

**Resolving Technical Issues.** Another aspect of TK was related to the ability to resolve hardware and software issues. From the results, teachers felt somewhat comfortable resolving their own technical issues \((M=3.40)\), but not as much with supporting students to resolve their technical \((M=3.07)\) issue. The Archambault and Crippen (2009) study contained two similar items: resolving technical issues \((M=3.20)\), and supporting students with technical issues \((M=3.04)\). These findings demonstrated, particularly with helping students resolve technical issues, that there is lower TK with this skill across both studies. However, the lower C-SETS mean does not necessarily represent the actual respondent knowledge or skill, but rather may be influenced by other factors such as student digital competency, issues with connectivity, or there may not have been issues that needed to be resolved.

Three remaining significant Respondent Characteristic (RC) differences occurred with bachelor’s degree holders indicating less technology resolution skills than those with a master’s degree and multiple advanced degrees. There was a significant difference between Homebound or Medical Setting \((M=2.00)\) and AS/ES/LSS Push In/Pull Out \((M=3.63)\), but this could be interpreted as those in the Homebound or Medical Setting may not have had many technical issues to address because they were mostly providing support face-to-face, with the exception of the beginning phases of the quarantine lockdown phase of the pandemic, in the spring of 2020.
**Accessibility Features.** A final item in the Technological Perception construct indicated a lack of ability to support students with accessibility features ($M=2.98$) compared to the other means of the component indicating that more technical training is warranted with these necessary features across digital platforms to ensure equitable access for all students. Significant differences with both 1:1 and connectivity initiative independent variables were observed with all of the non-participant subgroupings, indicating less agreement with this skill. This provided further evidence that schools with established access to technological infrastructure promoted increased TPK and skills across stakeholders (Richardson et al., 2013).

Another significant difference for the sub group email/text message participants occurred only with this item across the dataset of this study. The mean for the social media group ($M=3.04$) was significantly higher than those who participated via email ($M=2.54$), which was not reported in the results section. This certainly highlights a TPK shortfall with this skill but supports a supposition that there were not any technical or other differences within the sample for this subgroup. A possible implicit assumption was that social media users would have higher TK than those teachers who were not on social media and participated in the study via email or text. Moreover, the conjecture was that nonsocial media users would have less TPACK and lower means across the components, because of less engagement and exposure to online content. An assertion, however, cannot be made with confidence regarding the nonsocial media group because the subgroup accounts for 12.5% of the sample and there is a likelihood that at least a few of those 35 participants have a social media account. Nonetheless, aside from one value, there were not any other differences that merited further disclosure.
School and Respondent Characteristics. Analyses of differences within this component established certain characteristic relationships that occurred, but not in subsequent components for RC. Within the Technological Perception component, respondents with advanced degrees demonstrated more knowledge and skill across three technical applications. Eight of the ten item means were lower for Title I respondents in this component. These data, along with participation in 1:1 initiatives reflected a reality amplified by the pandemic, that technologies had not been fully integrated into Title 1 schools’ digital infrastructure. Conversely, resourced schools had more teachers utilizing technologies at a larger scale and thus had more TPACK (Hall et al., 2020). Closing the digital gap and expanding digital infrastructure, where more stakeholders have access and opportunity, will increase these skills due to the exposure and gained experience with using technologies (Richardson, 2013).

Technological Perception Summary. Survey respondents demonstrated greater perceptions of their Technological Knowledge (TK) to operate computer equipment, digital content, and videoconferencing platforms. Respondents lacked pedagogical knowledge with assessment, delivery of specialized instruction, and guidance for students to utilize digital accessibility features. This highlights a need for more technical training and targeted ongoing professional development, specific to Technological Pedagogical Knowledge (TPK) and TPACK. Significant differences were observed across multiple SC variables. The implications for the impact of existing digital technology infrastructure or lack thereof on knowledge and skills is reinforced by these findings. Moreover, the same claim within Technological Perceptions can be made for the impact of educational attainment on knowledge and skills, as those with advance degrees demonstrated higher
levels of skill. Special education teachers with bachelor’s degrees had the lowest mean score within the group for each of the ten items in this Technological Perspective component. These findings highlight the impact of teacher preparation programming, and continuing education on knowledge and skills.

**Instructional Perception**

Five items of this component produced perceptions of pedagogical, content and combinations of this knowledge. Six significant differences were observed across three SC independent variables. Survey responses from this component provided answers for two sub research questions:

*How much pedagogical knowledge did special education teachers have during emergency remote education?*

*What was the content knowledge of K-12 special education teachers during emergency remote education?*

**Instructional Planning.** The highest mean value of the five items in this component was in response to special education teacher perceptions of being more effective with planning and delivering specially designed instruction prior to the pandemic ($M=4.06$). Although different contextually, an item from the Archambault and Crippen (2009) study of K-12 in-service online teachers had a similar mean. Planning concepts ($M=4.03$) provided a benchmark for a skill that resembled what the C-SETS teachers perceived to be the opposite of their skill level during the pandemic. In other words, the perception was that special education teachers did not think they were as effective with planning and teaching during ERE.
**Specially Designed Instruction.** Respondents were asked to indicate their perceptions for using a *variety of approaches, strategies, and methods when teaching students who had an IEP* during ERE ($M=3.47$). An examination of one of the Respondent Characteristic subgroup values revealed that teachers with less than four years of experience ($M=3.13$) were less confident with this skill compared to teachers with 10-14 years of experience ($M=3.56$) but was not considered statistically significant in post hoc analysis. School Characteristic independent variable subgroup values for Rural school districts ($M=3.27$), and between 25-50% ELL ($M=3.25$) all had the lowest values of their grouping. There was a significant difference with 1:1 CID ($M=2.93$). Beyond the characteristic patterns, the interpretation for this item portends a lack of pedagogical skill, training, confidence, and/or inability to fully deliver robust instruction due to contextual factors.

**Core and Alternate Standards.** Respondents’ perception of the degree to which their instruction *aligned with common core or alternative standards* ($M=3.37$) was not definitive. There were three significant differences with this item with SC independent variables. Respondents from schools that had participated in both or either 1:1 CIP and 1:1 CID had higher means. Similarly, Large City school district respondents demonstrated more effectiveness than those from rural school districts. A pattern had emerged where respondents from schools that had more established technology resources were indicating a higher level of knowledge and skill across the first two components.

**Universal Design for Learning.** Special education teachers’ perception of ability *to promote multiple means of expression, engagement, and representation of content* ($M=3.13$) suggested that there was not agreement with their ability with these skills.
Similar to specially designed instruction, certain subgrouping means were comparatively lower, such as Rural school districts ($M=2.73$), between 50-75% ELL ($M=2.70$), and non-1:1 CID participants were significantly less skilled with the application of UDL principals. The Archambault and Crippen (2009) study contained two items that represent aspects of the Universal Design for Learning (UDL) model, for which this item was designed to measure. A TCK item, the *ability to use technological representations (i.e. multimedia, visual demonstrations, etc.) to demonstrate specific concepts in my content area* ($M=3.76$) and a TPACK item, *My ability to use technology to create effective representations of content that depart from textbook knowledge* ($M=3.81$) (Archambault & Crippen, 2009, pp. 87-88). Those values demonstrated a higher standard, though Archambault & Crippen (2009) noted that with TPACK, teachers perceived their teaching abilities in a traditional sense as strong with content and pedagogy, but when incorporating technologies to deliver content, there was less confidence with applying those skills and being effective with communicating concepts. One teacher noted in an open ended C-SETS response:

“I was never able to implement an effective method for my nonverbal students to participate in class.”

This contextualized a level of TPACK for the C-SETS respondents, specific to this item of the Instructional Perspective construct. Benton-Borghi (2013) proposed a UDL infused TPACK model for enhancing teacher preparation programming to include skills for teaching diverse learners. The rationale was rooted in Vygotskian theory of the social learning process, where this model would “foster greater collaboration between general and special education” (Benton-Borghi, 2013, p.259). Thus, equipping teachers
with the necessary skills to teach all learners across contextual settings would promote enhanced outcomes. During ERE, most did not seem to possess or generalize these skills which may have contributed to unintended consequences such as a lack of student engagement, less effective instructional delivery, and participation.

**Behavior.** The final item was designed to measure behavioral intervention practices: *I utilized aspects of School Wide Positive Behavioral Support, Positive Behavioral Interventions and Supports, Multi-Tiered System of Supports, Social Emotional Learning, and/or an individualized Positive Behavior Support plan to manage student behaviors during the COVID-19 pandemic.*

The mean for this item (3.07) does not reveal much to draw conclusions. The middle value of the scale accounted for 24% of the responses, and 35% somewhat or strongly disagreed. Approximately 40% indicated somewhat or strongly agree, so at least half of the sample provided some sort of behavioral support albeit not clearly delineated. Perhaps not surprisingly, Emotional Support teachers reported the highest mean ($M=3.90$) of the Support Type group, which consequently was the highest mean value of any subgrouping within the dataset. Non-1:1 CID participants indicated a significantly lower value ($M=2.60$) behavior intervention practices.

This item was intended to serve a few purposes. The pandemic impacted stakeholders differently which may have had an emotional effect. Social Emotional Learning (SEL) initiatives were on the rise across the country prior to COVID-19 and became more pervasive during the pandemic (Katzman & Stanton, 2020). Other programs like SEL, which has been incorporated into systems like School Wide Positive Behavior Support (SWPBS), or other school wide initiatives such as Multi-Tiered
Systems of Supports (MTSS) had been installed into a given school community prior to the pandemic. This item was attempting to ascertain if these initiatives were still in effect, or if any of the learned strategies were being utilized during remote online instruction. Student behaviors could have manifested in different ways during ERE e.g., withdraw, inattentiveness, aggression, or cyber bullying (Marteney & Bernadowski, 2016). One special education teacher commented in an open-ended response: “Due to kids behavioral issue[s] parents decided not to [have them] participate in any video sessions.”

It was unclear whether systems, training or interventions were in place and being utilized. Moreover, it was uncertain if and how were they adapted to be applied in the ERE context. Some students may have had a Positive Behavior Support Plan as an aspect of their special education programming. Behavior Analytic strategies may have been utilized to promote positive outcomes for students. One of the pilot participants shared about a virtual token economy that was employed in their inclusive virtual classroom. Students were able to earn generalized reinforcers that could be exchanged for a special delivery, or even a socially distanced visit from the teacher. While it is unclear which specific aspects of behavior support were utilized, in general terms, a substantial portion of the sample were providing some sort of unspecified behavioral support as an aspect of special education pedagogy.

**Instructional Perception Summary.** Special education teacher perceptions of their ability to plan for instruction were relatively neutral, with the exception of the survey respondents indicating more convincingly that they perceived their effectiveness with planning to be greater prior to the pandemic. Teachers did not indicate confidence in their PK and PCK with planning, instructional delivery or applying strategies such as
UDL. An unspecified form of behavioral intervention support as a special education pedagogical practice was employed by a portion of the sample. The mean differences within sub groupings revealed more about the existing dynamics within the context of this study. Title I funded schools/districts, rural locales, non 1:1 computing initiative participants, and a portion of those who supported ELL were demonstrating less knowledge compared to the means of the group. Although not statistically significant, teachers with less experience and or a bachelor’s degree reflected the lowest means relative to these constructs of knowledge. These dynamic patterns continued to be present in the next component.

**Preparational Perception**

Seven items targeted special education teacher preparation, technical training, and ongoing professional development with technologies, pedagogy, content, and administrative support. Fourteen significant mean differences were obtained across five SC components. Results from this component responded to the sub research question:

*Prior to the pandemic what training and professional development did special education teachers receive to prepare for online remote instruction?*

**District/School Planning.** The lowest means of the entire survey were found in the Preparational Perception component that contained a collection of the lower means across the dataset, including the lowest item value of the entire study. District/schools were lacking sufficient preparation with outlining a scope and sequence for content ($M=2.25$) which was indicative of how special education teachers perceived the level of preparedness and curricular support they were provided. It also signaled how the nature of the ERE context significantly impacted educational practices and stakeholders at all
levels, as noted by Hall et al. (2020) in their pandemic TPACK study that critically examined the societal contexts of how technologies were being integrated during the COVID-19 pandemic, including an awareness of systemic inequities perpetuating the digital divide.

Across multiple subgroupings of the independent variable groups, only one subgroup had a mean above 2.70. That subgroup contained five respondents who taught 75% and above ELL ($M=3.40$), accounting for 1.7% of the sample population. With the exception of that outlier, these data demonstrated a distributed consistency with this finding. Interestingly, further examination revealed, that Large City districts had the greatest value ($M=2.54$) of the School Locale group, which was significantly more than rural school districts ($M=1.86$). Surprisingly, Suburban districts were below the item mean at ($M=2.15$), where the implicit assumption may have considered this subgroup to have a greater mean. However, the trend for non 1:1 CIP ($M=2.12$), and 1:1 CID ($M=1.93$) participants continued within this component as the mean differences were significantly lower than special education teachers of participating schools.

**Professional Development.** The shortfall with district/school mapping content for ERE extended to technical training, ongoing professional development (PD) and support during the pandemic. A majority of the participants were in agreement that they did not receive adequate professional development during the pandemic regarding special education case management policies and procedures ($M=2.50$). Special education teachers who indicated that they taught at a charter school had a significantly higher value ($M=3.33$) than non-charter respondents ($M=2.45$).
Special education teachers also reported receiving less PD with how to teach content during ERE ($M=2.52$), than before the pandemic ($M=3.28$). Title I respondents ($M=2.88$), and 1:1 CIP participants ($M=3.40$) indicated receiving significantly more content PD prior to the pandemic compared to non-Title I and 1:1 CIP participants. Whereas 1:1 initiative participants both prior ($M=2.74$) and during ($M=2.58$) received significantly more PD on content during the pandemic than both of the non-participant initiative groups.

This type of PD was specific to content, for enhancing CK and PCK, where the next two items targeted training for the utilization of content based digital programs for instruction. The component mean was higher for training utilizing content based digital programs during the pandemic ($M=3.14$), compared to prior ($M=2.80$), demonstrating that many had not been exposed to this type of TCK. Non-1:1 CIP ($M=2.66$), and connectivity ($M=2.41$), respondents had significantly lower participation in this type of training prior to the pandemic. 1:1 CID participants ($M=3.22$) and Large city districts ($M=3.43$) had significantly higher values for technology training during the pandemic. This indicated that rural districts were less resourced, as articulated in a TPACK study that was conducted in a rural setting by Hill and Uribe-Florez (2020) where they recommended research in other settings as “[o]ther school systems may have more access to resources for professional development for teachers” (p. 10).

A TPACK item in this component measured special education teachers’ perceptions of receiving ongoing PD for how to use technology to deliver remote online instruction and content ($M=2.74$). Two significant differences were observed within both 1:1 variables where participating districts/schools had higher values for this type of
training compared to the component mean as well as their respective non participant subgroupings.

**Administrative Support.** The administrative support item ($M=3.16$) was a marginal valued response. Title I and non 1:1 device schools had lower means within their respective groups for this item, but they were marginal and not statistically significant. Teachers of ELL 75% and above ($M=2.60$), Secodary-21 $M=2.63$), and Life Skills Support ($M=2.76$), contained the lowest means across the subgroup components, where they perceived being supported the least by administrators. An interesting finding occurred within the school locale group where rural school districts perceived the most administrative support of the group ($M=3.43$) and suburban school districts had the lowest value ($M=2.87$).

Some participants shared their experiences with the open-ended responses, which were presented in the results chapter. A truncated sample without the single positive respondent’s perception is paraphrased:

> Communication from administration was conflicting and changed from week to week. We also received very little PD. I entered the pandemic with limited technical knowledge and had to seek assistance as needed (often asking several people before I could get the needed help) and basically figure it out for myself.

**Preparational Perception Summary.** The responses of this component produced some of the lowest means of the study, revealing perceptions for a lack of overall preparation, technical training, ongoing PD, and support. A scope and sequence for content was not thoroughly outlined for special education teachers, and although they indicated receiving PD for how to teach content prior to the pandemic, most participants were not provided with ongoing PD for teaching content during the pandemic. Few
respondents received technical training on utilizing content based digital programs prior to the pandemic, which increased slightly during the pandemic. While some received this technical training, most indicated not receiving ongoing PD for how to use technology to deliver remote online instruction and content. Finally, special education teachers indicated a low level of administrative support during the pandemic.

**Interactional Perception**

The five items in this component were designed to measure parent communication, IEP team collaboration, and participation. Two significant differences occurred within one independent variable. Results from this component responded to the sub research question:

*To what degree did special education teachers support, interact and communicate with colleagues, students with disabilities, and their caregivers during emergency remote education?*

**Parent Communication.** Two items asked special education teachers to gauge their perceptions of parent communication before the pandemic ($M =4.15$) and during ($M =2.51$). Most participants strongly agreed (51.4%) that communication increased, while some expressed difficulties contacting parents. These divergent perceptions are further personified by a sample of the open ended responses:

Early in the pandemic I had weekly check ins with my students’ parents. I was able to connect with them in a way I had not previously in my career. So many problems were solved and avoided when I talked with parents.

Some parents were very difficult to get ahold of due to their demanding work schedules...others would dodge calls and emails.

**IEP Team Meetings.** Participation in IEP Team meetings marginally increased during the pandemic ($M =3.27$). with 47.5% either somewhat or strongly in agreement.
Moreover, the utilization of telecommunication and videoconferencing technologies permitted increased access for all stakeholders to participate in meetings remotely.

Special education teachers from districts/schools participating in connectivity initiatives ($M = 3.35$) had a significantly higher IEP team meeting involvement than the non-connectivity subgroup ($M = 2.94$), reinforcing the notion that increased connectivity led to higher attendance for IEP meetings.

A sample of the open ended responses provided differing perceptions:

I was able to get parents to attend virtual IEPs on line easier. Many seemed to prefer this method. Parent correspondence/attendance to meetings are quicker online. Some parents seemed more engaged and actually attended meetings because they were able to be phone conferenced in. More parents showed up during Covid than prior to Covid.- I want to continue to use zoom as an option for IEP meetings to increase parent participation.

I had about the same participation for IEP meetings. Most parents were ok with meeting virtually or over the phone for IEP meetings. Parent involvement did not change during the Pandemic. Most parents are not aware of what is being taught.

**IEP team collaboration.** IEP team collaboration conversely decreased during the pandemic ($M = 2.61$), where collaboration with IEP team members occurred more frequently prior ($M = 3.49$). This can be explained by the nature of the contextual factors where educational professionals were displaced from their daily in-person interactions and were relegated to utilizing remote communication technologies to collaborate.

Most teachers were great at providing feedback, attending meetings, and signing paperwork. But then others struggled to keep up with the amount of virtual communication...[,which] changed almost daily and it was frustrating.

**Interactional Perception Summary.** The contextual dynamics of ERE impacted interactions across stakeholders. A majority of special education teachers and parents
were able to increase communication by utilizing telecommunications and videoconferencing as a method to remain connected during the pandemic. This also enabled parents to increase their participation in IEP meetings, as it was a more convenient and effective manner to attend. Conversely, IEP team collaboration decreased during the pandemic due to logistical factors related to remote functioning. Access to technology was an established barrier for some districts and schools where IEP team collaboration which was significantly lower for those who did not participate in connectivity initiatives ($M=2.26$).

**Experiential Perception**

Four items were designed to gauge special education teacher’s emotional stress, anxiety, and use of leisure time for planning, teaching, and special education case management duties in response to the sub research question:

*How did special education teachers perceive their experiences implementing emergency remote education, during the COVID-19 Pandemic?*

Respondents were in strong agreement that they sacrificed more leisure time to plan for teaching tasks or special education case management duties during the pandemic ($M=4.24$). They perceived feeling less anxiety or stress when planning and teaching content prior to the pandemic ($M=4.02$), as well as indicating disagreement that they used to spend more time planning before the pandemic ($M=2.51$). Non-Title I ($M=3.79$) and charter schools ($M=3.33$) had significantly higher values compared to their subgrouping counterparts for planning prior to the pandemic. A majority of respondents (74.7%) indicated that they somewhat or strongly agreed with the perception of feeling stress or anxiety when using technology to teach content during the pandemic ($M=4.04$).
**Experiential Perception Summary.** Assumptions were confirmed that teachers had dedicated more time planning during the pandemic, while sacrificing leisure time, with increased stress or anxiety. Those emotions were also experienced when delivering instruction with technologies during ERE. Special education teachers’ experiences were confounded by elements from the other components that contributed to the increased workload and emotional stress or anxiety. Respondents open ended responses convey some of these perceptions:

Distance learning was very hard and frustrating for everyone. The uncertainty made it difficult to plan. Anything we actually "needed", we had to find or learn on our own. Documentation of services was extremely stressful and difficult to keep up with...It didn’t appear to me that staff...mental health was important to administration.

**Student Technological Access Perception**

The four items in this component were designed to gauge student access to technologies during the pandemic as a combined indicator for an aspect of engagement or participation. Each item yielded at least one statistically significant value where eight differences were observed across six independent variables.

**Connectivity.** Access in this component referred to internet connectivity \((M=3.03)\) had a neutral value. However 48.2% somewhat or strongly agreed that they had students who did not have access to the internet. Title I funded school respondents \((M=3.15)\) had significantly more students without internet access compared to non-Title I funded schools \((M=2.64)\). Two open ended responses provide perceptions regarding connectivity:

Many of our students didn't have internet, or parents worked so they couldn't come on my zoom meetings during the day. [Some] had horrible internet connections... [when] using a district provided hot spot.
**Technological Device.** Roughly two thirds of the respondents indicated their students had access to a technological device that could operate the necessary software and applications for remote learning ($M=3.74$). The mean was significantly higher than the component mean and subgrouping counterpart for schools that participated in 1:1 CIP ($M=3.62$), 1:1 CID ($M=3.86$) and connectivity initiative ($M=3.84$). Roughly a third of the respondents indicated supporting students who did not consistently have access to a technological device ($M=2.88$). This was significantly lower for non 1:1 CID participants ($M=2.82$) compared to schools/districts that participated ($M=3.20$).

**Cell Phone Access.** Almost 50% indicated somewhat or strongly agree having students who used a cell phone to participate in remote online learning. This limited access was observed to be significantly larger for those that supported less than 25% ELL ($M=3.32$), charter schools ($M=3.87$), and non-1:1 CID participants ($M=3.24$).

**Student Technology Summary.** Results from this component demonstrated that aspects of the digital divide persisted for students having equitable access to the necessary and sufficient resources that they required to access their education. This in turn created participation and engagement issues for those who had difficulties with connectivity and/or did not have access to an appropriate device that could operate various online platforms, many of which were inaccessible via a cell phone. As a result, several statistically significant differences were observed with under resourced districts and schools.
Innominate Items

This group contained six items that were unable to load onto the previous components, however these items were designed to target specific elements of special education teachers’ perceptions during ERE that were relevant to the research questions. Moreover, they related thematically to certain aspects of the constructs across the components of the C-SETS. There were seven statistically significant mean values observed with three independent variables across three items of this grouping.

Parent/Caregiver Support. The support of a parent or caregiver was vital for students to be able to access, for engagement and sustained participation in ERE. The median was 3 on the scale for respondents’ perceptions of having consistent support with operating technologies and assistive technology where applicable ($M=2.80$). This was one of the lower means across the data set with a mode value of 2, where 31% indicated somewhat or strongly agree which included 32 respondents who were in strong agreement. Open-ended responses mostly reflected the challenges special education teachers experienced:

Without the aid and support of parents, family members and/or caregivers; in my opinion, [students] did not receive instruction while remote parents/caregivers functioned as 1:1's. It worked but was almost entirely reliant on parent participation

[M]y students could not interact remotely on their own, so parents had to invest a great deal of time to help...[They] relied on their parent/guardian to log them onto the computer daily. If the parent/guardian left, my student had no support. We never had the chance to help parents learn the systems and programs we used, so some of my students were not able to benefit from virtual learning.

Other responses reflected the positive aspects when support was available:
I had families who joined in and supported adapting surroundings and helping students become more engaged, successful, & accountable. Parents were more involved and engaged in their child’s learning.

These data illustrate the importance of having this support while recognizing the challenges as demonstrated by another respondent’s perception:

*Parents who continued to work through the pandemic struggled to support students in instruction and have care for students at home.* Petretto et al. (2020) discussed the importance of these supports and the hardships families confronted in the COVID-19 pandemic context. Students required technical support and accommodations to access their education, which typically would require a learning coach, as described by Coy (2014), to facilitate access to online learning contingencies.

**Technology Intervention Programs.** This issue of access and engagement was further explored with the item *my students utilized technology based intervention programs, such as iReady, Lexia, & Unique Learning System* $(M=3.22)$. The intention was to measure if students had access to this type of specialized digital content to determine if schools/districts offered the provision of this resource, and if they were utilizing such programs as a viable resource for both asynchronous and synchronous remote learning. Operating such programming required teacher and caregiver support for those who did not have experience with using these programs. The data suggests that 54% somewhat or strongly agree that such programming is being utilized, where 33.4% somewhat or strongly disagree. The mean was slightly lower for schools that did not participate in 1:1 device initiatives prior to the pandemic $(M=3.19)$, special
education private schools \(M=2.87\), and Rural school districts \(M=2.78\). The means for Title I \(M=3.27\) and Large city \(M=3.53\), which were the highest in their groups, suggest that these resources were available and that resources had been dedicated to such programming for students. Two significantly higher values were produced for 1:1 CID participants \(M=3.34\) and connectivity initiative participants \(M=3.31\).

**Online Learning Platforms.** Similar to the previous item this was also designed to ascertain allocated instructional digital resources to determine availability and utilization. Respondents were asked to indicate their utilization of online learning platform, adaptive learning program and/or other technology based programs to teach content to students with IEPs, such as Nearpod, Lexia, iReady, Prodigy Math, Seasaw, Unique Lea \(M=3.95\). This demonstrated relatively higher agreement with a median of 5 on the Likert scale, where 53.9\% were in strong agreement confirming that this type of resource was available across the independent variables of the sample. Two significantly higher values were produced for 1:1 CID participants \(M=4.07\) and connectivity initiative participants \(M=4.06\).

**Special Education Policies.** This item was designed to measure special education teachers’ understanding of various case management policies, applied to the ERE context. It was also intended to gauge the level of, preparation, PD, and/or training that was provided during the pandemic as various procedures such as evaluations, assessment, and progress monitoring were impacted. Respondents indicated moderate agreement that they understood the adjusted policies and procedures for remotely evaluating, assessing and/or formulating IEPs, progress reports and evaluations, when applicable, for students
Certain procedures such as assessment and evaluation were impacted by contextual factors requiring adjustments to policies. The means were consistent with the exception of three significant differences with Small city districts \( (M=3.97) \) and midsize city school districts \( (M=3.15) \), 1:1 CID participants \( (M=3.69) \) compared to non-1:1 \( (M=3.07) \) and connectivity initiative participants \( (M=3.69) \) compared to \( (M=3.17) \). Overall, 59% somewhat or strongly agree, suggesting that special education teachers had an understanding of these policies.

**Selecting Content.** Special education teachers indicated that they had to select and identify content for their students during the pandemic \( (M=4.41) \). This mean was tied for the second highest value of the dataset and strongly indicates that teachers engaged in this practice. This item was designed to measure an aspect of content knowledge, but also was intended to gauge an aspect of teacher preparation with how districts/schools were prepared, and if there was any PD that supported teachers with this aspect of instruction during ERE. This item aligns with the item from the Preparational Perspective component that measured district/schools outlining a scope and sequence of content \( (M=2.25) \) which was the lowest mean of the dataset. Based on these perceptions, special education teachers did not have access to content that was thoroughly planned, outlined and readily available, where instead they were forced to identify their own content for instruction with their students.

**Future Practices.** The last item of the C-SETS as respondents to indicate their perception for *I learned something from remotely teaching content online with technology that I will use in my future practices for in person learning* \( (M=4.24) \). This
was the third highest value of the data set where 84% of the respondents overwhelmingly indicated some degree of agreement, including 54.6% indicating strong agreement. This item was in response to the sub research question:

*What aspects derived from the methodical use of technology to teach content during emergency remote education will special education teachers apply to future practices?*

This item was proceeded by an optional open-ended response to further elucidate on future practices or to express other perceptions from other experiences during ERE. Many participants offered meaningful responses that provided a real world connection to the survey items. Many teachers described various aspects of teaching with technologies that they would incorporate such as using slide presentations, web applications, online platforms, and features such as talk to text, recording audio instructions or video demonstrations. A lot of special education teachers expressed their intentions to continue to use technologies to maintain parent communication, collaboration, and involvement. This was especially made explicit for attending and holding IEP meetings. A summary of the interpretation of findings will be proceeded by a discussion of the implications, connecting these interpretations to the real world of special education.

**Interpretation Summary**

Special education teachers overall had the requisite technical knowledge to operate basic equipment and digital content during Emergency Remote Education (ERE). The strength of those skills was perceived less for resolving technical issues, supporting students with digital accessibility features, applying technological knowledge to deliver specially designed instruction, and the utilization of technologies to assess students.
Special education teachers perceived to be more effective with planning prior to the pandemic and indicated less certainty with delivering specially designed instruction aligned to the core/alternate standards, utilizing behavioral strategies and employing the principals of Universal Design for Learning.

At the onset of the pandemic, teachers were not provided with a comprehensive curricular plan, nor did they perceive that they received ongoing professional development for how to teach content or how to use technology to deliver remote online instruction. Instead, they had to identify and select their own content for their students and plan accordingly. While there was some agreement that special education teachers did receive professional development for teaching content prior to the pandemic, there was not agreement that training was also provided for content based digital programs. There was even less agreement that they received PD during the pandemic about special education case management policies and procedures, despite indicating a moderate understanding. There was marginal agreement for receiving administrative support or ongoing technical training with operating technological equipment, software, programs applications and/or web-based platforms, during the pandemic.

Parental communication and correspondence increased during the pandemic as well as IEP meeting participation due to the utilization of telecommunications and videoconferencing technologies. However, IEP team collaboration decreased during ERE as a result of contextual factors. Special education teachers shared perceptions of their experiences with increased planning time during the pandemic at the expense of leisure time and increased resultant emotional effects of stress and anxiety. Some of that was exasperated by issues with student access to technology, which was a significant issue for
those who did not participate in technology resource initiatives, or were in historically under resourced districts or schools. This included issues with connectivity, access to a technological device, and one that was appropriate for gaining access to certain digital content that was inaccessible via a cell phone. Another barrier to student access, engagement and sustained participation was the level of parental/caregiver support during online learning. This support allowed more students to gain access, by assisting with technological functions, so they could engage and have support to sustain their involvement. Special education teachers and students had access to various digital content programs and platforms online to further facilitate this engagement. Based on their perceptions during ERE, special education teachers indicated that they would apply an aspect from what they experienced or learned to future practices.

Implications

The implications based on an interpretation of the C-SETS results indicated several issues related to teacher preparation, technical training, and ongoing professional development. Additional implications for parent communication, collaboration, student engagement, access to technological resources, social emotional learning, future practices, and school characteristics will be discussed.

Teacher Preparation

The survey results demonstrated that special education teachers had the requisite technical skills to operate various computer technology and basic applications necessary for functioning during ERE. These teachers, however, likely did not attend pre-service programs that focused on virtual instruction, and the results from this study confirm that the C-SETS participants were not prepared to deliver online remote instruction using
technologies. Trust and Whalen (2020) conducted a survey online during the pandemic, which concluded many teachers were unprepared for what they referred to as Emergency Remote Teaching (ERT). Similar issues from that study demonstrated that teachers struggled with applying adapted pedagogical approaches virtually much like the C-SETS sample had issues with delivering specially designed instruction, conducting assessments, and with UDL. The respondents of this study also demonstrated TK gaps with resolving technical issues and guiding students with online accessibility features.

Smith (2020) noted a concern with preparation for using an LMS or other technological applications during the pandemic to deliver specially designed instruction, where skill deficiencies directly impacted the ability to provide special education services and supports. The underdeveloped components of preparational skill are associated with the domains of TPK, TCK, and TPACK. These were identified as areas of need from a TPACK study conducted of Israel chemistry teachers during the pandemic (Rap et al., 2020). The need for teachers to learn and possess these skills in order to successfully be prepared to teach in an ERE contingency was referred to as a type of teacher digital competency, in a German TPACK study conducted during the pandemic (König, et al., 2020). The authors suggested an emphasis for future educators to develop TPK as an aspect of their preparation program (König et al., 2020). The impact of teacher preparation, or lack thereof, influenced teachers’ abilities to effectively deliver instruction. This was not just exclusive to special education teachers, as other studies highlighted similar barriers across disciplines and locations. As a solution, for in-service teachers, all of the studies recommend some form of varying technical training or professional development.
Technical Training and Ongoing Professional Development

The C-SETS results convincingly demonstrated a lack of technical training, ongoing professional development, and support for special education teachers. Moreover, there was not any evidence that suggested there was purposeful planning for content with an explicit scope and sequence. Teachers were forced to take matters into their own hands as evidenced overwhelmingly by the results, to identify, formulate and adapt content for their students, despite many having access to online platforms. While there was a moderate amount of PD for content prior to the pandemic, there was little support indicated for PD for content during ERE. There was also a lack of technical training for content based digital platforms and applications prior to the pandemic, which was in turn indicated marginally during the pandemic. The same was implied for administrative support during the pandemic, where there was a consensus for marginal support. This lack of technical training, according to a remote focus group study conducted during the pandemic, created obstacles in the context of ERE (Smith, 2020).

Teachers had to rely on other means and avenues to close their digital competency gaps as described by Trust and Whalen (2020): “Participants reported needing significant support with shifting their practice and, as a result, mainly relied on informal, self-directed learning with their professional learning networks for assistance” (p. 191). This study noted that there was minimal training and PD, where participants had expressed a need and desire to receive more technical training (Trust & Whalen, 2020). Similarly, the C-SETS participants demonstrated a developmental need for a range of skills such as the application of remote pedagogies for an assortment of special education practices, behavioral strategies, content planning and design, for online instructional delivery.
The need for prioritizing PD was expressed in a TPACK study, during the pandemic, to develop skills in order to integrate technologies and provide exposure, especially for those students who did not have access (Hall et al., 2020). Another TPACK study, conducted in a rural setting, prior to the pandemic, examined technology integration with an emphasis on these skills as necessary “for teachers to learn strategies for effectively using the technology available to enhance student learning (Hill & Uribe-Florez, 2020, p.10). They also recommended a consideration for continuous support to address teachers’ expressed need for more time to learn as the findings showed that teachers were less confident with TK and TPACK. There was a recommendation for administrators school leaders to create opportunities for this type of support (Hill & Uribe-Florez, 2020).

The notion of ongoing training is a point of emphasis, as teachers especially required this type of PD and support during ERE. This was necessary to address the multitude of issues and needs that were prevalent throughout from developing technological instructional skills, resolving various issues, designing lessons with core/alternate standards aligned content, and understanding special education policies and procedures. A large study conducted during the pandemic with participants from Norway and the US on teacher readiness had a qualitative survey response that sums up what is supported by the data of the C-SETS: “We use[d] many online programs ... but received no training on how to teach on a digital platform” (Gudmundsdottir & Hathaway, 2020, p. 243). The online resources were available, but the training and PD were lacking.
Communication, Collaboration and Engagement

Parent communication increased for most of the C-SETS respondents during the pandemic. IEP team meeting participation did as well due to the convenience of being able to attend remotely via telecommunication or videoconferencing technologies. While those tools were available for educational professionals to utilize, IEP team collaboration decreased during ERE due to the contextual factors of not being able to correspond in person, on a daily basis.

The importance of maintaining communication was demonstrated in the German TPACK survey, conducted during the pandemic, where maintained communication was found to be predicted by conceptual TPK competency (König et al., 2020). The contact and communication was one aspect where a nurtured relationship with ongoing correspondence led to the necessary collaborative piece that requires emphasis. Parental support was of critical importance for students to gain access to their education. The implication was that communication led to collaboration which was key to supporting students who required assistance to engage and sustain their participation.

Two studies out of Finland during the pandemic both highlighted the importance of parental support and its impact on student success (Iivari et al., 2020; Niemi & Kousa, 2020). Parental support was critical for all students, and especially for more diverse learners with complex needs. The need for a learning coach during ERE was of the utmost importance. A reflection from one of the open-ended responses of the C-SETS offers this perspective:

One big issue with teaching remotely was getting students to participate/log in...or to respond to email or even phone calls from me. I had better luck with getting parents to respond but not all of them would either... Parents were often unaware the student was not logging in or...not doing
their work. It was a mixed bag for the students as it is now, either their parents support or they don’t. The resources were there for the kids but it was up to them and their parents to ensure they were using it.

Parental/caregiver involvement or support was one of the major factors for student engagement during ERE. Understandably, many parents had employment responsibilities, or supported other family members, which may have included children, or did not have the digital competency to navigate the technologies, as they were dealing with the same stressors that every stakeholder confronted. Additionally, for those students who relied on assistive technology or required accessibility features, there was a deficit of skills across teachers and caregivers, more training was needed and/or support from related services providers to enhance opportunities for engagement. Nonetheless, it was ultimately up to parents to ensure that their students could gain the access to engage, which was contingent upon many factors including parent availability, digital competence, the availability of technologies and connectivity.

Access to Technological Resources

Numerous academic articles and published reports in the media examined how the pandemic exasperated the existing digital divide across the globe (Hall et al., 2020; Iivari et al., 2020; Smith, 2020). In America, there were initiatives to increase internet access and provide technological devices to students who were not equipped during the pandemic. Prior to 2020, there were school 1:1 device initiatives that proceeded the pandemic, long before it was ever known to be a reality. However, not all districts had participated and many remained without such technology which was intended for students to gain access at home to close the homework gap (Richardson et al., 2013). The lasting impact was noticeable during the pandemic because as the previously un-
resourced gained access to equipment, they lagged in digital competency which was
demonstrated across multiple independent variables in the C-SETS results (Kim &
Padilla, 2020).

Digital equity became a calling card for social justice initiatives in education for
good reason. But providing equipment and connectivity does not necessarily equate to
equitable access as there needs to be a consideration for technoethical aspects such as
ethical, legal, moral, social and practical issues that could perpetuate the divide (Gearhart,
2009; Gleason, & Heath, 2021; Hall et al., 2020). Moreover, teachers had access to
technologies, including various online platforms and applications, and yet they were
underutilized for a myriad of reasons, such as lack of training, teacher digital
competency, student access or engagement, student digital competency, and or lack of
support at home to promote access.

An additional layer of complexity was added with those students who had the
most significant needs where accessibility features, 1:1 support and training across
stakeholders was a necessary contingency in order for there to be a sufficient opportunity
to gain access for engagement. The issues for access and resources varied across the
country as there were those who did not encounter the same challenges as others. This
was reflected in the results of the C-SETS where some teachers shared perspectives of
positive experiences while others reflected their challenges. The social emotional toll of
those encounters caused an impact on all stakeholders who experienced ERE.

**Social Emotional Learning**

The experiential perceptions were measured and discussed from the perspective of
special education teachers. Open ended responses offered words such as overwhelmed,
stressed, anxious, tired, and frustrating. Teachers were susceptible to succumbing to stress and anxiety as a consequence of increased time planning, sacrificing leisure time, and likely from feeling less confident due to a lack of various skills that had yet to be generalized. Huang and Lajoie, (2021) conducted a study that examined the impact of self-regulated learning (SRL) on developing TPACK, highlighting how dysregulation can encumber one’s learning process. This can be applied across stakeholders.

Social Emotional Learning (SEL) had emerged and been amplified as a prominent initiative in education to promote a mainstream awareness and behavioral health IQ particularly for students which was further necessary to be taught during the pandemic (Katzman & Stanton, 2020). It encouraged introspective conversations for self-realization, awareness and positive social interactions. During the pandemic, it was especially vital to have these discussions and keep a finger on the pulse of students’ well-being due to the stressors of ERE. It was necessary to expand and apply this concept to all stakeholders. Parents, students, and educational professionals all were experiencing an emotional impact from the pandemic.

Trust and Whalen (2020) described the stress of teachers who “felt overwhelmed and unprepared to use online or remote teaching strategies and tools and they struggled to adapt their pedagogy to fluctuating situations, such as students’ unreliable Internet access, changing personal needs, and unclear or shifting educational or governmental directives” (p. 191).

It was important for all stakeholders, and particularly in this scenario with teachers, for an opportunity supported by administrators to foster an initiative to engage in SEL as a strategy to improve teachers’ social emotional competence (Katzman &
This applies to teachers’ well-being, which is important for learning self-regulation strategies so that they are able to apply these skills in order to be supportive of their students, as demonstrated in an SEL study conducted on teachers, that taught stress reduction and prevention (Lang et al., 2020). As a matter of future practice, an SEL initiative that embraces all stakeholders will contribute to more stability and positive outcomes.

**Future Practices**

Future practices were primarily informed by the open-ended responses that replied to what teachers may bring into their post pandemic practices. Special education teachers frequently noted that there were certain technological elements from ERE that will be beneficial. The use of videoconferencing was one of the most mentioned aspects, as a tool for increasing parent engagement and participation in activities and IEP meetings. The use of instructional platforms was also widely referenced, citing the ease for presentation, organization, and data collection. Other applications were mentioned as useful tools to engage and enrich student participation and learning including the use of personalized audio, video and slides. Special education teachers will benefit from various technical training and professional development initiatives including facilitating an inclusive SEL format that encompasses all stakeholders. As technology is increasingly infused into daily practices and functioning, this utilization will continue to increase expansively across educational activities environments.

**School Characteristics**

The comparison of means across the independent variables revealed a noteworthy finding. The only significant differences between the demographic characteristics of
special education teachers reported was across 5 items in the Technological Perception component for educational attainment. All of the remaining 58 significant mean differences across the majority of survey items were attributed to school characteristics. This implies that individual demographic characteristics of special education teachers were not a factor in how they perceived their experiences. Conversely, several school characteristics demonstrated how these environmental factors impacted perceptions in the ERE context. Well-resourced schools produced higher values than those that were considered historically under resourced as indicated by characteristics such as district locale, Title I, and charter. Schools that did not participate in connectivity initiatives, 1:1 computing initiatives prior or during the pandemic perceived less knowledge, skills, preparation, support, and resources. This implies that factors such as funding, access to resources and technological infrastructure impacted several aspects for all stakeholders. The recommendations for best practices provide various proposals for how to address these issues. However, there are many engrained systemic mechanisms that abet the perpetuation of these dynamics, and significant reform initiatives will be necessary to bridge the gaps at all levels. Local, state and federal officials, including law makers play a role in shaping policies. This includes federal legislation like what was passed in 2021 called The American Rescue Plan Act, which provided over 100 billion dollars in relief funding directly to local school districts based on the Title I funding they received, and invested 65 billion in broadband infrastructure to provide the 30 million Americans without access, which includes several million school aged children (ED Review (2021)).
Recommendations for Best Practices

The implications, based on the interpretations of the C-SETS and outlined future practices, are the foundation for these recommendations for best practice for teacher preparation, technical training, ongoing professional development, administrative support, communication and collaboration for engagement, access to technology, and social emotional learning. The overarching purpose is to encourage agency across stakeholders in education to apply what has been learned from their experiences to enhance future practices.

Preparation

The preliminary recommendation is for teacher preparation programs to expand on existing programming to include the development of technological pedagogical knowledge (TPK) and TPACK. This should be a priority across disciplines and should not be exclusive to those who plan to teach online. An emergent core requisite skill for 21st century education is teaching with technologies, TPK, and pre-service teachers should be exposed to a variety of the existing online tools which can be utilized in a face-to-face learning contingency (Trust & Whalen, 2020).

This should be expanded for special education teachers to learn about technical pedagogies to deliver specially designed instruction, conducting assessment with technology, employing principals of UDL, while becoming familiar with online features (Basham et al., 2020). This further needs to be applied to digital accessibility features of various technologies, assistive technologies and augmentative alternative communication. Pre-service special education teachers should be trained in utilizing technology based intervention programs and simulate or engage in field experience where there is
opportunity to engage in digital data collection processes. Moreover, preparation programs should promote field placement and study to the greatest extent possible, where pre-service special education teachers have more opportunities to spend time in the field.

Based on personal experience and professional observations, pre-service special education teachers require more robust exposure to special education policies and procedures, including the IEP process, writing purposeful measurable IEP goals, and progress monitoring practices. Programs rely on future district placements for pre-service teachers to receive that sort of training and PD, which does not provide them with all of the necessary tools and makes an assumption that the knowledge will be provided in a timely and purposeful manner.

The TPACK studies that examine preparation and PD, note the importance of not just viewing the domains exclusively, though important for fundamental skill development, but to synthesize the constructs as a necessary comprehensive skillset for pre-service teachers (Sahin, 2011). Hence it is necessary to be able to measure such competencies as articulated by Schmidt et al. (2009):

Researchers have noted the need to develop reliable assessment approaches for measuring TPACK and its components to better understand which professional development approaches do (or do not) change teachers’ knowledge, as well as deepening the collective sensitivity to the contexts in which these approaches work (or do not work) (pp. 126-7).

Moreover it may be beneficial to have such assessments measure pre and in-service TPACK to evaluate program effectiveness and identify areas of opportunity for PD. Additional measures such as the SRL and SELF-T assessments may be considered to address other aspects of human development that can influence positive outcomes for pre-service teacher in preparation to join the workforce (Huang, 2020; Lang et al., 2020).
A final consideration, learned from the pandemic, is for teacher preparation programs to consider having a course or modules on emergency preparedness in the event that ERE would become necessary in response to a natural disaster or pandemic. There is an opportunity to undergo with this type of preparation so that teachers are not ‘blindsided’ by a future event and have both the training and skills to be able to meet such responsibilities (Trust & Whalen, 2020).

**Ongoing Support**

Ongoing support refers to a trifecta of: technical training, ongoing professional development and administrative support. The need for technical training, assistance and ongoing PD was vital for in-service teachers to sustain growth, maintain skills, and expand TPACK. The findings suggest that much of the resources were in place, with the exception of access issues for students, and it was the lack of training and PD that was a barrier. There should be opportunities for all stakeholders to engage in multidisciplinary trainings, where related services personnel and paraprofessionals are included with extended initiatives to include parents/caregivers when applicable.

Schools/districts seem to invest in certain resources but fail to follow through with meaningful ongoing support (Trust & Whalen, 2020). Some will offer PD at the beginning of the school year for digital curricular programs or platforms and then teachers are left to fend for themselves for the remainder of the year. This is not the case in all instances, as the best practice is to set up ongoing PD, ongoing support groups, online forums professional learning communities, a direct conduit to administrators and a given program provider representative (Trust & Whalen, 2020). It is not an equitable practice to obtain these resources and not fully train teachers to be able to deliver in a
meaningful way, or not take into consideration contextual factors that when suppressed may be more detrimental and not technoethical (Hall et al., 2020).

**Communication, Collaboration and Engagement**

This is another vital area to promote positive outcomes. Fostering positive relationships with parents and caregivers is a crucial element for student success. The communication during the pandemic and ERE increased in part out of necessity, but also was due to new methods as a result of videoconferencing. IEP team meeting participation should continue to be offered online, in order to continue to promoting parental participation and collaboration.

This partnership should extend to increasing parental involvement with student engagement and participation. Special education teachers must endeavor to sustain meaningful communication and collaboration to promote positive outcomes for their students (König et al., 2020). This collaboration must extend beyond the teacher/parent contingency, where a multi-disciplinary approach to supporting students is employed. In the online digital context, additional parent/caregiver support is required to maximize opportunities for meaningful engagement and participation. This is contingent upon access to various technologies and digital competency across stakeholders.

**Access to Technology**

Districts/schools must continue to ensure that their digital infrastructure and provision of necessary technological resources are established. These tools are a vital aspect of the 21st century educational landscape where total access promotes digital equity for all students (Hall et al., 2020). An aspect of this access is predicated on digital competency across stakeholders. This not only includes the necessary skills for students,
but also for their parents/caregivers and for teachers. This access will be enhanced by teachers’ proficiency with skills as it relates to TPACK across a variety of applied practices.

This is relevant for educational activities across settings, where technology is increasingly being incorporated for in-person learning including supplemental online course offerings (Trust & Whalen, 2020). Access to such technology is necessary for students to engage in school buildings, at home for enrichment or homework, and in the event that educational activities have to be conducted remotely in response to an emergency. Beyond access to technological equipment, increased connectivity is essential to ensure equitable access to close the digital divide.

**Social Emotional Learning**

As districts and schools continue to promote this initiative, there should be a holistic approach for social emotional learning. While the core objective is to increase students’ social awareness and emotional intelligence, there should be an aspect for considering the SEL of all stakeholders (Schuck & Lambert, 2020). This is necessary for the emotional validation of parents/caregivers and educational professionals while promoting self-regulatory skills that can improve outcomes. The social emotional bearing of the pandemic impacted stakeholders in different ways, necessitating a need to have an inclusive forum to address and process these experiences. A consideration for the emotional well-being of all stakeholders is necessary to promote the self-care and regulation necessary for functioning across environments.
Limitations

The limitations that warrant discussion, begin with the time frame for when the survey was administered, use of social media for this study, survey item design, and researcher biases.

Timeframe

The contextual dynamics in the spring of 2020 were much different then August of 2021, when the survey was launched. The design of the survey instrument would likely have remained the same, but the results may have been different if the survey was dispensed at that time. Perceptions from the pandemic’s inception through the spring of 2020 would have portrayed a particular set of experiences versus those that spanned 18 months.

The context of this study permitted special education teachers to orient their perceptions based on this extended time period, where they were further removed from the truly unique experience and initial shock of ERE in the spring of 2020. Instead they had a complete year under their belts, removed from the initial phase of ERE. Many had either remained fully remote, in a hybrid/blended contingency or back in person. This perspective undoubtedly influenced perceptions, for some may have viewed their experiences in totality, where others may have referenced specific periods along this continuum. Perhaps certain items could have targeted different aspects of this time frame, or comparatively measured elements e.g., what was it like to perform instructional practices in the spring of 2020 versus the following year, or IEP team meeting participation and parent correspondence etc. Ideally, it would have been valuable and informative if there could have been a pre and posttest type of design, where respondents
participated right before the summer break in 2020 and then took the C-SETS or some sort of modified version, the following summer, in 2021, in order to measure or gauge any differences and change from those two periods of time.

**Facebook**

The next issue was related to the use of Facebook as the primary method for recruit and administration. This involved a host of potential barriers and confounding factors. A primary critical observation questioned the characteristics of survey participants who were Facebook users, potentially impacting the representativeness of the population sample (Reagan et al., 2019). While the C-SETS study did not discover any pattern of significant differences for skills of the TPACK domains with the social media participants, the comparative sub sample was small. With over two billion users worldwide, it would be beneficial if there was a way to determine the percentage of teachers who utilized social media, to satisfy questions for goodness of fit with a given sample (Reagan et al., 2019).

The advantages of using social media platforms was being able to reach a high volume of individuals within a targeted segment or demographic of the population (Reagan et al., 2019). Potential access to over 100,000 special education teachers was levied by joining numerous public and private social media groups for special education teachers. While issues with spamming and cyber bots arose from the public groups, there was not a way to be able to definitely determine any participation rate for the totality of the sample. Where some groups had thousands of members, it was apparent that no one was viewing certain pages as they did not have any observable activity for months, including new posts, comments, or likes. Many of these pages were designed to support
special education teachers back in the spring of 2020 and had very large membership in the thousands, and yet were almost completely stagnant, yielding one or two participants.

Other private groups had a high volume of activity and the C-SETS would get buried in the feed, meaning the post was not viewable because so many subsequent postings had been established. A technique known as bumping was employed, where when one comments or engages with a posting in another manner, it would bump to the top of the page’s feed and become the first viewable post for those who visit the page. However, if a group administrator is able to pin the post, it remains at the top. This was achieved for the C-SETS with one of the private groups, but if others were willing to support in this manner, there likely would have been a much more significant volume of responses. Only one administrator was responsive and willing to provide data for this study to gauge various data to determine participation rate. Estimates based on the different subgroups of the survey population provided data on participation rates, but an estimate to make a conclusion cannot be drawn because of so much unknown variability.

Many funded studies utilize Facebook for research and utilize various strategies, including ads, to recruit participants (Reagan et al., 2019). The C-SETS incentivized participation with the chance to win a $25 Amazon gift card, with ten total available. There is not a way to gauge how effective this was, but it was an optional feature that required respondents to provide an email address for which 91% shared. An assortment of studies analyzed in an article that reviewed recruitment practices for research on Facebook, contained a range of studies with small and large samples (Reagan et al., 2019). The C-SETS was able to obtain an acceptable sample (n=280) but may have been able to yield a larger number of participants.
A limitation with the Facebook data was with trying to gauge how many individuals viewed the post in totality, or engaged in some manner, which included clicking on the survey link. Group administrators and moderators who had access to post performance analytic data were nonresponsive to requests to disclose, with the exception of one individual administrator.

The administrator of “Twinkl Special Education Group,” a private Facebook group, provided ongoing correspondence, support and disclosure of analytic data that were utilized for a subgroup analysis of response rate. A series of screen shots containing the posted survey’s performance were shared throughout the live phase of the survey. These reports reflected how many members were active on the page at the time of the post, how many were reached, meaning how many members viewed the post, and how many engaged by either clicking, sharing, liking, or commenting on the post. Appendix G shows a screenshot of a report that was shared after the survey was closed, depicting 481 active members who were active at the time of the post. This reflects 127 members were reached, and 50 engaged with the post, where 15 commented, 5 liked, and 30 clicked the survey link.

All 30 of the link clicks resulted in completed survey submissions, suggesting a 23.6% response rate with this particular sub population of the sample. This group also had an electronic newsletter where the survey link was posted and accessed via Facebook messenger, linking to a webpage. An additional 51 surveys were submitted via this platform, for a total of 81 completed surveys produced from this one group of 583 members on this social media platform. Fourteen surveys had to be discarded for not
meeting the participant eligibility criteria, which resulted in a total of 67 surveys, accounting for 23.9% of the participants of this study.

Another method for analysis was available via a “Seen by” tally counter on certain postings. All groups with 250 members or less automatically had this feature enabled as viewable, which could not be disabled by a given group’s administrator or moderator. Appendix H contains a screenshot of the C-SETS posted on the private group page “Teaching—Multiple Disabilities.” This group of 142 members produced three completed survey submissions and was seen by 25 members generating a response rate of 12%.

The survey link posted to eight public special education groups resulted in 11 total completed surveys, accounting for 3.9% of the sample dataset. A total of 363 surveys were submitted via five public group post links were a result of cyber survey spam bot activity. The postings were promptly closed and removed from these public sources. Multiple screening methods were utilized to limit this activity and eliminate the submissions prior to analysis. Indicators such as observed multiple submissions within seconds via the timestamp submission indicator, survey responses that were all the same number across items, email addresses that were a collection of random characters, misaligned support designations with classifications, and other general misaligned items that comported with the participant eligibility criteria abetted the confirmation that these were not legitimate submissions. This aspect of online survey research was a limitation due to the amount of time and mechanisms that had to be in place to monitor such activities.
**Item Design**

There were several items that were reworded and designed throughout the developmental phases of this study, culminating with certain adjustments informed by the pilot phase. However, there were items containing wording intended to measure certain elements, or in a manner that they had to be reverse coded for statistical analysis, which could have been avoided. For instance, for the item containing this segment “I was able to effectively use a learning management system,” it was intending to measure TK in operating a digital platform but had a subjective element of “effectively” which could have impacted responses. Item design was also impacted by the perspective and experiences of the research which will be further explained in the proceeding section.

Several demographic items could have been presented in a different manner, to elicit responses that were not difficult to code or provide a reliable response. Both classification and support type had a “select all that apply” response contingency, which made it difficult to disaggregate the responses. Moreover, there should have been a simple yes/no question asking if teachers were functioning in self-contained environments and if yes to provide a percentage range in order to determine more accurately the support type. Another item should have asked if teachers had ever taught virtually or online, prior to the pandemic, and lastly there should have been an item to determine if teachers had received any TPK training in their preparation programs.

A final issue with the item design, was with trying to classify certain items within the TPACK domains. There was certainly an assortment of items that could be placed into more than one category, but there were other items that were designed to measure certain perceptions, where there was some finagling to word them in a way to both satisfy
the intended target as well as be able to fit the mold of a domain. In fact, all of the items loaded on their respective TPACK domains, but the components were more appropriate for answering many of the pandemic specific aspects posed by the questions and produced higher loading and reliability values. As the innominate grouping emerged during the analysis, additional constructs could have been made explicit at the onset, as this aim of this study was not to validate or solely employ a singular pandemic TPACK instrument. Moreover, because of the unique contextual aspects of the study and integrating elements of the special education discipline into existing validated measures, replicated items and other constructs, the research questions were seeking answers that required some expanded design.

**Biases**

This researcher should disclose the dual role as the author of this study as well as a certified special education teacher who provided special education services remotely during the pandemic. That perspective certainly had an influence on many aspects of this study. As a special education teacher in a large urban school district, there were many observations that inspired the research questions and design. There were several assumptions that were made based on these personal experiences that had an impact on the target of certain survey items. These experiences included working with multiple stakeholders, while using technologies for a range of practices and working with students in a range of capacities. Those included providing individualized, small group or inclusive instruction, conducting assessments, and assisting with resolving technical issues, as well as providing emotional support with levity at times. There were opportunities to participate in the IEP process, attend professional development offerings,
and share the ups and downs with others while trying to be a special education teacher on a laptop. In fact much was learned and gained from each interaction, where the added novelty of the experience was this researcher had been on a special academic assignment for the school year 2020-21, where it was a new school environment, without previous established relationships. There was not any face-to-face correspondence with any stakeholders for the entire year, which added to what was a truly remarkable and unique experience, for which there is an abundance of gratitude and much was learned.

The challenge, however, was trying to separate the questions of personal interest, experience and perspective to consider the broader context. This included an attempt to recognize the diverse manner in which special education is provided across the country, including various service delivery models, policies, procedures, and terminology. A consideration had to be made for different locales, which provided varying resources and available supports. An effort was made to embrace the notion that there was a wide range of experiences and to objectively consider how to create an opportunity for all of those voices to be heard in order to capture those perceptions in an un-biased manner.

**Future Research**

The interpretation of the results, implications and limitations of this study identified recommendations for future research. This includes teacher preparation, professional development, technological pedagogies, collaboration, social emotional learning, and social media research methods. A modification of this study should be extended to gain the perceptions of other stakeholders who experienced emergency remote education during the COVID-19 pandemic. This could include: students, parents, caregivers, families, community based partners, medical personnel, behavioral health
partners, related services providers e.g., speech or physical therapists, paraprofessionals, general education teachers, public health representatives, government officials, district, state and school administrators.

**Teacher Preparation**

Pre-service teacher preparation programs should consider developing a TPACK competency measure that can evaluate pre-service teachers’ skills prior to joining the workforce and then have a post measure to reevaluate these skills to inform both pre-service programming and in-service professional development (Schmidt et al., 2009). A TPACK measure specific to special educators should be developed to gauge the necessary skills that need to be evaluated for both the learner and a given program. UDL is an example of an approach that Basham et al. (2020) suggest as a vital framework that should be taught in the wake of an opportunity to redesign educational practices post pandemic. Strategies like UDL and other pedagogical approaches should be taught in conjunction with various technology integration, including pedagogical development, training for assistive technology, and accessibility features (Anderson & Putman, 2020). Aspects of the TPACK model should not be taught exclusively, for the goal is to promote the development of a unified set of technological pedagogical and content knowledge (Hall et al., 2020; Schmidt et al., 2009; Trust and Whalen, 2020). Because many TPACK instruments are self-assessment measures, there is an aspect of subjectivity and thus should be a consideration when exploring other types of design (Hill & Uribe-Florez, 2020).

Researchers should examine emergency preparedness in education and consider multiple modalities as expressed by Trust and Whalen (2020), because there could be a
scenario where technology cannot be fully utilized to its maximum capacity. This should be built into teacher preparation programs as a supplemental component of preparedness. An aspect of this learning should incorporate methods and strategies for special education teachers to utilize in order to address the needs of their students. Teacher preparation programs should also consider expanding their program methods and features as suggested by Hager and Fiechtl, (2019) to include more opportunities to engage in content online for enhanced access for special education teacher candidates and more field based experiences with increased collaboration with school based partners.

**Professional Development**

Researchers should evaluate the offerings, applicability quality, and effectiveness of district/school technical training and professional initiatives. Feedback from in-service teachers will be necessary to evaluate the utility and purposefulness of this vital support. Teachers should be able to recommend topics and have choices based on their needs. A TPACK instrument for in-service teachers would help inform these areas of need as well as evaluate skills and knowledge. The supports should be continuous, and teachers should have some agency in the matter, as Coy (2014) recommended to perspective virtual teachers to be cognizant of different types of professional development opportunities, including what is required and what may be ongoing.

Trust and Whalen (2020) recommend that teachers participate in less formal modalities of professional development. A teacher directed approach where individuals participate in forums such as online support groups or teacher led professional learning communities would foster meaningful learning. Post pandemic research can examine these types of contingencies and respond to the question, what types of professional
development and training practices work? What do teachers prefer? What topics are chosen, taught, and by who? Other options to consider are for the ability to conduct remote PDs to expand access to those in rural districts, including the notion of forging those online communities across districts and locales (Hill & Uribe-Florez, 2020; Jameson et al., 2020).

Special education teachers need targeted professional development on developing TPACK, and research is required to inform what skills need to be addressed. Moreover, a special education specific TPACK instrument needs to be developed to help measure skills, both as a pre and posttest, to evaluate learning areas of need and mastery of content (Kaplon-Schilis & Lyublinskaya, 2020).

**Technological Pedagogies**

Further research is necessary for online assessment practices for special education professionals. The ability to conduct various types of assessment with standardized procedures was hampered during the pandemic. The backlog of assessments for educational professionals, including school psychologists, necessitated the need to conduct tele-assessments adopting certain procedures (Stifel et al., 2020). Similarly, special education teachers were required to employ such procedures to conduct the necessary assessments but need more research and professional development to inform such practices (Smith, 2020).

Continued inquiry with the use of assistive technologies (AT) in virtual environments will promote positive outcomes for engagement and participation. The infusion of AT in the TPACK model along with UDL has been the focus of study from a team of researchers (Basham et al., 2020; Marino et al., 2009). This is especially important for those individuals who require more significant supports to access their
education. This along with the integration of other technologies into a variety of instructional practices, such as the use of an iPad or other tablet technology, can help assist with various approaches as well as with planning (Anderson et al., 2017).

Schmid et al. (2020) conducted a study examining how the use of digital technologies with lesson planning compared to TPACK scores of preservice teachers. Regression procedures were employed to further investigate the relationships across the independent variables e.g., age or subject group. While only one group was found to have predictive qualities, this design should be considered for future research with special education teachers and variables such as Title I, 1:1 Device initiative, District Locale, other SES indicators and Level of education. The data from the C-SETS could be used for such future inquiry. The aim would be to see if any of these variables can predict outcomes or levels of TPACK.

**Communication & Collaboration**

Research should be conducted on videoconferencing for enhanced communication with parents/caregivers, and as a method to participate in IEP meetings (Crutchley, 2012; Lewis, 2020). Research can examine how this type of correspondence strengthens parental relationships and family partnerships, while promoting collaboration and involvement. This partnership is vital for promoting outcomes within the teacher/parent relationship for students and communities (Jameson et al., 2020; Shuck & Lambert 2020).

This collaboration leads to the necessity to develop programming to train parents to support their students with technologies and other strategies to address their diverse and unique needs. An increase of parental involvement, engagement and support is
paramount for student success. In a remote online contingency, the need to develop skills for caregivers to provide the vital support as a learning coach is necessary (Coy, 2014). This is particularly needed for a special education specific learning coach protocol, where these is scare research on this topic. Researchers should examine adult educational programming opportunities for parents to participate in partnership with districts/schools to enhance skills, engagement and community involvement. Future research should also examine the impact of intra-disciplinary collaboration on IEP team collaboration, planning, participation and outcomes. With all of these initiatives, researchers need to continue to make efforts to bridge the research-to-practice gap by disseminating findings in a manner where they can be processed and received in a meaningful way. The use of technologies can support such ventures (e.g., using multimedia interactive approaches to present findings while partnering across disciplines to collectively consider meaningful applications of such knowledge).

**Technology Access**

Researchers need to continue to investigate the initiative to close the digital gap (Trust & Whalen, 2020). This needs to be oriented from the technoeethical lens where digital equity is taken into consideration and inquiry looks beyond the basic notion of whether a given entity is resourced (Smith, 202). Iivari et al. (2020) claim that there is more to the digital divide then having access to the internet or use of a computer. They contend that there needs to be an initiative to promote the utilization of digital technologies in purposeful and meaningful ways that promote positive social practices (Iivari et al., 2020). Digital competency, technical training and collaboration will promote equitable access (Boté-Vericad, 2020).
**Social Emotional Learning**

The importance of emotional wellbeing, self-regulation and awareness are aspects of social emotional learning that are taught to students. Building upon the existing research, there needs to be more expansion of the SEL pedagogy, promoting more inclusion for educators and other stakeholders (Katzman & Stanton, 2020; Klapproth et al., 2020; Roman, 2020; Schuck & Lambert, 2020). Additional research should build on Lang et al. (2020) SELF-T (social emotional learning for teachers) course which provided resources and methods to measure SEL. There needs to be a comprehensive, holistic program to process the experiences during COVID-19 within any given community structure, be it a school, or a classroom, as the impact of the pandemic affected all stakeholders.

**Social Media Research**

Future researchers should be cognizant of posting to public pages where surveys are susceptible to being spammed, as referenced in Limitations. Additional security and screening measures may need to be in place to maintain the integrity of submissions. Another initiative for social media research should be to collaborate and correspond with administrators who are willing and able to provide the post data so that participation rates can be calculated and determined. Finally, consideration should be given to the funding aspect of a given study, as that can help generate respondents. This was a doctoral study and did not have significant funding other than an offer to give away a few gift cards. Larger studies have the resources to recruit more participants (Reagan et al., 2019).
Summary

Special education teachers embraced the call to provide support for their students during the COVID-19 pandemic. While many did not have any prior experience or training to teach online, most demonstrated the technical skills to operate various technologies in an unprecedented emergency remote education contingency. Special education teachers faced challenges with performing various duties while navigating shifting policies and confronted a reality of lacking certain skills to effectively teach their learners with unique needs, using technologies online. They had to overcome many obstacles from districts/schools lacking in providing curricular planning technical training, ongoing professional development and administrative support, to students gaining access to technology, digital competency skills, and support from a caregiver to promote engagement. Collaboration with colleagues decreased, but IEP team meeting and parent/caregiver communication increased during this period of time. There was an emotional toll as planning time increased, inducing stress and anxiety while trying to put forth their best effort. Historically under-resourced districts demonstrated less technological skill, pedagogical knowledge, and preparation during the pandemic. Moreover, schools that lacked an established technology infrastructure with non-participation in computing and connectivity initiatives significantly had less opportunity to gain access for engagement in educational activities. Nevertheless, special education teachers overwhelmingly indicated with confidence that when the pandemic ends, there were many aspects and lessons learned from this experience that will be applied to future practices.
Epilogue

The COVID-19 Special Education Teacher Survey was developed to gain insight into the perceptions of special education teacher’s experiences during emergency remote education, while seeking answers to certain questions that were relevant, before, during and beyond this period of time. The pandemic amplified several systemic issues pertinent to educational professionals, students, families, school communities and society at large, justifying a reappraisal of our current methodology and institutions. The implications of these findings could help inform a host of educational practices and influence societal shifts, as the long-term impact of COVID-19 on our civilization is yet to be realized. All stakeholders who had experienced this moment, giving pause on an impending return to the status quo, could ponder a transformative initiative for education in the 21\textsuperscript{st} century. We should endeavor to embrace what we have learned collectively and apply it to promote long-term positive outcomes, so that when we reflect back on these times, it will not portray a post pandemic dystopia, but be an impetus for opportunity and change.
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## APPENDIX A

### SURVEY SOURCES

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<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
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SURVEY MESSAGES FOR SOCIAL MEDIA

Survey Recruitment Group Administrator Message

Greetings,

My name is David Katowitz and I am a special education teacher in a large urban school district located in the Northeastern region of the United States. I am also a doctoral student at Temple University and I am requesting your assistance to ask members of this group to participate in a brief survey for my dissertation.

The past 18 months have been unprecedented times in the realm of education. Special education teachers have confronted a host of challenges to try to meet the needs of our students. I have developed a questionnaire to gauge the perceptions of K-12 special education teachers’ experiences during the COVID-19 pandemic. This research study has been designed to help improve special education teacher preparation and ongoing professional development.

The survey should only take approximately 10-15 minutes to complete, is completely anonymous and participants can enter to win a $25 Amazon gift card!

Below you will find a link to the C-SETS (COVID-19 Special Education Teacher Survey) and a suggested survey posting message. I would be so grateful if you would be willing to share this and genuinely appreciate your support.

Facebook C-SETS Posting Message

ATTENTION (Insert Group Name)!

I am a Multiple Disabilities Support teacher in Philadelphia and a doctoral candidate at Temple University. Please share your experiences teaching remotely during the COVID-19 pandemic by completing a brief survey to help improve future teacher preparation, training and professional development. Click below to begin and enter for a chance to win a $25 Amazon Gift Card!
APPENDIX C

RESEARCH SUBJECT CONSENT FORM

Title: The Collective Perceptions of K-12 Special Education Teachers During the COVID-19 Pandemic

Protocol No.: 28411

Primary Investigator: Joseph P. Boyle (Dissertation Chair)

Co-Investigator: David Katowitz (Doctoral Candidate)

Daytime Phone Number: (XXX) XXX-XXXX

Email: tuc31680@temple.edu or davidkatowitz@gmail.com

RESEARCH CONSENT

You are being asked for your consent to take part in a research study. This consent document describes the key information that we believe most people need to decide whether to take part in this research.

Why am I being invited to participate in this research?

Over the past year, dating back to March of 2020, special education teachers who do not typically teach remotely, have confronted a host of challenges to try to meet the needs of our students. A brief survey has been developed to gauge the perceptions of K-12 special education teachers’ experiences during the COVID-19 pandemic. This research study has been designed to help improve special education teacher preparation, technical training and ongoing professional development.

How long will I be in this research?

We expect that your taking part in this research survey of 42 items will take approximately 10-15 minutes.

What happens to me if I agree to take part in this research?

If you decide to take part in this research study, you will be asked to complete an online survey with 42 items and demographic questions. All responses will be kept confidential and no records of any personal information will be stored permanently.

What are the risks of this study?

There are not any risks for participating in this survey. If you choose to register for the gift cards, you will temporarily be providing personal information in the form of your
email address. While your participation in this research will be safeguarded, there is no guarantee of confidentiality.

**What happens to the information collected for this research?**

Your private information will not be shared or permanently stored. This survey will be administered online where the data will be securely stored via the survey platform application. The survey data and contact information will be password protected and stored separately from the contact information from the survey data. This contact information will be deleted/destroyed once it is no longer necessary to store i.e., after distribution of the gift cards if you choose to register for eligibility. All demographic information and survey items will be kept confidential.

**Who can answer my questions about this research?**

- If you have questions, concerns, or complaints, or think your participation in this research has caused you any harm, please first contact the research team via the phone number or email listed at the bottom of this section.

- This research is being overseen by an Institutional Review Board (“IRB”). An IRB is a group of people who perform independent review of research studies. You may talk to them at (215) 707-3390 or irb@temple.edu if:
  - You have questions, concerns, or complaints that are not being answered by the research team.
  - You have questions about your rights as a research subject.

**Will I be paid for taking part in this research?**

You will not be paid for taking part in this research, but can enter to win a $25 Amazon gift card. After the closing of this survey, a total of 10 gift cards will be randomly awarded and distributed to 10 of this study's participants who fully complete the survey and register for eligibility. Federal tax law requires you to report this if you win, as income to the Internal Revenue Service.
Thank you for taking the time to complete this survey. This research study has been designed to help improve special education teacher preparation, technical training and ongoing professional development. All responses will be kept confidential and remain anonymous. No personal information will be disclosed. Please complete the demographic information below.

**Demographic Information**

1) **Please share the year you were born:** _______________ (or) choose “Prefer not to specify”

2) **Gender:**
   (a) Female __________
   (b) Male __________
   (c) Other:: __________
   (d) Prefer not to specify
   If "Other" please provide a description if you are comfortable sharing (Not Required): __________

3) **Race/Ethnicity** (Indicate all that apply):
   (a) American Indian or Alaska Native
   (b) African America
   (c) Asian
   (d) Caucasian
   (e) Native Hawaiian or Pacific Islander
   (f) Hispanic or Latino, Latina, Latinx
   (g) Other: __________
   (h) Prefer not to specify
   If "Other" please provide a description if you are comfortable sharing (Not Required): __________

4) **Education:**
   (a) Bachelor’s Degree
   (b) Master’s Degree
   (c) Multiple Advanced Degrees
   (d) Doctoral Degree
   (e) Other: __________
   If "Other" please provide a description if you are comfortable sharing (Not Required): __________

5) **Are you a certified special education teacher?**
   (a) Yes
   (b) No I have an emergency certification, permit, or other designation to provide special education services
   (c) I was a student teacher during the COVID-19 pandemic
   (d) Additional certifications Y/N List: __________

6) **How many years have you been teaching, including the past school year of 2020-21?** __________
C-SETS Demographic Information Continued

7) Please share the exceptionalities and/or IDEA classifications of the students whom you support (Indicate all that apply):

(a) Autism
(b) Deaf-blindness
(c) Deafness
(d) Developmental Delay (IDEA Part B and C)
(e) Emotional disturbance
(f) Gifted/Intellectual Giftedness/Talented
(g) Hearing Impairment
(h) Intellectual disability
(i) Medically Fragile
(j) Multiple disabilities
(k) Orthopedic impairment
(l) Other health impairment
(m) Specific learning disability
(n) Speech or language impairment
(o) Traumatic brain injury
(p) Visual impairment including blindness
(q) Other: ________________

8) Are any of your students English Language Learners (ELL)?

(a) I do not support any ELL
(b) Less than 25% of my students are ELL
(c) Between 25-50% of my students are ELL
(d) More than 50-75% of my students are ELL
(e) Over 75% of my students are ELL

9) Please share your role as a special education teacher type of supports & services may vary by state (Indicate all that apply):

(a) Autism Support/Services
(b) Deaf-blindness Support/Services
(c) Deafness Support/Services
(d) Emotional Disturbance/Behavioral Support/Services
(e) Gifted Support/Services
(f) Hearing Impairment Support/Services
(g) Homebound Support/Services
(h) Inclusion/Push In Support/Services
(i) Learning /Academic Support/Services
(j) Life Skills or Intellectual Disability Support/Services
(k) Multiple Disabilities Support/Services
(l) Orthopedic Impairment or Physical Support/Services
(m) Pull Out/Resource Room Support/Services
(n) Special Education Support/Services in a Medical Setting
(o) Traumatic Brain Injury Support/Services
(p) Visual Impairment including Blindness Support/Services
(q) I provide supports/services in a private school for exclusively for students with special needs
(r) I provide supports/services in a private school setting (not a school for students with special needs)
(s) Other: ________________
C-SETS Demographic Information Continued

10) What ages/grades do you teach? (Indicate all that apply).

(a) Early Intervention N-3
(b) Early Childhood
(c) K
(d) 1
(e) 2
(f) 3
(g) 4
(h) 5
(i) 6
(j) 7
(k) 8
(l) 9
(m) 10
(n) 11
(o) 12
(p) 18-21

11) What state or territory is your district located in?

12) Describe you school district locale:

(a) Large city, population of 250,000 or more.
(b) Midsize city, population less than 250,000 and greater than or equal to 100,000.
(c) Small city, population less than 100,000
(d) Suburban, outside city and inside (or near) an urbanized area
(e) Town, considered in an urbanized cluster up to 10 miles away from an urbanized area
(f) Rural, Considered 10 miles and beyond from an urbanized cluster
Other: __________________________

13) Name of district (OPTIONAL):

14) Do you work in a charter school? Y/N

15) Does your school receive Title I funding? Y/N

16) Are you primarily a Special Education teacher at a fulltime cyber or virtual school? Y/N

17) Prior to the pandemic, did your school offer any programs or courses that were offered online and in-person, or in your building? Y/N

18) Prior to the pandemic, did your school offer any programs or courses that were offered online and remotely? Y/N

19) PRIOR to the Pandemic, did your district provide a school-issued device for learning, where every student had access to a technological learning device such as a computer, laptop, or tablet for use at home? Y/N

   DURING to the Pandemic, did your district participate in a school-issued or 1:1 device program initiative to provide access to a technological learning device such as a computer, laptop, or tablet for use at home? Y/N

20) DURING to the Pandemic, did your district provide resources or participate in any initiatives to promote or enhance internet connectivity for students? Y/N

21) OPTIONAL Email address to enter for chance to win a gift card: __________________________
COVID-19 Special Education Teacher Survey (C-SETS) Questionnaire

Try to recall your experiences when directly interacting and teaching students with disabilities during the COVID-19 pandemic. This refers specifically to when you were only delivering instruction fully online and remotely. Please answer all of the questions the best of your ability or select "Neither Agree or Disagree" if you are uncertain. All responses will be kept confidential and remain anonymous.

Thank you for taking the time to complete this survey.

SD=Strongly Disagree D=Somewhat Disagree N=Neutral A=Somewhat Agree SA=Strongly Agree

<table>
<thead>
<tr>
<th>TPACK Domains:</th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TK (Technology Knowledge)</strong></td>
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</tr>
<tr>
<td>1. During the pandemic, I had the technical skills to operate computer hardware, and equipment.</td>
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<tr>
<td>2. I had the technical skills to operate computer programs, software applications and web-based platforms during the COVID-19 pandemic.</td>
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<tr>
<td>3. During the COVID-19 pandemic, I supported students who consistently did not have access to a laptop, computer, or tablet during online remote learning.</td>
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<tr>
<td>4. I had students who did not have access to the internet during the COVID-19 pandemic.</td>
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<tr>
<td>5. I felt comfortable resolving MY OWN technical issues with technological equipment, software, internet applications, web-based content, and connectivity issues, during the pandemic.</td>
<td></td>
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<tr>
<td>6. During online remote instruction, I was able to help students troubleshoot technical issues with hardware, software, internet applications, web-based content, and connectivity issues.</td>
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<tr>
<td>7. During the pandemic, I received training and ongoing professional development to enhance my skills with operating technological equipment, software, programs applications and/or web-based platforms.</td>
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<tr>
<td><strong>PK (Pedagogical Knowledge)</strong></td>
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<tr>
<td>8. During the pandemic, I was able to use a variety of approaches, strategies and methods when teaching students who had an IEP.</td>
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<tr>
<td>9. Prior to the pandemic, I collaborated more frequently IEP team members when planning for my students.</td>
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<tr>
<td>10. During the COVID-19 pandemic, I understood the adjusted policies and procedures for remotely evaluating, assessing and/or formulating IEPs, progress reports and evaluations, when applicable, for students.</td>
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<tr>
<td>12. I communicated more frequently with parents and caregivers, prior to the pandemic.</td>
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<tr>
<td>13. I received professional development during the pandemic regarding special education case management policies and procedures.</td>
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</tbody>
</table>
### C-SETS Questionnaire Continued

SD=Strongly Disagree  D=Somewhat Disagree  N=Neutral  A=Somewhat Agree  SA=Strongly Agree

<table>
<thead>
<tr>
<th><strong>CK (Content Knowledge)</strong></th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>14. During the pandemic, I was effective in delivering instruction aligned with the common core and state and/or alternative standards.</td>
<td></td>
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<tr>
<td>15. My school or district thoroughly outlined a scope and sequence for the content that was delivered during the pandemic, including general education curricula, remedial/intervention programming and/or alternative content.</td>
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<td>16. During the pandemic, I had to identify and select content for my students.</td>
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<tr>
<td>17. Prior to the pandemic, I was provided training and ongoing professional development in how to teach content.</td>
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<td>18. During the pandemic I received support from an administrator i.e., a principal, school based leader, or district personnel.</td>
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<tr>
<td><strong>TPACK Subdomains:</strong></td>
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<tr>
<td><strong>PCK (Pedagogical Content Knowledge)</strong></td>
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<tr>
<td>19. During the pandemic, I was provided training and ongoing professional development in how to teach content.</td>
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<tr>
<td>20. Prior to the COVID-19 pandemic, I was more effective with planning and delivering specially designed instruction with accommodations and modifications when applicable.</td>
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<tr>
<td>21. Prior to the pandemic I used to spend more time planning for instruction.</td>
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<tr>
<td>22. I sacrificed more leisure time to plan for teaching tasks or special education case management duties during COVID-19 compared to before the pandemic.</td>
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<tr>
<td>23. Prior to the pandemic, I felt less stress or anxiety when planning and teaching content.</td>
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<tr>
<td><strong>TCK (Technological Content Knowledge)</strong></td>
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<tr>
<td>24. Prior to the pandemic, I received training in utilizing content based software programs for general education curricula, remedial/intervention programming and/or alternative content.</td>
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<tr>
<td>25. During the COVID-19 pandemic, I used an online learning platform, adaptive learning program and/or other technology based programs to teach content to students with IEPs, such as Nearpod, Lexia, iReady, Prodigy Math, Seasaw, Unique Learning System etc.</td>
<td></td>
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<tr>
<td>26. During the COVID-19 pandemic, my students utilized technology based intervention programs, such as iReady, Lexia, &amp; Unique Learning System.</td>
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<tr>
<td>27. My students had access to a technological device that could operate all of the necessary software and applications for remote online learning during the COVID-19 pandemic.</td>
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<td>28. I had students who used a cell phone to participate in remote online learning and as a result were unable to fully access content and materials during the pandemic.</td>
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<tr>
<td>Question</td>
<td>SD</td>
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<tr>
<td>29. I was able to remotely use technological programs, software, applications and/or web-based platforms to assess, progress monitor, and/or evaluate students during the COVID-19 pandemic.</td>
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<tr>
<td>30. My communication with parents/caregivers increased during the pandemic.</td>
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<tr>
<td>31. During the pandemic, I utilized video conferencing platforms such as Zoom, Google Meet or Schoology for my instructional delivery where I was able to operate the various features and tools.</td>
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<td>32. During the pandemic, I was able to guide students to utilize accessibility features for software programs, applications, and web-based content.</td>
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<tr>
<td>33. During the pandemic, I consistently had the support of a parent, caregiver, or other family member to assist students at home with operating technologies including assistive technology when applicable.</td>
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<tr>
<td>34. I was able to use videoconferencing technology, such as a Zoom breakout room, Google Meet, or Schoology to provide small group or individual instruction/support for my students during the pandemic.</td>
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<tr>
<td>35. I was able to effectively use a learning management system (LMS) e.g., Blackboard, Canvas, Google Classroom or Schoology, to organize materials and administer assignments during the pandemic.</td>
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<tr>
<td>36. During the pandemic, the overall IEP team participation increased for meetings that were conducted remotely and online, and/or via telecommunications.</td>
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</table>
**C-SETS Questionnaire Continued**

SD=Strongly Disagree D=Somewhat Disagree N=Neutral A=Somewhat Agree SA=Strongly Agree

<table>
<thead>
<tr>
<th>TPACK Unified Domain</th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPACK (Technological Pedagogical Content Knowledge)</td>
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<tr>
<td>37. I was able to use technologies to implement specially designed instruction with accommodations (and modifications where applicable) during online remote learning.</td>
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<tr>
<td>38. Using technology, I was able to promote multiple means of expression, engagement, and representation of content, to meet the unique learning needs of the students I support during the pandemic.</td>
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<tr>
<td>39. I felt stress or anxiety when I was using technology to teach content during the COVID-19 pandemic.</td>
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<tr>
<td>40. During the pandemic, I collaborated more with IEP team members to plan instruction, adapt content, and or formulate IEPs.</td>
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<tr>
<td>41. I received ongoing professional development for how to use technology to deliver remote online instruction and content during the pandemic.</td>
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<tr>
<td>42. I learned something from remotely teaching content online with technology that I will use in my future practices for in person learning.</td>
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</table>

**Additional Comments:**

(Optional) Please provide details or additional comments about any aspect(s) from remotely teaching content online with technology, that you may utilize in your FUTURE practices. Additionally, please feel free to describe interactions with any stakeholder(s) and/or any other thoughts you may be willing to share from your experiences during the COVID-19 Pandemic.
**Principal Components Correlation Matrices**

*Technological Perspective Correlation Matrix*

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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<tbody>
<tr>
<td>1. Computer skills</td>
<td>.216*</td>
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<td></td>
<td></td>
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<tr>
<td>2. Special instruction</td>
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<tr>
<td>3. Learning system</td>
<td>.312*</td>
<td>.333*</td>
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<tr>
<td>4. Video small group</td>
<td>.234*</td>
<td>.240*</td>
<td>.273*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5. Web content skills</td>
<td>.736*</td>
<td>.310*</td>
<td>.357*</td>
<td>.292*</td>
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<td>6. Assessment Online</td>
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<td>.499*</td>
<td>.430*</td>
<td>.327*</td>
<td>.379*</td>
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<td>7. Accessibility tools</td>
<td>.197*</td>
<td>.487*</td>
<td>.332*</td>
<td>.260*</td>
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<td>.492*</td>
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<tr>
<td>8. Technical support</td>
<td>.338*</td>
<td>.365*</td>
<td>.282*</td>
<td>.289*</td>
<td>.394*</td>
<td>.389*</td>
<td>.511*</td>
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<td></td>
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<tr>
<td>9. Resolve own issues</td>
<td>.519*</td>
<td>.271*</td>
<td>.255*</td>
<td>.188*</td>
<td>.609*</td>
<td>.398*</td>
<td>.335*</td>
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<tr>
<td>10. Videoconferencing</td>
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<td>.427*</td>
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<td>.371*</td>
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</table>

**Correlation is significant at p< .01 (2-Tailed)**
### Instructional Perspective Correlation Matrix

<table>
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<tr>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>1. Teaching methodology</td>
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<tr>
<td>2. Behavior interventions</td>
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<td>.319**</td>
<td></td>
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<tr>
<td>3. Universal Design Learning</td>
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<td>.313**</td>
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<tr>
<td>4. Core alternate standards</td>
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<td>.379**</td>
<td>.349**</td>
<td>.511**</td>
</tr>
<tr>
<td>5. Prior effective plan/teach</td>
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<td>.294**</td>
<td>.179**</td>
<td>.327**</td>
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</table>

**Correlation is significant at p < .01 (2-Tailed)**
### Preparational Perspective Correlation Matrix

<table>
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<tr>
<th>Survey Item</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Technology training and PD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Content scope and sequence</td>
<td>.427**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Prior training technology content</td>
<td>.357**</td>
<td>.343**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Prior PD teaching content</td>
<td>.271**</td>
<td>.399**</td>
<td>.514**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. PD teaching content during</td>
<td>.560**</td>
<td>.514**</td>
<td>.406**</td>
<td>.479**</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>6. Administrative Support</td>
<td>.307**</td>
<td>.406**</td>
<td>.318**</td>
<td>.380**</td>
<td>.391**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. PD using technology to teach</td>
<td>.675**</td>
<td>.390**</td>
<td>.413**</td>
<td>.389**</td>
<td>.629**</td>
<td>.454**</td>
<td></td>
</tr>
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<td>8. PD Special Education Policies</td>
<td>.358**</td>
<td>.336**</td>
<td>.205**</td>
<td>.274**</td>
<td>.394**</td>
<td>.352**</td>
<td>.445**</td>
</tr>
</tbody>
</table>

**Correlation is significant at p< .01 (2-Tailed)**

**
### Interactional Perspective Correlation Matrix

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. IEP team participation increased</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Collaborated more with IEP team</td>
<td>.361**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Parent communication increased during</td>
<td>.187**</td>
<td>.239**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Collaborated more IEP team prior</td>
<td>-.042</td>
<td>-.285**</td>
<td>-.181**</td>
<td></td>
</tr>
<tr>
<td>5. Parent communication more frequent prior</td>
<td>-.134*</td>
<td>-.121*</td>
<td>-.546**</td>
<td>.197**</td>
</tr>
</tbody>
</table>

**Correlation is significant at p < .01 (2-Tailed)**
**Experiential Perspective Correlation Matrix**

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Felt stress teaching</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Sacrificed more leisure time</td>
<td>0.250**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Less stress when planning prior</td>
<td>0.348**</td>
<td>0.367**</td>
<td></td>
</tr>
<tr>
<td>4. Spent more time planning prior</td>
<td>0.061</td>
<td>0.320**</td>
<td>0.270**</td>
</tr>
</tbody>
</table>

**Correlation is significant at p< .01 (2-Tailed)**
### Technology Access Correlation Matrix

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No internet access</td>
<td>.430*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Access to a technological device</td>
<td></td>
<td>.259*</td>
<td></td>
</tr>
<tr>
<td>3. Participation via cell phone</td>
<td>.349*</td>
<td>.351*</td>
<td></td>
</tr>
<tr>
<td>4. No access to a technological device</td>
<td>.387*</td>
<td>.351*</td>
<td>.210*</td>
</tr>
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</table>

**Correlation is significant at p< .01 (2-Tailed)**
**APPENDIX F**

**C-SETS**

Open-Ended Responses

<table>
<thead>
<tr>
<th>Zoom positively impacted the participation of IEP meetings. Attendance was an incredible concern during virtual learning.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without the aid and support of parents, family members and/or caregivers; in my opinion, did not receive instruction while remote. They have regressed both academically and socially. These students, that I work with, are severe/high needs individuals.</td>
</tr>
<tr>
<td>While my district did stay open during the pandemic, many of my students and their families chose virtual learning. My students have severe multiple disabilities and relied on someone else to access technology. This person did not always understand how to assist the student to utilize the lessons or provide feedback to me. Emailing packets of work and receiving description of student's participation was the option. This did not assist with progress monitoring or IEP documentation. I know my students were stimulated through activities, and parents/helpers did their best.</td>
</tr>
<tr>
<td>When preparing for substitutes we will continue to use Google classroom to house materials, even if students do not access Google classroom anymore at this time.</td>
</tr>
<tr>
<td>We went back to in person last fall and only 2 students received online instruction delivered primarily by a para educator.</td>
</tr>
<tr>
<td>We used google classroom where daily assignments were available to students. We met daily via google meet to review daily work. some students were unable to access computer without support of family</td>
</tr>
<tr>
<td>We did not have access to much of the online supports or technology as we are a separate location school for severe/profound special needs students and we do not get most of what students within the school district do. It is very sad to see</td>
</tr>
<tr>
<td>We are a full inclusion district so this offered the opportunity to provide individual instruction</td>
</tr>
<tr>
<td>We already used 1-to-1 iPad technology with easily-adaptable reading assignments, with the expectations and qualifications for meeting or exceeding mastery in assignments before the pandemic. Our standards-based grading was &quot;sliding scale,&quot; making sure that students' needs were met, including grades that reflect their own scope and relative competency. A student on a 2nd grade reading level could still meet mastery in a 7th grade standard if they could write a framed paragraph with direct access to notes, because it showed that they knew how to access the information, even if putting it into the right order or with appropriate grammar. The objective is not to show that they can meet mastery in 5 standards in the same sentence.</td>
</tr>
</tbody>
</table>
Using Schoology to connect lessons in a place that also allowed feedback and grading was helpful when teaching virtually. Students/Families were also able to preview material when needed to help them prepare and know what we would be focusing on.

Use of some interactive sites has proven useful as we are not to use "workbooks or handouts" due to the pandemic. In addition, in my self-contained classroom, we are almost always teaching asynchronously; consequently, we will continue to use these tools. Anything we actually "needed", we had to find or learn on our own. In addition, our district went all Microsoft and blocked all Google apps. In our quest for how tos, everything was geared toward Google Classroom. Very difficult for us.

Use more constant engagement tools like nearpod or pear deck

Training parents of students with severe disabilities on resolving technological issues and supporting me on perform mandatory assessments was an ongoing struggle.

This remote year was so my first year in an MDS classroom. Adapting instruction for remote learning with students who are non-verbal and minimally responsive was a definite challenge, particularly with regard to progress monitoring/ goal work. The up side, for me, was the ability to develop stronger relationships with families and to give them ideas of how to work with their children.

There were some students who could not participate at all when we were teaching remotely or were able to participate minimally. One student thrived but needed constant adult support to interact. Parents who continued to work through the pandemic struggled to support students in instruction and have care for students at home.

The use BOOM cards was beneficial for students in the classroom to reinforce skills learned. These same students then became familiar with the program to use during virtual days to continue practicing learned skills. This is definitely a program I plan to use this upcoming school year. So in the even we do have to go virtual, they will already be familiar. Same with ULS.

The uncertainty made it difficult to plan. During the spring of 2020, I came up with my own schedule for students and set up consistent live instruction with little guidance. During the 20-21 school year, when we were remote, I had continuous support from everyone but was having a hard time helping my students in a whole group.

The technology I was given to teach from was inadequate for what I needed. More was expected of me than teachers who were teaching in person. I planned and taught two classes per period. I had triple the iep duties due to having to keep data and make new goals, objectives, and present levels for every student I taught.
The primary impediment to my instruction online during the pandemic was that most students lacked any computer skills and could not understand vocal directions to engage with content. As a result, parents/caregivers functioned as 1:1's. It worked but was almost entirely reliant on parent participation from home for hours daily. One solution might be for the district to arrange for home support with safety protocols to support students and families.

The most support we received was from each other (spec Ed teachers). Our administrators had no understanding of Google Classroom, yet tried to direct us. Since returning back to school, I have continued to use Google Classroom & create google forms, slides, docs for certain lessons.

The loss of tactile opportunities was detrimental for my students; they did much better once they could touch things.

Technology was a constant struggle. Many parents of my caseload students didn't know how to operate an iPad. Technology was overloaded. There was no guidance for what to do if students didn't complete work or log onto teams meetings so I had multiple students that just didn't complete the work all year. We were given an online platform (Schoology) and promised formal training but the Schoology professionals were not able to work us into their schedule and we started the school year blind. They ended up putting a self-paced learning guide in a Schoology sandbox class for us to use. Teachers were so overwhelmed with everything else many didn't complete the training. We were also expected to simultaneously teach remote learners and in-person learners at the same time.

Teaching virtually was the hardest thing that I had ever done. I spent endless hours planning lesson and doing daily logs everyday. My students' parents struggled with having their child on all day and having to assist them. My students were not able to operate their Chromebooks on their own and relied on the support from their parents at home.

Teaching students with severe autism, the online resources I developed and used were mostly to community with my classroom families. I also sent home binders of printed work every two weeks, mailed materials directly to families, and purchased hands-on manipulatives and had those shipped to families too.

Teaching remotely provided a unique view into my students' lives. I had families who joined in and supported adapting surroundings and helping students become more engaged, successful, & accountable. I was thankful for the families who were honest about their frustrations and asked for help, so it strengthened our partnership and my effectiveness in teaching and increasing engagement for learning. I also had a family who sat next to their student all day long and told him the answers (offscreen) even when I was trying to teach him how to read/spell in a one-on-one situation and would not let him try. This was the only student whom the classroom teacher and I could not rely on independent work he submitted, as it did not reflect HIS abilities....but actually set him up for tough times come this fall if the family decides to let him learn in person.
Teaching during the pandemic was extremely stressful for me. It didn't appear to me that staff and their mental health was important to administration. Many teachers were well during the pandemic and no one seemed to care!

Teaching did not go well in March 2020 when we had to quickly go to distance learning. Many of our students didn't have internet, or parents worked so they couldn't come on my zoom meetings during the day. I gave my cell phone number to all the parents on my caseload because distance learning was very hard and frustrating for everyone. Consequently, I was "working from 8 am until 10 pm. My school did a really good job helping us get ready for all 3 contingencies for fall 2020 and our elementary school was one of the few public schools in my state to be in-person learning all year. We got training for Zoom, Seesaw, etc for that school year.

Starting in August, 2020, I had to teach both face to face and remotely. From January- June - both at the same time.

Sped students didn’t benefit from concurrent instruction

Special ed students need in person learning

Some of the software programs.

Since teaching fully remote, I have become a lot more knowledgeable and tech savvy. In the words of my students "MsEspo, you have come a long way with your technology skills."

Since my students are nonverbal and have complex bodies they needed a learning partner to be with them for remote learning. Therefore I had access to parents or learning partners every day and therefore the adults were learning just as much as the students during our time online. Many parents commented on learning just how much their child could learn and communicate which they didn't necessarily see regularly when we were in the building learning and they were working

Remote only worked if there was an adult sitting in the same room as the student. Being able to take a glimpse into the the homes was very telling and helped to explain some questions about behavior.

Remote learning taught me that students enjoy working with tech and allowing them the opportunity to continue it post covid would be to their benefit. We also received very little PD. School admin was very helpful, upper admin was not. We had to go through the union for basically everything to get any support from upper admin.
Prior to COVID I used my smart board and occasionally the students brought in their iPads. Most work is done with paper and pencil or hands on. My district used Canvas/Big Blue Button for daily conferences and Zoom for IEP meetings. More parents showed up during Covid than prior to Covid. Testing was done virtually using dry erase boards that they would hold up and later the students used the private chat to submit answers.

Parents just do not care much about their child's daily learning nor do they have ability to discipline their kids or motivate them nor are they even educated enough to help w content. This pertains to 95% of parents at my middle school.

Parent involvement did not change during the Pandemic. Most parents are not aware of what is being taught.

Our area is economically poor. Many did not or could not access internet service. If internet service could be accessed, technology such as computers, chrome books, laptops were not available. Parental support was not always forthcoming. Our children suffered greatly educationally during this time. We were able to continue in school instructions most of the school year. Quarantine practices were upheld limiting times of instruction to different students.

My students made more gains attending remotely due to the decreased behaviors and distractions in the classroom. Parents were more involved and engaged in their child's learning.

My students have severe disabilities. They relied on their parent/guardian to log them onto the computer daily. If the parent/guardian left, my student had no support. My students also do not attend to a screen for long periods of time. It was very difficult to get the parents to log onto school multiple times a day. So my students did NOT get the appropriate amount of service hours that their IEP stated. My students focus for 10-20 minutes, then need a break. Virtual learning was horrible for the low functioning autism or ID students.

My students had difficulty in sitting in front of the computer and staying focused. There were issues with internet or hot spot connections. At times a student would have to use one of his parents IPhones to connect. Some of my students would literally get up and leave the computer. An adult in the home was needed to keep the student seated and focused. I work in Los Angeles in a heavily Hispanic population. Blended families might reside in one home or apartment so finding a quiet space was also a major problem. All in all I think the parents and students did the best they could but it was a difficult situation in which to teach.

My students are unable to access tech without assistance. Half my class recieved help and attened zoom classes. Half did not get help, so they never accessed any classes. I have MD/VI/Blind and Deafblind students.
My students are in a self-contained autistic class with limited verbal skills as well as academic skills with English as a second language. Without adult supervision, students would not participate or complete any assignments. They also had difficulty using computer to go from one platform to another. I would have to deliver paper assignments. These assignments then would not get completed as adult supervision was necessary.

My school district was not a 1:1 computer device district prior to COVID-19. Post pandemic we will remain a 1:1 device district so students will be able to learn more computer skills and tech. I will use Flipgrid and Nearpod in my future practice.

My morning meeting slides and videos will be used in the future. Along with my botmoji flat teacher class project.

Most of my students do NOT have internet (all but 1). We were also in person all last year with a week of distance learning. This was mostly due to the majority of our district not having high speed internet. We were out from March-May in 2020 with the students doing paper packets and limited online work.

Many parents did not take remote learning seriously. They needed constant reminders from me to get dressed as if they were in school. Many students or their parents signed them on. They had their screen turned on all day. In my prior school I was told to mark them present even though I knew the student in the virtual classroom.

Many of the special education PDs (especially for learning support) were a joke and asynchronous so they didn’t help much at the district level. All the PDs at the school level were for the regular education teachers. So while they can say they offered trainings, they weren’t very useful.

Jamboards, drag and drop PowerPoints, brain pop and abaya. I didn’t start teaching until the 20-21 school year (graduated in a pandemic). I was given no direction as my district stubbornly tried to stay open despite it all.

It was fortunate that the school system I work for provided chrome books and hotspots for students that did not have internet and ways to participate with remote learning. The biggest obstacle was getting students to join the Google Meets and participating in class. Students often muted mics and turned cameras off, and I did not know if they were “there” or not. It was stressful trying to troubleshoot problems with logging into programs. I often made how to videos with step by step instructions, but often found students still struggled. I offered additional sessions that special education students would not attend for extra support. Documentation of services was extremely stressful and difficult to keep up with. Most teachers spent their own money to buy iPads and pencils to teach, so students could effectively see problems worked out on their screen. I learned how to write with a mouse but took additional time to make it legible. I created most of my own activities and spent hours researching ways to help my students learn new material and work in IEP goals. I had about the same participation for IEP meetings. Most parents were ok with meeting virtually or over the phone for IEP meetings.
It was a mixed bag for the students as it is now, either their parents support or they don’t. The resources were there for the kids but it was up to them and their parents to ensure they were using it. The communication to staff changed almost daily and it was frustrating.

Jamboard was a life saver!!

It brought me to have a better relationship with the families.

In some ways, using online platforms made grading easier, however, the types of questions available didn't always lend themselves to working with students with unique learning needs. By the end of the initial shut down last spring, parents, who were just as stressed as the rest of us, expressed their appreciation of just how meaningful the instruction and support was, despite not being face to face.

In my opinion, my students did not try their best because their parents were there, giving them the answers. I strongly suggested that parent let the students answer the questions, especially during an assessment. When pareanswer, it skews the data.

In my current position I work with High school students, and I do more case management than direct instruction, but the hope is that my case management helps to guide instruction for my students. Doing this job during the pandemic was really a mixed bag. Most teachers were great at providing feedback, attending meetings, and signing paperwork. But then others struggled to keep up with the amount of virtual communication. Some of our students didn’t engage with virtual instruction, despite several attempts to work with them to solve issues and guide them in using the online platforms. Our Community Outreach office did an excellent job ensuring students had laptops and they even worked with Comcast to get some families access to WiFi. Some parents seemed more engaged and actually attended meetings because they were able to be phone conferenced in, as opposed to having to come into the school building. This was super beneficial. But then others would dodge calls and emails. Overall I feel we as a school really did our best, but again there were a lot of both positive and negative experiences through the last year.

I will utilize Nearpod for my future classes. It's a great online tool. I didn't use so many online tools in my teacher life than last school year, during the pandemic. I had to use my private time to learn how to use everything online.

I will use ULS and boom cards going forward. I also plan to use educational videos to support my teaching.

I will use the skill of making interactive Google slides to use during lessons

I will continue to use the content I put on schoology in my sessions. I will continue to use a virtual meet for my home school students, as appropriate.
I will continue to use Remind messaging, Canvas assignments & Zoom for additional ways to engage with parents and students.

I will continue to provide online web-based content for at home practice and use by parents when interacting with their severely disabled child. My biggest problem was that my students could not interact remotely on their own, so parents had to invest a great deal of time to help their SPED child compared to their regular education students. I had one family that let me know that with one computer in their home, the other 3 children took priority and they did not use any face-to-face or guided learning activities during the whole 15 month closure. Another parent got so frustrated with the simple learning activities that were mailed home and were posted weekly that they completely gave up after one month. It was not a successful year for any of my profound-severely disabled students.

I will continue to create and use Boom Learning Cards with students for recreation leisure and instructional use.

I will continue to assess skills through our LMS as it saved me time grading.

I will be using Google classroom to post activities to do at home as well as messages and notices to parents.

I was never able to implement an effective method for my nonverbal students to participate in class. They were often just sitting there because they were unable to complete activities independently or did not have assistance to complete activities. We use Canvas, but for my students it was just a place to go to find the daily meeting link. I only had 1 student who consistently turned in assignments in canvas. We never had the chance to help parents learn the systems and programs we used, so some of my students were not able to benefit from virtual learning.

I was able to make and find a lot of resources that my students could use online, and I plan to continue to use to stop wasting paper! Teaching remotely overall, especially in the sped world was very challenging. I felt like there were many gray areas with very little answers.

I want to continue to use zoom as an option for IEP meetings to increase parent participation.

I used lots of slideshows and more effectively used Schoology to make things accessible to students. I also used apps like notability and interactive games.

I use more ebooks from sites like epic!, ReadingIQ, and Vooks, as well as resources from Twinkle and other websites that I never used before.

I turned many of the interviews of students and goal progress monitoring into FORMS to track data.
I teach transition-aged students with intensive disabilities. I designed online vocational lessons that were preferred by some students over hands on lessons. These will be incorporated more in face-to-face instruction this year. I used more social emotional learning and embedded it in transition work during zooms. SEL became a very important need among the students.

I teach students with severe/profound needs. The parents didn’t realize all that their students were capable of when we worked together as a team.

I taught students on the autism spectrum. All but one had a parent sitting with them. This student was not able to participate, complete work, or use Google Classroom.

I taught special education variety of students outside of my certification. Struggling adjusting to accommodate disability

I struggled given instruction to my students. Many of my parents had to access video sessions for my kids due to their ability levels. Due to kids behavioral issue parents decided not to participate in any video sessions.

I saw students fall behind during the pandemic. Some students found themselves at risk due to abuse and poverty, heightened by pandemic stress. This cannot happen again.

I realized that my students weren’t submitting assignments through our LMS because they couldn’t read the directions to the posted assignment or the emails reminding them to do the work. I started giving each group of assignments specific emojis in the title of the assignment and using voice recording software to turn the written directions into audio format. The emojis gave me a visual to reference when I mentioned a missing assignment and it gave them a starting point to look for the assignment. I embedded an audio tag into all of my emails so my students could ‘read with their ears’ the emails I sent to them. I continue to use an audio tag in all of the emails I send to students.

I provide special education services to preschoolers in their classrooms, and, during the pandemic, to a multiply disabled older student at her home. I was not given any support by my agency; we were responsible for figuring out how to teach remotely on our own.

I never used Google Classroom or Zoom before and learned how to use them ON MY OWN and continued to use Google Classroom with in person learning.

I learned to use specific digital tools (maybe 2-3) that help my students learn best instead of trying to use 5 or more tools in my lesson plans. Also, I learned that less can mean more during online teaching. I would plan an excess amount of work and fly through instruction, but quickly I realized my students required a slower pace and more repetition of the content.
I learned that my students were so vulnerable in this whole COVID shut down. Some with parents who did not make sure they had time set aside for our session or some who had horrible internet connections even using a district provided hot spot. I did communicate more with my parents either by phone, email, or even in zoom. I know so much more about my student home situations (good and bad). I was able to get parents to attend virtual ieps on line easier. Many seemed to prefer this method. Our district did not offer any PD for Special Education. Our tech resources were running thin helping Gen Ed teachers after which they helped SPED. Most importantly the majority of my students regressed. Those that did show growth had strong home support (usually a stay at home mom who devoted her time to making sure her child accessed all areas of services, and instruction offered to their students.

I learned more from YouTube and Tik Tok than I did from my district.

I learned a lot and adjusted a lot but I prefer in person learning.

I have previous experience with teaching virtual School 10 years ago I was an online teacher for three years and I use platforms such as blackboard angel and Moodle

I have a better understanding of Google Classroom, Zoom and Google Meet. I will continue to use the aforementioned platforms during my professional career.

I had to use more of my leisure time to create virtual resources & my own finances to purchase virtual resources since none were provided to me from my district. I was not offered any training on how to use technology or virtual platforms. I survived by using the websites teacherspayteachers.com and boomlearning.com

I had to get a Google voice number while working from home so parents could contact me via phone. I was usually in contact with parents weekly.

Technology was a struggle when it came to writing notes or just demonstrating a tasks with students. It took weeks to figure out how to just TEACH virtually.

There was only special education training regarding virtual ARD procedures and verbiage for IEPs during a virtual setting. No information on how to to TEACH special education students from home. Quite a challenge

I had Learning A-Z funded for my class and another Special Education class and I signed up for Boddle Learning (math). My students needed a learning platform that was fun in math and reading. They are too old for SmartyAnts and became bored of it.

I gained new knowledge of online programs and platforms that have given me new opportunities to use online learning in my brick-and-mortar classroom. I also was introduced to many new websites that provide a wealth of knowledge and activities that can enhance student knowledge and engagement. Remote learning has enhanced my relationships with colleagues due to the need to pull together to support each other and to share ideas and expertise in online learning.
I found it extremely difficult to help my online resource students with work or teach them lessons. Majority of the time there were TVs on, siblings and parents interrupting. Video games being played etc. with their attention elsewhere or distracted I felt like I was not helping them at all.

I felt uncomfortable with technology even though I had more training than most older teachers. I imagine that younger teachers were not as upset by the increase in technology. I did develop a virtual classroom that I will continue to use. I had students who had no contact with me or any other teacher/administrator. I suspect that was due to financial difficulties. Even parents who were doing well and seemed to have access to technology did not necessarily provide or encourage proper interactions with technology. It has been a very sad time, especially for children with special needs.

I embraced the use of Google Slides to present materials. I will continue to do this to make the curriculum (Unique learning system) more exciting. I like to add my bitmojie, gifs and embed relevant learning videos. I also learned the value of BOOM cards, especially for the lower level students. I have a library full of activities. I have used TPT (teacher's pay teachers) for years, but would have truly been lost during DL without it. I purchased materials ALOT. (With my own funds)

I changed districts between the onset of covid and last school year. One district offered no advice for sped, the other has zero technology for students

I became very familiar with the Unique Learning System. I will always use the system to teach my special needs students.

I became very familiar with Google Classroom. Google was my students’ favorite platform.

I am using a lot of programs online that help with "Speech to Text" and "Voice Typing". I am using whiteboards to create interactive lessons. My district was not flexible with times and instruction with my physically impaired students. It was difficult to keep my student with ASD on task when online for 6 and a half hours a day. Many of my students love technology, but they missed the social interaction, life skills, community based instruction, and therapy that they would have had in person.

Google slides for adaptive books

Google Classroom MUCH more effective than Canvas for my students.

GOOGLE CLASSROOM

For students who cannot read or write, I now plan to use online resources that I didn't know about prior to the pandemic. Boom Cards, Pink Cat Games, and Education.com have great resources that can help these students practice their skills at home with their parents.
Early in the pandemic I had weekly check ins with my students parents. I was able to connect with them in a way I had not previously in my career.

During the Pandemic several of my students did not have internet access in their homes and were not able to access internet with any consistency. One big issue with teaching remotely was getting students to participate/log in when I was online or to respond to email or even phone calls from me. I had better luck with getting parents to respond but not all of them would either. The students I worked with were middle school and high school age and were often home alone during instruction time. Parents were often unaware the student was not logging in or that they were not doing their work. I entered the pandemic with limited technical knowledge and had to seek assistance as needed (often asking several people before I could get the needed help) and basically figure it out for myself.

During the March 2020 shutdown my students didn't have access to technology. The next fall 2020 in my district students and parents were able to change learning paths pretty much whenever which left me doing virtual/hybrid/in-person all at the same time.

During the COVID-19 Pandemic, I was responsible for educating 10 students, most of whom are nonverbal and requiring high levels of support (hand-over-hand, hands-on manipulatives). My biggest struggle was participation. When I did get student participation via zoom, it was difficult to maintain attention; attending skills were low for in-person instruction to begin with). Some parents were very difficult to get ahold of due to their demanding work schedules. Unique Learning Systems is the program I used to present all of my academic content. Before the new updates, I was unable to view student work and was only told if the work was completed or not. Furthermore, I was unable to tell how much support a child received on work. I am tech-savvy and was able to adapt a lot of resources for my unique learners, but I was not able to meet many of their needs on a digital platform.

Due to disability not all students were able to access remote learning at all. I printed materials and delivered them to their doorstep regularly.

Difficult with students using AAC devices and when it break down no way to communicate.

Communication is key through our all aspects of teaching. So many problems were solved and avoided when I talked with parents and their child. So many opportunities and good lesson were developed through clear honest and open communication.

Chat feature allows more quiet students to participate. Digital organization of materials. Digital "copy" of work to easily organize IEP goals/progress. Digital manipulatives, books, programs, access to curriculum. Parent correspondence/attendance to meetings are quicker online.

Being forced to use technology to teach made me learn how to do things on my own. I also became more comfortable with it. I now incorporate technology in most of my lessons.
Because I teach medically fragile/ severe/ profound, technology is NOT how you teach this population. We tried all kinds of things, but it just wasn't a good situation.

As a Special Educator in a residential setting, I was on campus during the Pandemic providing instruction in the classroom and from the residential setting both in person and remote to one student who remained at home.

As a music teacher working in a self-contained school, my macbook was very helpful. And pulling out a guitar and singing was good too. The students and parents appreciated even simple activities that built community (singing). I'm trying to keep things (somewhat) simple now that we're back.

All of my students were supplied with an iPAD and internet during the pandemic. I learned how to use the jam board and am looking forward to using it in the classroom in Sept if the school district allows the students and staff to use the IPADs in the classroom. I found several programs that I was able to use for 1 month for free that I am in the process of trying to get my school to purchase a licenses for.

Communication from administration was conflicting and changed from week to week. Our tech support person worked 24/7 to remotely assist with problems we encountered, but she was pulled in so many different directions, it was impossible for her to always respond when we needed her help. This was frustrating, and when encountering software glitches, internet issues, etc., we were often changing lesson plans on the fly because what was planned didn't work at that time. Many of us encountered "failed" digital lesson plans because what we spent hours creating didn't function they way it should have. Was this due to lack of training and experience with the platform or program? Probably. We were also one of very few districts in our area that continued a full day schedule even when we were completely remote. For my special ed students, I was to designate "office hours" where students would visit me for one-on-one instruction. Many students simply begged off that time because they were so tired of sitting in front of a screen. I couldn't blame them. We also experienced students receiving "help" and cueing from parents in real time during instruction. Students were muted and parents were standing off screen. It was difficult to assess what the students were actually understanding and retaining. Many of my students were sharing rooms with siblings who were also receiving instruction. When they would " unmute" I could hear other teachers talking. The noise level and distractions they had to try to filter out was relentless and overwhelming for most. Obviously, it was not an ideal situation. Some didn't have a desk on which to work - simply sitting on a bed or in a livingroom chair with no place to write. Organization of materials was difficult for them as well. All of this made teaching laborious, frustrating, and extremely stressful.
## Twinkl Group Survey Post Performance Data

### Performance

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### Interactions

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### Comments

- 15

### Link Clicks

- 30

### Other Clicks

- 0

Reported stats might be delayed from what appears on posts.
ATTENTION MULTIPLE DISABILITIES TEACHERS! I am a Multiple Disabilities Support teacher in Philadelphia and a doctoral candidate at Temple University. Please share your experiences teaching remotely during the COVID-19 pandemic by completing a brief survey to help improve future teacher preparation, training and professional development. Click below to begin and enter for a chance to win a $25 Amazon Gift Card!

COVID-19 Special Education Teacher Survey (C-SETS)

Greetings, my name is David Katowitz and I am a special education teacher in Philadelphia, Pennsylvania, as well as a doctoral candidate at Temple University.

The past 18 months have been unprecedented times in the realm of education. Special education teachers, who do not typically teach remotely, have confronted a host of challenges to try and meet the needs of our students.

I have developed a brief survey to gauge the perceptions of K-12 special education teachers' experiences during the COVID-19 pandemic for my dissertation.

This research study has been designed to help improve special education teacher preparation, training, and ongoing professional development.

DOC.S.GOOGLE.COM
COVID-19 Special Education Teacher Survey (C-SETS)
Greetings, my name is David Katowitz and I am a special educati...

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