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## Access and Inclusion of Students with Disabilities in Virtual Learning Environments: Implications for Post-Pandemic Teaching

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**ABSTRACT:** This article reviews the extant literature showing impacts of the COVID-19 pandemic on access to inclusive education for students with disabilities. It also explores the disproportionate impacts of distance learning and school closures during the COVID-19 pandemic on the legal rights, social-emotional supports, and quality of instruction for special education students and their families. Early data show that educational impacts of COVID-19 have exacerbated long-standing issues of inequity; these impacts may have long-term repercussions for this underserved group of students. The authors introduce frameworks that may inform future instructional practices to successfully teach students with disabilities in virtual learning environments.

**KEYWORDS:** Digital learning; special education; social justice; teaching strategies

Literature Review  
Improving Quality and Access  
Conclusion  
References  
Author Contact

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On March 11, 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a pandemic. Soon after this declaration, the U.S. Center for Disease Control (CDC) issued guidelines that were aligned with those of the International Red Cross to slow the spread of the novel coronavirus, mitigate stress on the U.S. health care systems, and protect society's most vulnerable populations. The guidelines included the following components: social distancing, quarantine, and isolation (Red Cross, 2020). These drastic measures required teachers, schools, and parents/caregivers to abruptly shift from in-person classroom instruction to online instruction. By May 24, 2020, over 60% of the United States' PK-12 students were receiving services exclusively through virtual learning modalities (Fields et al., 2020). At an emergency meeting of the Global Online Learning Alliance in April of 2020, policymakers from around the world observed that "twenty years of talk of digital literacy and educational preparedness for the knowledge economy has been condensed into 20 days of urgency" (Caldwell, 2020, p. 11). School closures across the U.S. and around the world resulted in dramatic changes for more than 1.5 billion students and their families (UNESCO, 2020a). Students with disabilities, an already marginalized population, were particularly vulnerable to the many educational, physical,

mental, and socio-emotional effects of the COVID-19 pandemic and the abrupt conversion to virtual learning.

Because of the inequitable impacts of the pandemic upon children with disabilities, children from economically poor backgrounds, and second language learners, this international crisis brought renewed focus and attention to the pre-pandemic disparities of access to quality education for students with disabilities as compared to their non-disabled peer learners (Toquero, 2020). These long-standing concerns regarding equal access to education under the law—including high-quality instruction, inclusionary practices, culturally relevant behavioral and emotional supports, and culturally and linguistically relevant diagnosis and instruction—have increased calls to ameliorate these inequities. This paper will outline the nature and impacts of these inequities as well as some solutions to the current inequities in virtual learning environments for students with disabilities.

### Literature Review

Individuals with disabilities represent the largest multicultural minority in the world (Azoulay, 2020); yet, the educational outcomes for this prevalent minority are bleak. Worldwide, students with disabilities are less likely to complete primary or secondary education, are less likely to achieve basic literacy skills, and are more likely to be income poor (UNESCO, 2019). The Salamanca Statement and Framework for Action on Special Needs Education (1994) was written and adopted by the United Nations with representation from educators and activists from several countries. The Salamanca Statement was developed in response to the urgent need for nations to ensure the rights of all children with disabilities. Among these rights affirmed by the United Nations was the right to inclusive education (UNESCO, 1994; 2020b). Many experts in the field of special education concur that inclusion and access to the general education curriculum or Least Restrictive Environment (LRE) is a cornerstone of the social justice rights of students with disabilities and their families (Artiles, et al., 2006; Lewis, 2016). While children and adolescents in many countries, including the United States, have benefited from their governments' ongoing efforts to preserve inclusive education for all children, the global pandemic has eroded access to inclusive learning environments for students with special needs.

In the United States, approximately 14% of school-aged students from 3-21 years old are identified as having a disability ([www.ed.gov](http://www.ed.gov)). To ensure quality education for these students, federal special education law requires that they be educated in the least restrictive environment (LRE) with their neurotypical peers. This same law guarantees free and appropriate education (FAPE) for children identified for special education services law (EHA, 1975; IDEA, 2004). Although IDEA (2004) identifies the general education setting—with appropriate supports and service—as the LRE for most students and children with disabilities, exclusionary practices continue to perpetuate segregated settings for many students with disabilities. For example, only 65% of students with disabilities aged 6-21 years old spend 80% or more of their school day in the general education setting. Among students with extensive support needs (ESN), only one in three

spend more than 50% of their day in the general education setting (Irwin, et al., 2021). While these data highlight significant gains for students with disabilities when compared with denial of access to public education for four in five of these same students before 1970 (Department of Education, 2020), “inclusion” and LRE remain elusive goals for many students with intellectual, sensory, and learning disabilities in the U.S.

### **Impacts to Barriers and Access to Inclusive Learning Environments**

Special education students experienced reduced access to inclusive education when schools switched to virtual learning due to limited home access to the Internet (Busby et al., 2020). Previously, lack of Internet access has been a long-standing equity issue facing many American students living in rural areas, students living in poverty, as well as those from culturally and linguistically diverse backgrounds (Anderson & Perrin, 2018; FCC, 2019). For families who shared more than one of these situations: living in poverty, being linguistically diverse, living in a rural area, or who have a child with a disability, the risk of not having consistent access to the Internet increased exponentially.

In the U.S., the pandemic also caused an interruption of educational services to students with disabilities due to policy decisions and interpretations. On March 20, 2020, the United States Department of Education (USDE) issued a guidance statement aimed at clarifying service delivery options for identified special education students as districts ended face-to-face instruction during the pandemic (USDE, 2020). As a result of this guidance memo, many districts throughout the U.S. abruptly ended all services—including virtual instruction—for children with disabilities. While the document attempted to clarify LRE and FAPE for students with disabilities in the wake of school closures, individual districts interpreted the USDE statement as permission to deny educational access for hundreds of students with IEPs (Nadworny, 2020). Although services to these special education students were restored within weeks of the cessation of educational services, the loss of precious learning time for this at-risk population of students likely exacerbated learning loss during the pandemic.

Lawsuits filed in various state and federal courts since May of 2020 assert FAPE was denied to students with disabilities when public schools stopped providing services to special education students during the weeks following the guidance statement (Jameson et al., 2020). In one lawsuit filed by the Chicago Teachers’ Union (CTU), the plaintiffs claimed that an emergency declaration by the Secretary of Education, Betsy DeVos, failed to take into consideration the fact that emergency measures nullified hundreds of Individualized Education Plans (IEPs) for students in the Chicago Unified School District. The lawsuit alleged that DeVos acted “arbitrarily and abused her discretion... by failing to waive any requirement to redraft tens of thousands of educational plans under [IDEA 34 C.F.R. §300.324(b)(1)(ii)], the regulations related to reviewing and revising the IEPs...” (Jameson et al., 2020, p. 183). CTU’s request for an injunction of the Secretary of Education’s emergency measures which effectively nullified the IEPs of special education children was subsequently denied (Chicago Teachers’ Union vs. DeVos, 2020).

The events that led to the deprivation of the education and civil rights of students with disabilities and the de facto nullification of students' IEPs may have been the result of hasty decisions made during an international crisis. However, they highlight the ongoing struggles of individuals with disabilities to receive services in the best of times, and just how easily these rights can be denied. Because of this, Prior (2020) warns parents and advocates of students with disabilities to remain vigilant, especially in times like these, and "Keep abreast of future developments regarding this issue, for once we allow vital IDEA protections to be eroded, even under current circumstances, it will become much easier to do so when governmental obligations to people with disabilities becomes inconvenient" (p. 49).

### **The Impacts on Socio-Emotional Learning Needs and Home-School Supports**

The COVID-19 pandemic has had profound emotional and mental health effects on most PK-12 students. Reported impacts include significantly higher feelings of stress among PK-12 students, greater numbers of students self-reporting they felt depressed, higher numbers of aggressive acts towards others, and significant increases in youth/adolescent suicide attempts, to name a few (Owusu-Fordjour et al., 2020; Zhang et al., 2020). Students with disabilities and their families also reported heightened stress and subsequent mental health challenges during this period (Hoekstra, 2020; Navas, et al., 2020).

The sociocultural landscape of the physical classroom and school environment for children receiving special education services—including specialized supports, targeted therapies, and instructional materials tailored for individual students with disabilities—often did not transfer to the home setting or virtual learning environments. For these reasons, parents and caretakers of students with disabilities were suddenly thrust into the job of recreating supportive learning environments for their children almost overnight, leaving parents and caregivers feeling alone and unsupported. For these reasons, families with school-aged special needs children reported even higher levels of stress and anxiety, as well as greater concerns about their child's education compared with families with non-disabled school-aged children (Goldberg, 2020; Nelson & Murakami, 2020).

As the home environment became the epicenter for instruction and learning, educators also realized the wide disparities between the quality of virtual learning for students with special needs and those without disabilities. Once the necessary educational and instructional supports were no longer available to special education students in virtual learning environments, parents and family members found they were forced to bridge these gaps. For some families, the gaps were too great for them to fill. Nelson and Murakami (2020) observed that "...schools and their leaders [realized they] could not guarantee that every child's at-home learning environment was equal and equitable, especially when students required specialists and accommodations beyond those able to be offered through a virtual learning environment" (p. 114). These discrepancies reminded educators of the impacts that students' home lives had on their long-term academic success, but they also showed how instrumental collaborative

partnerships with school personnel are in ensuring equity and access to learning. For many educators, this collaboration required them to rethink existing biases and assumptions about parent participation, especially parents from economically poor, marginalized communities, who often served as essential workers and thus, in many instances, were not able to provide direct instruction because they simply were working outside the home (Mize & Glover, 2021).

Even in homes where technology and Internet services were adequate for online instruction, student absences and truancy skyrocketed after public schools converted to online learning formats during the pandemic (Nelson & Murakami, 2020). This was especially true of students with disabilities. This group of students was considered by their teachers to be a particularly high-risk population for chronic absenteeism and truancy during this period (Santibanez & Guarino, 2020). These high truancy rates were attributed to the fact that students with disabilities and their families felt marginalized and disenfranchised from the virtual learning instruction offered by the school districts (Goldberg, 2020). As with the missing support services provided to students with disabilities and their families, critical social and emotional supports were also cut off due to virtual instruction and school closures.

### **Impacts on Quality and Design of Instruction**

Poor educational outcomes of students with disabilities have been an ongoing concern long before the onset of the COVID-19 pandemic. These poor outcomes are due, in part, to students' limited access to consistent, high-quality instruction to meet their unique needs (Fields, et al., 2020). It was this concern regarding appropriate instruction for students with disabilities which led to a provision in IDEA (2004) requiring instruction based upon evidence-based practices, or EBP. However, the concept of EBP for special education students remains an elusive concept, with teachers and administrators unsure about what these instructional practices should look like (Esposito et al., 2018).

Inadequate instructional practices and services for special education students are also due to an acute national shortage of qualified special education teachers (Artiles et al., 2002; McLeskey et al., 2004; Ondrasek et al., 2020). This, in turn, has led to the erosion of quality in the special education teacher preparation pipeline, as states allow special education teacher preparation programs to reduce program entry requirements, shorten supervised fieldwork experiences before licensure, and allow teacher candidates to take on special education caseloads and teaching responsibilities before they have completed their teacher preparation requirements (Sawchuck, 2016). The pandemic has only accelerated this attrition rate, with districts bracing themselves for even greater losses of teachers in high-need areas such as special education (Carver-Thomas et al., 2021)

Studies conducted since the beginning of the pandemic show that all teachers, even experienced educators, lacked the knowledge and skills necessary to provide inclusive online learning environments (Adedoyin & Soykan, 2020; Jackson & Bowden, 2020). The detrimental short-term impacts, including learning loss, could be because online learning settings are staffed by teachers unprepared to teach virtually (Adedoyin &



Soykan, 2020; Kuhfeld et al., 2020). Researchers are concerned that student learning loss resulting from factors associated with the COVID-19 pandemic will disproportionately impact students from disadvantaged backgrounds and students with disabilities (Jackson & Bowden). To test the potential loss of learning to the pandemic, Kuhfeld et al. (2020) developed models of learning loss or “COVID Slide” (p. 555) that predict below-level advancement across reading and mathematics. These models showed that, across all groups of students in PK-12, students in 2021 may only achieve 63-68% of their predicted growth in reading and 37-50% in mathematics. This study also affirmed that students from low SES backgrounds, those with high absenteeism rates during online learning, and those with limited parental supports during the pandemic will likely suffer the greatest learning losses. While Kuhfeld et al.’s (2020) report did not aggregate prediction data for students with special needs, other research shows that students with disabilities are disproportionately represented in these three high-risk categories (Catalano et al., 2021; Nelson & Murakami, 2020). This suggests that students with a disability and at least one other high-risk predictor may experience the greatest learning losses among all students.

Early data are confirming these alarming predictions by Kuhfeld and colleagues (2021). A study by the State of New York shows that learning loss among students with disabilities is highest among all students in the state (Office of the New York State Comptroller, 2021). Fairfax County School District conducted an internal analysis of students who had failed one or more classes since the beginning of the COVID-19 pandemic. Students with disabilities performed much worse than their counterparts, faring only better than the county’s English language learner population (Fairfax County Schools, 2020).

The failure of schools and teachers to engage students with disabilities successfully in virtual learning settings is clearly documented. So, too, are many of the long-standing barriers to quality, inclusive education for students with disabilities, among them: an inconsistent pipeline of well-prepared special education teachers; implicit and explicit bias, physical and communication barriers; as well as the compounding effects of cultural difference and poverty. These social justice issues must be faced long after the global pandemic has subsided. As long-accepted inequities, these obstacles are firmly entrenched in school systems that favor neuro-homogeneity over neurodiversity and have merely been transferred to virtual teaching spaces.

What can be addressed in the short term is to improve the quality and effectiveness of virtual instruction during the pandemic. This can be accomplished by helping teachers to choose and apply effective instructional strategies in virtual learning environments. In fact, some educators see opportunities in the application of technology in virtual environments, which have the potential for leveling the instructional playing field for many students who have been underserved and poorly taught in face-to-face classrooms and more traditional virtual environments. In our efforts to mitigate learning loss for all students during the pandemic, particularly those most vulnerable to such loss, we are beginning the task of identifying learning environments and instructional strategies that will improve outcomes for all students across virtual as well as traditional brick-and-mortar learning environments.

## Improving Quality and Access for Students with Disabilities in Virtual Learning Environments

As we have outlined in the previous section, efforts aimed at ensuring equity in online education for marginalized students must not only address access to virtual instruction through reliable Internet and appropriate software and hardware tools, but they must also address issues related to the quality of instruction. To this end, we look to the literature on effective teaching practices in face-to-face instruction and consider teaching practices that can result in active student engagement and desired student learning outcomes among children and adolescents with disabilities.

### Applying Social Constructivist Theories to Virtual Environments

Vygotsky (1978) noted the critical roles that communication and language play in cognitive development and learning. By making these a cornerstone of his social constructivist theory of learning, Vygotsky recognized the fundamental role in how socially shared and cultural interactions impact language learning and cognitive development. Other researchers and theorists (e.g., Bodrova & Leong, 2007; Brofenbrenner, 1997) have substantiated and expanded on Vygotsky's original treatise, calling attention to the settings in which learning and social interactions take place, both at the micro-level (classrooms, home, and community) and at the macro-level (the cultural and social contexts of communication and learning), and to the types of interactions that take place between the learner and the mentor across all these formal and informal learning settings. Constructivists study those settings and social interactions that either facilitate or discourage language learning and cognitive development (Bodrova & Leong, 2007; Brofenbrenner, 1997). In this regard, constructivist theories are well suited to identifying strategies educators can implement to overcome obstacles to student engagement and interactions in online and virtual learning formats for all students but especially with students who present with special educational needs (Hall, 2007; Kearney et al., 2012).

To study the effects of social-constructivist theories on the efficacy of distance learning and technology for students with special education needs, Kearney et al. (2012) designed the M-learning model. By using constructivist concepts of *collaboration*, *personalization*, and *authenticity* as benchmarks, the M-learning model can be used to assess whether these key components of constructivist teaching are evident in the instruction provided to students with disabilities in online learning environments.

### **Collaboration**

Within the constructivist framework, *collaboration* involves the active participation of the instructor during whole class, small group, and even individual sessions (Lei et al., 2010). As a key framework, collaboration guides educators to provide support to students with disabilities across all learning environments (McLeskey et al., 2017) and is

particularly important in ensuring that teacher-student interactions incorporate empathy, connection, and quality participation for all students in e-learning environments. Whether in face-to-face settings or asynchronous online instructional delivery formats, collaboration requires active participation from the teacher and all students to establish a connected learning community (Kearney, et al., 2012). In online learning environments, collaboration can occur in synchronous discussions, asynchronous discussion posts, or cooperative learning groups meeting in a virtual environment. In all of these collaborations, the teacher encourages collaboration and meaning-making by adapting the specifics of the virtual environment and the presentation of content so that the online community of learners can interact together, discuss, and share. Recent research findings demonstrate that the collaborative quality and perceived connectedness of teacher-student interactions are key factors in the engagement and success of all students, but most especially students with special education needs. We have known for some time that the collaboration and skillful interactions between students and teachers-as-mentors are among the most powerful teaching tools available (Echevarría, 1996; Portes, et al., 2018). This key factor is turning out to be especially important in virtual learning environments as well (Gullo, 2021).

### ***Personalization***

Another key component of culturally responsive and emotionally supportive instruction in online learning is personalization, which allows for individualization of the teaching environment through specialized instruction and tools which allow the learner to interact with the text in a connected manner. Personalization in all learning environments in social-constructivist frames means that students also exercise agency and are encouraged to make independent choices about how they will meet their academic goals (Kearney, et al., 2012). Mobile devices, such as smartphones, tablets, and laptops allow students to apply the concept of personalization to their own learning experience. This allows more flexibility that encourages autonomous learning for students to achieve a certain degree of independent exploration that extends beyond synchronous learning formats. Furthermore, mobile technologies enable students to choose what to study within a topic as well as how and when to investigate and explore community-based learning opportunities.

### ***Authenticity***

In constructivist frameworks, authenticity holds that materials and topics presented in the learning context must be culturally relevant to students and reflect their socio-cultural backgrounds and their families' educational aspirations and goals (Kearney et al., 2012; Sleeter & Stillman, 2005). Mumbardó-Adam et al. (2021) found that authenticity was a natural aspect of distance learning environments during the COVID-19 pandemic because it situated learning within the context of each student's home. This, in turn, required students and their families to use immediate resources found in the home or local community, along with available digital technologies to simulate learning.



In summary, the M-learning model is a powerful paradigm through which to interpret and apply constructivist teaching theories to virtual learning situations. In particular, the model emphasizes the interplay of time and space in the design and delivery of online instruction. By applying the M-learning framework to the virtual learning of 1,975 New Zealand secondary students during the pandemic, Yates et al. (2021) determined that the M-learning model is a potentially informative framework for the application of constructivist frameworks in virtual learning modalities. However, this study also showed that the *authenticity*, *collaboration*, and *personalization* components of the M-learning model required more detailed descriptors and definitions to implement this model effectively. For example, the M-learning model did not distinguish between collaboration and instructional conversations. While the inputs on each of these activities looked quite similar in practice, their intended outcomes were potentially quite different. Finally, Yates et al. (2021) concluded that student motivation was a critical learning component that the M-learning model did not consider in the learning process.

### **Application of High-Leverage Practices in Virtual Learning Environments**

To provide more clarity regarding the description of effective teaching practices that encourage inclusion and student engagement in virtual learning environments, we turned to research that provided detailed descriptions of what teachers of students with disabilities need to know and be able to do. The Collaboration for Effective Educator Development, Accountability, and Reform (CEEDAR) Center, in conjunction with the Council for Exceptional Children (CEC), developed a resource for educators working with students with disabilities in inclusive settings. These high-leverage practices (HLPs), organized into a single document, comprise some of the most current, evidence-based practices in the field of special education (McLeskey et al., 2017). Based upon the principles of Universal Design for Learning (UDL), these HLPs are designed to guide the design and adaptation of curriculum and instruction for students with disabilities. Intended to assist special education teachers at every stage of their career, these HLPs are clustered around the following broad categories of special education teacher practices: collaboration high-leverage practices, assessment high-leverage practices, social/emotional/behavioral high-leverage practices, and instruction high leverage practices, all which will be discussed below.

#### ***Instructional High Leverage Practices***

McKeithan et al. (2021) adapted the instruction HLPs by grouping them into the following three aspects: a) Plan with Purpose, b) Teach for Success, and c) Actively Engage learners, see table below. These adaptations offer ways in which instructional HLPs can be used in online and remote learning environmental settings for students with autism and other special education populations. When these evidenced-based practices are implemented with fidelity, they can help to ensure equitable learning environments for all students, especially those traditionally marginalized within school settings. Using the

aspects of within Instruction HLPs as a guide, teachers can provide effective remote learning environments for students with special education needs (McKeithan et al., 2021).

## Table

### *Instruction High Leverage Practice Areas*

Area	Instruction HLP
Plan with Purpose	HLP 11: Identify and prioritize long- and short-term learning goals
	HLP 12: Systematically design instruction toward a specific learning goal
	HLP 13: Adapt curriculum tasks and materials for specific learning goals
	HLP 14: Teach cognitive and metacognitive strategies to support learning and independence
Teach for Success	HLP 17: Use flexible grouping
	HLP 15: Provide scaffolded supports
	HLP 16: Use explicit instruction
	HLP 20: Provide intensive instruction
Actively Engage Learners	HLP 21: Teach students to maintain and generalize new learning across time and settings
	HLP 18: Use strategies to promote active student engagement
	HLP 19: Use assistive and instructional technologies
	HLP 22: Provide positive and constructive feedback to guide students' learning and behavior

(McKeithan et. al., 2021)

**Plan with Purpose.** By planning with purpose, McKeithan et al. (2021) urge teachers to provide instructional planning based on students' short- and long-term goals. In online learning environments, this means teachers need to provide multiple representations and remind students of their goals. This strategy is effective in individual, small group, and large group settings. Organization and over-planning of each lesson are also key so that students internalize the expected outcomes to be learned by the end of

each lesson. Additionally, advance organizers (e.g., visual reminders of lesson and lecture sequence; clear expectations of lesson outcomes) are central to online and face-to-face instruction settings (Adeldoyn & Soykan, 2020). As an example, the organization and expectations of teaching online became clearer to students with autism when teachers used mini-lessons or “chunked” online lectures and virtual sessions (McKeithan et al. 2021).

**Teach for Success.** Explicit instruction is a systematic approach to teaching across all content areas. This involves the use of an advance organizer for the learner, followed by modeling of the skill in question by the instructor or mentor, then having students practice the new skill or apply the new knowledge with guidance from the instructor. After the completion of these steps, the student engages in applied independent practice in order to generalize and use the skill in a new setting or situation (Doabler & Fien, 2013). Explicit instruction has been used successfully with students with special education needs in online environments (Agrawal & Morin; Cook & Cothren Cook, 2011). In this capacity, explicit instruction requires teachers to have mastery of a) ability to systematically teach subject matter content, as well as b) advanced knowledge and efficacy of the specific uses of the technology and/or software as they are applied in the lesson (Wang & Lu, 2021). Cesar et al. (2021) also showed found that teachers could successfully use explicit teaching sequences through an interactive online video platform. While scaffolded instructional supports benefit all students, this supportive approach is particularly critical for students with disabilities specific to teaching in an online environment. For example, Kim and Hannafin (2011) propose a problem-solving approach during interactive face time. This added layer of distance learning makes constructivist principles of scaffolding and instructional conversations difficult but not impossible to apply in the online learning environment (Krause & Moore, 2021; Weintraub Moore & Wilcox, 2006).

**Actively Engage Learners.** McKeithan et al. (2021) emphasize the need for teachers to establish connections with students’ personal, educational, and/or professional aspirations. Engaging students through their personal experiences and interests is a well-documented, effective tool to be used in online learning environments. Among secondary students, online learning environments can become forums for discussions and shared problem-solving that deepens students’ understanding of multifaceted data and complex topics. Typically, in the context of social sciences or advocacy work, prompts about controversial topics challenge students’ attitudes or require them to think, share, and support their views on the topic in question. This learning method increases student engagement, especially for adolescents. For example, O’Brien et al. (2014) observed that discussion posts themselves were essential components of meaning-making because students deepened their understanding of controversial topics and events through an online discussion board. As this may be particularly relevant during a pandemic or other catastrophic events, the authors warn that such discussion posts require a great deal of planning and consistent monitoring in the online learning setting. Hodges et al. (2020) had similar findings in their high levels of engagement and discussions among secondary students in online asynchronous discussions. As with face-

to-face instruction, teachers need to emphasize specific, positive, and frequent feedback to individual students to maintain engagement in online learning settings. This also helps students to maintain focus and learn to anticipate feedback to assist them with their goals. Finally, expanded access to technology can boost students' engagement and participation in online learning. Through the use and modeling of instructional software for students (educational games and software; Padlet, Grammarly, Kahoot, etc.), technology can engage students and help to bridge the gap between remote and face-to-face learning settings.

### **Challenges of Implementing Inclusive Practices in Online Environments**

Low teacher efficacy in online learning environments is a persistent problem that compromises the success of virtual learning environments (Graham et al., 2019). Weintraub Moore and Wilcox (2006) found similar results relative to teachers' confidence in using technology tools in education settings. When the state of New York polled its special education teachers during the pandemic, less than 50% felt that they were able to address the needs of their special education students in remote/virtual learning environments (Office of the NY State Comptroller, 2021). There needs to be thoughtful changes to teacher preparation and professional development so that teachers are better prepared for distance learning and on the effective use of technology (Davis & Roblyer, 2005; Wang & Lu, 2021). Kearney et al.'s (2012) M-learning model shows promise as an outline for guiding teacher-student interactions in virtual learning environments. However, this study also shows that some components of the M-learning model require more detailed descriptors and definitions than were provided to implement this model effectively. Additionally, constructivist techniques such as instructional conversations require extensive practice and experience to be effective (Hall, 2007).

McLeskey et al. (2018) acknowledged that many teachers lack the confidence to apply HLPs not only in online teaching platforms but also during face-to-face learning situations. The application of HLPs requires significant planning as well as deep content knowledge, especially when teaching students with disabilities. As a result, HLPs should be further addressed not only in preservice teacher preparation but also through professional development opportunities for experienced teachers. Despite these existing and often persistent challenges, HLPs and the social constructivist theory may yet form an effective framework when implemented consistently and with extensive supports from school districts. Both the M-learning model and the HLP framework are promising pedagogical approaches that may increase active engagement for all students in virtual learning environments, including students with disabilities. Such improvements could create a more level playing field in the educational access of all students and amend social and educational inequities that have predated the global pandemic for students with disabilities.

## Conclusion

Schools across the globe implemented educational programs that relied upon virtual or online learning during the COVID-19 pandemic. Despite efforts to mitigate the impact of learning loss, long-standing technological, economical, and educational inequities facing society's most educationally vulnerable K-16 education populations were laid bare (Andrew et al., 2020). Students with disabilities, along with other marginalized populations, were denied access to educational guarantees by not having Internet. Though district and regional efforts to provide Internet to households with school-age children were corrected over time during the pandemic, Internet access alone is not enough to ameliorate inequities in online environments.

The pandemic reminds educators that social justice measures include improving the quality of student-teacher interactions and instructional strategies in these online learning environments. To this end, the authors have described a promising constructivist M-learning framework along with high leverage practices to promote successful and engaging inclusive virtual learning experiences for students with disabilities. Given that online instruction is likely to continue in the future, students with disabilities will continue to fall behind their peers unless changes are made to the access and quality of online instruction. When implemented with proper planning and adequate teacher training, virtual learning environments and online instruction can yield positive outcomes associated with face-to-face instruction for all students, especially students with disabilities.

One of the most disturbing and perhaps revealing developments of the pandemic occurred in the weeks following school closures. During this time, local districts in some regions of the U.S. interpreted emergency education measures brought on by the pandemic as a reason to deny the educational rights of their students with disabilities. Although educational services for these students were restored eventually, these policy responses to the COVID-19 pandemic serve as a reminder to families and advocates of children with disabilities that the civil and educational rights of special education students are fragile and never a guarantee of access to public education, much less to quality, inclusive learning environments and instruction.

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