CITES | Virtual Learning Project

Virtual Learning Considerations for Students with Disabilities

Center on Inclusive Technology & Education Systems

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IDEAs that Work
U.S. Office of Special Education Programs

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About CITES

The Center on Inclusive Technology & Education Systems (CITES) at CAST is funded by the Office of Special Education Programs (OSEP) at the U.S. Department of Education. The goal of CITES is to empower school districts to create and sustain inclusive technology systems that serve all students, including students with disabilities who require assistive technology or accessible educational materials.

CITES aims to assist districts in creating and sustaining inclusive technology ecosystems that foster intentional collaboration between educational technology (EdTech), assistive technology (AT), and information technology (IT) to benefit students with disabilities and all students. To do this, CITES is developing a framework of evidence-based practices to enhance the successful use of technology by all students. Reference the CITES Glossary for clarity on a variety of terms specific AT/IT and EdTech.

The CITES framework consists of the following topics:

- Leadership
- Infrastructure
- Teaching
- Learning
- Assessment
- Family Engagement (threaded throughout the framework)

Overview

The 2017 National Education Tech Plan clearly states the significant role technology plays in providing accessibility for all learners, including students with disabilities:

> "Digital learning tools can offer more flexibility and learning supports than traditional formats. Using mobile devices, laptops, and networked systems, educators are better able to personalize and customize learning experiences to align with the needs of each student. They also can expand communication with mentors, peers, and colleagues through social media tools" (p. 22).

In 2020, the capacity of schools to teach with digital learning tools in ways that meet the needs of students with disabilities was tested beyond any expectation as schools had to scramble to provide remote instruction during the height of the pandemic. While most students returned to in-person classrooms as the pandemic evolved, many are now in virtual learning environments that likely wouldn't exist if not for the pandemic.

The primary goal of the CITES Virtual Learning Project was to engage with established virtual schools, districts with virtual programs, and organizations dedicated to virtual learning, to learn about promising practices related to educating and supporting students with disabilities and their families. Central to this work was identifying what technologies are used in these settings and how students who require assistive technology (AT) to access instruction are supported. Equally important is understanding how teachers and families are supported to use the technology tools effectively for inclusive teaching and learning.

In 2016, prior to the pandemic, OSEP shared a statement with guidance to ensure the needs of students with disabilities are met in virtual classrooms. In addition, states were already focused on further development of virtual programs and policies related to the acquisition of instructional materials. Currently, five states have online course requirements for graduation, four states strongly encourage online courses for high school graduation, and at least 12 states have policies to support virtual learning options for inclement weather.

Since the pandemic, states and districts have heightened awareness of virtual learning opportunities and the essential supports required to offer virtual learning as an option to students with disabilities. Most schools have returned to their brick-and-mortar settings; however, continued health concerns, inclement weather emergencies, school safety/security issues, teacher strikes, or even construction projects may necessitate that districts offer virtual learning options for unspecified periods of time for an entire district or individual schools. Also, some school districts are creating or expanding virtual learning options because of the success of some courses and/or specific populations of students who experienced increased success and/or remained in school because of the virtual option.

With virtual and hybrid learning opportunities on the rise, educational leaders must consider how to meet the needs of students who require AT to access digital learning from home or other settings. In fact, it is required that students with disabilities can “acquire the same information, engage in the same interactions, and enjoy the same services” as students who do not have disabilities "in an equally integrated and equally effective manner, with substantially equivalent ease of use.” (Joint Letter U.S. Department of Justice and U.S. Department of Education, June 29, 2010).

Background Information

Activities conducted to inform this work included:

- Interviews and surveys with administrative staff from five virtual schools to identify best practices related to virtual education and students who use AT and require accommodations. All five schools were established more than four years prior to the onset of the pandemic. In addition, the average percentage of students with disabilities attending schools in the U.S. is 15%. The five virtual schools reported that 15-27% of their students had identified disabilities.
- Virtual School Program Participants
    - eSchool Garnet Valley, Glen Mills, PA
    - Mountain Heights Academy, Utah
    - North Carolina Virtual Public School, North Carolina
    - Virtual Learning Academy Charter School, New Hampshire
    - Greater Commonwealth Virtual School, Massachusetts
- Access the Virtual School Program Profiles Document
- Interviews with personnel from three key organizations that provide resources to educators invested in virtual schools:
    - Quality Matters
    - Virtual Learning Leadership Alliance (VLLA)
    - Digital Learning Collaborative (DLC)/Digital Learning Annual Conference (DLAC)
- Identification of current organizations and resources that are focused on virtual learning and students with disabilities.

- Development of an annotated bibliography focused on virtual education and students with disabilities published since the pandemic began.

Interviews & Survey Analysis

The CITES framework guided the analysis of the interviews and surveys. Data from the five interview transcripts and surveys were analyzed deductively by a group of three researchers utilizing the constant comparative method (Glaser & Strauss, 1967) and coding techniques consistent with open coding (Strauss & Corbin, 1990). Initial codes based on the CITES framework were identified by all three researchers. New codes emerged during the process of data analysis and were agreed upon by all three researchers. All transcripts were uploaded into Dedoose Version 7.0.23 software for each researcher to review independently, line-by-line, and to assign open codes to discrete units of data. Researchers compared assigned codes and discussed differences to achieve consensus. Discrepancies were deliberated until 100% agreement was reached.

Key Takeaways

Despite different models, virtual schools that are successful in supporting students who use AT and require accessibility report similar resources, opportunities, and practices for their educators, students, and their families.

It is worth noting that during every virtual program interview, there was at least one school or district level champion for students who use AT, and those champions took it upon themselves to ensure that students have access to quality learning opportunities. Students would not have opportunities for academic success without them. However, to make a lasting change, a supports system is needed so that best practices are in place and requirements are met for all learners from the beginning. Students who use AT and require accessibility should never be waiting for someone to retrofit curriculum or troubleshoot digital tools so they can access learning. Students with disabilities have a right to accessible educational materials and AT from the start (Karger, 2021).

This list provides an overview of the practices that best support students with disabilities and their families based on our findings.

- Accessibility and Assistive Technology (AT) Considerations:
    - Intentional attention by leadership and technology teams to select and implement platforms and products that have AT and accessibility features embedded is impactful. For example, including AT considerations and accessibility when selecting learning management systems and software applications from the onset. Intentional selection of technology and resources with built-in accessibility features support both students who require AT to access learning and those who don't require it, but benefit from the optional support.
    - Selection of accessible applications can reduce barriers and support all students. For example, research has shown that captions benefit all learners (Gernsbacher, 2015).
    - Highlighting the necessary intersections between Information Technology, Assistive Technology, and Educational Technology leadership teams helps ensure school/district decisions to ensure the supports needed for accessibility and assistive technologies are already in place for the learners who require them. As part of this, including accessibility requirements and priorities in policy manuals on the school website and in contract language with vendors demonstrates such a commitment. Such collaboration can also support implementation of Universal Design for Learning (UDL) across the district.
    - Providing resources for families such as Understood and the Center for Parent Information and Resources.
    - Ensuring all stakeholders understand and have access to resources from the American with Disabilities Act, the Office of Special Education Programs, the Office of Civil Rights.
- Flexibility and Choice:
    - Some virtual schools provide opportunities at the local school or district level for all students to choose between synchronous, asynchronous, hybrid, or brick-and-mortar classes. In one example, the curriculum is aligned across programs so students can switch settings, as appropriate.

This program also provided opportunities for students to try different learning settings to see which setting was optimal for their individual learning needs. In some programs, students can choose to be enrolled virtually for all classes or selected classes.
    - One option for schools is to provide students participating in virtual courses with space on a school campus to work independently and/or receive in-person support from program staff.
- Consistency in Curriculum:
    - Notably, in districts that offer both on-campus and virtual learning options, the same course content and materials are used. There is no difference in the content or requirements whether students take a class virtually or in person.
    - Although all students should have access to the same curriculum, it is recognized that the sites that successfully provided accessible content worked with experienced staff members to train and support curriculum writing.
- Curriculum Development Addresses Accessibility:
    - Professional learning opportunities, offered to both general and special educators, are key to successful programs for students with disabilities and their families. Offering opportunities for a sustained period of time that address how to design accessible materials, write inclusive curriculum, and provide personalized learning supports demonstrated increased access for all students.
    - Instructional designers should embed accessible features in courses to first ensure the needs of students who use AT and require accessibility are met, but also to provide flexible and UDL-aligned options to reduce barriers frequently found in virtual and face-to-face learning settings.
- Virtual instruction with embedded requirements for synchronous or face-to-face meetings, intentional connections between teachers and students, and opportunities for connections among students are shown to support engagement and positive academic outcomes. Examples include:
    - Asynchronous courses paired with opportunities for school, family and community engagement
    - Synchronous instruction

    - Required and optional opportunities for check-ins with instructional and school support staff
    - Required number of direct contact times with students and families
    - Extracurricular activities, including clubs and community service projects
      Note: Interviewees noted the biggest barriers to student success have been a lack of opportunity for face-to-face connections and asynchronous-only options. Students and families both benefit from the opportunity and flexibility to meet face-to-face and synchronously.
- Coordination Between the Virtual School and School of Record:
    - IEPs and 504 Plans must be shared with all school personnel who will be involved in implementing a student's educational program. In addition to relevant administrators and teachers, this includes personnel who may be designing or adapting curriculum for the student.
    - Even if the student and family select a school that is different from the school of record, it may be that the school of record is still responsible for the student's IEP or 504 Plan. Communication between both schools should be established and maintained throughout the school year to ensure students with disabilities are receiving appropriate accommodations and services. Staff directly involved in the student's learning should be aware of the student's IEP goals, supplemental services and necessary accommodations and AT.
- Families and Building Communities:
    - Communication with families should be consistent and provide options, including;
        - Access to a help desk
        - Regularly scheduled meetings between families and school personnel
        - Family access to apps within the LMS system
- Opportunities for families to engage as part of the school community should be provided. Considerations may include hosting:
    - In-person events
    - Synchronous office hours
    - State, district, or school groups: For example in the state of Massachusetts, every public school district in Massachusetts is required

by law to offer a Special Education Parent Advisory Council (SEPAC). Membership is offered to all parents of children with disabilities and other interested parties.

Key Takeaways Aligned with the CITES Framework

Five areas particularly relevant to informing the CITES framework as it relates to virtual learning environments emerged:

- Leadership — All of the practices identified under the Leadership section of the CITES framework are applicable to virtual schools.
- Alignment of Information Technology/Assistive Technology — The virtual schools included in this project demonstrate how to align Information Technology (IT), Assistive Technologies (AT), and accessibility features to ensure students with disabilities have equitable access to learning. Many similarities are highlighted in the Personalize Learning Devices section of the CITES framework and in the Unify Inclusive Technology Decision-Making section of the CITES framework.
- Professional Learning — The virtual school programs included in this project provide a variety of models and resources to support all educators, including support for teaching students with disabilities. Additional practices are identified in the CITES framework section Teaching in Inclusive Technology Systems.
- Family Engagement — Models provide resources and suggestions for supporting and communicating with families throughout the academic year.
- IEP and 504 Plans in Virtual Settings — The development and implementation of IEPs and 504 Plans varies based upon whether the virtual school or the school of record is the lead for this process. The instructor for the virtual course must be adequately informed of a student's goals and objectives, and implement requirements for providing access to the general education curriculum.

General Resources

In 2016, prior to the pandemic, the Office of Special Education Programs (OSEP), shared a statement ensuring the needs of students with disabilities were met in virtual classrooms. Prior to and since then, several organizations have worked on establishing standards and providing resources to support existing virtual schools, as well as those who would like to establish virtual learning opportunities. Below are the key organizations, reports, and resources currently available to schools. When applicable, the resources specific to students with disabilities, Assistive Technology (AT), and/or accommodations are highlighted.

Organizations/Centers

Assistive Technology Industry Association (ATIA): The mission of ATIA is to "serve as the collective voice of the assistive technology industry so that the best products and services are delivered to people with disabilities." In addition to sponsoring an annual Assistive Technology Conference, they also offer a Learning Center and AT Resources, one of which is the journal Assistive Technology Outcomes & Benefits (ATOB). ATOB recently published an edition focused on Assistive Technology Services During and After the COVID-19 Pandemic. The complete list is also available in the Selected Annotated Bibliography.

National Standards for Quality Online Learning: The National Standards for Quality Online Learning is a partnership between Quality Matters, the Virtual Learning Leadership Alliance, and the Digital Learning Collaborative. The goal is to continuously revise the National Standards for:

- Quality Online Teaching
  Standard F Diverse Instruction - This standard addresses accommodations for students including those with disabilities.
- Quality Online Programs
  Standard G: Equity and Access - This standard provides guidance to ensure students can access programs.
- Quality Online Courses

Standard E Accessibility and Usability - This standard addresses the commitment to accessibility so all learners can access all content and activities.

Quality Matters: Quality Matters is a nonprofit, quality assurance organization that provides resources in support of online learning including:

- Professional Development — Sections are devoted to making materials accessible.
- Expert review of online courses — Includes accessibility as part of the review process.
- Online database of relevant research — Includes articles focused on students with disabilities and access.
- Rubrics and Standards for online courses and programs — These provide guidance for making materials accessible.
- Conferences and other community building event and activities — presentations and activities include those focused on students with disabilities and accessibility.
    - Quality Matters Accessibility Policy for Online Courses demonstrates their commitment to students with disabilities and **includes a statement on Assistive Technology.**
    - Quality Matters: Case Study on NC Virtual — North Carolina Virtual Public School is one of the virtual programs highlighted by the CITES project.
    - VLLA (Virtual Learning and Leadership Alliance): VLLA is an association of virtual programs that provides collegial support and collaborative opportunities to the individual members and member organizations to share resources, services, and expertise.
        - Research and Reports — Many of these reports focus on the inclusion of students with disabilities and virtual learning.
        - Michigan Virtual — As a member of VLLA, Michigan Virtual has a research arm, Michigan Virtual Learning Research Institute, which published a series of reports/papers about best practices. A subset of these reports focus on students with disabilities.

Digital Learning Collaborative (DLC): The Digital Learning Collaborative is a membership organization for leaders of virtual school programs and hosts the Digital Learning Annual Conference (DLAC) and provides resources:

- DLC State Profiles —This website, sponsored by DLC, offers an overview of key digital learning activities and policies in each state.
- Accessibility Statement, **which includes a statement about Assistive Technology.**
    - Snapshot 2022
    - Additional Resources Identified by DLC:
        - Center on Online Learning
        - Texas Virtual School Network Accessibility Guidelines

Unesco

- Accessible ICTs and Personalized Learning for Students with Disabilities
- Learning for All: guidelines on the inclusion of learners with disabilities in open and distance learning

iNACOL (National Association Collaborative Online Learning) initially offered the Online Learning Standards and then became the Aurora Institute.

The Center for Family Engagement: The Center for Family Engagement has a tool, Comparison of Family-School Communication Technologies, which provides an overview of technologies allowing families to communicate online with educators. This includes a section on Accessibility & Ease of Use Landscape about:

- Messaging and Texting Services
- Learning Management Systems (LMS)
- Student Information Services
- Single Sign-on

The Center for Learner Equity: The Center for Learner Equity centers its work on ensuring that students with disabilities, including those in under-resourced communities, have access to high quality educational opportunities and choices. They

accomplish their mission through research, advocacy, coalition formation, and capacity building with national, state, and local partners.

During the pandemic, The Center for Learner Equity provided resources specifically related to COVID-19 and Students with Disabilities including:

- How Has the Pandemic Affected Students with Disabilities? A Review of the Evidence to Date
- Ensuring FAPE for Students with Disabilities During COVID-19: A Resource for Educators
- Resources for Educating Students with Disabilities During the Coronavirus Crisis

National Center on Accessible Educational Materials at CAST: The National AEM Center is a resource for state- and district-level educators, parents, students, publishers, conversion houses, accessible media producers, and others interested in learning more about and implementing accessible digital materials and technologies.

Policy & Research Reports/Databases

State of Ed Tech Leadership (CoSN) — This 2022 survey reports the current state of technology in education as reported by school district leaders. Particular attention is paid to the status of Information Technology (IT).

Digital Instructional Materials - Acquisition Policy for States (SETDA) is an online database which provides state and territory policies and practices related to the acquisition and implementation of digital instructional materials in K12 education.

State Education Agency Considerations for CARES Act Funding as Related to Digital Learning provides a resource for state leaders regarding considerations for federal stimulus funding expenditures.

Online Curriculum Accessibility Considerations

- eDynamicLearning
    - Equity and Access Statement

    - All eDynamic courses are designed to meet Web Content Accessibility Guidelines (WCAG) 2.0 AA, enabling learners of all styles to participate equally. A list of accessibility features that are included in all eDynamicLearning courses can be found on their website.
- Flex Point Education Cloud (formally Florida Virtual)
    - Develops courses for online, which districts can purchase
    - Flex Point Accessibility Statement
- Imagine Learning - (Formally Edgenuity)
  Imagine Learning Accessibility Statement
- VidCode
  Used to teach students how to code, per the information provided by Vidcode Technical and Accessibility Specifications: Vidcode Accessibility
    - Includes a read-aloud function for instruction sets and makes references available to all users
    - Features high contrast theme throughout the platform to optimize text
    - Offers ability to use the platform without a mouse

Learning Management Systems Accessibility Features

- Canvas Accessibility Features
- Schoology Accessibility Features (click Schoology VPAT.pdf (80 KB) to access the PDF of accessibility features)
- Blackboard Accessibility Features

Office of Special Education 2020 Resources to Support Virtual Learning

- Questions and Answers on Providing Services to Children with Disabilities During the Coronavirus Disease 2019 Outbreak March 2020
- Supplemental Fact Sheet Addressing the Risk of COVID-19 in Preschool, Elementary, and Secondary Schools While Serving Children with Disabilities – March 21, 2020
- QA on IDEA Fiscal Flexibilities, June 26, 2020
- QA Part B Service Provision September 28, 2020

COVID Resources from ED with sections on Special Education (SPED - 2020-2021)

- SPED section — provides a list of documents specifying the regulations that need to be addresses/followed
- Resources for Home Learning

References

Glaser, BG. & Strauss, AL. (1967). The Discovery of Grounded Theory: Strategies for Qualitative Research. New York: Aldine De Gruyter.

U.S. Department of Education, Office of Educational Technology, Reimagining the Role of Technology in Education: 2017 National Education Technology Plan Update, Washington, D.C., 2017.

Strauss, A. & Corbin, J. (1990). Basics of Qualitative Research: Grounded Theory Procedures and Techniques. Newbury Park, CA: Sage Publications.

Selected Annotated Bibliography

The research articles included in this annotated bibliography represent a small number of seminal articles on virtual learning and students with disabilities as well as a sampling of the current research which has been conducted since the 2020 pandemic began. The full text is available at no cost for the majority of the articles. Others, where full text is not available, were listed due to their relevance. To help readers quickly retrieve relevant research, the bibliography includes three sections:

- **Special Issues**: To date, two special journal volumes focused on students with disabilities during the pandemic have been published. The first, Assistive Technology Industry and Benefits, Volume 16 Issue 1, published by the Assistive Technology Industry Association is specific to issues related to assistive technology during the pandemic. The second special issue published by the Journal of Online Learning Research, Volume 6, Issue 3, is not specifically focused on AT, but does provide some of the latest research in the landscape of

students with disabilities in virtual educational settings as well as issues related to accessibility.

- **Selected Articles Focused on Assistive Technology and Students with Disabilities in Virtual Learning Environments**: This section includes articles specific to Assistive Technology
- **Selected Articles Focused on Students with Disabilities in Virtual Learning Environments**: The articles in this section are not specific to Assistive Technology but they include important considerations for students with disabilities in virtual environments.

Special Issues

Assistive Technology Outcomes and Benefits, Volume 16 Issue 1

- Edyburn, D., & Howard, E. L. (2022). Introduction to Volume 16 Issue 1. Assistive Technology Outcomes & Benefits, 16(1), IX-XV.
  Abstract: As citizens around the world celebrated New Year's Eve on December 31, 2019, few people could imagine how the year would actually unfold as a result of the emergence of the COVID-19 virus. In 2020, the specialized language of public health would enter the vocabulary of the ordinary citizen as they tried to make sense of topics such as coronavirus, pandemic, flattening the curve, asymptomatic, superspreader events, social distancing, personal protective equipment (PPE), and ventilators (Patella, 2020). In a matter of months, the COVID-19 global pandemic would impact all aspects of society in every country (Burrell, 2021; Chan & Ridley, 2021). Efforts to manage this public health crisis involved government agencies at the national, state, regional, and local levels resulting in disparate policies, recommendations, and practices affecting citizen's daily lives (Christakis, 2020; Hayes, 2020; Tooze, 2021; Wright, 2021).
- Courduff, J., Lee, H., Rockinson-Szapkiw, A., & Watson, J. H. (2022). Assistive Technology/Augmentative & Alternative Communication Implementation: School to Home during COVID-19. Assistive Technology Outcomes and Benefits, 16(1), 1-20.

Abstract: This explanatory sequential mixed-methods study sought to describe the implementation process of AT/AAC from school to home during the COVID-19 pandemic, including the extent to which AT/AAC was used, how AT/AAC was used, and what, if any, support the school systems provided. A researcher-designed survey was completed by 104 special educators and 45 parents. Seventeen follow-up interviews were conducted with educators and parent participants. Results of the study demonstrated the importance of clear communication, explicit expectations, and procedures for AT/AAC use, and collaboration among stakeholders if AT/AAC implementation is to be as effective as possible.

- Kohlmeyer, K. M. & Edyburn, D. (2022). Voices from Academia Virtual Parent Education on Assistive Technology: Pandemic Lessons Learned. Assistive Technology Outcomes and Benefits, 16(1), 21-43.
  Abstract: Parent involvement and assistive technology (AT) consideration in the special education process are federally mandated but not operationally defined, measured, or explicitly taught. Parents face many barriers navigating educational systems, especially when pandemic distance learning collides with educational transitions, such as when students move between classes, grade levels, or schools. This study identified the need for and developed a virtual parent training program. Two modules were created and presented to address: (1) AT literacy to increase parents' level of education and knowledge on the purpose and benefits of AT, and (2) AT advocacy so that parents of students with learning disabilities can be more informed and supportive, can be participatory team members, and can more confidently advocate for their students' needs. The results show statistically significant improvements with strong effect sizes across knowledge gained, perceived confidence, and course satisfaction. Study implications are discussed to inform the development and direction of future parent education programs.
- Rhoads, C. R., Silverman, A. M., & Rosenblum, L. P. (2022). Voices from Academia Providing Education to Students with Visual Impairments During the Pandemic. Assistive Technology Outcomes and Benefits, 16(1) 44-57.
  Abstract: As part of a larger study, the authors examined how the COVID-19 pandemic was impacting access to technology for students with visual impairments. In November 2020, 369 educators of students with visual

impairments completed an online survey where they shared their experiences with the accessibility of digital learning tools, their students' improvement of skills, and providing instruction through the use of technology. Key lessons learned from the findings include educators must ensure that students have full access to all learning materials, students need early instruction in technology use, and professional development in technology needs to be readily available to educators.

- Kirsta von Hellens, O. T. D., & FAOTA, L. (2022). Voices from Academia: A Digital Walk Through Digital Talk: Lessons Learned. Assistive Technology Outcomes & Benefits, 16(1), 58-74.
  Abstract: Communication is an essential part of who we are. The purpose of this study was to evaluate the impact of a parental education program during COVID-19. A parent utilized a communication device in order to increase the number of opportunities for their nonverbal child to engage and participate at home and in the community. A descriptive mixed-methods case study with a sequential exploratory design was used in this study. A single parent of a nonverbal 8-year-old female diagnosed with Autism and Attention Deficit Hyperactivity Disorder was previously issued a complex communication device but had never used the device in either the home or the community prior to the study. Following a parental education program, the results indicated that the parent increased communicative opportunities, led to engagement in meaningful family activities. The use of family-centered parental education resulted in positive communication outcomes for increased family connectedness while it enhanced a sense of belonging within the family.
- Poss, B. (2022). Voices from the Field A Journey to Build a Community of Practice During the COVID-19 Pandemic. Assistive Technology Outcomes and Benefits, 16(1),
  Abstract: As the COVID-19 pandemic emerged as a global health threat, Assistive Technology (AT) professionals and educators suddenly found that their work and professional development shifted to virtual spaces. Communities of Practice began to develop or adapt to focus on to aid professionals who suddenly had to change the way they supported users of. Through social media and via online video conferencing platforms such as Zoom, these communities focused on how to provide assistive technology services in the virtual world and

have continued to be rich resources as the pandemic has continued to evolve and change how services are delivered.

- Sisk, J., Carr, J., & Tracy, M. (2022). Voices from the Field The Assistive Technology Services Experience of the 2020-2021 School Year. Assistive Technology Outcomes and Benefits, 16(1) 84-97.
  Abstract Assistive Technology Services (ATS) is the central group of itinerants and resource staff directly working with students and schools to provide assistive technology accommodations within the Fairfax County Public School (FCPS) system in Virginia. When schools closed in March 2020 because of the COVID-19 pandemic, the group was required to make immediate, yet impactful adjustments to its daily operation. ATS worked within the purview of the evolving technology climate that was gradually occurring with the district's FCPSOn technology initiative. This initiative went from a yearly rollout to placing computer devices in all students' hands in the scope of a few months. Assistive Technology Services was able to collaborate with diverse groups in the school system, assist in safely providing access to technology devices, assess specific student assistive technology needs, and develop effective training practices within a new virtual learning environment. As concurrent learning emerged and students returned to school in January 2021, Assistive Technology Services adapted its standard operating procedures to that of the "new normal" that will continue to evolve not only as the pandemic subsides, but as emerging technologies continue to change the face of education.

Journal of Online Learning Research, Volume 6, Issue 3:

- Ortiz, K., Rice, M., McKeown, T., & Tonks, D. (2020). Special Issue: Inclusion in Online Learning Environments. Journal of Online Learning Research, 6(3), 171-176.
  Abstract: In Endrew v. Douglas County, the Supreme Court of the United States found that students with disabilities deserve opportunities to make progress appropriate for their circumstances and that all children should have the opportunity to meet challenging objectives. The goal of inclusive education should be to stop relying on chance and start planning for meaningful progress for all students (Kozleski, 2020a). As educators, researchers, and advocates, we

should demand meaningful progress across all learning environments, including those that engage digital and online resources.

- Stevens, M. (2020). Expertise, complexity, and self-regulated engagement: Lessons from teacher reflection in a blended learning environment. Journal of Online Learning Research, 6(3), 177-200.
  Abstract: Blended learning has been touted to have substantial benefits for both teachers and learners. Enacting blended instruction with students provides data and other information sources to support teacher reflection. However, reflective accounts from practicing teachers in these blended environments are missing from research literature. With these understandings in mind, I, a practicing teacher in a public middle school, collaborated with two researchers serving as critical friends to form a research team that reflected on blended learning in my class. By engaging in this study, reflection served my goal to integrate Google Tools into reading support, use authentic problem based learning (aPBL) to develop critical thinking, and increase student responsibility for learning. Findings center on my development of expertise in subject matter and technology, the complexity of the gathering and interpreting data produced in this blended environment, and engagement that changed through self-regulation used by myself and my students.
- Alvarado-Alcantar, R., & Keeley, R. (2020). Students with specific learning disabilities' experiences with instructional materials and programs in a blended high school history classroom: A phenomenological study of accessibility. Journal of Online Learning Research, 6(3), 201-220.
  Abstract: Students with specific learning disabilities (SLD) who are participating in blended learning courses are a vulnerable population due to the rapid increase in use of online learning environments at the K-12 level. As more classroom teachers begin using a blended learning framework and serving as both the teacher and course designer, it is important to ask how students with SLD in the K-12 blended learning setting experience accessibility in the instructional materials teachers use. Using a phenomenological research design, interviews were conducted with participants identified as having SLD who were also enrolled in a high school, senior level blended history course. Participants provided the researcher with insights related to taking future blended courses, accessibility of course content, and accessibility of the learning management

system. Generally, the participants were working to be successful, but found the instructional materials lacking in accessibility features. Information about the perceptions of participants with SLD can be used to help teachers, and course designers, create blended courses that are perceived by participants to be informative, educational, and accessible.

- Tonks, D., Kimmons, R. & Mason, S.L. (2020). Mattering is Motivating: Special Education Students' Experiences with an Online Charter School. Journal of Online Learning Research, 6(3), 221-244. Waynesville, NC USA: Association for the Advancement of Computing in Education (AACE). Retrieved August 30, 2022 from https://www.learntechlib.org/primary/p/217275/.
  Abstract: In the U.S., K–12 special education students are increasingly enrolling in online schools in hopes of improved opportunities and outcomes. In this study, researchers interviewed five special education students enrolled in a targeted online school, along with their parents (n = 9), to better understand their motivations for enrolling and their experiences of what worked for them in the unique setting. Students and parents explained how their prior schools had not worked for them, and how the online school better met their needs for self-determination, mattering, differentiation, and positive socialization. Results are intended to inform policymakers and stakeholders in online schools to provide the best learning opportunities for special education students.
- Rice, M. & Oritz, K. (2020). Perceptions of Accessibility in Online Course Materials: A Survey of Teachers from Six Virtual Schools. Journal of Online Learning Research, 6(3), 245-264. Waynesville, NC USA: Association for the Advancement of Computing in Education (AACE). Retrieved August 30, 2022 from https://www.learntechlib.org/primary/p/217628/.
  Abstract: Ensuring accessibility is an important concern for students with disabilities in online learning environments, including virtual schools. Previous research suggests that there is widespread confusion about what constitutes accessibility when designing instructional materials and who should be in charge of ensuring materials are accessible. Also, accessibility is often conflated with concepts like personalization, aesthetic appeal, and engagement. Accessibility is a critical issue as state educational agencies enable fully asynchronous classes with low levels of interaction between learners and teachers. As virtual schools come under corrective action failing to provide

appropriate services to students with disabilities, learning about accessibility in those contexts is particularly vital. Moreover, states may begin to consider policies they made many years ago and determine their efficacy. In this study, 111 teachers from six virtual schools that were facing corrective action due to low graduation rates participated in a survey about their perceptions of the accessibility of the instructional materials for their online courses. The survey yielded a 42% response rate. Responding teachers perceived that their instructional materials were "somewhat" accessible with a wide dispersion of response data. Implications for these findings in light of previous research and in light of their corrective action status are offered. The study also stands as an example of a state reconsidering policies made before there was sufficient research to support a decision and the implications for critical data points like graduation rate.

- Jeffrey, C., Peltier, C. & Vannest, K. (2020). The Effects of an Online Psychoeducational Workshop to Decrease Anxiety and Increase Empowerment in Victims of Trolling and Cyberbullying. Journal of Online Learning Research, 6(3), 265-296. Waynesville, NC USA: Association for the Advancement of Computing in Education (AACE). Retrieved August 30, 2022 from https://www.learntechlib.org/primary/p/216915/.
  Abstract: Trolling and cyberbullying are predominant behaviors in an internet culture often motivated by a desire to create discord or distress. Despite significant effort, the verbal, psychological, and emotional abuse spurred by individuals who troll or cyberbully is impossible to fully monitor and control. In addition, psychological interventions for distress caused by these negative online interactions are limited, leaving victims struggling to find coping mechanisms for traumatic, yet intangible, encounters. Given society's increasing use of the internet for social interaction, this negative affect merits exploration of an effective therapeutic intervention specifically for online harassment. This study used a single-case experimental design to examine a functional relation between a brief psychoeducational workshop and three adult participants' feelings of internet-related anxiety and empowerment. Results indicate that this workshop may beneficial for victims of trolling and cyberbullying, particularly for web forum moderators. Possible implications include the development of a digital K-12 school-based intervention for primary and secondary school-aged

students that restores positive affect from online harassment and fortifies them against future attacks. This may be particularly helpful for children and adolescents who meet criteria for mental health or learning disabilities that already leave them at risk for anxiety, depression, and interpersonal difficulties.

Selected Articles Focused on Assistive Technology and Students with Disabilities in Virtual Learning Environments

Bowser, G. (2020). Remote Assistive Technology Services: Many Things Are Remotely Possible In Assistive Technology to Support Inclusive Education. Emerald Publishing Limited.

Abstract: This chapter offers descriptions of many current uses of video conferencing technology for the delivery of assistive technology (AT) services at a distance. It begins with definitions of remote AT services, virtual teams and virtual teamwork and moves to a discussion of the advantages and disadvantages of remote AT support for individuals, teams and organizations. A review of research regarding the outcomes of remote services helps to clarify ways that assistive technology providers can enhance function and build agency capacity by working, at least in part, in a virtual support environment. The chapter provides a discussion of various aspects of virtual teamwork that affects how individuals work together remotely as well as potential barriers to the provision of remote AT services. Multiple examples are provided throughout as well as descriptions of specific features of video conference technology options that should be considered before adoption. A planning form for the integration of remote assistive technology supports into the array of AT support services is included.

Layton N, Mont D, Puli L, Calvo I, Shae K, Tebbutt E, Hill KD, Callaway L, Hiscock D, Manlapaz A, Groenewegen I, Sidiqi M. Access to Assistive Technology during the COVID-19 Global Pandemic: Voices of Users and Families. International Journal of Environmental Research and Public Health. 2021; 18(21):11273. https://doi.org/10.3390/ijerph182111273

Abstract: The SARS COVID-19 pandemic emerged in 2019 and has impacted people everywhere. Disparities in impact and outcomes are becoming apparent for individuals

and communities which go beyond the trajectory of the disease itself, influenced by the strength and weaknesses of systems of universal health care, and the actions of civil society and government. This article is one of a series exploring COVID-19-related experiences of assistive technology (AT) users across the globe and implications for AT systems strengthening. AT such as mobility products, braille devices, and information communication technologies are key enablers of functioning, necessary to the achievement of the UN Sustainable Development Goals and enshrined in the Convention on the Rights of Persons with Disabilities. Reporting on a survey of 73 AT users across six global regions, we demonstrate that minority groups already living with health inequities are unduly impacted. An AT ecosystem analysis was conducted using the WHO GATE 5P framework, that is, people, products, personnel, provision and policy. AT users and families call for inclusive pandemic responses which encompass their needs across the lifespan, from very young to very old. We offer specific recommendations for future action to strengthen access to AT across public policy and civil society in pandemic preparedness and response.

Lohmann, M. J., Kappel, A., & Taylor, M. S. (2022). Augmentative and Alternative Communication and Remote Learning. Rural Special Education Quarterly, 41(1), 48-54.Abstract: For rural locations, the use of remote learning may provide schools the opportunity to meet student needs without requiring students to travel long distances to access services. It is critical that teachers of students with disabilities understand how to support learning and know how to use the accommodations, modifications, and assistive technologies listed in student Individualized Education Programs (IEPs) in online classrooms. Students with language disabilities sometimes require augmentative and alternative communication (AAC) systems to effectively communicate. This article provides teachers with practical tips of teaching students to use AAC online and supporting its continued use in the virtual classroom.

Smith, E. M., Hernandez, M. L. T., Ebuenyi, I., Syurina, E. V., Barbareschi, G., Best, K. L., ... & MacLachlan, M. (2020). Assistive technology use and provision during COVID-19: results from a rapid global survey. International journal of health policy and management.
Abstract Background: The coronavirus disease 2019 (COVID-19) pandemic has impacted all segments of society, but it has posed particular challenges for the

inclusion of persons with disabilities, those with chronic illness and older people regarding their participation in daily life. These groups often benefit from assistive technology (AT) and so it is important to understand how use of AT may be affected by or may help to mitigate the impacts of COVID-19. Objective: The objectives of this study were to explore the how AT use and provision have been affected during the initial stages of the COVID-19 pandemic, and how AT policies and systems may be made more resilient based on lessons learned during this global crisis. Methods: This study was a rapid, international online qualitative survey in the 6 United Nations (UN) languages (English, French, Spanish, Russian, Arabic, Mandarin Chinese) facilitated by extant World Health Organization (WHO) and International Disability Alliance networks. Themes and subthemes of the qualitative responses were identified using Braun and Clarke's 6-phase analysis. Results: Four primary themes were identified in in the data: Disruption of Services, Insufficient Emergency Preparedness, Limitations in Existing Technology, and Inadequate Policies and Systems. Subthemes were identified within each theme, including subthemes related to developing resilience in AT systems, based on learning from the pandemic. Conclusion: COVID-19 has disrupted the delivery of AT services, primarily due to infection control measures resulting in lack of provider availability and diminished one-to-one services. This study identified a need for stronger user-centred development of funding policies and infrastructures that are more sustainable and resilient, best practices for remote service delivery, robust and accessible tools and systems, and increased capacity of clients, caregivers, and clinicians to respond to pandemic and other crisis situations. Keywords: Assistive Technology, Health Policy, Ageing, Disability, Resilience, Crises

Russ, S., & Hamidi, F. (2021, April). Online learning accessibility during the COVID-19 pandemic. In Proceedings of the 18th International Web for All Conference (pp. 1-7). Abstract: During the COVID-19 pandemic, many elementary, middle, and high schools made an emergency transition to online learning. Students have faced numerous access issues during this time, but little is known about how well students with

disabilities can access online course content. Many teachers are unfamiliar with adapting, developing, and creating accessible online course content and there is scant research on younger students' experiences with accessible online course content and platforms. Previous research, however, provides insights on how to identify and address challenges that students with disabilities face when accessing online learning in institutions of higher education. In this paper, we review and analyze 14 papers published in the past 11 years on e-learning accessibility to translate insights into actionable recommendations to improve the accessibility of platforms at the time of the COVID-19 crisis, as well as future pandemics. Based on the reviewed research, we present several recommendations including building organizational cultures of accessibility with support for educators as accessible content creators and increased awareness of the many types of disabilities that may affect students and how accessible content can prevent increasing opportunity gaps. Although emergency online learning due to the COVID-19 pandemic will likely and hopefully end in the near future, the lessons learned should continue to inform future improvements in accessible education for all learners.

Welby, K. A. (2021). Remote Learning Strategies for Students with IEPs: An Educator's Guidebook. Routledge. (Chapter 6 is focused on Assistive Technologies)
Abstract: This succinct guidebook provides educators with the essentials they need to navigate remote learning for students with Individualized Education Programs (IEPs). Filled with practical tools and excerpts from teachers in the field, this book explores tips to share with parents, alongside synchronous and asynchronous strategies that can help make IEPs possible in a remote environment. Ideal for special educators, coaches, service providers, and leaders, this is the go-to resource for supporting IEPs outside the traditional classroom.

Selected Articles on Students with Disabilities in Virtual Learning

Basham, J. D., Blackorby, J., & Marino, M. T. (2020). Opportunity in crisis: The role of universal design for learning in educational redesign. Learning Disabilities: A Contemporary Journal, 18(1), 71-91.
Abstract: The COVID-19 pandemic initiated an unprecedented shift in special

education practice from brick-and-mortar instruction to online learning. This manuscript explores factors related to the shift and argues the COVID-19 disruption creates an opportunity for systemic educational reform. The Universal Design for Learning framework is presented as a means to proactively anticipate learner variability while redesigning an education system to meet the diverse needs of students with learning disabilities. Issues surrounding FAPE in online instruction, digital inequity, and socioeconomic status are addressed. The article concludes with an example of how an online course, developed using the framework and supported with multiple technologies, can benefit students with learning disabilities.

Carter, R. A., Jr., Basham, J., & Rice, M. (2016). Helping Special Education Teachers Transition to K–12 online Learning. Graziano & S. Bryans-Bongey (Eds.) Online education: Issues, methods, and best practices for K12 educators. (pp. 173-190). Medford, NJ: Information today, Inc.
Abstract: For the special education teacher, the online course environment represents challenges and opportunities that are different from those experienced in the traditional face-to-face (f2f) setting. This chapter presents practical and research-based applications to guide special educators in the exciting and sometimes complex online environment. The chapter is framed around five key issues that address teachers' and learners' successful transition into fully online or blended learning environments: (1) the development and implementation of Individualized Education Programs (IEPs), (2) curriculum making and the timing of instructional delivery, (3) facilitating learner independence and self-determination, (4) communication with learners and their families, and (5) collaboration with families and colleagues to build relationships that support student learning.

Cavanaugh, C., Repetto, J., Wayer, N., & Spitler, C. (2013). Online learning for students with disabilities: A framework for success. Journal of Special Education Technology, 28(1), 1-8.
Abstract: Students with disabilities increasingly are choosing online learning experiences. Research-based interventions need to be applied to online learning to keep these students engaged in school. From the literature on students with disabilities who are at risk, we have identified five areas of impact that can contribute to student engagement. These "5 Cs" are learner control, a flexible and rigorous

curriculum, a safe climate, a caring community, and connection to students as individuals and their future goals. The 5 Cs are discussed along with their application to online learning environments, and examples of current online programs employing these strategies are given.

Houston, L. (2018). Efficient strategies for integrating Universal design for learning in the online classroom. Journal of Educators Online, 15(3), n3.

Abstract: Many learners who have not chosen to identify as having physical, sensory, and learning disabilities still may struggle to learn in the online learning environment due to diverse abilities and backgrounds, differing cultural and linguistic backgrounds, and other factors that affect perception, learning ability, and engagement. Given the apparent difficulty of a subset of learners who choose to learn in technology-enhanced instructional environments, most online learners identify as average or exceptional learners but they may not have their learning needs met due to inadequate course design, development, and delivery. This article will explore how the Universal Design for Learning (UDL) framework can be integrated efficiently into all phases of the online course development process. It will explore how the strategies can help faculty meet the challenge of learner diversity. Alternative approaches are included to encourage the creation of flexible instructional materials, techniques, and options that empower educators to meet the varied needs of online learners.

Ortiz, K., Mellard, D., Deschaine, M. E., Rice, M. F., & Lancaster, S. (2020). Providing Special Education Services in Fully Online Statewide Virtual Schools: A Policy Scan. Journal of Special Education Leadership, 33(1).
Abstract: The rapid emergence and authorization of statewide, fully online, virtual charter schools has resulted in the need for states to identify potentially inequitable effects of disability service funding policies. We describe state funding policies and the designation of responsibilities regarding the provision of special education services for students attending full-time virtual schools. Particular emphasis is given to policies directing dollars for individualized services for students with disabilities who live outside their immediate residential school or intermediate school district. Virtual school special education policy most often aligns with typical charter school regulations, often with no differentiation between online and brick-and-mortar charter schools.

Ortiz, K., Rice, M., Deschaine, M., Lancaster, S., & Mellard, D. (2020). Special education funding flow patterns in virtual charter schools. Journal of Special Education Leadership, 33(1), 3-13.
Abstract: The rapid emergence and authorization of statewide, fully online, virtual charter schools has resulted in the need for states to identify potentially inequitable effects of disability service funding policies. This article describes state funding policies and the designation of responsibilities regarding the provision of special education services for students attending full-time virtual schools. Particular emphasis is given to policies directing dollars for individualized services for students with disabilities who live outside their immediate residential school or intermediate school district. Based on this policy scan, service delivery responsibilities and funding configurations might be expected to have clear overlap; however, the findings suggest that they are viewed differently and addressed differently in states' policies. No state model was identified that could represent an unequivocal best practice. Instead, each model has strengths and weaknesses that are likely grounded in the ethos of the various state offices of education and their orientation to charter schools and school choice in general. Six recommendations are provided provided to consider when writing or reviewing state-level policy for students with disabilities enrolled full time in cyber schools.

Ortiz, K. R., Rice, M. F., Curry, T., Mellard, D., & Kennedy, K. (2021). Parent Perceptions of Online School Support for Children with Disabilities. American Journal of Distance Education, 35(4), 276-292.
Abstract: Students with disabilities and their parents face additional challenges in any educational environment, but little previous research maps these challenges in a online schools. The purpose of this study was to understand parent perceptions of IDEA implementation for children with disabilities during the transition to fully online schooling. Specifically, the study focused on special education services and the preparation parents received for their new roles as on-site mentors. Multiple research strategies were used, including a survey of 58 parents and individual interviews with 15 respondents of those surveys. Findings of this study suggest that a generally welcoming demeanor of online school staff is integral to parent perceptions of the quality of the transition. However, two issues from the findings of this study raise concerns about state policies and local providers. First, students are losing many special education services without replacements appropriate to the online setting and,

second, parents lack understandings about their changing roles when they enroll their children in online schools.

Rice, M., & Dykman, B. (2018). The emerging research base for online learning and students with disabilities. Handbook of research on K-12 online and blended learning, 189-206.
ABSTRACT: Students served under federal civil rights laws (i.e., IDEA, Section 504) are entitled to enroll in the full range of online learning environments and receive mandated services. Attending to these students' needs has presented challenges for educators in online schools, but research that would inform decision-making and planning has been scarce. This chapter provides some context for serving students with disabilities online and summarizes previous research reviews on this topic. In addition, this chapter updates research findings from an original chapter in the first Handbook of K12 Online and Blended Learning Research. New findings suggest that students with disabilities are enrolling in online courses, but gaps in understandings about student outcomes, accommodation and service delivery, and educator preparation and support persist. The chapter ends with suggestions for applying research to practice, engaging in additional research, and forming policies ensuring students with disabilities receive services.

Rice, M., Oritz, K., Curry, T., & Petropoulos, R. (2019). A case study of a foster parent working to support a child with multiple disabilities in a full-time virtual school. Journal of Online Learning Research, 5(2), 145-168.
Abstract: With increases in the number of students enrolling in virtual schools, increases in students with disabilities can also be expected at virtual schools. Further, not all of these students enrolling in virtual schools will live with their biological parents. As students with disabilities move online, they continue to be protected under the Individuals with Disabilities Education Act (IDEA). However, these students spend much of the day with their parents or caregivers, if they are supervised at all, which raises questions about the depth and breadth of services that students with disabilities are receiving through their virtual schools. The purpose of this case study was to learn how a foster parent of a student with a disability in a fully online virtual middle school program perceived the school's response to her child's needs, as well as how she imagined that the school perceived her. This foster mother determined that virtual

school educators could not educate her son in accordance with IDEA. The study offers implications for improving students' and parents' virtual school experiences.

Rice, M. F., & Ortiz, K. R. (2021). Evaluating digital instructional materials for K-12 online and blended learning. TechTrends, 65(6), 977-992.
Abstract: With the large increase in online instruction, including remote instruction with online materials during the COVID-19 pan- demic, there also was an increase in the use of instructional materials that were made to be displayed online or were digitized for online use. However, teachers have not had access to guidance about how to select and evaluate online instructional materials for classroom use. The lack of guidance has the potential to harm historically excluded populations of students and could frustrate teachers as they learn to teach with digital materials. The purpose of this paper is to share the 4A Framework for evaluating online instructional materials. The framework is organized around the premise that quality online instructional materials are accessible, promote active engagement, advocate for inclusion, and are accountable for their relationships to standards and data privacy. Each feature is discussed and examples of teacher work in applying the framework are shared.

Smith, C. (2020). Challenges and opportunities for teaching students with disabilities during the COVID-19 pandemic. International Journal of Multidisciplinary Perspectives in Higher Education, 5(1), 167-173.
Abstract: According to the United Nations Educational, Scientific, and Cultural Organization (UNESCO, 2020), school closures caused by the COVID-19 pandemic have affected over 1.5 billion students and families. The COVID- 19 pandemic has presented multiple challenges for teaching students with disabilities in an online instructional environment, but there are also opportunities for collaboration, training, and communication for special educators to meet the needs of their students.

Wray, M. D. & Ortiz, K. R. (2021). Sixteen-state scan of policy for remote online learning and students with disabilities. Inclusive Digital Era Collaborative, Center for Research on Learning, University of Kansas. Report to Washington Office of Superintendent of Public Instruction, Olympia, WA.
Abstract: Federal and state education policies provide local education agencies (LEAs) with the direction necessary to develop sound processes and practices needed to support every student across all learning environments. It is critical now more than

ever for state education agencies (SEAs) to be as responsive as possible through policy directives, strong guidance to help fill in knowledge gaps, and professional development initiatives