Promise and Peril:
Examining the Role of Ed Tech for Students With Disabilities

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With the ever-increasing use of technology in education, and especially in response to the COVID-19 pandemic, advocates and educators find themselves at a crossroads. The use of high-quality and accessible technology in schools can support higher levels of learning, facilitate rigorous learning opportunities, and close opportunity gaps. On the other hand, inadequate access to these technologies for some groups of students—or the spread of inaccessible technologies or those that fail to enhance learning—only threaten to widen existing opportunity divides.

Education technology has the potential to more quickly and accurately identify students who may have disabilities or struggle in school, increase accessibility to content, reduce stigma, increase engagement, and strengthen accountability for students with disabilities. It also has the potential to do exactly the opposite, especially with regard to students with disabilities and other vulnerable populations.

This report, informed by an extensive literature review and interviews with key policy makers, practitioners, parents, and other stakeholders, delves into how education technology (ed tech)—as a way to deliver and enhance learning and as the foundation upon which a learning environment is conceived and constructed—will or will not meet the inclusive educational needs of students with disabilities. It addresses the need to safeguard students' rights and, at the same time, promote higher-level learning for all learners.

For education technology to be implemented effectively and succeed in helping to level the playing field for all students, specific steps must be taken. The capacity for ed tech to enhance educational equity depends on five factors:

1. **Vision:** Higher and deeper levels of learning for all students must be the end goal of ed tech purchases, and all learners should be the beneficiaries of these investments.
2. **Accessibility:** All ed tech used in schools must be matched to students' learning needs and targeted to addressing specific instructional goals for all learners.
3. **Training:** All educators, parents, students, and administrators must be trained to effectively leverage ed tech for high levels of learning for all students.

4. **Accountability:** Schools using ed tech, as well as private companies supporting these tools and activities, must be held accountable for the education of all students and student subgroups.
5. **Funding:** Funding for the acquisition and integration of ed tech must be provided to support the long-term success of all students.

Getting these factors right for all students requires a team effort. It demands that students and their families, educators, administrators, and policy makers unite in their support of local, state, and federal policies that open doors of opportunity for all learners. Success in the education technology movement requires each of us to accept responsibility, engage in difficult conversations, and make choices to ensure true equity.

Introduction

Kristin Kane is not your average parent of a student with a disability. Not only does Kristin share the same diagnosis of dyslexia with her daughter, Lauralye, but Kristin co-founded the Virginia chapter of the disability rights advocacy group, Decoding Dyslexia. For several years, she spent her workdays advising other parents of students who have disabilities on how they can most effectively engage with their children's schools. When reflecting on her own K–12 experience, Kristin sees great progress. Disabilities don't carry the same stigma they did when she was a student. Advancements in technology, like text-to-speech software and digital graphic organizers provide Lauralye with more inclusive and engaging learning opportunities than Kristin could have ever imagined when she was her daughter's age.

There's no question that technology has transformed education, much as it has other fields, providing new opportunities to communicate, learn, and monitor progress. Yet, in other ways, technological advancement has not erased opportunity gaps between students with disabilities and their peers—it has simply redefined them. That fact can often feel disempowering, even for an engaged parent like Kristin. For example, Lauralye's school district implemented an adaptive learning software program that presents students with questions that increase or decrease in difficulty based on previous correct or incorrect responses. While Lauralye's disability inhibits her capacity to decode text, she has no problems with (and even demonstrates strength in) reading comprehension. Because the software did not address her challenges with decoding, Lauralye and other peers with dyslexia were assigned texts and given assignments well below their learning capacity. In other words, the adaptive features of the software unintentionally relegated Lauralye to inappropriately low standards that didn't reflect her true academic interests and ability.

This experience highlights the dilemma encountered by many students, parents, and educators: Do ed tech opportunities close or widen opportunity gaps? The complex reality is that they can do both, and outcomes will be shaped by the care and precision with which technology solutions are applied in schools to support learning for all students.

This report reflects a synthesis of a yearlong review of more than 100 articles, as well as conversations with dozens of parents, policy influencers, and other key stakeholders charged with reviewing, purchasing, designing, and implementing ed tech products and activities for students with disabilities. The findings highlight essential questions we all must ask in approaching ed tech investments. It also provides recommendations that can open doors of opportunity, while safeguarding the rights of all students in a rapidly changing world.

Disability, Technology, and the COVID-19 Pandemic
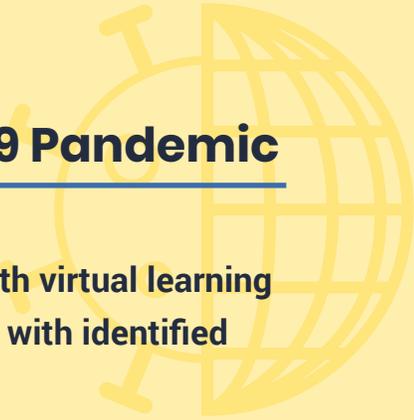
COVID-19 has turned even the best of what we know and do with virtual learning spaces and ed tech on its head! Every student (including those with identified disabilities), every teacher, every subject has been impacted.

Providing mandated specialized services and supports, testing, and accommodations is complex. And new procedures are needed for communicating with students, parents, and school colleagues. Ramping up these activities with barely any notice while ensuring that all students receive the high-quality instruction and support to which they're entitled can seem overwhelming. NCLD has developed the following resources to help families, educators, and schools navigate this transition.

Key Terms in Ed Tech During COVID School Closures – Lots of new terms have gained greater importance in light of school closures. This publication explores some of these terms and implications for students with disabilities.

Key Laws in Ed Tech During COVID School Closures – Disability rights are safeguarded through a variety of civil rights laws. This publication highlights some of the key legal and policy implications for students with disabilities in light of school closures.

4 Immediate Actions for Parents –Parents face new realities and changed relationships with regard to their children's education. This publication highlights the four immediate actions parents can take to ensure a smooth experience for their children.

4 Immediate Actions for Educators – Educators, even those comfortable with ed tech, will have needed to adapt to changes in daily routines, norms, and instruction. This publication highlights some initial actions educators can take to leverage ed tech for the benefit of all learners. NCLD has also worked with national partners to provide educators curated resources, office hours, case studies, and other supports to navigate this transition. Find those resources at **www.educatingalllearners.org**.

Find more NCLD resources relating to education technology and supporting students with disabilities in light of COVID-19 school closures at **www.ncld.org/covid19**.

Background and Focus of Report

This report defines ed tech as any digital tool that facilitates, enhances, or changes how education is monitored or delivered. This aligns with the Individuals with Disabilities Education Act (IDEA), which defines assistive technology as "any item, piece of equipment, or product system…that is used to increase, maintain, or improve functional capabilities of individuals with disabilities."[1] While the IDEA definition applies to assistive technology for individuals with disabilities, this report applies the term to include general education students as well—and emphasizes two specific functions of ed tech:

- **Learning enhancement:** Using technology to monitor instruction and outcomes and to facilitate different approaches to *how* learning is delivered. This function includes online videos, digital activities, and real-time data tools that can be applied in traditional and virtual education (schooling conducted predominantly or entirely through the internet).

- **Learning environment:** Using technology to alter fundamental characteristics of education including *where*, *when*, and *through whom* learning takes place. This function includes blended, virtual, and online platforms used to facilitate learning.

The primary distinction between these functions is that learning enhancement technologies integrate within existing educational environments, while learning environment technologies change learning environments in some fundamental way.

Ed tech can also include technology-related accommodations for students with disabilities, often referred to as assistive technology (AT). Examples include mobility aids, such as wheelchairs, scooters, walkers, and prosthetic devices, and learning tools such as screen readers, calculators, and graphic organizers. Unfortunately, it's not uncommon to hear the terms *assistive technology* and *education technology* used interchangeably. Both are necessary and appropriate to ensure access to high-quality learning opportunities, but they function to address learning and accessibility needs in fundamentally different ways.

Technology is being used with students in new and exciting ways on a daily basis. There are students with disabilities in every classroom and regardless of their special needs status, they are first and foremost members of the general education community.[2] It's therefore imperative to consider how education technologies (those used by all students) apply to and can benefit students with disabilities.

The expansion of these new technologies in education can, however, result in seemingly contradicting opportunities and challenges for students with disabilities:

- **Identification:** On the one hand, new technologies have shown promise in helping to identify and pinpoint the needs of students who may have a disability and need an evaluation.[3] On the other, technologies often miss certain social and visual cues that can help educators recognize students' needs and identify disabilities.[4]

- **Accessibility:** Technologies have opened new doors of learning to students in ways that could hardly have been imagined even 10 years ago.[5] But many technologies have not developed built-in accessibility features. As a result, certain students are shut out of new, technology-dependent opportunities.[6]

- **Stigma:** Technology levels the playing field when it's designed with all students in mind.[7] But students may feel singled out and stigmatized if they're the only ones using ed tech or are using it in a way that is different than their peers.[8]

- **Engagement:** Technology can facilitate greater student engagement and help students feel a sense of ownership over their learning.[9] It can also lead to some students being assigned less engaging, more rote activities.[10]

- **Accountability:** New technologies can provide detailed, ongoing data about student progress and increase the capacity for educators and schools to account for and report student achievement and outcomes.[11] But proprietary and privacy limitations on who owns, accesses, and stores these data can inhibit accountability.[12]

Many variables will influence how ed tech can impact student learning: how and why particular technologies were selected, the ways in which faculty are engaged and supported, the commitment of students and families, the interface between "tech and touch" approaches to teaching and learning, and many more. With the inevitable growth in ed tech across all sectors of the education community, it's essential that the needs of students with disabilities not be an afterthought. The remainder of this report presents issues and questions relating to two ed tech categories—enhancements and environments—and frames recommendations for meeting the needs of students with disabilities now and in the future.

Learning Enhancements

Proper integration of ed tech learning enhancements into schoolwide practices is essential for preparing students for 21ˢᵗ century success. Weaving technology into students' learning opportunities can contribute to technological literacy and skills, essential capacities for the modern workplace. Within schools, ed tech can also empower students to engage in more complex and creative work; improve administration and management of schools by gathering, synthesizing, and facilitating the use of data; provide broader access to learning through open education resources (OER); and improve overall communication.[13]

Familiarity with and use of technology are not luxuries in the modern world.[14] The rapid expansion of ed tech is a reflection of generational and social realities and demands. When compared to their peers, students with disabilities often gravitate toward technology and express demand for its use.[15] Many students are highly skilled at using these tools, not all of which are of equal value. When technology is used effectively, students with disabilities can experience greater engagement with learning.[16] When used inappropriately and indiscriminately, students with disabilities can experience greater isolation and frustration.[17]

Still, the benefits are real and tangible. Many schools are effectively leveraging ed tech tools to both identify disabilities and provide links to compensatory instruction and targeted interventions. Studies have highlighted how students with disabilities experienced academic and engagement gains from using ed tech tools including iPads, podcasting, and 3D printers.[18] The effectiveness of these technologies is derived from their capacity to empower students with disabilities and their peers to represent, express, and engage with content in flexible and interactive ways, the hallmarks of Universal Design for Learning (UDL) as defined and developed by CAST.[19]

Not all technologies embody the flexibility and interactivity that is so important for learning. Students with disabilities, particularly those with learning and attention issues, may be prone to more off-task behavior when using technology that doesn't facilitate engagement.[20] Others may have challenges interacting with technologies due to inherent accessibility issues.[21] Furthermore, teachers may not have been trained or supported in effectively leveraging ed tech for the benefit of all learners.[22]

As *Forbes* magazine contributor Willard Dix notes, "Teaching has always been a human activity, not just in the sense that it takes humans to do it, but in the fact that it is one of our most intimate relationships…."[23] Educational technology is successful when it helps to enhance the human endeavor of learning, but it's not a magic wand. Family members, educators, administrators, and policy makers can help ensure that ed tech enhances students' experiences by asking the following questions:

- **Parent:** Is the ed tech being used in my child's school or virtual environment created with all students in mind? Do its features ensure that all students, regardless of cultural, language, or disability status, can engage in high-quality learning that is aligned with their personal and academic needs?

- **Educator:** Are the ed tech tools geared toward higher levels of learning for all students? Are faculty provided the training and support needed for effective implementation?

- **Administrator:** Given the intended functions and desired outcomes for ed tech applications, has implementation been embraced by faculty? Has it made their work easier or more impactful? Are measures in place to evaluate return on investment, both financially and in terms of human capital?

- **Policy maker:** Is there an effective procurement and review process that parents, educators, and administrators can trust in and be a part of to gauge whether or not specific products are accessible and effective in the short and long-term?
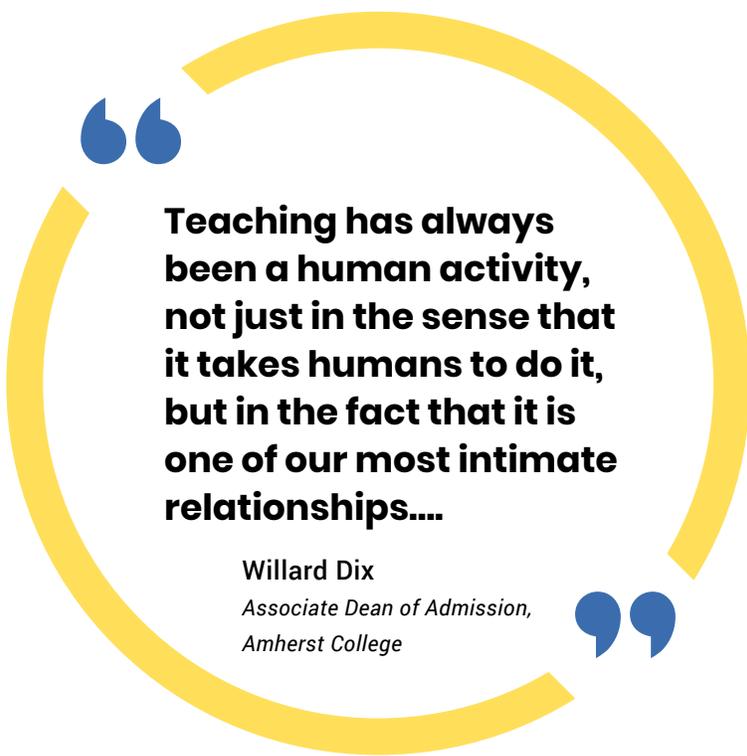
> **Teaching has always been a human activity, not just in the sense that it takes humans to do it, but in the fact that it is one of our most intimate relationships….**
>
> Willard Dix
> *Associate Dean of Admission, Amherst College*

Learning Environments

Technology doesn't just change how brick-and-mortar schools operate; in some cases, it redefines or even replaces them. Some schools have turned to technology to help identify students with disabilities—a practice almost unheard of just a few years ago. Adaptive software using algorithms in response to student and teacher input is being used to create assumptions about targeted instruction and propose learning trajectories for individual students. And the roles of educators and specialized instructional and support personnel are changing. Rather than sitting in a classroom with students, they can teach from home or from any remote location. These technologies exist and can be deployed at scale. But it's important to ask whether their deployment improves the learning experiences of all students and, if so, under what conditions?

Wherever one stands on the benefits and challenges of ed tech adoption and implementation, emerging technologies undeniably invite the potential for significant change to existing learning environments. Ed tech can provide relief for some students with disabilities, while adding challenges for others. Our collective responsibility is to evaluate innovation on its own merits and determine whether its implementation increases or reduces (short- and long-term) opportunity gaps for all students, including those with disabilities.

Students with disabilities today are among the fastest-growing populations engaged in virtual learning environments.[24] Good data suggest that online learning has increasingly been embraced by both students and their families.[25] At the same time, the field of virtual schooling and best practices in tech-intensive instructional settings is still evolving. The policy oversight necessary to secure and protect individual students' rights has not yet caught up to rapid advances in technological innovation.[26] Once again, this begs the question of whether advances in educational delivery will widen or close opportunity gaps.

A number of benefits directly appeal to students with disabilities and their families when it comes to virtual and digital learning environments. Some are drawn by the multiple ways to engage with content. Others find the anonymity in virtual settings appealing as a means to reduce stigma.[27] Still others feel empowered by the choices afforded in virtual and online education settings. For students and parents who are discouraged with their school building experience, it's easy to see the appeal of these programs. Parent surveys have shown that the decision to shift to virtual instruction is often not based on the merits and strengths of those programs, but rather as a consequence of their frustration with brick-and-mortar schooling.[28] At the same time, parents may not be fully aware of the time commitments they will need to make, changes in ownership and responsibilities for ensuring learning outcomes, and the need to embrace a host of new administrative processes that accompany any shift from in-school to virtual learning environments.[29]

While there's no denying the rapid growth in virtual learning opportunities, both through school-based and fully and intentionally designed online initiatives, questions remain about the efficacy of these programs. Some experts have expressed concern that data about some programs are either lacking or overly proprietary in nature;[30] and that reports of outcomes, when reported, are deeply troubling.[31] Others have raised concerns about insufficient policy oversight of failing programs;[32] and have suggested that program features such as asynchronous communication[33] and issues related to staffing and resources[34] can pose unintended challenges for students with disabilities.

Access to ed tech to advance student learning must be framed within the context of protecting student rights and equity. Online learning should never compromise a student's civil rights and their access to a free and appropriate education (FAPE). Given the range of pedagogical and civil rights issues that have surfaced with regard to this shift to technology-rich learning environments, parents, educators, administrators, and policy makers should seek answers to the following questions:

- **Parent:** Am I able to commit to the time required to support my child's education in a virtual setting? Does the virtual education program provide clear channels of communication with general and special education staff? Will the program provide clear and ongoing information about my child's learning progress and outcomes?

- **Educator:** Have I received or will I receive training to help me identify struggling students in virtual contexts and determine when a student might need differentiated instruction, supplemental support, or a special education evaluation? Does virtual instruction align to the principles of Universal Design for Learning (UDL)? Will I receive guidance to address unintended barriers that online learning may present to students with disabilities?

- **Administrator:** How can I ensure transparency of student outcomes with internal (e.g., school personnel) and external (e.g., students and parents) audiences?

- **Policy maker:** Is there sufficient subgroup accountability for the performance of students with disabilities in virtual learning environments?

5 Challenges for Online and Virtual Schooling for Students With Disabilities

There's no one-size-fits-all approach to virtual schooling, and some fully online programs have realized better results than others with students who have disabilities. The following is a summary of some caveats and cautions that should be addressed regarding unique challenges these programs face in teaching students with disabilities and supporting their needs.

1. **Lack of transparency:** It's easier for parents whose child has enrolled in a virtual school program to withhold information about their child's disability. Likewise, students themselves may not disclose their disability, and online schools often lack established protocols and procedures to ensure that students' disabilities are recognized and valued for the purposes of planning instruction and providing support. Experts have shared concerns about student data that are missing or discarded, or that can't easily be accessed because of proprietary and privacy constraints.[35] These are challenges for any school. But they can be particularly pronounced in virtual schools, which tend to be more decentralized and reliant upon services provided by private vendors.

2. **Lack of policy oversight:** Many of these programs lack oversight. According to a 2016 analysis by the Center on Online Learning and Students with Disabilities (COLSD):

    *   Of the 55 states and territories, only 21 had mandated vendor applications for online providers that specifically mention serving students with disabilities.

    *   Only 24 percent of states provided information for online programs regarding the supervision of special education on Child Find (the IDEA legal requirement that schools identify children with disabilities) and on the provisions of free and appropriate public education (FAPE).

    *   Thirty-eight states did not have any clear guidance/policy of who would provide special education services in a virtual/online school setting.

    *   Teacher education programs lacked standards associated with teaching students with disabilities in online settings, and K–12 online education is not tied to program accreditation.

    *   Approximately 75 percent of all states and territories had ratings of *Unclear*, *No with Evidence*, or *Nothing Found* in six of the nine items most closely aligned with IDEA.[36]

3. **Pedagogical challenges and inaccessibility:** While features of online learning can create opportunities for greater physical accessibility (e.g., embedded read-aloud options) and pedagogical accessibility, certain inherent features such as real-time chats, pauses in communication, and the inability to observe nonverbal cues make teaching students with disabilities in this medium more challenging.[37] And as mentioned earlier, evidence suggests that teachers lack the preparation and support to effectively meet the online learning needs of students with disabilities.[38]

4. **Educational responsibility:** Fully online learning programs demand that parents assume multiple roles—educator, paraprofessional, nurse, coach, motivator, etc.—each requiring a significant investment of time.[39] Critics argue that this expectation de-professionalizes the craft of teaching and asks more of most parents than they can reasonably provide.[40] While this is true for all parents of students engaged in virtual schooling, it's particularly pronounced for parents of students with disabilities given their children's more complex needs.

5. **Resource concerns:** According to an analysis by COLSD, the student-to-teacher ratio in many fully online programs is high. It's unclear whether or to what extent students eceive specialized instruction and support from special education and related service providers.[41]

Policy Recommendations

Policy makers have a critical role to play in ensuring that students with disabilities have equal access to learning opportunities offered by advances in ed tech. However, there is a great deal of work to do in the policy arena. Many of the laws governing and informing ed tech innovation (e.g., the Individuals with Disabilities Education Act, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act) have not been updated in over a decade. That's an eternity, considering both the pace at which technology tools and innovations have been evolving and the increasing demand for these tools and innovations for students in K–12 and beyond.

The deployment of ed tech is implicated in policy in a number of ways (see Appendix C). Laws such as IDEA, the Every Student Succeeds Act (ESSA), Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act (ADA) mandate specific protections for students with disabilities that must be adhered to by states, districts, and schools. Agencies can also compel action on the part of schools and their vendors through administrative regulations. In 2016, the U.S. Department of Education issued guidance to states clarifying their responsibilities with regard to serving students with disabilities in virtual schools.[42] Lastly, federal, state, and local decision makers and vendors can voluntarily adopt established standards, such as the Voluntary Product Accessibility Template (VPAT) and the Web Content Accessibility Guidelines (WCAG). These provide clear standards and expectations of accessibility for tech tools and online content.[43]

These and other policy mechanisms (e.g., state technology strategic plans, procurement processes, educator preparation standards) should be leveraged to ensure that ed tech—its conception, development, procurement, implementation, and evaluation—effectively meets the highest-level learning needs of students with disabilities. To accomplish this, advocacy and action are required in five key policy areas:

1. **Vision:** Expectations for high and deep levels of learning for all students must be the end goal of ed tech purchase and use.

2. **Accessibility:** All ed tech used in schools must be practically and pedagogically accessible to all students.

3. **Training:** All educators, parents, and students must be equipped to effectively leverage ed tech to achieve high levels of learning.

4. **Accountability:** Schools using ed tech and private companies supporting learning through ed tech must assume responsibility for the education of students, including subgroups.

5. **Funding:** Adequate funds must be provided to support the immediate and long-term success of all students engaged in online learning programs and activities.

The remainder of this report will elaborate on these key policy areas and their implications for local, state, and federal decision making in pursuit of ensuring that all students are equipped with the knowledge, skills, and dispositions essential to their success.

1. Vision

For ed tech efforts to be effective, they must be anchored in a vision that clearly communicates a commitment to excellence for all students. Multiple analyses have confirmed that this expectation is grounded in the belief that all students can and should graduate high school with the knowledge, skills, and dispositions essential for 21st century success.[44] Research highlights that when ed tech (in its broadest form) fails to improve and support complex thinking, opportunity gaps persist.[45] Unless policy makers embrace a commitment to higher and deeper levels of learning for all students, certain groups will fall prey to lowered expectations and be denied rigorous learning opportunities. Federal, state, and local policies can help inform a more explicit focus on high levels of learning by taking the following actions:

- **Federal:** The U.S. Department of Education, in collaboration with the U.S. Department of Labor, the Corporation for National and Community Service, and other federal entities, should update the National Education Technology Plan to emphasize interagency collaboration and articulate how each entity can contribute to delivering high-level, 21st century learning opportunities for students with disabilities.

- **State:** Each state education agency should require that the vision and plans within each division (e.g., tech curriculum, special education) support the common goal of greater inclusivity for all students.

- **Local:** Local education agencies—in partnership with their respective school boards—should be explicit in the development and implementation of strategic plans regarding the use and procurement of ed tech. This includes the need to ensure that all ed tech activities are accessible and rigorous, and that responses to requests for proposal (RFPs) from vendors meet this standard.

Spotlight: Future Ready Schools Framework

The Future Ready Schools (FRS) initiative is a project of the Alliance for Excellent Education. Its goal is to help school districts implement education technology thoughtfully and strategically. It includes 3,200 superintendents who have formally engaged with other essential stakeholders including librarians, principals, IT leaders, and instructional coaches. At the heart of the Future Ready effort is the FRS framework, which supports districts in their efforts to thoughtfully implement ed tech and fully consider the implications for curriculum, instruction, and assessment; personalized professional learning; robust infrastructure; budget and resources; data and privacy; uses of space and time; and community partnerships.

Learn more at **https://futureready.org**

2. Accessibility

Accessibility must be a critical component of any vision underlying the selection and implementation of educational technologies. Without intentionally building accessibility into all experiences facilitated by ed tech, tools and programs could inadvertently track students, resulting in lowered expectations and lack of access to meaningful learning experiences. Key to achieving accessibility is ensuring alignment with the principles of Universal Design for Learning (UDL). According to CAST, UDL is a "framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn." Evaluations of ed tech products have shown that many fall short of adhering to the principles of UDL,[46] especially with regard to helping students with disabilities engage with content.[47] In some cases, as products achieve wider distribution, re-designs that increase their popularity ignore accessibility features.[48] Federal, state, and local policy makers can take several steps to safeguard accessibility of ed tech products. These include:

- **Federal:** The U.S. Department of Education and the U.S. Department of Justice should strongly enforce accessibility requirements under the ADA (which include WCAG 2.0 AA or the latest best practice standards) in both traditional and virtual settings.
- **State:** States should create task forces and divisions to create clear guidelines for procurement of products and evaluate whether materials are accessible for all learners.

- **Local:** School districts should build the capacity of educators (through professional development or by providing technical assistance) to implement UDL and align instruction and use of technology with UDL principles.

Spotlight: AEM Best Practices Cohort

The National Center on Accessible Educational Materials (AEM) works to empower state and local efforts to support materials and technologies "usable for learning across the widest range of individual variability, regardless of format or features." As part of this program, the center manages the AEM Best Practices Cohort, a group of eight states who meet regularly to discuss and disseminate best practices that relate to the quality and accessibility of education materials and technologies. The forum has enabled decision makers from Alaska, Florida, Indiana, Iowa, Maryland, Minnesota, Ohio, and Texas—to not only collaboratively develop solutions to common challenges, but to also share those solutions with other states.

Learn more at **http://aem.cast.org/policies/aem-best-practice-cohort.html#.W6PMds5Kipp**

3. Training

Making ed tech available to all learners requires a commitment by schools and districts to train and support educators in the selection and use of these products and approaches. To ensure equity and inclusion for the greatest number of students, troubleshooting and personalizing the use of tools for learners with different needs must be a priority.[49]

Most educator preparation programs provide—but rarely require educators to complete—only one or two courses on disability or special education, and few provide a deep focus on ed tech integration.[50] Knowledge and skills regarding how best to support students with disabilities in virtual environments is an area of particular need for most educators, especially since ed tech can significantly alter the role and relationship of students and teachers. Identifying struggling students, providing instructional supports through virtual media, implementing Universal Design for Learning (UDL), navigating IEPs in virtual settings, and addressing off-task behavior for students with disabilities are all tasks for which educators need to be prepared.[51] Steps to increase teacher capacity to implement these practices include:

- **Federal:** The reauthorization of the Higher Education Act should include specific provisions to increase teacher knowledge and skills related to educational and assistive technologies as well as supporting inclusive learning environments. This could be accomplished through grants and pilot programs that incentivize states to create higher standards for educator and school leader development programs.
- **State:** State certification, teacher and leader licensure, and program accreditation requirements should reflect rigorous standards for professionals engaged in online programs.
- **Local:** Local education agencies (LEAs) should require schools to provide explicit instruction to students on using technology, and ensure that educators and administrators are aware of the legal requirements to integrate and leverage ed tech to facilitate high levels of learning.

Spotlight: Indiana PATINS Project

The Promoting Achievement through Technology and INstruction for all Students (PATINS) Project is a statewide technical assistance network that connects the state's local education agencies to the supports they need to implement technology inclusively for all learners, including those with disabilities. Its services include direct professional development and technical assistance to districts and schools working on inclusive ed tech implementation, general and targeted assistance to help districts implement accessible educational materials, and a lending library for software and services. These combined efforts ensure that districts and schools across Indiana don't leave any student behind when implementing inclusive teaching and learning in the 21st century.

Learn more at **https://www.patinsproject.org**

4. Accountability

In addition to educator capacity, one of the most important challenges to guaranteeing educational equity in the deployment of ed tech is accountability. School, district, and state education accountability systems are critical safeguards for traditionally disadvantaged student subgroups like students with disabilities. These systems should not be overlooked or abandoned in these times of rapidly changing and ever-increasing education innovation. This is especially true given the extent to

which schools have engaged private, for-profit companies to provide—and in many instances, define and lead—ed tech activities across every sector of the education community. Laws and administrative oversight have not always kept up with the breakneck speed at which emerging ed tech products have entered the education marketplace. Challenges such as the protection of proprietary data, students taking online courses in untested subjects, inadequate evaluation mechanisms for products, and students and families opting out of assessments need to be studied and addressed.[52] Federal, state, and local policies require guidance that takes into account the fluidity of participation, accessibility issues, and needed protections that relate to emerging technologies. Tangible steps to accomplish this include:

- **Federal:** In its enforcement of federal education laws—including but not limited to IDEA and ESSA—the U.S. Department of Education should require all schools receiving federal funds (including virtual schools) to report on how ed tech is being implemented to identify and support student subgroup outcomes.

- **State:** States must create stronger reporting and enforcement mechanisms for all schools, including online charter and virtual schools. Guidance should articulate processes for improvement and, as appropriate, sanctions, including the suspension or revocation of accreditation when programs fail to provide instruction that results in students meeting adequate standards (as a whole or in subgroups).

- **Local:** Districts should implement processes for monitoring and evaluating the effectiveness of ed tech providers (e.g., individuals, vendors) and the efficacy of individual products against specific outcomes. Surveying students and faculty can inform future investments as part of this effort.

Spotlight: U.S. Department of Education "Dear Colleague" Letter on Students With Disabilities Attending Public Virtual Schools

In August of 2016, the U.S. Department of Education issued a "Dear Colleague" letter to states to ensure that students with disabilities in virtual schools receive the special education supports to which they are legally entitled . The letter emphasized the need for high standards for virtual schools serving students with disabilities, to ensure oversight, accountability, and transparency for these schools. The letter emphasized that virtual schools were legally bound to ensure students' rights under IDEA and that those rights could not be diminished or compromised; called each relevant school district to clarify how it

was fulfilling evaluation, eligibility, IEP, and least restrictive environment provisions of IDEA; and called on states to meet their responsibilities to ensure that they have adequate Child Find policies so that all children, regardless of the severity of their disability are identified and evaluated in virtual school programs.

Learn more at **https://www2.ed.gov/policy/speced/guid/idea/memosdcltrs/dcl--virtual-schools--08-05-2016.pdf**

5. Funding

Implementing ed tech in ways that adequately meet the needs of all students, including those with disabilities, will require changes in investment and allocation of resources. Effective and inclusive implementation of ed tech is a moral and legal imperative and must not become yet another of education's unfunded (or underfunded) mandates. Special educators and others (e.g., literacy specialists, speech-language pathologists, psychologists) who are engaged in the design and implementation of high-quality, personalized instruction in traditional school settings should be recruited to ensure that online ed tech programs also meet the needs of all learners. Without their expertise, we risk creating a system that puts students onto two inequitable tracks—lowering expectations for students with disabilities and denying them opportunities. Since most laws, regulations, and practices have not kept up with advancements (both risks and opportunities) of ed tech, state and local entities face difficulties in implementing funding mechanisms that guarantee accessibility and rigor. The following federal, state, and local actions can help address this imbalance:

- **Federal:** Congress should fully fund IDEA, with stipulations around spending for ed tech that require schools to deliver evidence-based practices. Funding for research on the efficacy of emerging ed tech products and programs for students with disabilities should also be included.

- **State:** State education agencies should provide schools greater resources for the delivery of educational and assistive technologies, as well as for accommodations needed to ensure accessibility and to provide opportunities for learning enhancement for all students, including those with disabilities.

- **Local:** Local education agencies should ensure that all investments in ed tech are coupled with investments in professional learning to support inclusive ed tech implementation.

> ## Spotlight: New Hampshire UDL Academy
>
> New Hampshire has long been recognized as a national leader in educational innovation. The state has also put resources into ensuring that education innovation efforts fully account for accessibility. One example of such efforts is the New Hampshire UDL Academy, a grant program funded by the New Hampshire State Department of Education's Bureau of Special Education to support the efforts of districts and schools to integrate and scale Universal Design for Learning. The program, facilitated through a partnership with CAST, offers yearlong professional learning for districts that commit to implementing a team approach to professional learning that adheres to principles of UDL.
>
> *Learn more at* **https://www.education.nh.gov/who-we-are/division-of-learner-support/bureau-of-student-support/universal-design-learning** *and read NCLD's case study of one district implementing the approach at* **https://www.ncld.org/wp-content/uploads/2017/07/DJ-Bakie-Elementary-School.Case-Study.Fin_-1.pdf**.

Conclusion

When it comes to the topic of educational technology, everyone agrees: It's here to stay, embedded into the fiber of our schools and society as a whole. And if we work together, we can realize and reap enormous benefits for students and their families—benefits that will extend well beyond the K–12 years. Effective deployment of ed tech empowers students to conduct more complex and creative work, and it improves the administration and management of schools. The "promise and peril" of ed tech will be defined by how technology is used, the extent to which it's accessible, the ways in which it accelerates learning, and ultimately, how it results in the cultivation of a tech literate and skilled modern workforce.

Ed tech is often framed with competing narratives. On one hand, it has been offered as a panacea to provide easy access to content and address academic underachievement. On the other hand, it has been decried as impersonal, insensitive to the human interactions that are so critical to the education enterprise, and even undermining the professionalism and integrity of teaching as a craft. The reality is much more complex. We know, for example, from OECD international education analyses, that countries where technology is leveraged as a primary driver of learning do less well on tests of higher-

order learning (e.g., PISA) than those that focus more on human-directed learning opportunities.[53] At the same time, other studies highlight the benefits of ed tech on achievement.[54] Both these competing findings are true because ed tech integration isn't a single intervention—like most concepts in education, it's successful under the right circumstances and otherwise can be detrimental.

As is the case with every other aspect of our lives, education technology changes how we experience the world in existing environments and it changes those environments in fundamental ways. Decision makers must think carefully about how technology can impact students under different circumstances.[55] Paul Jaeger, a University of Maryland professor, cautions that "...for persons with disabilities, unless technological design and implementation meaningfully focus on inclusion, the internet may become a new means of increased marginalization in society."[56]

Local and national efforts are underway to help educators and leaders make well-informed decisions about education technology.[57] Questions like "How much would student learning increase if decision makers had access to better information about how ed tech tools perform in contexts similar to their own?" are being asked. Emerging data suggest that 85 percent of ed tech spending may be wasted on tools that are a poor fit or that are not implemented correctly.[58]

The key is to find ways to work together, through partnerships, collaborations, and alliances, and to find proactive ways to capitalize on the "promise" of ed tech for all citizens. Developers and publishers, vendors and consumers, school administrators and policy officials, educators, students, and their families—*all* must be engaged and valued in shaping approaches to ed tech that lead to supporting rigorous content learning, and that result in opportunities that foster cognitive, emotional, and behavioral growth for all students.

Appendix A

Questions Relating to Equitable and Inclusive Implementation of Education Technologies

	Educators	Principals and School Admin	Ed Tech Admin and Team	Vendors and Consultants	Colleagues	
Parents	X	X				How is the success of this technology being evaluated for my child and for all learners?
	X	X	X			How are the outcomes of specific technologies being evaluated? Are outcomes being disaggregated (collected and looked at separately) for students with disabilities by grade, academic subject, or other criteria?
		X				Will somebody with expertise in assistive technology attend my child's IEP or 504 meeting to review progress to date and recommend any needed changes or additional supports with the use of a specific ed tech tool/platform?
	X	X	X			How many hours should I anticipate spending each day/week to support my child's learning, especially if instruction is fully virtual? What specific tasks will I be doing?
		X				Are the teachers overseeing this program certified to teach children with disabilities?
	X	X	X	X		What information about my child is being collected by learning management systems (LMS)? With whom is that information being shared, inside or outside the school community?

Questions Relating to Equitable and Inclusive Implementation of Education Technologies

	Educators	Principals and School Admin	Ed Tech Admin and Team	Vendors and Consultants	Colleagues	
Educators		X	X	X		What's the intended use of this tool/platform? Will I be trained to effectively use it with all my students, including those with disabilities?
		X	X	X		Does this technology enhance my ability to provide explicit instruction for students with disabilities? If so, will I be provided training and support?
		X		X		What "depth of knowledge" does this technology support?
		X				How much and through what means am I expected to communicate with families about student progress and any issues accessing and using tech? Are there other staff who can help with this process?
			X			What assistive technology do I have at my disposal? Are the ed tech tools and strategies I'm using accessible to the broadest range of learners?

Questions Relating to Equitable and Inclusive Implementation of Education Technologies

	Educators	Principals and School Admin	Ed Tech Admin and Team	Vendors and Consultants	Colleagues	
School Administrators	X		X			Will investing in this ed tech tool or platform make educators' jobs easier or harder? Are there other efficient and cost-effective ways for them to achieve this goal? What materials, training and support do they need to be successful?
				X		How does this product or platform address the full range of student variability including English language learners, students with disabilities, and other disadvantaged populations?
			X	X		What hardware and bandwidth considerations need to be addressed to ensure that this ed tech tool or platform can be used effectively for all learners, including those with mild to moderate disabilities?
			X	X		To what extent are the features of the platform or tool interoperable with other commonly used ed tech products and platforms?
			X	X	X	What data are being collected and how are they being used? Is student confidentiality being protected?
				X		Are there licensing restrictions regarding numbers of users? Can the program or platform be easily accessed by users across multiple sites?

Questions Relating to Equitable and Inclusive Implementation of Education Technologies

	Educators	Principals and School Admin	Ed Tech Admin and Team	Vendors and Consultants	Colleagues	
Local/State Policy Makers	X	X	X	X		Are educators receiving sufficient training to implement educational technology tools and platforms?
	X	X	X			Do policy decisions made address the unique characteristics of all student populations and, in doing so, help close the digital divide?
		X	X	X	X	What procedures are in place to ensure that ed tech investments (to schools and vendors) are maximizing benefits to schools while safeguarding taxpayer dollars?
				X	X	What funding model is in place for the provision of ed tech services and support (e.g., per-pupil fee, course completion, achievement, graduation)? Does it vary for different student subgroups?
					X	Is there an effective certification process in place for educators to ensure that they're qualified to provide online instruction to students with disabilities?

Appendix B

Glossary: Defining Key Terms in Report

adaptive learning

This refers to any software or program that builds a model of the preferences, goals, and knowledge of each individual student and uses that model throughout the interaction with the student in order to adapt to that student's needs.[59] When using adaptive learning applications, students with disabilities may require appropriate accommodations to ensure that automated decisions (e.g., content selection, pace of instruction) are not diminishing learning opportunities.

assistive technology

This refers to any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability."[60]

accessibility

This refers to the "ability to access" the functionality, and possible benefit, of some system or entity. It's used to describe the degree to which a product such as a device, service, or environment is accessible by as many people as possible."[61]

accommodations

This refers to adaptations made for specific individuals with disabilities when a product or service isn't accessible.[62]

blended learning

This refers to learning that involves leveraging the internet to provide each student a more personalized learning experience, including increased student control over the time, place, path, and/or pace of learning.[63] For students with disabilities to succeed, it's imperative that blended learning experiences be coupled with needed accommodations and supports.

born accessible

This refers to materials are products that are conceived and created with accessibility in mind. Designing and creating "born accessible" products is more labor intensive and expensive than with traditional products, but not more so than the often prohibitive cost of retrofitting existing content for accessibility.[64] Learn more at **http://diagramcenter.org**

educational technology

Ed tech is the term used to describe digital tools and programs that facilitate, enhance, or change how education is monitored or delivered.

learning management system

This refers to systems and methods that support the creation and timely electronic scheduling and delivery of course materials in education.[65]

online learning

This refers to education in which instruction and content are delivered primarily over the internet. It's often used interchangeably with virtual learning, cyber learning, and e-learning.[66]

open education resources (OER)

This refers to educational materials that are in the public domain or available for use with an open license, not restricted in use by copyright.[67]

Universal Design for Learning (UDL)

This is a way to optimize teaching to effectively instruct a diverse group of learners. The approach is based on insights from the science about how people learn. It emphasizes accessibility in how students access material, engage with it, and show what they know.[68]

Find more resources at the following useful compilations

UC Davis Ed Tech Commons

The Ed Tech Commons at UC Davis provides a short, useful list of common terms in education technology.

Common Sense Media Glossary

Common Sense Media includes a glossary of useful terms in one-to-one technology programs.

Ed Shelf Dictionary

Ed Shelf helps unpack education technology terms in a clear and digestible manner.

Appendix C

Relevant Laws and Best Practices Related to Accessibility and Technology

accessible educational materials (AEM)

AEM are print- and technology-based educational materials, including printed and electronic textbooks and related core materials that are designed or enhanced in ways that makes them usable across the widest range of learner variability, regardless of format (e.g., **print, digital, graphic, audio, video**).[69] Learn more at **aem.cast.org**

Americans with Disabilities Act (ADA)

The ADA is a federal civil rights law that provides legal protections for individuals with disabilities from discrimination in employment, state and local government, public accommodations, commercial facilities, telecommunications, and transportation. Learn more at **https://www.ada.gov/access-technology/index.html**

Assistive Technology Act (Tech Act)

The Tech Act is intended to promote people's awareness of, and access to, assistive technology (AT) devices and services. The act seeks to provide AT to persons with disabilities so they can more fully participate in education, employment, and daily activities on a level playing field with other members of their communities. The act covers people with disabilities of all ages, all disabilities, and in all environments (early intervention, K–12, postsecondary, vocational rehabilitation, community living, aging services, etc.). Learn more at **ataporg.org**

Every Student Succeeds Act (ESSA)

This is the nation's main law governing K–12 education. ESSA calls for states, districts, and schools to provide students access to challenging academic standards, use the same test for all students (with the exception of the 1 percent of students with significant disabilities), and hold schools accountable for the success of students, including students with disabilities and other subgroups. Learn more at **https://www.understood.org/en/school-learning/your-childs-rights/basics-about-childs-rights/every-student-succeeds-act-essa-what-you-need-to-know**

Individuals with Disabilities Education Act (IDEA)

This is the nation's main law governing specific rights of K–12 students with disabilities. IDEA entitles all public school students the right to a free and appropriate public education (FAPE), a free evaluation for students suspected of having a disability, and special education and related services to students identified as having an educationally handicapping condition. Learn more at **https://www.understood.org/en/school-learning/your-childs-rights/basics-about-childs-rights/individuals-with-disabilities-education-act-idea-what-you-need-to-know**

Section 504 of the Rehabilitation Act of 1973

This is a civil rights law intended to remove barriers for students with disabilities in K–12 public schools and to protect children and adults with disabilities from discrimination in school settings and beyond. Learn more at **https://www.understood.org/en/school-learning/your-childs-rights/ basics-about-childs-rights/section-504-of-the-rehabilitation-act-of-1973-what-you-need-to-know**

Section 508 of the Rehabilitation Act

This act requires federal agencies to procure, develop, use, and maintain information and communications technology (ICT) that is accessible to people with disabilities. Learn more at **https://www.section508.gov/manage/laws-and-policies**

Voluntary Product Accessibility Template (VPAT)

VPAT is a document that explains how ICT products such as software, hardware, electronic content, and support documentation meet Section 508 standards for IT accessibility. Learn more at **https://www.section508.gov/sell/vpat**

Web Content Accessibility Guidelines (WCAG)

WCAG is a standard that provides a single international standard for web content accessibility by ensuring that it's perceivable, operable, and understandable to a variety of individuals. Learn more at **https://www.w3.org/WAI/standards-guidelines/wcag/**

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