

How can schools respond long-term to COVID-19?

Lyman L. Dukes III, Ph.D.

University of South Florida
United States

Allison F. Messina, M.D.

Johns Hopkins All Children's Hospital
United States

Nicholas Gelbar, Ph.D.

University of Connecticut
United States

Marlena Minkos, Ph.D.

LEARN Regional Educational Service Center
United States

Abstract

With COVID-19 considered by many experts to be endemic, the likelihood of persistent and incomparable academic and social-emotional disruption for school-aged children is extraordinary. School professionals have also been adversely impacted. Many children and families, prior to the pandemic, dealt with enduring adverse childhood experiences (ACEs) including domestic turbulence and financial, food, and housing insecurity. The disruption of the past two school years, and the possibility of ongoing school disruption, exacerbates these challenges. The recommendations herein are designed to address the expected long-term effects of the ongoing pandemic within the educational setting.

Keywords: COVID-19; harm reduction; human factors engineering; toxic stress; ACEs; educational equity, health and safety education, remote learning; HyFlex; universal design; teacher education.

Introduction

“I believe SARS-CoV-2 is going to stay with humans forever,” said the CEO of Moderna, a vaccine research and development firm (Guzman, 2021, para. 3). This is both a sobering assessment and a recognition that we will continue to grapple with virus-related educational challenges even after the COVID-19 crisis wanes. Since U.S. schools closed in spring 2020, we have been reminded of the extensive support they provide beyond instruction which include meals, daytime childcare, mental health support, and technology access, to name a few. In large part due to the profound pandemic disruption, we understand more clearly the interconnectedness of schools to the well-being of our communities. Indeed, school staff are considered by many to be “frontline workers” (Johnson-Trammell, 2020) due to their roles as facilitators of access to a multitude of vital supports. The pandemic has exposed weaknesses in the country’s ability to effectively meet these critical community needs. As educational professionals we are compelled to deliberate how the pandemic has prompted our discipline to evolve. Herein we focus specifically on a number of changes underway and share recommendations in response to each.

Teachers nationwide are the backbone of the educational system. The Tampa Bay Times, in August, 2020 (Sokol) led with the headline; “Many teachers are fearful as they contemplate a return to school.” Students and parents alike have similar concerns and have also expressed fear (Lerer, 2020). The National Association of School Psychologists (NASP) noted school professionals, especially teachers, must help children develop a sense of control and learn to react to stress caused by COVID-19 (NASP, n.d.). Skills and strategies for a safe return to in-school participation are especially critical as many infectious disease experts believe the current novel coronavirus has become endemic (Wan & Johnson, 2020). In fact, initial studies suggest immunity to the virus may wane rapidly (Gallagher, 2020; Guzman, 2021). The potential result, particularly given the possibility of a partially effective vaccine (Aubrey, 2020), vaccine misinformation (Chabria, 2020) and vaccine reluctance (Wallis, 2021) is having to carry on with daily life with COVID-19 as a persistent concern (Aubrey, 2020).

Stakeholders, including school staff, students, and families require access to relevant resources and training. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) provided seven key dimensions to effectively support a safe return to school. These recommendations merit particular attention given the burgeoning recognition of both a persistent virus and a profoundly altered educational landscape. Three of the recommendations are: (1) Training to support safety and health, (2) Training to support teachers’ psychological and social-emotional well-being, and (3) Teacher preparation and learning (International Task Force on Teachers for Education, 2020). With respect to students, the American School Counselor Association (ASCA) has asserted children may not be ready to engage in formal learning unless they are psychologically and physically secure (Sharp & Fitzgerald, 2020). Families should also have access to coronavirus relevant educational resources, so they are prepared to better aid their children’s social-emotional and educational well-being (Centers for Disease Control and Prevention [CDC], 2020).

In addition to meeting the immediate virus-related needs of school stakeholders, there is also a need to recognize and respond to long-term issues of stress and trauma children have experienced that may be exacerbated by the pandemic. Adverse childhood experiences (ACEs) that can lead to stress and/or trauma before age 18 include but are not limited to parental substance abuse, divorce, mental illness, incarceration, and domestic violence. Indeed, there is mounting scientific evidence of the lifelong impact of adverse events of this nature during childhood (Merrick et al., 2017). Chronic adverse experiences can lead to toxic levels of stress for children ultimately deleteriously impacting the development of both the body and brain including the disruption of learning and adaptive behavior. Unsurprisingly, there is scant research on the impact of epidemics or pandemics on childhood well-being. However, experts warn COVID-19 poses significant risk due to learning disruption, physical isolation, increased levels of community and caregiver stress, as well as the risk of illness (Araújo et al., 2020). When compounded by baseline ACEs and/or toxic stress, the potential impact on lifelong health, learning, and adult life goals may be profound.

Beyond the impact of childhood ACEs, other obstacles such as racial inequity are likely also intermingling with pandemic effects. Thus, school systems must be responsive to persistent issues of racial inequity, and the ways in which it has been exacerbated by the pandemic. Many communities already challenged by disproportionately higher unemployment rates, home and food insecurity, as well as other adverse experiences are also being unduly affected by greater rates of COVID-19 illness and death (Gould & Wilson, 2020). School participation among families in low-income minority communities appears to have also been more adversely impacted. For example, Hillsborough County Schools in Florida, one of the largest urban school districts in the U.S., reported working to track down more than 7,000 missing students as the 2020-21 school year began (Patterson, 2020). When considered on a national scale, the problem becomes stark; an estimated three million children have not been in school since March 2020 (Korman et al., 2020). Certainly, response to the impact of the pandemic should be focused upon the varied and unique needs of all stakeholders with particular attention given to cultural sensitivity as well as equity and access.

Equitable access to digital learning tools is also an ongoing concern and the rapid shift to remote learning has underscored those challenges. Prior to the pandemic, Project Tomorrow (2020) reported the following: (a) In middle schools where the population is primarily minorities, 44% of the students were assigned a Chromebook whereas 65% had a Chromebook assigned in majority white serving schools; (b) Fifty-nine percent of teachers in primarily minority serving schools needed mobile digital devices for the classroom and primarily white serving schools reported the same need only 38% of the time; and (c) One-third of teachers in Title 1 school communities

reported daily usage of Google apps as compared to 52% in non-Title 1 schools. The digital divide also impacts students in rural communities as well, with 62% of rural school principals noting it as a significant issue (Project Tomorrow, 2020). Immediately following the onset of the pandemic, initial reports indicate digital access has been exacerbated by the need to learn remotely. A U.S. Census Bureau survey indicated almost 29% of Black homes reported having technology for learning “sometimes” or “usually” available, while 9% reported having digital learning devices “rarely” or “never.” The same survey reported learning devices being “rarely” or “never” available in white homes 4.3% of the time (Journal of Blacks in Higher Education, 2020). Indeed, lack of digital learning resources may be a significant contributor to past, present, and future student learning deficits.

At a broader level, fears about student learning loss due to COVID-19 have been reported as well. Additionally, experts are raising concerns about the increased chance of student drop out (Bauer et al., 2020). However, achievement gaps due to race/ethnicity have been a persistent and seemingly unmanageable challenge in U.S. K-12 schools for many years. For example, the typical Hispanic or Black student is approximately two years behind academically when compared with the typical white child (Dorn et al., 2020). It has also been reported students with disabilities attending school remotely are facing challenges receiving legally required academic supports and services spelled out in their individualized education plans (IEPs) resulting in some students not participating in school at this time (Jameson et al., 2020). The rapid shift to fully online instruction has resulted in apprehension about the potential to exacerbate learning loss due to ineffective instruction as well as a lack of instructional access (Villano, 2020). Dorn et al. (2020) conducted a study in which a prediction model was utilized to examine learning loss as a function of the quality of the remote instruction. The authors reported in the event of “average-quality” remote instruction learning continues but at a slower rate as compared to face-to-face teaching. Students receiving “lower-quality” remote instruction stagnate at current grade level, and those not receiving instruction are experiencing substantial learning loss. In sum, there is deep concern the COVID-19 spring 2020 school building closure, as well as the continuing utilization of remote instruction for many students, when considered alongside the typical “summer learning slide” could be academically grim for many students.

While teachers and school instructional support staff should be lauded for the rapid shift to fully online instruction in spring 2020, there are genuine concerns about remote teaching effectiveness moving forward. Challenges have been reported with instructional efficacy as well as the digital tools that were (or were not) utilized during spring 2020 (Herold, 2020). Additionally, even with a return to school business as usual, it is likely remote instruction will be utilized with more consistency in the future (Herold, 2021). For example, COVID-19 is one of a number of pediatric illnesses that sometimes warrant not being physically present at school but do not necessarily preclude a child from participating in learning activities from a distance. Additionally, school systems are already choosing to shift to online instruction during emergency school closures, such as during inclement weather, rather than close schools altogether. At present, we have an opportunity to purposely plan for the delivery of instruction that may well be provided remotely as well as face-to-face. Schools and students have demonstrated shifting from face-to-face to remote learning, and back, is imminently possible, though at this time not always instructionally effective. Both K-12 schools and teacher preparation programs may have to prepare teachers for the delivery of instruction in online and face-to-face settings, perhaps even simultaneously. That is, school personnel may have to be prepared for instructional models that result in students shifting between face-to-face and online settings during the school year with the expectation learning will occur effectively and without interruption. If this is indeed the case, how do we best provide professional development opportunities for currently practicing teaching professionals as well as appropriate and effective preparation for pre-service teachers? Moreover, what should that preparation include?

The school experience will likely never be, and arguably should not be, what it was prior to COVID-19. There are a number of fundamental assumptions we make as educational professionals and the pandemic has laid bare the need to deeply reflect upon those beliefs. For example, we believe *all* children should have an opportunity to learn, but are we providing an equal and efficacious chance to do so? We believe *all* students should arrive at school ready to learn, but are we overlooking some of our students’ needs? We also believe a child’s health and wellness is vital to their ability to be present in school and learn. Is the health and wellness of *all* children given appropriate consideration? While we cannot resolve these issues, we believe there are models both within and outside the field of education that highlight a potential path forward and begin to address the issues we have described.

Recommendations

It is fair to surmise there will be new norms driving education going forward. Moreover, we better understand the critical role schools play in the daily lives of children, families, and the larger community. From social interaction, childcare, mental health care, food sourcing, and the delivery of education, schools address an array of critical needs. In that spirit we share a number of suggestions. The recommendations proposed are aligned with the issues highlighted earlier: (1) Infection prevention guidance for both school staff and students, (2) Trauma-informed instructional practices and other supports for a diverse array of students, (3) Utilizing innovative instructional methods to teach students in both online and face-to-face settings possibly simultaneously, and (4) Improvements in teacher preparation. We will begin with a focus on models outside education that can inform safe in-school participation. Subsequently, we will address models within education focused upon instructional design and delivery and also discuss the preparation of teachers entering the profession.

Models Outside Education

Harm Reduction Principles. Harm reduction is a strategy designed to lessen the harm associated with certain dangerous activities in situations when those activities cannot be completely avoided. It was originally developed as a methodology aimed at improving the health and wellbeing of individuals with substance abuse problems when abstinence was not possible. Over time, however the same set of principles have proven a useful tool in guiding behavior in other potentially risky situations in order to lessen associated harm. (Canadian Pediatric Society, 2008).

Utilizing harm reduction principles is an effective public health strategy intended to result in compliance with risk-mitigation behaviors. Forbidding behaviors is generally not acceptable to the public and does not typically result in meaningful and sustainable levels of compliance. For example, in the early days of the HIV/AIDS crisis, health officials promoted abstinence from sex as the best way to stop the spread of HIV. Though clearly effective, abstinence was not accepted as a reasonably sustainable strategy even in communities hard hit by HIV. As more was learned about the spread of HIV, however, encouraging *safer* sex to mitigate risk was more acceptable and ultimately a much more successful public health strategy. Similarly, in the earliest days of the COVID-19 pandemic, the response to shelter in place and shutter all non-essential activity was effective in mitigating disease spread for a time, but the economic and social costs of this strategy made it clear that plan could not endure. As more was learned about the ways in which SARS CoV 2 spreads, it became clear that we could indeed move to a less restrictive response. Armed with the knowledge that masking and social distancing can greatly reduce the spread of the virus, these rules can allow for more freedom for individuals to move about their communities while still minimizing the risk of illness and transmission (Arcuni, 2020).

In the educational setting, harm reduction strategies specific to mitigating disease spread mirror the infection prevention strategies hospitals and medical facilities have used for decades. Fortunately, many of these strategies start with strict compliance to basic hygienic principles. Handwashing, advising students and staff to stay home when feeling ill and environmental cleaning and disinfection are important and likely familiar recommendations in educational facilities. However, because SARS CoV 2 is primarily spread through respiratory droplets, facial coverings, physical distancing and attention to proper ventilation and air filtration of spaces are also necessary. Because these strategies are newer to educational settings, education and training for school staff, students and parents is critical. The utilization of human factors engineering is a means of applying harm reduction principles in settings such as schools in order to mitigate potential hazards of in-person instruction.

Human Factors Engineering. Human factors engineering is a discipline dealing with the “application of information on physical and psychological characteristics to the design of devices and systems for human use,” (Chapanis & Holstein, n.d., Introduction section). When applied to the design of environments, in this case school buildings, the tenets of the process stipulate solutions can be developed to account for human behavior within such settings. The process, for example, could result in the development of instructions, operating procedures, rules and so on. The goal in the case of COVID-19, or frankly any other similar illness, is to develop policies and procedures intended to ensure human safety within school facilities to the greatest degree possible.

SARS CoV 2 is the virus responsible for COVID-19 disease. Reducing the spread of COVID-19 disease in the school setting is based on a series of layered defenses aimed at interrupting transmission of the virus from one

individual to the next. Knowledge of how SARS CoV 2 spreads among people is critical to understanding these interventions. Based upon microbiological as well as epidemiological evidence, there are three routes of transmission: 1) Close contact transmission (< 6 feet) via large respiratory droplets, 2) Long range transmission via aerosolized droplets, and 3) Fomite transmission, which is contact transmission via inanimate objects such as door handles, shared equipment, water fountains, and so on, which may be contaminated with virus. Additionally, intensity, frequency and duration of exposure to SARS CoV 2 virus via the three routes of transmission increases the risk of contracting disease. School site modifications which have been recommended and operationalized throughout the country take into consideration these routes of transmission (Jones et al., 2020). Moreover, these recommendations have been echoed by the CDC in their recent updated school reopening guidance (CDC, 2021).

Reducing risk of close contact transmission. Universal masking is the cornerstone of reducing transmission of SARS CoV 2. Since the primary route of spread is via close contact with the expelled respiratory droplets of an infected individual, containment of these droplets is a critical intervention. Masks also can protect the wearer by decreasing concentration of inhaled respiratory droplets. The use of masks is especially important when people cannot be optimally distanced (e.g., students passing each other in the halls). Whenever possible, however, allowing for physical distancing adds an additional layer of safety. Configuration of students' desks and workspaces to allow for a 6-foot separation between students allows for reduced risk from close contact transmission. This strategy can also be enhanced by offering students the option for online instruction which reduces in-school classroom attendance. The distancing strategy is especially critical when use of a face covering is not possible such as during school mealtime. During meal time every effort must be taken to ensure proper distancing and crowd control. Ideally, when weather permits, meals should be eaten outside. As much as possible, recreational activities should be held outside as well.

Long range transmission via aerosolized droplets. Unlike larger respiratory droplets, virus can travel in smaller respiratory droplets which can travel farther than the 6-foot zone around an infectious person. Again, masks mitigate this spread, but smaller particles can escape from masks and accumulate in spaces with poor ventilation. It has been shown by reducing the concentration of these aerosolized particles, transmission can be reduced. Thus, long range transmission can be mitigated by allowing outdoor air to circulate through indoor spaces and adequately filtering recirculated air. Schools should work with environmental, physical plant and life safety departments to assure ventilation systems with adequate filtration capability are installed in school buildings. Ventilation system filters should have a minimum efficiency reporting value (MERV) of 13 or greater. Allowing outside air to circulate through buildings can also help reduce the risk of accumulation of aerosolized droplets. Additionally, limiting the number of people congregating in indoor spaces will serve to decrease concentration of aerosols.

Fomite transmission. Transmission of virus by inanimate object refers to transmission of SARS CoV 2 by contaminated high touch surfaces and equipment. Fomite transmission is best mitigated via frequent cleaning and disinfection of high touch areas and through the use of automated devices (e.g., touchless faucets, automatic doors) and through frequent hand sanitizing. Frequent disinfection of high touch surfaces is important in limiting transmission of virus from inanimate objects. Fortunately, most common alcohol, hydrogen peroxide and bleach-based disinfectants are effective against SARS CoV 2. A complete list of EPA approved disinfectants can be found in Table 1. Frequent hand sanitizing is also critical to stopping fomite transmission. Hand washing for at least 20 seconds with soap and water should be encouraged. Additionally, alcohol-based hand sanitizer is effective hand antiseptic. Hand sanitizing rubs should contain at least 60% ethanol or isopropyl alcohol. (see Table 1).

Models within Education

Trauma-Informed School Instruction. Toxic stress “is the detrimental biological response to living with prolonged and unmediated stress that can occur when someone lives in persistent poverty” (Brisson et al., 2020, p. 697). Toxic stress impacts child development (Oh et al., 2018; Shonkoff, 2012) and has been linked to negative adult health outcomes including greater risk for psychopathology, cardiovascular disease, and other so called lifestyle diseases (Brisson et al., 2020; Shonkoff, 2012). Epidemics such as COVID-19 can be conceptualized as an event that may lead directly to toxic stress (e.g., death of a child's family member from the disease) as well as potentially facilitating other ACEs that lead to chronic stress (e.g., food insecurity resulting from a caregiver's job loss).

Since passage of the No Child Left Behind Act some twenty years ago, the academic achievement of students has become the primary focus of the American education system. Over time, it has become clear schools must support students' social and emotional learning in order to allow them to be able to make reasonable academic progress, which has been catalyzed by the current pandemic. Many children experiencing toxic stress are likely going to struggle to access learning opportunities both in-person and in remote formats. The specific barriers to accessing learning include "emotional problems associated with fear and anxiety, maladaptive social adjustment, disruptive behaviors, impairments in executive functioning, and a range of other difficulties that are often categorized rather loosely as socio-emotional problems or mental health disorders" (Shonkoff, 2012, p. 17302). Schools are uniquely positioned to assist students in developing resiliency against these negative impacts of toxic stress. Shernand colleagues (2016) describe environments that buffer against toxic stress as "environments in which stress and trauma are prevented whenever possible, risk factors are identified and addressed, and people who are affected receive immediate support and treatment" (p.3).

Minkos and Gelbar (2021) recently described actions schools can take in order to develop resiliency against toxic stress in the wake of the COVID-19 pandemic. They describe the need for schools to implement a multi-tiered systems of support approach to addressing trauma in schools and note all staff need to be trained on trauma-informed practices. Further, they indicate the need to infuse social and emotional curricula across all settings and grade-levels. The Collaborative for Academic, Social, and Emotional Learning (CASEL) has research-based recommendations for specific curricula at each grade level (see Table 1). In addition, psycho-educational training on the causes and impact of toxic stress need to be provided to school staff and when developmentally appropriate to students themselves. In addition, mindfulness (Volanen et al. 2020) and other stress reduction strategies such as deep breathing (Franke, 2014) can be implemented in all classrooms to provide students with tools to respond more appropriately to stress. At a more fundamental level, it is extremely important for adults to demonstrate authenticity and compassion with students in order to be able to effectively provide support.

Supporting the Whole Child. The pandemic has made it clear schools serve many functions including the provision of food, technology, and some forms of medical care, though perhaps not as effectively as necessary. In addition to supporting students' social and emotional needs, school personnel should be prepared to address other challenges in the wake of the pandemic. The lack of digital learning tools for all students is a particularly germane problem (Project Tomorrow, 2020) and school leadership is encouraged to think creatively about how to equalize access. For example, schools can share information about neighborhood community agencies or libraries that provide access to Wi-Fi and digital devices. Schools might also partner with their local education or state educational agency to supply wireless hotspots and tablets for check out. In addition to providing devices, school and district leadership may consider working with local government representatives to support community digital networks to facilitate connectivity for underserved groups. In particular, schools should think creatively about how to best allow flexibility for family participation given the increased demands placed on families during the pandemic. For example, schools can utilize cloud platforms for family-teacher meetings. Schools might also consider the possibility of making some teaching staff available in the evening hours for student support via cloud platforms as well. However, these suggestions again highlight importance of the need to ensure access to technology for all students.

Given the recognition the quality of remote instruction provided is of concern (Dorn et al., 2020; Herold, 2020) and that, in some cases, students have been missing from school altogether (Korman et al., 2020), subsequent student learning gaps are expected. While this a complex issue that merits a multi-pronged solution, one possible approach is to provide high dosage tutoring (Munyan-Penney & Barone, 2020), which involves providing daily intense periods of personalized instruction in small groups (2-3 students) during the regular school day, after school, or as mentioned earlier, delivered remotely in the evenings by properly trained personnel. For example, properly trained personnel could include certified teachers, paraprofessionals, teacher candidates, or well-trained tutors (e.g., Americorp) (Edgerton, 2021). Previous research has indicated high-dosage tutoring leads to achievement gains in math (Ander et al., 2016) and English/Language Arts (Kraft, 2013). With better planning and we acknowledge additional funding, schools can serve as community hubs to better address the needs of the whole child.

Models to Promote Remote and Face-to-Face Instructional Effectiveness. Within the current context of COVID-19, schools must select and utilize models for instructional delivery that support student populations with diverse social-emotional and academic needs, while also enabling the fluent transition of instructional delivery between online and face-to-face settings. The HyFlex learning model could provide a useful starting point for guiding the development of instruction within this context. HyFlex learning models were originally conceptualized within higher education and integrate learning that is both hybrid and flexible (Beatty, 2014). More specifically, within a HyFlex learning model, students are provided with a combination of both online and face-to-face learning opportunities (i.e., hybrid) and may choose to engage with learning either online or in person (i.e., flexible). The HyFlex learning model is a student-driven approach that essentially allows students to create their own blended learning experience, tailored to their unique circumstance (Malczyk, 2019). Thus, HyFlex is well-suited for application within school settings where in person attendance on both individual and systemic levels may be continually shifting based on epidemiological and infection prevention guidance or other unique needs a school or school system might experience.

It should be pointed out, HyFlex delivery, if implemented with fidelity, will require significant re-thinking of the instructional setting. Accessibility and interactivity, whether a student is in-class or remote, becomes of primary importance. If audio and video are to be utilized in a manner in which there is opportunity for student participation regardless of in-school presence there will likely need to be both investment and experimentation in order to do so effectively. Additionally, tables and seats will likely need to be mobile, and tools allowing for “chat” or similar communication and the ability to share ideas on “whiteboards” (e.g., Jamboard) in which online students participate in groups with in-school students will need to be utilized. In fact, these are only a few examples of many that may merit consideration.

Universal Design for Learning (UDL) offers a complementary perspective to HyFlex in meeting student needs within this context. The concept originated in the field of architecture with the passage of the Americans with Disabilities Act in 1990, and sought to proactively design physical environments to be accessible to all individuals (Bernacchio & Mullen, 2007). Universal design was later applied to educational settings whereby the goal of UDL is to proactively design instruction to effectively address the varied needs and preferences of diverse learners (Minkos & Maykel, 2019). UDL differs from traditional instruction in which content is typically delivered to students and assessed in one way. The framework is centered around providing students with multiple means for engagement, representation, and action and expression. A variety of instructional activities are provided in order to stimulate students’ interests and motivation for learning. Course content is presented in various modalities in order to promote access for students with different learning preferences. Additionally, students are provided with alternative options to demonstrate their learning (Minkos & Maykel, 2019).

Embedding UDL within a HyFlex model can provide educators with a framework for promoting student learning within the context of COVID-19. However, it also involves a significant shift in the manner in which instruction is designed, having the potential to increase the cognitive load of educators during a time that is already so challenging. One potential approach that may be effective in decreasing the complexity of shifting to such a framework is to design the class fully online and view the in-person portion as an enhancement to the class. Additionally, teachers might view class time as a place to connect, regroup, and review content, rather than having remote students passively watch in person students engaging in instruction. In order to promote engagement and a cohesive classroom environment across in person and remote learning cohorts, educators might choose to pair up in person students with remote students through online breakout sessions to work together. Teachers might also choose to create instructional materials that could be used both online and face-to-face in synchronous and asynchronous learning activities. For example, teachers could videotape short mini-lessons in advance that could be played live for face-to-face students or viewed online by remote students. Additionally, teachers could videotape live synchronous lessons and post them online so students could view them on their own time. A potential advantage of creating such learning tools is the videos could be viewed multiple times if needed to support learning, and students and parents could access the videos at times that were convenient for them. Teachers might also plan learning activities that provide options for both remote and face-to-face students to demonstrate their learning. For example, students might be given the choice to either write a paper, do an oral presentation (either in person or via videotape), or create a web-based presentation (e.g., Prezi) on a specific topic. Proactively planning to provide a variety of options that can be completed either at home or in school sets the stage for smoothly transitioning between remote and face-to-face learning.

INSERT TABLE ONE ABOUT HERE

Post Covid-19 Teacher Preparation

If we make the reasonable assumption the pandemic has likely altered the way education will be designed and delivered, then we are obliged to consider what this means for teacher preparation programs. In the short term programs have been forced to address immediate challenges with steps such as certification/licensure waivers for students who cannot currently meet program requirements, waivers or extensions for testing requirements, and modifications of clinical expectations (Holdheide, 2020). In fact, due to the pandemic experts have highlighted the need for permanent changes in clinical and field experiences for pre-service teachers (Virella, 2020) noting clinical and field-based experiences should be provided in both traditional and digital formats.

However, necessary changes to teacher education are deeper and more complex than modifications in field experience alone. As mentioned, it is anticipated remote instruction will continue in some form even when schools return to business as usual. As Speed (2020) astutely noted, “Online teaching and learning tools have dramatically aided student engagement in the time of COVID-19, and these will continue to be leveraged to drive learner interest and active participation well beyond the pandemic” (Data Driven Insights). However, a common refrain among schools, teachers, students, and families during the pandemic has been the lack of digital fluency educators and schools have exhibited (Herold, 2020). Teacher educators are then compelled to prepare students to utilize evidence-based instruction in-person or remotely and potentially simultaneously. Secondly, preparation programs should include, as part of their curriculum, training with digitally friendly instructional methods, digital tools and applications, and use of learner analytics for instructional decision-making. Analytics, for example, can allow for early warning of inadequate progress, thus setting the stage for timely instructional modifications. Third, preparation programs are encouraged to develop and offer digital badges, micro-credentials, and recertification opportunities for currently practicing teachers. Indeed, state and local education agencies and schools of education are encouraged to utilize this disruption as an opportunity to re-think working relationships given their collective stake in attracting, preparing and supporting current and future teaching professionals.

Educator preparation personnel might also leverage this moment to better address other persistent school-relevant community and societal crises in their programs. First, many experts argue toxic stress is a public health emergency (Brisson et al., 2020). Thus, preparation programs are encouraged to consider including mental health instruction and training for their students as well as training in the use of trauma-informed teaching practices. Next, marginalized student groups continue to be underserved in our K-12 schools (Project Tomorrow, 2020). Schools of education are strongly encouraged to attract, support, and graduate teachers of color. For example, the University of South Florida, among others, has implemented the Call Me MiSTER program in local high schools to encourage young men of color to consider a teaching career (Scott, 2021). Moreover, preparation programs can include training in “social justice education” (Belle, 2019). Belle described a course in which students examine curricular theories to understand the contextuality of education and recognize, even if unintentional, some theories can subtly impart oppressive messages. Third, often overlooked is the need for teacher self-care. Again, the pandemic has highlighted both the significant expectations and the concomitant stress under which school professionals work each day. Pre-service programs are encouraged to be mindful of the importance of including as part of mental health instruction the need for teachers to utilize resources and strategies to themselves remain resilient.

Lastly, the coronavirus appears to be exacerbating teacher shortages (Jones & Pflaum, 2020). Reports indicate it has spurred retirements and potential reductions in the number of college students considering teaching as a degree option (DiNapoli, 2021). Moreover, increased staff turnover, or teacher churn, is also being reported, though it varies by region (Will, Gewertz, & Schwartz, 2020). Of course, even prior to the pandemic urban schools were reporting a loss of a quarter or more of their teachers each school year (Seton, 2019). There are a number of ways in which this may be addressed including greater collaboration with local and state education leaders. For example, internships might be modified to include salary or stipend options and/or future teachers may be provided some sort of financial remuneration upon degree completion and being hired by a district. This funding could be provided at the district, state, or federal level and could even extend to full coverage of the cost

of earning a teaching degree. A satisfactory pipeline of properly trained diverse teacher pool is essential to meeting the many challenges our schools now face.

Conclusion

At time of this writing the CDC (2021) had just published updated guidelines for a safe return to schools. Specifically, the medical guidance provided herein is consistent with their most recent recommendations. Moreover, there is wide agreement in the literature regarding the extraordinary impact of COVID-19 particularly on marginalized students. The ongoing school disruption provides an opportunity for education professionals to reflect upon our current practices and set the stage for education innovation as society emerges from this crisis. It is our hope the recommendations we have shared can make a contribution to that improvement.

References

- Ander, R., Guryan, J., & Ludwig, J. (2016). *Improving academic outcomes for disadvantaged students: Scaling up individualized Tutorials*. Brookings. <https://www.brookings.edu/wp-content/uploads/2016/07/Full-Paper-1.pdf>
- Araújo, L.A., Veloso, C.F., Souza, M.C., Azevedo, J.M., & Tarro, G. (2020). The potential impact of the Covid-19 pandemic on child growth and development: A systematic review. *Jornal de Pediatria (Rio J)*. doi: 10.1016/j.jped.2020.08.008
- Arcuni, P. (2020, October 13). *From condoms to coronavirus masks, 'harm reduction' has worked to protect public health*. KQED. <https://www.kqed.org/science/1970286/from-condoms-to-coronavirus-masks-harm-reduction-has-worked-to-protect-public-health>
- Aubrey, A. (2020, September 27). *A COVID-19 vaccine may only be 50% effective. Is that good enough?* npr. <https://www.npr.org/sections/health-shots/2020/09/12/911987987/a-covid-19-vaccine-may-be-only-50-effective-is-that-good-enough>
- Bauer, L., Lu, S. & Moss, E. (2020, October 1). *Teen disengagement is on the rise*. Brookings. <https://www.brookings.edu/blog/up-front/2020/10/01/teen-disengagement-is-on-the-rise/>
- Beatty, B. (2014). Hybrid courses with flexible participation: The HyFlex course design. In L. Kyei-Blankson & E. Ntuli (Eds.), *Practical Applications and Experiences in K-20 Blended Learning Environments* (pp. 153–177). IGI Global.
- Belle, C. (2019, January 23). *What is social justice education anyway?* Education Week. <https://www.edweek.org/teaching-learning/opinion-what-is-social-justice-education-anyway/2019/01>
- Bernacchio, C. & Mullen, M. (2007). Education & training: Universal design for learning. *Psychiatric Rehabilitation Journal*, 31(2), 167-169. doi: 10.2975/31.2.2007.167.169
- Brisson, D., McCune, S., Wilson, J. H., Speer, S. R., McCrae, J. S., & Hoops Calhoun, K. (2020). A systematic review of the association between poverty and biomarkers of toxic stress. *Journal of Evidence-Based Social Work*, 1-18.
- Canadian Pediatric Society. (2008). Harm reduction: An approach to reducing risky health behaviours in adolescents. Position Statement (AH 2008-01). *Pediatric Child Health*, 13(1). 53-56. DOI: [10.1093/pch/13.1.53](https://doi.org/10.1093/pch/13.1.53)
- Centers for Disease Control and Prevention (2021, February 12). *Operational strategy for K-12 schools through phased mitigation*. CDC. <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/operation-strategy.html>
- Centers for Disease Control and Prevention (2020, December 11). *Back to school planning: Checklists to guide parents, guardians, and caregivers*. CDC. <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/parent-checklist.html>
- Chabria, A. (2020, December 18). *Anti-vaccine and alt-right groups team up to stoke fear of COVID-19 vaccine*. Los Angeles Times. <https://www.latimes.com/california/story/2020-12-18/anti-vaxxers-team-up-alt-right-against-covid-19-vaccine>
- Chapanis, A. & Hostein, W.K. (n.d.). *Human-factors engineering*. Britannica. <https://www.britannica.com/topic/human-factors-engineering>

- DiNapoli, M. (2021, February 10). *Eroding opportunity: COVID-19's toll on student access to well-prepared and diverse teachers*. Learning Policy Institute. <https://learningpolicyinstitute.org/blog/covid-eroding-opportunity-student-access-prepared-diverse-teachers>
- Dorn, E., Hancock, B., Sarakatsannis, J., & Viruleg, E. (2020, June). *COVID-19 and student learning in the United States: The hurt could last a lifetime*. McKinsey & Company. <https://www.mckinsey.com/~/media/McKinsey/Industries/Public%20and%20Social%20Sector/Our%20Insights/COVID-19%20and%20student%20learning%20in%20the%20United%20States%20The%20hurt%20could%20last%20a%20lifetime/COVID-19-and-student-learning-in-the-United-States-FINAL.pdf>
- Egerton, A.K. (2021, January 21). *The importance of getting tutoring right*. Learning Policy Institute. <https://learningpolicyinstitute.org/blog/covid-getting-tutoring-right>
- Franke, H.A. (2014). Toxic stress: Effects, prevention, and treatment. *Children*, 390-402. doi:10.3390/children1030390
- Gallagher, J. (2020, October 27). *Covid: Antibodies 'fall rapidly after infection'*.bbc. <https://www.bbc.com/news/health-54696873>
- Gould, E. & Wilson, V. (2020, June 1). *Black workers face two of the most lethal preexisting conditions for coronavirus – racism and economic inequality*. Economic Policy Institute. <https://www.epi.org/publication/black-workers-covid/>
- Guzman, Z. (2021, January 25). *Moderna CEO offers a bleak assessment of COVID-19: Virus to stay with the world 'forever'*. Yahoo finance. https://finance.yahoo.com/news/coronavirus-is-going-to-stay-with-us-forever-moderna-ceo-224622557.html?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2x1LmNvbS8&guce_referrer_sig=AQAAAF1JpIy2trNOVzZ98bHh7m3LcsiviEIPVqeQ6WduXauQT31wSWzNc8vj11a2rqJhJs3ugZBQV1oIzcKv-snOcwUM01Eh5axT60sZZY1JPxqnSi5u-oZvvr9XwqDsdC2zk5XkNeaeX84wmFSloGJ4XYoT7hevTbzKJ0co_B5Uw
- Herold, B. (2020, April 10). *The disparities in remote learning under coronavirus (in charts)*. Education Week. <https://www.edweek.org/technology/the-disparities-in-remote-learning-under-coronavirus-in-charts/2020/04>
- Herold, B. (2021, January 7). *'No going back' from remote and hybrid learning, districts say*. Education Week. https://www.edweek.org/technology/no-going-back-from-remote-and-hybrid-learning-districts-say/2021/01?utm_source=nl&utm_medium=eml&utm_campaign=popweek20210115&M=59835126&U=2569368&UUID=0dc2bac4b87948707a01e5e0d0f06d21
- Holdheide, L. (2020, August 5). *Promising practices to prepare new teachers in a COVID-19 world*. American Institutes for Research. <https://www.air.org/resource/promising-strategies-prepare-new-teachers-covid-19-world>
- International Task Force on Teachers for Education. (2020, May). *Supporting teachers in back-to-school efforts*. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000373479?posInSet=2&queryId=N->
- Jameson, J.M., Stegenga, S.M., & Ryan, J. (2020). Free appropriate public education in the time of COVID-19. *Rural Special Education Quarterly*, 39(4), 181-192.
- Johnson-Trammell, K. (2020, December 22). *Educators are frontline workers who should receive the vaccine as soon as possible*. EdSource. <https://edsources.org/2020/educators-are-frontline-workers-who-should-receive-the-vaccine-as-soon-as-possible/645683>
- Jones, C. & Pflaum, N. (2020, November 13). *Teacher exodus: Data shows teachers retiring in droves amid COVID-19 pandemic*. KUTV. <https://kutv.com/news/beyond-the-books/covid-19-pandemic-prompting-teacher-exodus>
- Jones, E., Young A., Clevenger, K., Salimifard, P., Wu, E., Lahaie Luna, M., Lahvis, M., Lang, J., Bliss, M., Azimi, P., Cedeno-Laurent, J., Wilson, C., & Allen, J. (2020, June). *Healthy schools: Risk reduction strategies for reopening schools*. Harvard T.H. Chan School of Public Health Healthy Buildings program.
- Journal of Blacks in Higher Education. (2020, May 25). *How the racial digital divide impacts online education during the pandemic*. jbhe.com <https://www.jbhe.com/2020/05/how-the-racial-digital-divide-impacts-online-education-during-the-pandemic/>

- Kraft, M.A. (2013). *How to make additional time matter: Integrating individualized tutorials into an extended day.* Harvard. https://scholar.harvard.edu/files/mkraft/files/kraft_-_how_to_make_additional_time_matter.pdf
- Korman, H.T.N., O'Keefe, B., & Repka, M. (2020, October 21). *Missing in the margins: Estimating the scale of the COVID-19 attendance crisis.* Bellweather Education Partners. <https://bellwethereducation.org/publication/missing-margins-estimating-scale-covid-19-attendance-crisis#How%20did%20you%20estimate%201-3%20million%20missing%20students?>
- Lerer, L. (2020, July 16). *Reopen schools? Here's what you had to say.* New York Times. <https://www.nytimes.com/2020/07/16/us/politics/reopening-schools-teachers-students.html>
- Malczyk, B. R. (2019) Introducing social work to HyFlex blended learning: A Student-centered approach. *Journal of Teaching in Social Work, 39*(4-5). 414-428. DOI: 10.1080/08841233.2019.1652226
- Merrick, M.T., Ports, K.A., Ford, D. C., Afifi, T.O., Gershoff, E.T., Grogan-Kaylor, A. (2017). Unpacking the impact of adverse childhood experiences on adult mental health. *Child Abuse & Neglect, 69*, 10-19. DOI: [10.1016/j.chiabu.2017.03.016](https://doi.org/10.1016/j.chiabu.2017.03.016)
- Minkos, M. L. & Gelbar, N. W. (2021). Considerations for educators in supporting student learning in the midst of COVID-19. *Psychology in the Schools, 58*, 416-426. DOI: 10.1002/pits.22454
- Minkos, M. L. & Maykel, C. (2019). Implications of universal design for learning. In Gregory, J. L. (Ed.), *Learning Theory for School Leadership.* Top Hat. <https://tophat.com/>
- Munyan-Penney, N. & Barone, C. (2020). *COVID-19 response: High dosage tutoring to accelerate student learning.* ERN. <https://edreformnow.org/wp-content/uploads/2020/07/COVID-19-Response-High-Dosage-Tutoring.pdf>
- National Association of School Psychologists. (no date). *Helping children cope with changes resulting from COVID-19.* NASP. <https://www.nasponline.org/resources-and-publications/resources-and-podcasts/school-climate-safety-and-crisis/health-crisis-resources/helping-children-cope-with-changes-resulting-from-covid-19>
- Oh, D. L., Jerman, P., Marques, S. S., Koita, K., Boparai, S. K. P., Harris, N. B., & Bucci, M. (2018). Systematic review of pediatric health outcomes associated with childhood adversity. *BMC pediatrics, 18*(1), 83.
- Patterson, J. (2020, September 27). *Hillsborough county working to track down 7,000 missing students.* WFLA. <https://www.wfla.com/community/health/coronavirus/hillsborough-county-working-to-track-down-7000-missing-students/>
- Project Tomorrow. (2020). *90 days that changed K-12 teaching and learning: Spotlight on equity in learning.* Project Tomorrow. <https://content.blackboard.com/90DaySeriesBrief2>
- Scott, L. (2021, January 26). *USF brings 'Call Me MISTER' program to St. Pete to increase teacher diversity.* ABC Action News. <https://www.abcactionnews.com/news/region-pinellas/usf-brings-call-me-mister-program-to-st-pete-to-increase-teacher-diversity>
- Seton, H. (2019). The elephant in the classroom. *Educational Leadership, 77*(2), 77-80.
- Sharp, S. & Fitzgerald, A. (2020, August 26). *Prioritize equity and student and staff social/emotional learning needs on school reentry.* <https://www.njsca.org/events/2020/8/26/asca-webinar-prioritize-equity-and-student-and-staff-social-emotional-learning-needs-on-school-reentry>
- Shern, D. L., Blanch, A. K., & Steverman, S. M. (2016). Toxic stress, behavioral health, and the next major era in public health. *American Journal of Orthopsychiatry, 86*(2), 109-123. DOI: [10.1037/ort0000120](https://doi.org/10.1037/ort0000120)
- Shonkoff, J. P. (2012). Leveraging the biology of adversity to address the roots of disparities in health and development. *Proceedings of the National Academy of Sciences, 109*(Supplement 2), 17302-17307.
- Sokol, M. (2020, August 5). *May teachers fearful as they contemplate a return to school.* Tampa Bay Times. <https://www.tampabay.com/news/education/2020/08/05/many-teachers-are-fearful-as-they-contemplate-a-return-to-school/>
- Speed, R. (2020, July 27). *4 ways education will change post-COVID-19.* Blackboard. <https://blog.blackboard.com/4-ways-education-will-change-post-covid19/>
- Villano, M. (2020, September 24). *Students with special needs face virtual learning challenges.* CNN. <https://edition.cnn.com/2020/09/24/health/special-needs-students-online-learning-wellness/>
- Virella, P. (2020, June 2). *How will teacher and principal training look in a COVID-19 world?* UConn. <https://education.uconn.edu/2020/06/02/how-will-teacher-and-principal-training-look-in-a-covid-19-world-2/#>

- Volanen, S. M., Lassander, M., Hankonen, N., Santalahti, P., Hintsanen, M., Simonsen, N., Raevuori, A., Mullola, S., Vahlber, T., But, A., & Suominen, S. (2020). Health learning mind – Effectiveness of a mindfulness program on mental health compared to a relaxation program and teaching as usual in schools: A cluster-randomised controlled trial. *Journal of Affective Disorders*, 260, 660-669.
- Wallis, C. (2021, January 7). *The best evidence for how to overcome COVID vaccine fears*. Scientific American. <https://www.scientificamerican.com/article/the-best-evidence-for-how-to-overcome-covid-vaccine-fears/>
- Wan, W. & Johnson, C. Y. (2020, May 27). *Coronavirus may never go away, even with a vaccine*. Washington Post. <https://www.washingtonpost.com/health/2020/05/27/coronavirus-endemic/>
- Will, M., Gewertz, C., & Schwartz, S. (2021, November 17). *Did COVID-19 really drive teachers to quit?* Education Week. <https://www.edweek.org/teaching-learning/did-covid-19-really-drive-teachers-to-quit/2020/11>

Table 1: Additional Resources

Model	Resource
Harm Reduction	<i>A harm reduction approach to COVID-19:</i> https://jamanetwork.com/channels/health-forum/fullarticle/2766837 <i>Utilizing harm reduction for safer gathering:</i> https://www.chicagotribune.com/coronavirus/ct-covid-coronavirus-harm-reduction-20201121-qeohezjhh5dk3isth4n4ljzgay-story.html
Human Factors Engineering	<i>Centers for Disease Control and Prevention return to school recommendations:</i> https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/operation-strategy.html <i>Centers for Disease Control and Prevention sanitizer recommendations:</i> https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/hand-sanitizer.html <i>Environmental Protection Agency disinfectant recommendations:</i> https://www.epa.gov/pesticide-registration/list-n-disinfectants-coronavirus-covid-19
Trauma-Informed Teaching	<i>Collaborative for Academic, Social, and Emotional Learning curricula grade level recommendations:</i> https://casel.org/guide/ <i>Resources for trauma-informed schools:</i> https://www.weareteachers.com/9-resources-for-trauma-informed-school/ <i>Trauma Services and Adaptation Center:</i> https://traumaawareschools.org/traumaInSchools
HyFlex and Universal Design for Learning	<i>CAST Universal Design for Learning Guidelines:</i> http://udlguidelines.cast.org <i>Hybrid-Flexible course design text:</i> https://edtechbooks.org/hyflex <i>IRIS Center. Universal Design for Learning: Creating a Learning Environment that Challenges and Engages All Students:</i> https://iris.peabody.vanderbilt.edu/udl/