FOCUS on EXCEPTIONAL CHILDREN

VOLUME 48 NUMBER 2 OCTOBER 2024

Evidence-Based Technology Tools to Support Diverse Learners, Educators, and Service Providers Across Instructional Settings

October 2024

Anya S. Evmenova[1], Anita Vermeer[2], Lori Cooney[3], Jocelyn Washburn[4], Terry Jackson[5], and Tolulope Sulaimon[6]

Abstract

Technology can improve learning outcomes for students with and without disabilities and enhance instructional activities implemented by educators and service providers across diverse settings. The Stepping-Up Technology Implementation funding has been established by the Office of Special Education Programs in the U.S. Department of Education. The aim of this funding is to promote the development, demonstration, and integration of the evidence-based technology tools and approaches into K-12 classrooms and early childhood settings. It also supports educators, service providers, and early childhood providers in improving learning outcomes. All Stepping-Up technologies are designed, implemented, refined, and tested through the iterative research and development cycles based on data from children, students, and youth with and without disabilities as well as educators, service providers, and families. This article presents an overview of 28 readily available technology-based interventions organized into five categories: Literacy; Math, Science, and Coding; Transitions and Career Readiness; Behavior and Social Skills; Professional Development and Coaching. In addition, 10 actionable suggestions for seamless implementation of technology tools and approaches are provided.

Keywords: *technology tools and/or approaches; evidence-based practices; assistive, accessible, and instructional technology; Universal Design for Learning*

For many years now, technology has been used to enhance and improve learning outcomes for students with various disabilities and support educational activities designed and delivered by educators and related service providers across various learning environments. Technology can promote access to educational content (e.g., Fernandez-Batanero et al., 2022; Kennedy & Boyle, 2017), improve engagement and social skill development (e.g., Aspiranti et al., 2020; Carreon et al., 2022), and facilitate personalized and inclusive practices (e.g., King-Sears et al., 2023; Zhang et al., 2020). Technology can empower students with disabilities to complete academic tasks more independently and efficiently (e.g., Edyburn, 2020). Proficiency with technology helps develop vital digital literacy skills, preparing learners with disabilities for future academic and career paths (Lowenthal et al., 2022). Technology can enhance educators' ability to collect data and make data-driven decisions across a wide variety of educational settings (Fuchs, 2021; Ruhter & Karvonen, 2024).

Using assistive and instructional technology is a high-leverage practice (HLPs) shown to significantly improve student outcomes (McLeskey et al., 2017). Assistive technology (AT) consists of AT devices and ser-

[1] George Mason University
[2] Office of Special Education Programs, U.S. Department of Education
[3] University of Massachusetts Boston
[4] University of Kansas
[5] Independent Consultant
[6] University of North Carolina Greensboro

vices. An AT device is "any item, piece of equipment, software program, or product system that is used to increase, maintain, or improve the functional capabilities of persons with disabilities" (IDEA, 34 CFR § 300.5). AT service is "any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device" (IDEA, 34 CFR § 300.6). For more information and guidance on meaningful implementation of AT as part of the Individuals with Disabilities Education Act (IDEA), refer to the 2024 *Myths and Facts Surrounding Assistive Technology Devices and Services* document by the Office of Special Education Programs (OSEP) at https://sites.ed.gov/idea/idea-files/at-guidance/. In turn, instructional or educational technology (EdTech) includes digital and multimedia tools that improve teaching and enhance learning across all content areas. The *2024 National Educational Technology Plan (NETP)* by the U.S. Department of Education (https://tech.ed.gov/netp/) discusses ways to increase the potential of EdTech to support teaching and learning by closing the digital access, digital design, and digital use divides. To enhance the use of both AT and EdTech tools, more robust research-based processes that involve learners with disabilities, their educators, and parents/caregivers in the conceptualization, development, strategic selection, and implementation of technology-based interventions are needed.

FOCUS ON EXCEPTIONAL CHILDREN

ISSN 0015-511X

FOCUS ON EXCEPTIONAL CHILDREN is an online, open access journal. Articles are solicited by the Editorial Board and published after review by the Editorial Board. All articles in *Focus on Exceptional Children* are made available under a Creative Commons Attribution Non-Commercial-NoDerivatives (CC-BY-NC-ND) license and can be found at https://journals.ku.edu/focusXchild

TECHNOLOGY SELECTION CONSIDERATIONS

With the potential to improve student outcomes, technology use for instructional purposes has become more common. Individualized AT solutions should be considered and selected by a collaborative team as part of the Individualized Educational Program (IEP) as mandated by the IDEA law (Pub. L. 108-446 § 300.324). Numerous frameworks and resources exist for a comprehensive and robust AT assessment (Evmenova & Hrisseh, in press). When it comes to large scale school-wide or district-wide EdTech implementation, schools and districts use varied processes to select and integrate technology-based tools into the instruction (EdTech Evidence Exchange, 2021). Most schools report using technology in regular classroom activities and claim to have flexibility in their selection process (Gray & Lewis, 2021), yet digital disparities continue to exist (Heath et al., 2022; Prado & Warschauer, 2024; Warschauer & Matuchniak, 2010). Factors such as school improvement plans and cyber security protection are often among the initial conversations, but decision makers may lack knowledge of appropriate technology tools for students with disabilities (Atanga et al., 2020; Cohen & Popoff, 2022; Maylahan, 2022; Maylahan 2024; U.S. Department of Education, 2022). At least three key factors must be considered during the selection process: accessibility, Universal Design for Learning, and evidence-based practices.

ACCESSIBILITY

Addressing the digital use, design and access divide has become a national concern as technology use increases (U.S. Department of Education, 2023). Likewise, ensuring all educational materials are accessible is at the center of providing equitable access to instruction and reducing learning barriers (Shaheen, 2022). All technology tools, such as web content and mobile apps used by state and local governments, must meet WCAG 2.1, Level AA standards (Americans with Disabilities Act, 2024).

UNIVERSAL DESIGN FOR LEARNING

In addition, the Every Student Succeeds Act (ESSA, 2015) states that the principles of Universal Design for Learning (UDL) should be included in providing students with personalized, rigorous learning experiences supported by technology. The UDL framework guides educational practice to provide flexibility in the way students are engaged, the way content is presented, and the way that students can demonstrate their knowledge. By doing so, all students, including those with disabilities,

can benefit through this practice as it "reduces barriers in instruction, provides appropriate accommodations, supports, and challenges, and maintains high achievement expectations" (ESSA, 2015 122 STAT 3088). UDL-based technology tools provide features for multiple means of engagement, representation, and action/expression. More information on UDL can be found at https://www.cast.org/impact/universal-design-for-learning-udl.

EVIDENCE-BASED PRACTICES

Evidence-based practices must be prioritized in order to improve student outcomes. These activities include student interventions that have demonstrated empirical evidence of effectiveness through rigorous, high-quality research studies. In addition, ESSA (2015) also encourages the use of evidence-based professional development practices to effectively integrate technology into curricula and instruction and to efficiently improve students' outcomes. Addressing these and other factors can be a complex process for school leadership. The U.S. Department of Education continues to offer resources to support schools and districts in the selection process. For example, the EdTech Evidence toolkit (https://tech.ed.gov/evidence) can support leaders to ensure technology adoption aligns with evidence-based practices.

STEPPING-UP TECHNOLOGY IMPLEMENTATION PROJECTS

In an effort to improve the use of evidence-based technology tools and/or approaches across settings, OSEP initiated the Stepping-Up Technology Implementation grant funding in 2012. Projects funded by this initiative have been instrumental in developing and integrating evidence-based technology interventions for early childhood programs and K-12 classroom settings to enhance outcomes for children, students, and youth with disabilities. Together with innovative tools and approaches, these projects offer ongoing coaching and professional development to children, students, youth, families, educators, early childhood providers, and service providers facilitating their understanding and effective utilization of these tools.

While primarily aimed at supporting students with disabilities as well as struggling learners, these technologies have proven to be beneficial for all students. Over the past twelve years, more than 36,000 students have benefited from these initiatives, with more than 26,000 being general education students and more than 10,000 students with disabilities. By 2024, OSEP will have supported twelve cohorts comprising 50 individual projects at higher education and research institutes. These projects introduced a diverse range of educational technologies to over 37 school districts across the United States, focusing on literacy, math, science, coding, college and career readiness/transition, behavior management and social skills, professional development, and coaching.

This article provides an overview of existing evidence-based technology interventions developed as part of the Stepping-Up Technology Implementation program to support learners with and without disabilities as well as general and special education teachers, early childhood educators, service providers, and families. The aim of this article is to empower educators and service providers at the school and district levels with access to technology tools and/or approaches ready for successful integration, equipping them with ways to create inclusive learning environments that enhance outcomes for children, students and youth. It also offers some collective actionable insights gleaned from these implementation initiatives that can offer valuable guidance for effective technology selection and use.

ITERATIVE RESEARCH AND DEVELOPMENT BASED ON DATA

All projects described in this article were funded to design and refine the technology tools and/or approaches that support the successful implementation of research-based and evidenced based practices across settings (e.g., K-12 public elementary and secondary schools, including private schools, early childhood programs, afterschool programs, and settings where students are supported under IDEA). The expectation from the funding agency is that these technologies will be developed and tested following the four stages of implementation science: Exploration, Installation, Initial Implementation, Full Implementation (Fixen et al., 2009). This comprehensive evidenced-based approach to program development and implementation facilitates integration and sustainability of innovative practices over time. Selection and use of an evidence-based technology tool and/or approach is an intricate, non-linear process. An in-depth qualitative study of Stepping-Up projects revealed that the barriers and facilitators to technology integration can be found at all stages of the process (Evmenova et al., 2022). The first important step in implementation is to develop and sustain buy-in from users, educators, parents/caregivers, school and district level administrators. Educational leaders create by-in by (1) promoting information about the unique focus of each technology-based

intervention, (2) highlighting explicit alignment with existing initiatives, standards, and policies, and (3) sharing testimonials and narrative case studies to facilitate initial interest. Similarly, ensuring access to high-quality professional development and training for users and those involved in supporting them, as well as providing open-access and ready-to-use universally designed materials can generate interest and sustain the initial "buy-in" commitment. As the technology is being used, effective integration is impossible without the fidelity of implementation (Vroom et al., 2020), including supporting materials, ongoing coaching, and emphasis on using data to measure the fidelity of implementation. School districts and stakeholders can facilitate the iterative development and implementation process of technology tools based on data by allowing projects to conduct research and then translate research to practice and by supporting data collection for multiple purposes (Evmenova et al., 2022).

Each of the OSEP grant-funded projects goes through a data-driven iterative process as project staff work directly with the intended users for their technology tool and/or approach. Implementation supports are developed or revised and data are continuously collected such as fidelity of implementation and user outcome data. In addition, OSEP annually collects data on the quality, relevance, and usefulness of the project's tools and products. As projects complete their implementation activities, the focus shifts to disseminating resources and tools, making them more widely available for broad public use. Regardless of whether the tools are completely free or not, they have been proven to enhance the outcomes for children, students, and youth with disabilities. In addition, many of these projects continue to adapt and evolve to the ongoing changes in technology. For example, some projects may have started with one focus in their tool or approach but discovered through their iterative design process the need to shift activities and technology components to support effectiveness and ensure a sustainable tool.

SUSTAINABILITY, DISSEMINATION, AND COSTS

OSEP, supporting these evidence-based technology projects, intends to provide appropriate resources to enhance the implementation process. After a project collects sufficient research data proving that the tools are effective when used with fidelity and by the intended users, the information is shared with various target audiences nationwide. This includes lessons learned on sustaining the adoption and fidelity of evidence-based technology tools and approaches (Cooney et al., 2020; Evmenova et al., 2022). Grant funds provide an avenue for various dissemination activities such as research publications, conference presentations, and demonstrations. Dissemination efforts for Stepping-Up implementation projects focus on the reporting outcomes and sharing the available tools, products, and resources.

Many OSEP-funded projects continue to provide free tools and products readily available for public access even after grant funding ends. It is important to note that free does not mean it has a lower quality. As previously described, each tool has sufficient research data to support quality, relevance, and usefulness in addition to the evidence of effectiveness. There could be several reasons why a tool continues to be freely available. For example, some products and tools designed their platforms in a way that requires little to no updates, while others may have secured other funding sources. However, there are some exceptions to why a tool may not be freely available and some of the currently funded projects may have limited access depending on the stage of development.

Due to the nature of the work, some projects partnered with other entities (e.g., businesses, other universities, etc.) who may have helped with the technology production. Partnerships and collaborative planning have been a strategy for some OSEP-funded projects to ensure the technology tools are sustained once OSEP funding has ended. Sustaining this work can be costly, resulting in the need to charge nominal fees. Some approaches to sustainability include commercialization on a larger scale, partnering with other technology start-ups or vendors, licensing certain aspects of the technology, or obtaining additional funding from their university or other funding sources (e.g., foundations, large-scale grants). Thus, further information is included for individual projects by following the links provided.

TECHNOLOGY TOOLS COMPILATION

As stated previously, this article aims to share a compilation of existing evidence-based technology tools and approaches that went through a rigorous, data-driven, iterative research and development process. Overall, nearly three dozen products were developed as part of the Stepping-Up Technology Implementation initiative. Key personnel from all projects were invited to complete a questionnaire sharing information about their available product(s), including the primary and secondary focus area for their technology, primary and secondary intended users, ages and disability categories best supported by the tool, short and expanded description of the project, cost/free statement, as well as a website link available to the public. Additional information was collected about

the existing evidence supporting each technology tool. It is important to note that some tools were designed and refined through multiple cycles of Stepping-Up funding, in which case they were asked to submit the product description only once. Also, some projects funded earlier were inactive at the time of this publication, while other projects funded most recently were not ready to share information. Overall, 28 products were readily available for dissemination in this article. Table 1 presents an overview of the technology tools and/or approaches by indicating their primary and secondary focus areas, grade levels, and intended users. Brief descriptions of each project are organized in alphabetical order by the following primary categories: Literacy; Math, Science, and Coding; Transitions and Career Readiness; Behavior and Social Skills; Professional Development and Coaching including brief information on the evidence supporting each tool. The tools have been developed and tested with a diverse group of learners, including those with various disabilities (e.g., developmental delay, learning disabilities, emotional disturbance, other health impairments, intellectual disability, autism, traumatic brain injury, visual impairments, hearing impairments, speech or language impairment), English Language Learners, and students at risk for disabilities. Projects designed support for general and special education teachers, paraprofessionals, related service providers, coaches, and trainers. Data were collected in urban, suburban, and rural settings, including inclusive general education, resource, or self-contained classrooms.

LITERACY

Technology can play a crucial role in supporting literacy instruction for students of different ages and different disability categories. Assistive technology such as text-to-speech and speech-to-text programs can support reading comprehension and enable students to convert their thoughts into written text (e.g., Evmenova & Regan, 2019; Matre et al., 2022; Svensson et al., 2019). Instructional technology such as e-books and graphic organizers can make any text in any genre more engaging and accessible while structuring and organizing students' ideas during writing (e.g., Cooney et al., 2020; Wainwright et al., 2020). Interactive books and tools for digital notetaking can provide necessary UDL support to remove the barriers and promote accessibility for learners with variable abilities and needs (e.g., AlRawi & AlKahtani, 2022; Boyle et al., 2024).

Below are brief descriptions of six tools that support literacy instruction. Three offer reading curriculum and resources for elementary students, two support writing instruction, and one enables communication assessments for individuals of any age or disability who are operating at the earliest stages of communication (Communication Matrix). All reading tools support multilingual students with or at-risk for disabilities including a comprehensive online curriculum for Spanish-speaking early elementary learners (AERO), accessible and enhanced texts for 3rd- to 5th-grade Spanish-speaking students (CA-CSR), and supplemental vocabulary instruction for 3rd- to 5th-graders in English and Spanish, with sign language supports for individuals who use American Sign Language (MAP-R). The writing interventions support students with high-incidence disabilities including essay composition for writers from upper elementary through high school (WEGO) and automated scoring of writing products for middle schoolers (WRITE).

AERO

The AERO (Accelerated Early Reading Outcomes) Reading Curriculum is a comprehensive tutoring/intervention online curriculum to help early elementary students improve decoding, text reading, and language comprehension. This curriculum uses online placement tests and progress monitoring assessments to guide instruction. Newly-developed components of the AERO Curriculum (i.e., the components designed to improve learning for Spanish-speaking EL students with or at risk for reading difficulties) include (1) integrated multimedia supports (e.g., audio buttons that provide Spanish translations during vocabulary instruction; scaffolds in online lesson plans that help educators anticipate differences in responding or confusions that might emerge for a Spanish-speaking student); (2) an online PD module that improves reading intervention teachers' knowledge and capacity to use AERO effectively with Spanish-speaking ELs at risk for LDs in reading and enhancements to an existing PD module that seeks to improve educators' knowledge and capacity to engage in two-way conversations with families about students' literacy progress and support students' AERO-aligned home learning; and (3) a "Readiness Tool" and Readiness Planning Process that assesses schools' readiness to implement AERO and ensures alignment of AERO with existing curricula, state standards, school initiatives, and data collection processes. At the time of this manuscript's publication, evaluation data had not yet been analyzed. The project team plans to collect pre- and post-test student word reading assessment data, as well as information about potential gains in teacher knowledge to provide literacy instruction to emergent bilingual students and to support family engagement. Findings related to increases in teach-

Table 1

OSEP-funded Technology Tools by Focus Areas, Grade Levels, Intended Users

Technology Tool	Focus Areas					Grade Levels				Intended Users				
	Literacy	Math, Science, or Coding	Transitions and Career Readiness	Behavior Social Skills	Professional Development and Coaching	Early Childhood to Grade 2	Grades 3-5	Grades 6-8	Grade 9 +	Children, Students, Youth	Parents, Families	Educators, Teachers, Service Providers	Coaches, Trainers, School or District Level	Other
AERO	①				②	①				②	②	①	②	
CA-CSR	①				②		①			①	②	①		
Communication Matrix*	①			②							①	①	②	②
MAP-R*	①						①			①		②		
WEGO*	①				②		①	①	②	①	②	②	②	
WRITE Progress Monitoring*	①				②			①		①		①	②	
CAP-PD*		①			②		①	①		①	②	①	①	
Corgi*		①						①	①	①	②	①		
ESCOLAR*		①			②		①	①		①	②	①	②	
KinderTEK*		①				①				①	②	②		
NumberShire*		①				①				①		②		
OASIS		①				②	①	②	②		②	①	①	
SNUDLE*		①				②	①	②	②	①	②			
Check & Connect*			①	②				①	①			①	②	
EIT*	②		①					①	①	①		②		
FQI-E*			①	②			①			①		①	②	②
CodewithZB		②		①		①	①			①	①	②	②	
Ibestt*				①	②						②	①		
IGDI*				①		①					②	①	②	
VOISS*				①			①	①	①	①		①		
Braille Brain*	②				①	①	①	①	①	①	①	①	①	
COACHED*					①						②	①	①	
CViConnect*					①	①	②	②	②	②	②	①	①	
FLITE STEM Coaching*		②			①	①	①				②	①	①	
ReadyCoach*				②	①	①	①	①				①	①	
SETTT for Success*	②	②			①		①	①	①			②	①	
Step Up AT*	②				①	①					②	①	②	
VOISS Advisor*				②	①			①				①	①	

Key:

* Indicates tools with robust research evidence; all other tools are in the process of collecting and analyzing data.

① Indicates Primary Focus Areas, Grade Levels, or Intended Users

② Indicates Secondary Focus Areas, Grade Levels, or Intended Users

er knowledge and student decoding will be provided at a later date. Find more information about the online resources, including curriculum-aligned assessments, teacher lesson plans, and lesson-embedded scaffolds at https://aeroreading.org/.

CA-CSR

Computer Adapted Collaborative Strategic Reading (CA-CSR) compliments high-quality teacher-directed reading comprehension strategy instruction by increasing accessibility to text and support features for 3rd-5th graders. It contains a set of evidence-based reading comprehension strategies proven effective among English Learners (ELs) with and at risk for disabilities. The web-based tool provides students with text on multiple levels, in English and Spanish, with opportunities to listen as the text is read aloud. Additional features are included to facilitate high-quality, teacher-led CSR instruction. Teachers can use the texts to promote vocabulary and reading comprehension strategy instruction for students with diverse reading and language needs. As of this publication, evaluation data still need to be collected and analyzed, but researchers intend to conduct a quasi-experimental study design with at least 10 schools to evaluate the hypothesis that CA-SCR can accelerate student learning. The free library of texts can be accessed at https://www.ut-text.com.

COMMUNICATION MATRIX

The Communication Matrix is an assessment tool to help families and professionals easily understand the communication status, progress, and unique needs of anyone functioning at the early stages of communication or using forms of communication other than speaking or writing. The Matrix guides users through a series of questions to answer based on the observations and experiences with the individual. Anonymous data collection allows users to learn more about how people communicate. Speech Language Pathologists (SLPs), teachers, families, and researchers can connect through an active forum to share information, learn from the field, and offer and receive support. The Communication Matrix is appropriate for individuals of any age or disability operating at the earliest stages of communication and those with little or no means of symbolic communication. The Matrix is based on decades of communication research, organizing various schemas into a streamlined tool for tracking progress over time. Individual users can receive a limited number of free assessments and purchase assessment credits. The Communication Matrix can also produce custom reports and webinars for a small fee. The Community is free to use. For more information, visit https://communicationmatrix.org/.

MAP-R

Morphological Analysis Pathway to Reading (MAP-R) offers online interactive modules that 3rd-5th grade teachers can use to deliver supplemental literacy vocabulary instruction for students who are multilingual learners with or at risk for language disabilities. The technology-enhanced instruction integrates multilingual supports to provide accessible educational materials to students (including multilingual students who are D/deaf or hard of hearing). The lessons are designed to bolster students' use of morphological analysis to improve language and literacy outcomes. Materials are available in English and Spanish with sign language supports for individuals who use American Sign Language and can be delivered in various educational contexts, including rural and remote areas. Based on the results of a pilot study with 263 students in 14 third-grade classrooms, randomly assigned to six weeks of the MAP-R intervention or a wait-list comparison group, the intervention significantly positively affected morphological knowledge performance. Students in the treatment condition showed greater gains with an effect size of .33 for affix identification and .24 for suffix choice. All tools and materials are free to use upon requesting an account (carla.wood@cci.fsu.edu). For more information, visit https://mapr.fcim.org.

WEGO

Researchers developed an innovative technology-based writing intervention package through a series of WEGO (Writing Efficiently with Graphic Organizers) projects. The intervention includes tools for students in upper elementary and middle schools featuring Chrome-based technology-based graphic organizers with embedded evidence-based self-regulated learning strategies, mnemonics, video models, and UDL supports in order to improve the quality of persuasive, expository, and personal narrative essay writing. In addition, the WEGO teacher dashboard offers opportunities for teachers to make data-driven decisions about their writing instruction. The dashboard stores and organizes data on students' use of the WEGO tool and offers an interactive analytic writing rubric. Professional development and teacher resources are available on the website to support effective technology integration. WEGO tools were tested with more than 1,700 students with and without high-incidence disabili-

ties in 4th-12th grades and more than 100 teachers in different settings. Overall, the struggling writers improved the quantity of essay writing, while all students, regardless of ability, improved the quality. When given sufficient practice, students demonstrated maintained performance when the WEGO tools were removed. The newest version of the WEGO tools will also include motivational educational games focused on the components of the writing process (to be released in 2026). All WEGO tools and materials are free to use upon requesting an account at https://www.wegowriting.com/.

WRITE PROGRESS MONITORING

WRITE Progress Monitoring (PM) provides automated scoring of student writing with instructional recommendations. WRITE stands for Writing stRategies for Instructional Technology in Education (WRITE). Developed to assist in data-based decision-making, WRITE PM connects student needs with evidence-based writing interventions. WRITE PM supports middle school teachers to improve the writing production and performance of students with high-incidence disabilities and their general education peers. WRITE was tested with more than 1,569 students with and without high-incidence disabilities in 6th-8th grades across 28 middle schools. 44 general and special education teachers from three different midwestern states participated. Overall, students were assessed in the fall and spring, and those in the WRITE treatment group scored significantly higher in basic writing skills, including word count, number of correctly spelled words, and number of words in correct sequence than those in the comparison group. Currently, WRITE PM developers are building professional learning to accompany WRITE as part of Project WRITE-APLM. The Adaptive Professional Learning Model (APLM)-Online supports in-service professional developers and coaches as they support middle school teachers and teams with implementation of WRITE PM. The coaching tools include readiness assessments, coaching logs, and conversation guides. Educators interested in either or both WRITE PM and the APLM-Online are invited to complete the Interest Survey on https://kucrl.ku.edu/aplm-online and explore WRITE instructional recommendations at https://www.writingclassroom.org/.

MATH, SCIENCE, AND CODING

Technology for math and science content areas can provide explicit instruction and practice and promote independence and confidence for students with disabilities (Bouck, 2010; Ok et al., 2020). Adaptive learning platforms personalize math instruction based on learners' pace and level (Bang & Flynn, 2023). Virtual manipulatives and interactive simulations allow access to hands-on experiences and virtual experiments (e.g., Long et al., 2023; Shin et al., 2021; Winters et al., 2020). Video and multimedia resources and educational games make mathematics and science content more concrete and engaging (e.g., Long & Bouck, 2022; Marino et al., 2014; Morris et al., 2022; Satsangi et al., 2020). Graphic organizers organize information, break down complex problems, and visually map out science concepts (e.g., Rogers et al., 2020; VanUitert et al., 2020). In addition, there has been an increased focus on integrating computational thinking and coding into the curriculum including providing opportunities for students with disabilities to develop digital skills competencies (Hutchison et al., 2023). These skills are crucial for a growing number and types of jobs available to all learners including those with disabilities (Bureau of Labor Statistics, 2024).

Seven products with the primary focus on math and science are included in this article. Two programs provide early math instruction for preschool and elementary students (KinderTEK and Number Shire). CAP-PD supports evidence-based vocabulary instruction in middle school science. Two more products offer technology-based tools (e.g., graphic organizers, guides) enhanced with UDL and other accessibility features to promote the development of science skills and engagement for upper elementary (OASIS) and secondary (CORGI) students with and without high-incidence disabilities. Another interactive web-based tool provides student lessons and teachers resources for science instruction across upper elementary-middle grades (ESCOLAR). SNUDLE tool will soon be available to guide upper elementary students through the science inquiry process. In addition, the description of the CodewithZB project that integrates coding with behavioral outcomes can be found below in the Behavior and Social Skills section.

CAP-PD

Content Acquisition Podcast Professional Development Process (CAP-PD) (http://www.vocabsupport.com/) is a multimedia PD process that provides customizable instructional slides that teachers can use to implement evidence-based vocabulary instruction in science with middle school students. Students with disabilities often struggle in these courses because of the voluminous (sometimes 100+ terms per course) and complex terms that hold little meaning to students' daily lives (e.g., meiosis, endoplasmic reticulum). To support teachers,

researchers developed a library of Content Acquisition Podcasts with modeling videos (CAP-TV) that explain the key components of five evidence-based practices for teaching vocabulary (student-friendly language, use examples, provide numerous opportunities to respond with matching feedback, break terms into morphological parts, and have demonstrations). The instructional modeling vignettes help to build teacher knowledge of key practices. In addition, teachers can access customizable instructional slides for daily use. The slides use the practices taught by the CAP-TVs, so together they help teachers build needed declarative (awareness of practice) and procedural (knowledge of steps) knowledge for implementation with fidelity. Finally, teachers receive coaching using the COACHED platform (see description below) to build conditional knowledge. The CAP-PD process and associated instructional materials have been used to improve teacher and student outcomes in inclusive science classrooms. Over 1300 upper elementary and middle school students (182 with disabilities) have participated in the CAP-PD process and demonstrated learning gains in academic vocabulary knowledge. At the same time more than 40 teachers have participated in the CAP-PD process and have shown improved implementation quality and frequency of evidence-based vocabulary practices. For more information, visit www.vimeo.com/mjk or http://www.vocabsupport.com/.

CORGI

Corgi is a free, Google-based application (https://corgi.cast.org) to engage middle school and high school students with and without disabilities in rich and meaningful learning. Corgi integrates Universal Design for Learning (UDL), accessibility features (e.g., speech-to-text), and the Strategic Instruction Model (SIM) to support students to develop content-specific practices and habits of mind. The Corgi tool can be used to support students in organizing their thinking as well as in the development and documentation of STEM reasoning skills. Specifically, Corgi graphic organizers (called guides) take students through a step-by-step thinking process using one of four guides: Cause and Effect, Comparison, Question Exploration, and Claim-Evidence-Reasoning in science content. In practice, Corgi makes scientific reasoning processes explicit and visible to students; using the Google platform, students and teachers have a record of student thinking to build upon as they explore new content and concepts. Of the 259 students who used Corgi during the 2023-24 school year, almost half (48%) reported Corgi being "very easy" or "easy" to use, and 41% reported Corgi being "extremely useful" or "quite useful" in supporting their learning. Further, of the 6 middle school science teachers who used Corgi during the 2023-24 school year, 50% "agree" and 33% "strongly agree" that Corgi provides opportunities for learning science in an easily understood way. Additionally, all participating teachers "agree" or "strongly agree" that Corgi reflects evidence of conceptual soundness and quality, grounded in current best practices regarding science instruction. When reflecting on the future, all 6 of these middle school science teachers reported that they are "likely" or "extremely likely" to use Corgi in their future teaching and to recommend the tool to a colleague. For more information, visit https://corgi2.cast.org.

ESCOLAR

ESCOLAR is a web platform (https://escolar.tech) with flexible, interactive online tools for teachers and students to improve science instruction in grades three to eight. Targeted users include upper elementary teachers, middle school teachers, and their students. The tool supports all students such as general education students, students with specific learning disabilities, health impairments, emotional and intellectual disabilities, and English language learners. ESCOLAR provides student lessons and teacher resources (storylines, lesson plans, answer keys, and assessments) to support science instruction aligned with three-dimensional Next Generation Science Standards (NGSS). The ESCOLAR content and online environment incorporate theoretical principles to maximize usability and effectiveness and are enhanced with evidence-based eText supports (such as text-to-speech, vocabulary definitions, enhanced illustrations and videos, and digital notetaking) to make science learning accessible to students of all abilities. Preliminary case studies with third graders averaged pre and post data showed overall gains of ten percentage points. The completed design-based study with middle school students showed that students with disabilities or EL students improved at least 12 percentage points compared to students in a control group. The tool and resources are free upon setting up an account. For more information, visit https://escolar.tech.

KinderTEK

KinderTEK (https://kindertek.com) is an early math learning program that gives preschool and elementary students the chance to engage with kindergarten-level numbers, number words, and math concepts early and often. Through vivid visuals and engaging audio, it teaches

and solidifies foundational math vocabulary and skills using evidence-based instructional principles. The iPad apps, accompanying reports, and management features were developed through years of testing with thousands of students by educators in real classrooms. Students engage in math adventures that automatically adapt to each child's needs. Detailed reports and customization options help teachers and parents easily provide individualized math instruction to students across learning abilities and contexts. In the classroom, KinderTEK serves as a teaching partner to help educators provide individualized instruction and feedback to each of the kids they teach. At home and in informal learning contexts, KinderTEK supplements play-based and real-life experiences with fundamental math concepts. To date, over 5,000 students and nearly 300 parents and educators (in more than 125 schools and 50 districts) have been involved in KinderTEK's feasibility and efficacy testing. Teachers and students alike enjoyed using KinderTEK and said they would recommend it to others. Across multiple studies, students performing below benchmark on progress monitoring measures made the most gains on both proximal and distal measures by using KinderTEK. This had the desired effect of significantly narrowing achievement gaps. KinderTEK apps for home and classroom are available on the Apple App Store. KinderTEK Pro Connected (the recommended classroom solution) requires an annual license. For more information, visit https://kindertek.com.

NumberShire

NumberShire was developed by a team of researchers, educators, and engineers at the Center on Teaching and Learning and Thought Cycle LLC to improve Grade K-2 students' mathematics related outcomes. NumberShire is an app- and web-based educational game with an intensive focus on critical whole number concepts and skills. It complements and supports existing core mathematics curricula and can be used as a targeted intervention or whole-class instructional supplement. NumberShire provides educators with individual student and aggregate group mastery data reports that depict student math learning and progress in NumberShire activities. These mastery reports are aligned with the Common Core State Standards for Mathematics (K-2) to support instructional decision making. In several randomized controlled trials, students with or at risk for mathematics learning disabilities who played NumberShire made significant gains in whole number concepts and skills addressed in the Common Core State Standards for Mathematics, compared to students receiving typical math instruction and intervention support. A randomized control trial conducted in 26 first grade classrooms demonstrated that NumberShire can significantly improve mathematics learning in the domains of Counting and Cardinality, Number and operations in Base Ten, and operations and Algebraic Thinking. In addition, pilot studies were replicated in a large-scale randomized controlled trial conducted with 1,708 students in 153 classrooms in a large urban district. These students showed improvement in basic number skills and computation compared to a control group that received business-as-usual math instruction and intervention. The NumberShire (Home version) is available as a free download from the Apple store. All tools and materials are free to use upon requesting an account (ns1its@uoregon.edu) or visiting https://www.numbershire.com/.

OASIS

Opening Access to Supports in Science (OASIS) is designed to provide multiple resources, strategies, and materials to support on-site coaches in classroom science instruction. OASIS includes learning and applying a continuous cycle of professional development, professional learning communities, and a coaching model to support teaching and learning in science for students with disabilities with information and training that can be applied at all grade levels. Current research has focused on upper elementary level, 4th and 5th grade general and special education settings. The OASIS model is designed to build the capacity of coaches, teachers, schools, and districts to implement effective science instruction for all learners in the application of the science inquiry process now required by most state standards and promoted by the Next Generation Science Standards (NGSS). OASIS combines the research-based frameworks of UDL and inquiry-based science instruction to support a scalable coaching system for coaches. OASIS provides an enhanced model of professional development to support the coaching process. At the time of this publication, the dissemination study has not been conducted. However, the project measures implementation fidelity with coaches by using a high-quality professional development observation checklist and measuring student outcomes with scaled assessment instruments and Likert scale surveys to demonstrate an increase in science motivation, application, understanding and sense making. OASIS materials will soon be publicly available on a Google website. For more information, visit https://www.cast.org/our-work/projects/oasis-empowering-science-teachers-research-based-coaching.

SNUDLE

CAST has created a digital Science Notebook in a Universal Design for Learning Environment (SNUDLE), designed to provide students with UDL supports and scaffolds as they learn to apply the science inquiry process and improve their science sense-making skills. Currently SNUDLE is being used in upper elementary classrooms in several research projects at CAST. Using SNUDLE, students have many options and features to support them as they analyze, explain, and make connections of their data to the real world as they learn science concepts. SNUDLE was tested in three research studies using cluster randomized control trials in seven elementary schools with a total of 36 fourth-grade teachers and 902 students. The results showed that students with disabilities who used SNUDLE scored significantly higher on motivation in science and science academic achievement, with effect sizes (ES) ranging from 0.82 to 1.01. Currently, the platform used is Apache Wicket with additional CAST Figuration functionality. CAST hopes to have a publicly available edition of SNUDLE in the near future. For more information, visit https://www.cast.org/our-work/projects/oasis-empowering-science-teachers-research-based-coaching.

TRANSITION AND CAREER READINESS

The IDEA mandates that transition planning be included in the IEP to begin at the age of 16, or earlier, depending on the state (U.S. Department of Education, 2020). This planning is a critical component in preparing students with disabilities for their future academic, career, and personal endeavors. It involves goal setting, skill development, and access to support systems to facilitate a seamless transition from school to post-school life. In 2023, the Office of Special Education and Rehabilitative Services (OSERS) at the U.S. Department of Education (Department) published the *2023 Early Childhood Transition Questions and Answers* document (https://sites.ed.gov/idea/idea-files/2023-early-childhood-transition-questions-and-answers/) further emphasizing that transition services in the IEP may include "career exploration through vocational assessments or work experience opportunities" (U.S. Department of Education, 2020, p. 1). OSERS subsequently launched a symposium series *Expect, Engage, and Empower: Successful Transitions for All!* OSERS challenges participants to "raise expectations, engage families earlier, and fully empower all individuals who support transition services to improve post-school outcomes for children and youth with disabilities and their families" (U.S. Department of Education, 2024, Symposium Series – Second Symposium: Beyond the IDEA and WIOA Requirements section, para. 2).

Listed below are three projects that offer innovative and inclusive approaches to supporting students with disabilities as they transition to post-school life. The Check & Connect App helps K-12 students at risk of disengagement stay on track for graduation by monitoring attendance, grades, and behavior. EnvisionIT offers a free curriculum for middle and high school students, focusing on 21st-century skills and culminating in a comprehensive Transition Portfolio. Future Quest Island–Explorations (FQI-E) is an accessible online game that promotes early career awareness in 3rd-5th grades, resulting in personalized digital portfolios to inform early transition planning.

CHECK & CONNECT APP

The Check & Connect App (C&C App) is a web-based tool designed to facilitate the implementation of the Check & Connect (C&C) mentoring intervention for K-12 students showing warning signs of disengagement. This application aids C&C mentors in documenting, monitoring, and reporting student progress in attendance, grades, and behavior. This tool not only helps mentors keep students on the path to graduation but also saves time in data entry and analysis, provides real-time visual trends, and enhances the fidelity of C&C implementation. Mentors are restricted to viewing only their own students' data, while school administrators have access to advanced data visualization tools. These tools enable administrators to view data trends over time, assess the progress of specific student populations, monitor the frequency of mentor interventions, and ensure implementation fidelity. Through rigorous research, Check & Connect has been found to lead to increased credit accrual, persistence rates, graduation rates, and perceived parental participation in school, and reduced absences, tardiness, dropout rates, and behavior referrals for students with and without disabilities. Of the dropout prevention interventions reviewed by the U.S. Department of Education's What Works Clearinghouse, Check & Connect is the only program that has strong evidence of positive effects on staying in school. Annual licenses allow unlimited school users. More information, including a free webinar, is available online at https://z.umn.edu/Check-andConnectApp.

Additionally, self-paced online learning modules are available for school staff interested in enhancing their understanding of the C&C mentoring intervention and its continuous implementation. The first module, titled "*Readiness Tool: A Guide for Exploring Check & Con-*

nect at Your Site," is specifically designed for site leadership teams. It aims to help them understand C&C and assess their site's readiness for implementation based on various site and program indicators. The subsequent six online learning modules are focused on maintaining the fidelity of the Check & Connect intervention. Each module follows a structured format: preview, learn, apply, practice, and extend. Free access to all online learning modules can be found at https://z.umn.edu/CheckandConnectResources.

EnvisionIT (EIT)

EnvisionIT (EIT) is a free, evidence-based, standards-aligned, college and career readiness curriculum for 21st century students in middle and high school. EIT is a teacher-guided, digital curriculum for students with and without disabilities focused on helping students develop key literacy and career skills needed for the 21st-century workplace. The EnvisionIT curriculum is designed to teach fundamental 21st Century skills to students with and without disabilities in four key competency areas: (a) Transition Planning/Career Readiness; (b) Information Technology (IT) Literacy; (c) English Language Arts; and (d) Financial Literacy. Throughout the curriculum, students complete activities in these areas and build a comprehensive Transition Portfolio, which is the culminating product of the curriculum. Activities leading up to the completion of a Transition Portfolio include, but are not limited to, the following: (a) Completing online learning and transition assessments; (b) Researching careers and postsecondary programs; (c) Developing a resume and cover letter; (d) Writing a personal statement and career narrative; (e) Completing employment and college applications; and (f) Creating a high school course schedule. These activities require students to directly apply what they learn from unit content to set measurable postsecondary goals and develop a realistic plan for attaining these goals. Additionally, the Transition Portfolio serves as a deliverable that students can update and reuse for their career path after completing the EnvisionIT course. This curriculum should be administered by special and general educators in 6th-12th grades (middle and high school) to students with and without disabilities in special education and inclusive classrooms. In numerous experimental and quasi-experimental studies, the EnvisionIT (EIT) curriculum has been shown to increase IT literacy, reading, and transition skills in middle and high school students. EnvisionIT is available on Google Drive for Google Classroom or alternative platforms. Please see https://go.osu.edu/eitlibrary to access the free full curriculum.

FUTURE QUEST ISLAND–EXPLORATIONS (FQI-E)

Future Quest Island-Explorations is an online accessible curriculum that uses gaming strategies to motivate and support improved self-concept and early career awareness for upper elementary students (grades 3-5) with and without disabilities using the evidenced-based "Possible Selves" framework. "Possible Selves" addresses individuals' perceived future self-concept and guides students in thinking about the future, emphasizing nurturing academic and personal motivation (Ruvolo & Markus, 1992).

FQI-E personalizes learning through self-paced individualized instruction and includes an on-demand online mentor to guide them through their "Possible Selves" journey. Each student customizes their avatar and hops on a hovercraft to progress through 21 virtual islands, exploring various self-concepts such as "what I can be, what I would like to be" (Ruvolo & Markus, 1992). By the end of the game, a visual representation of a "Possible Selves Tree" and a personalized digital portfolio describes the students' hopes, dreams, preferences, goals, fears, and things that help them grow into a person, friend, learner, and worker. These artifacts can encourage early transition planning, promote student-led IEPs, and assist IEP teams in developing better secondary and postsecondary student goals and outcomes. Additionally, using UDL principles and accessibility features such as text-to-speech, speech-to-text, JAWS compatibility, read-aloud, and sentence starters, ensure all students can access and benefit from the curriculum, regardless of their abilities or devices. FQI-E was implemented with over 3,500 high-needs students nationwide, including 500 in a randomized-control trial. The program significantly increased career exposure for all students, with the greatest impact on those with IEPs and in high-poverty schools. Additionally, FQI-E showed positive treatment effects on planning, locus of control, social awareness, and belief in graduating high school among students in high-poverty schools. For more information, visit www.fqie.org.

BEHAVIOR AND SOCIAL SKILLS

The development of communication, behavior, and social skills plays a vital role in the overall well-being and academic success of students, particularly those with disabilities (Carter et al., 2014). Scholarly literature highlights the significance of early intervention, personalized

support, and evidence-based practices in fostering these skills (Sulu et al., 2023; Westling, 2015). Research consistently demonstrates that targeted interventions in communication, behavior, and social skills improve academic performance, enhanced relationships, and adaptive behaviors (O'Keffe & McNally, 2023; Shire et al., 2020). Technological innovations have expanded the repertoire of strategies available to educators, providing innovative tools to cultivate these essential skills in varied and engaging ways (Garcia-Garcia et al., 2023; Wainer & Ingersoll, 2011).

Four technology tools focused on behavior and social skills. ibestt tool enhances communication and collaboration among team members and facilitates data-driven decision-making to improve implementation fidelity. IGDI tool provides infant-toddler service providers with measures and an online data system to individualize services based on child outcomes. Another one (CodewithZB) is designed to improve social skills and communication in elementary school students with disabilities. Finally, VOISS provides interactive, school-based simulations that allow students to learn and practice essential social skills in a safe environment across multiple devices. These tools address various developmental stages and educational needs, benefiting educators, service providers, and families by enhancing support for students with disabilities.

CodewithZB

CodewithZB is a web-based platform that aims to improve the social skills and communication of elementary school (2nd-5th grade) students with disabilities. There are three options for the student to engage with (Zoobee™) ZB, an AI driven socially assistive robot and Ray-Z, a virtual robot, by learning basic coding to create a square. Each option is accompanied by a social story that explains the process and includes independent learning to create a square, teaching a peer to create a square and working on a task while ZB provides neutral feedback. The platform allows students to practice real-world skills like problem-solving, collaboration, cooperation, and strategic thinking in a safe, distraction-free environment. At the time of this publication, evaluation data is being analyzed by collecting pre and post-data on the number of on-task behaviors and conversation (initiation and reciprocity) instances with classmates, ZB or educators in the classroom. Users will have the ability to benefit from the tool both in and outside of the classroom, which will be available on the Project RAISE website (www.ucpc-fl.org/projectraise) once the study concludes in summer 2025.

ibestt

ibestt (Integrating Behavior Support and Team Technology) is a software application that guides early childhood and K-12 behavior support teams (e.g., coaches, teachers, related school personnel) in the development and implementation of individualized (Tier 3) supports in the classroom. ibestt was developed to address the common barriers to effective implementation of individualized behavior plans in the classroom such as time to plan and communicate, collaboration between teacher and coach, and missed steps in plan development. The application moves team members through a five-step, evidenced-based, behavior planning process of (1) requesting help, (2) Classroom Check, (3) Functional Behavior Assessment Summary, (4) Behavior Intervention Plan, and (5) Progress Monitoring. The digital platform provides a common view for the teacher and coach as they complete the steps. The ibestt tool supports the ongoing implementation of the plan with access to easy data collection, automatically generated graphs, and communication between coach and teacher through a messaging feature within the application, resulting in more effective behavior plans for students. Coaches can also access a Coaching Organizer to help them effectively support the teacher. Pilot testing of ibestt occurred in 18 schools across 3 districts in 2 states and was used with nearly 300 students, 108 of them had IEPs. There was a total of 438 educators including special education, general education, and early childhood educators. Participants indicated that ibestt is user-friendly, likely to be effective in completing Functional Behavior Assessments - Behavior Improvement Plans, increases the technical adequacy of Functional Behavior Assessments/Behavior Improvement Plans, and overall, Tier 3 team members were satisfied with ibestt. The tool is currently free to use after establishing readiness. For more information, visit https://ibestt.org/.

IGDI

Individual Growth and Development Indicators (IGDI) for Infants and Toddlers measures and the IGDI online data system provide infant-toddler service providers with the tools to individualize their services based on child outcomes. Each IGDI measure has age-based benchmarks for child performance, standard toy sets to facilitate assessments that are fun for children, forms and protocols for administration and scoring, individual child and group progress reports and graphs, and training packages to support implementation. Integrated into the IGDI Online Data System, the MOD (Making On-

line Decisions) system guides infant-toddler educators through data-driven decision-making steps to identify evidence-based practices for a child based on their performance on an IGDI measure. The MOD can incorporate any curriculum linked and cross-walked with one of the four IGDI domains. Substantial evidence exists in supporting the use of IGDIs in infant-toddler programs. Existing research provides theoretical and empirical evidence demonstrating how IGDIs can improve infant-toddler programs through 1) efficient progress monitoring, 2) data-based decision-making, and 3) outcome reporting to parents, teachers, specialists, funding agencies, and other key stakeholders. IGDI is free to use, but the measures require training and certification. Contact the team to learn more or set up a training session at https://igdi.ku.edu/contact-us/. The tool can be accessed through https://igdi.ku.edu/ and https://igdi-ds.ku.edu.

VOISS

VOISS: Virtual Reality Opportunities to Implement Social Skills is an interactive virtual reality environment developed to support middle school students (5th-9th grade) as they learn and practice social skills. Targeted users include students with autism spectrum disorder and learning disabilities but can be used for any student who struggles with social skills. VOISS integrates empirically validated social narratives into a safe, authentic, meaningful VR tool. Structured across 10 primary social emotional domains (e.g., receptive communication, expressive communication), VOISS contains 140 unique learning scenarios that are meant to teach knowledge and understanding of 183 social skills. Set in numerous school-based virtual environments (e.g., classroom, hallway, cafeteria), students move through a pre-programmed social narrative scenario interacting with student and teacher avatars and a narrator who offers direct/explicit verbal instruction. VOISS is available across multiple devices including iPads, Chromebooks, Oculus headsets, and Windows machines. VOISS was tested with 120 5th-6th grade middle school students with and without disabilities across 10 schools with 10 educators. Participants within 10 classrooms in four states were randomly assigned to VOISS and PEERS, another popular social skill curriculum. In both conditions, participants experienced an estimated 300 minutes of the intervention spread out over one to four months. Using the norm-referenced Clinical Evaluation of Language Fundamentals-5 Pragmatic Profile (CELF-5 PP) and a knowledge-based assessment, participants were assessed pre and post intervention to determine social communication skill acquisition and application. Students using VOISS made statistically significant growth pretest to posttest in social communication knowledge and application. VOISS was statistically greater than PEERS in all dependent measures, save one. Results indicate that VOISS has the potential to provide an effective means of delivering social communication instruction to middle school students. Overall, VOISS seeks to offer a safe environment where students can explore, learn, practice, and begin to generalize essential social skills (see https://projectvoiss.org).

PROFESSIONAL DEVELOPMENT AND COACHING

Professional learning occurs within the structure and activities of professional development and ongoing instructional coaching. Effective professional learning uses evidence-based practices to support teachers in implementing new instructional methods and tools with fidelity (e.g., Darling-Hammond et al., 2017). For example, an initial professional development (e.g., workshop, webinar) is supported by sustained, job-embedded instructional coaching. Research-based coaching cycles include observation with feedback, problem-solving, data-driven decision-making, reflection, and resources for new learning (e.g., Knight et al., 2018). In a meta-analysis of causal studies, Kraft et al. (2018) found moderate to large pooled effects of teacher coaching on instruction and student achievement. Technology features make coaching processes more efficient (Weiser et al., 2019) and offer an easily accessible space for varied resources, such as videos, vignettes, and modules for gaining new knowledge and skills. Of particular importance today, comprehensive and supportive professional learning opportunities are crucial for teacher retention. A recent teacher retention study found that teachers reported being more likely to continue working in schools with mentoring programs, organized PD, options for setting their own goals towards instructional improvement, and sufficient instructional resources (Lindsay et al., 2021).

Eight technology tools primarily focus on providing resources for professional development and instructional coaching aimed at improving instruction in evidence-based practices. Two tools in this category focus on math and science (Flite STEM Coaching, SETTT for Success); two focus on behavior social skills (Ready-Coach, VOISS Advisor), three focus on literacy (Braille Brain, SETTT for Success, Step Up AT), and one focuses on brain-based visual impairments (CViConnect). The successful inclusion of students with visual impairments

in the general education curriculum often depends on the preparation of teachers to provide necessary technology supports (Miyauchi, 2020). Additionally, one tool generally applies to professional learning for any subject matter relevant to special education teachers (COACHED). Each tool in the PD and coaching category is intended for specific grade levels, and the tools taken together in this category address all grade levels of students. These tools were designed primarily for PD providers/trainers and instructional coaches at the school or district level and educators, teachers, and service providers. Four of the tools also include parents and families as intended users.

BRAILLE BRAIN

Braille Brain is an online website that includes resources for individuals who would like to learn braille. Originally designed for print readers with vision to learn braille, this website includes three courses: Unified English Braille (UEB) Foundations, UEB Advanced (coming soon), and Nemeth code. The website also includes a set of assessment tools to support literacy development, including word lists, short passages, long passages, oral dictation exercises, and multiple-choice questions. By systematically completing the modules in each course, individuals can gain proficiency in learning braille symbols and rules. Although the target audience of these resources are sighted print readers wishing to learn braille, individuals who are transitioning from print to braille may find the materials useful. Teachers also may find the materials useful when wanting to look up specific symbols or to have a refresher on certain braille rules. Through this work, data showed that students with visual impairments using braille had positive growth in speed in reading narrative passages and growth in expository reading. Specifically, students reading the long passages found in the Foundations Assessments section of the app showed positive growth in reading speeds when engaging in a repeated reading intervention. Additional content is available (and coming soon) to support literacy assessment. The materials are available at no-cost at https://braillebrain.aphtech.org/about.

COACHED

COACHED (www.coached.education.virginia.edu) is a web-based professional development platform used to help teachers develop needed conditional knowledge (when to use practices, with whom, and under what circumstances) for supporting unique needs of students with disabilities, multilingual learners, and others who struggle. The COACHED platform provides teams the option to keep standardization to the coaching process, while addressing individualization and customization needs. COACHED is not only a tool for the function of documenting instruction and delivering feedback, but also a tool for developing the observer's conditional knowledge needed for effective coaching. Coaches and educators can select goals, tag video segments, and integrate comments to enhance the implementation of evidence-based teaching practices. The research and design team continues to refine COACHED to enhance the functionality which includes the customization of data collection and outputs. The tool uses generative artificial intelligence to support ease of feedback construction. Observers and teachers can reflect and communicate within the system, utilizing instructional archives such as lesson plans that are stored within the platform. Teachers coached using this process improve their implementation of evidence-based practices, which can then be measured on learning and behavioral impact of students. Currently, COACHED has over 292 institutions (e.g., schools, universities) with active users. Instructors, faculty, and others who use COACHED have demonstrated gains in the quality of feedback they provide compared to their traditional methods. In-service teachers and teacher candidates alike have shown improved instructional quality across various content areas after receiving COACHED feedback. COACHED has consistently received positive feedback and social validity scores from users. For more information, visit www.coached.education.virginia.edu.

CViConnect

CViConnect is an innovative iPad-based software system, designed for use with children with cerebral visual impairment (CVI). CViConnect allows a teacher to plan and deliver activities in a classroom or home setting. Families can present activities to the child, monitor results, and consult with CViConnect Support Professionals. The system offers a full library of activities created for CVI that can be individually assigned to a student, as is, edited to meet the student's needs, or team members can create their own activity. CViConnect uses the camera inside of the iPad to detect whether the child is looking at or away from the activity. This information is correlated with what is being displayed on the screen to help the family or teacher understand what target provides the best visual attention for the student.

CViConnect maintains a training site that explains how to complete the CVI Range Assessment and use the CViConnect App. Participants are encouraged to create activities for inclusion in the app to meet specific stu-

dent's needs. CViConnect provides tools for charting the progress of the student as they work towards their goals. The CViConnect Professional Edition provides a secure platform for educators to complete the instructional cycle, collect data, analyze data, make instructional decisions, plan, and reflect. Baseline data within CViConnect includes, but is not limited to, Functional Vision Evaluation summary, Orientation and Mobility summary, and Learning Media Assessment summary. Preliminary data have been collected from over 102 trainers and over 137 different students with CVI, showing that when these students work with a trained vision professional, the student has more directed visual behaviors, are more focused on visual tasks, and are engaged in more visually directed motor behaviors. Learn more about CViConnect and their resources at https://cviconnect.co/.

FLITE STEM COACHING

The Flexible Learning through Innovations in Technology (FLITE): STEM Coaching Suite provides support to instructional coaches who support teachers instructing students with disabilities in grades K-5 in mathematics and science. FLITE STEM Coaching consists of three open education components available at no cost: (1) a coaching cycle and related tools and resources designed to increase the implementation of evidence-based practices in science, technology, engineering, and mathematics (STEM); (2) a suite of STEM resources aligned to high leverage practices for students with disabilities (HLPs) to improve instruction and outcomes for students with disabilities; and (3) a web-based observation dashboard, formerly known as DebriefScape™, for targeted observation and feedback. Within the observation dashboard, a data tagging feature supports efficient coaching and allows teachers to recognize practices targeted directly (e.g., high leverage practice for students with disabilities) in their classroom instruction. The tools and resources harvested in this suite are from varied sources to support online professional development (PD) for teachers and the instructional coaches who work with those teachers through evidence-based practices in special education, mathematics, and science. Parents of students with disabilities in STEM can also use the tool. The evaluation of the tools at the end of the project's second year led to key adjustments. Using the Quality Assurance Review rubric, we assessed the DebriefScape™ Observation tool and found that while 60% of respondents confirmed its scientific validity, only 20-27% found it user-friendly, prompting improvements. These insights guided revisions to better support the teachers and coaches with further refinements planned based on Year 3 data and focus group feedback. All three components of FLITE STEM Coaching are free and available to the public and can be accessed through https://ucf.deviws.com/.

ReadyCoach

ReadyCoach is a collaborative coaching platform for instructional coaches, teachers, and other school personnel who support K-8 students in need of reading or behavioral supports. The platform is designed based on the research-based, data-driven instructional coaching model. The platform allows users to upload student data from many popular reading and behavior assessments (e.g., DIBELS, DESSA) and then receive automated grouping recommendations based on student needs identified in the data. ReadyCoach then supports goal setting for each intervention group, recommends interventions designed to address the identified need(s), and supports the subsequent tracking of goal progress and intervention fidelity. ReadyCoach is ideal for schools that implement response to intervention (RTI) or a multiple tiered system of supports (MTSS) frameworks. For behavior support, users reported high to very high quality, usefulness, and relevance of the ReadyCoach technology app for their coaching efforts of the data-driven instructional coaching model (DDICM) and support of students with emotional and behavioral difficulties. The average intervention fidelity was 95% of the required intervention steps, and 82% of students in intervention groups met their behavior goal on time. For reading support, initial results from a lagsite implementation design indicated that schools participating in DDICM coaching and use of the ReadyCoach technology app have significantly higher beginning to end-of-year early reading gain scores than schools not implementing DDICM coaching on the DIBELS 8th Edition measures of phoneme segmentation fluency, nonsense word fluency (correct letter sounds), and oral reading fluency (words correct). More information and a free 90-day trial can be found at https://readycoach.net/.

SETTT FOR SUCCESS

Special Educator Technology-Based Training of Trainers (SETTT) for Success leverages technology and evidence-based professional development practices to support educators (trainers) who design and deliver professional development for special education teachers. With support in the form of learning modules, coaching, and a community of practice, trainers use a resource collection and a professional development model to create

effective teacher professional development that addresses local needs in English language arts, mathematics, and science. SETTT for Success ultimately changes teacher practice to improve instruction for students with the most significant cognitive disabilities who take statewide alternate assessments in 3rd-12th grades. To date, SETTT for Success has served 14 teacher trainers from five sites. Those trainers have delivered professional development (PD) to 126 teachers. All trainers used the SETTT for Success technology and PD approach to design, deliver, and evaluate their PD sessions. Overall, trainers increased their technological and pedagogical content knowledge and 95% of teachers who attended trainers' PD sessions reported that they planned to apply what they learned from the PD in their future instruction. SETTT for Success is currently in a pilot testing phase, and cost information is not available. For more information, visit https://settt.atlas4learning.org.

STEP UP AT

Step Up AT is a customizable professional development program that provides coaching to teachers, teacher assistants, support specialists, school districts, and other agencies to adopt evidence-based assistive technology (AT) practices shown to improve early learning and engagement for young children (ages 3-5) with disabilities. The Step Up AT Professional Development Toolkit helps bridge the gap for teachers, educators, parents, and children with disabilities to help children reach early learning milestones. Through access, coaching, and easy-to-use resources, the free toolkit is a one-stop-shop for fostering inclusive practices in the early childhood classroom. Research on Step Up AT has demonstrated significant gains in educators' AT implementation and AT use among children with disabilities, with notable improvements in inclusive classroom practices and enhanced student engagement, communication, and participation. The program has reached a diverse audience, training 144 educators, classroom assistants, and peer coaches who supported 333 preschoolers with disabilities across 17 schools, with over 75% of participants being Hispanic. More information can be found at www.stepupat.org. Interested users can create an account to access the modules at https://www.development.stepupat.org/.

VOISS ADVISOR

VOISS Advisor is a website designed to support middle school educators as they implement social skill interventions and help students generalize learned social skills. VOISS Advisor has a social skill inventory to support educators as they identify student social skill needs and monitor progress over time. VOISS Advisor also has a bank of lesson plans, student case studies, evidence-based practice instructional videos, and how-to guides. It also has a library of social skill IEP goals and benchmarks aligned to national and state social skill standards. Educators can use VOISS Advisor as they implement social skill interventions with their students and further facilitate student generalization of learned skills to various real-world environments. VOISS Advisor can be used as a stand-alone professional development resource for any educator, related services provider, instructional coach, or professional development leader. VOISS Advisor is also a professional learning resource for VOISS, a virtual reality environment (available as an app for iPads, Chromebooks, Windows, and Oculus platforms) where students can learn and practice social skills in a safe, digital space. VOISS Advisor was tested with 30 middle school educators across 27 schools and nine states. Three randomized groups included one group of educators who implemented the VOISS virtual reality application with their students and used VOISS Advisor for implementation and generalization. Two other groups had educators who only used VOISS Advisor without VOISS and those who only used VOISS. Teachers' knowledge and skills for social skill instruction were measured, pre/post, as were their perceptions of use, and their students' acquisition of social skills. As of the writing of this manuscript, results from this randomized control trial are still being compiled. For more information, visit http://voissadvisor.org.

STRATEGIES THAT WORK: LESSONS LEARNED FROM THE PROJECTS

Since OSEP's Stepping-Up initiative began in 2012, funded project staff have been participating in regular cohort meetings. As part of this collaboration, a group of grantees compiled the *Strategies That Work* document, which shares lessons learned from each project's implementation experiences (Cooney et al., 2020). While this document focused on supporting current and future Stepping-Up grantees that would require a clear understanding of what it takes to develop and implement technology across different learning environments, some suggestions can be beneficial to educators and school leaders looking to integrate technology into their settings seamlessly. The following strategies were originally compiled in 2020, then reviewed and modified by current projects in 2024. Technology tools presented in this article are accompanied by materials including protocols, scaffolds, and supplementary resources to support the use of these strategies.

1. Align technology tools or approaches with other priorities or established policies at each setting (e.g., site, district, state). Technology is more likely to be implemented if it can be integrated within classroom/school/district initiatives (e.g., supporting executive functioning, and multi-tiered systems of support). The technology learning objectives and resources need to be well-aligned with typical educational practices.
2. Consider technology tools or approaches that are user-friendly, engaging, and meaningful for intended users with appropriate supports. The tools and approaches described above fit those characteristics as they yearly collect and report the data on usefulness, high quality, and relevance to their intended users.
3. Communicate requirements (e.g., timeframe, resources) necessary for implementation.
4. Establish leaders/users' commitment to promote adoption and increase sustainability.
5. Ensure selected technology and accompanying materials (e.g., tutorial videos, assessment tools for readiness, self-guided materials, and professional development) align with current accessibility standards.
6. Provide educators/intended users with designated time for ongoing support (e.g., professional development, coaching sessions) around technology implementation.
7. Allocate appropriate and sufficient time for procurement, professional learning, implementation, capacity building, monitoring progress, and continuity to ensure sustainability.
8. Ensure technology is implemented with fidelity to achieve intended outcomes.
9. Seek continuous feedback from educators/intended users to maintain high quality, relevance, and usefulness of technology tools and/or approaches.
10. Evaluate cost-effectiveness and efficiency associated with maintaining and updating the technology and its implementation materials.

Educators need to be aware and ready for the potential challenges that they might encounter while implementing technology such as lack of training or technological infrastructure. Luckily, most of the tools presented earlier offer such resources as readiness checklists, professional development, coaching supports, etc. These resources have been developed and revised in collaboration with intended users taking into account the context of the implementation cites. In addition, such centers as State Implementation and Scaling-Up of Evidence-based Practices (SISEP; https://sisep.fpg.unc.edu/) as well as National Implementation Research Network (NIRN; https://nirn.fpg.unc.edu/) offer guidance based on implementation science for seamlessly integrating evidence-based practices in real-world settings.

CONCLUSION: WHAT IS NEXT?

The Stepping-Up Technology Implementation initiative, funded by the U.S. Department of Education's Office of Special Education Programs (OSEP) since 2012, has significantly contributed to the development and implementation of cutting-edge AT and EdTech interventions for students with disabilities. These innovative projects address critical areas in literacy, math, science, coding, transition, career readiness, behavior management, social skills, professional development and coaching highlighting the transformative potential of technology in education. Although the primary focus of these technologies and/or approaches was to improve outcomes for students with disabilities, they also positively impacted more than 36,000 students, including more than 26,000 general education students in inclusive settings, demonstrating the need for evidence-based interventions for all students.

These projects illustrate how UDL-based technology can remove barriers, promote accessibility and personalization, and create more equitable and meaningful learning experiences. Integrating evidence-based practices with emerging technologies is crucial for advancing more effective and engaging learning experiences for all students. The future of EdTech promises even greater advancements, particularly in the following key areas:

- **Artificial Intelligence (AI) and Machine Learning** technologies have the potential to revolutionize personalized learning by providing instruction tailored to each student's unique needs and learning pace (Marino et al., 2023). AI-powered tutoring systems and intelligent feedback mechanisms could offer unprecedented levels of individualized support, enhancing the accessibility and effectiveness of education for all students, including those with disabilities. It is important to consider factors that

support the successful implementation of educational technology tools that integrate AI as they are developed and made available (Federal Register Notice, 2024). The effectiveness of intelligent tutoring systems demonstrated in recent research (e.g., Phillips et al., 2020), underscores their promise. Moreover, addressing ethical considerations such as data privacy and algorithmic bias (when algorithms unintentionally produce unfair results) is essential to ensure equitable access and use of AI in education (Marino et al., 2023).

- **Immersive Technologies such as Virtual and Augmented Reality (VR/AR)** have the potential to transform how students engage with educational content by offering immersive learning experiences. These technologies enable students to interact with virtual environments, such as virtual tours and simulations, making abstract concepts more tangible and engaging across various curriculum areas. VR/AR can positively impact student outcomes by providing alternative learning experiences where students explore and interact with educational content, especially benefiting students with disabilities (Moore, 2023). For example, students with visual impairments can use auditory cues and tactile feedback within VR environments to discover the world around them, while individuals with intellectual and developmental disabilities can explore scientific concepts that might be challenging in traditional settings. The integration of VR/AR can foster deeper and more meaningful learning experiences through multi-sensory, innovative approaches in an accessible digital environment.

As these technologies continue to evolve, it is essential to explore innovative ways to integrate them into curricula, aiming to enhance learning outcomes and provide inclusive, interactive educational experiences for all students. Continued investment in research, development, and professional development is essential for the future of technology in education, fostering collaboration among technologists, educators, service providers, policymakers, researchers, and intended users (including children and families). This interdisciplinary approach will ensure that new technologies are not only cutting-edge but also pedagogically sound and implementable across diverse educational settings. Targeted professional development for educators will be crucial in effectively integrating these technologies into teaching practices and adapting to the rapidly changing technology revolution. This comprehensive strategy recognizes and enhances the impact of initiatives like Stepping-Up Technology Implementation, aiming to leverage technological advancements to improve learning outcomes and ensure equitable access for all students, including those with disabilities.

DISCLAIMER

The inclusion of non-Federal resources or examples in this article is not intended to reflect their importance, nor is it intended to endorse any views expressed or products or services offered. These materials may contain the views and recommendations of various subject matter experts as well as hypertext links, contact addresses, and websites to information created and maintained by other public and private organizations. The opinions expressed in any of these materials do not necessarily reflect the positions or policies of the U.S. Department of Education. The U.S. Department of Education does not control or guarantee the accuracy, relevance, timeliness, or completeness of any outside information included in these materials.

REFERENCES

AlRawi, J. M., & AlKahtani, M. A. (2021). Universal Design for Learning for educating students with intellectual disabilities: a systematic review. *International Journal of Developmental Disabilities*, *68*(6), 800–808. https://doi.org/10.1080/20473869.2021.1900505

Americans with Disabilities Act (2024). Nondiscrimination on the Basis of Disability; Accessibility of Web Information and Services of State and Local Government Entities, 28 CFR Part 35 [CRT Docket No. 144; AG Order No. 5919-2024]. Retrieved from https://www.ada.gov/assets/pdfs/web-rule.pdf

Aspiranti, K. B., Larwin, K. H., & Schade, B. P. (2018). iPads/tablets and students with autism: A meta-analysis of academic effects. *Assistive Technology*, *32*(1), 23–30. https://doi.org/10.1080/10400435.2018.1463575

Atanga, C., Jones, B. A., Krueger, L. E., & Lu, S. (2020). Teachers of students with learning disabilities: Assistive technology knowledge, perceptions, interests, and barriers. *Journal of Special Education Technology*, *35*(4), 236-248. https://doi.org/10.1177/0162643419864858

Bang, H. J., Li, L. & Flynn, K. (2023). Efficacy of an adaptive game-based math learning app to support personalized learning and improve early elementary

school students' learning. *Early Childhood Education Journal*, *51*, 717–732. https://doi.org/10.1007/s10643-022-01332-3

Bouck, E.C. (2010). *Technology and students with disabilities: Does it solve all the problems?* In F. F. Obiakor, J. P. Bakken, & N. F. Rotatori (Eds.) Current issues and trends in special education: Research, technology, and teacher preparation (pp. 91-104). Emerald Group Publishing Limited. https://doi.org/10.1108/S0270-4013(2010)0000020009

Boyle, J. R., Watson, L., & Robinson, H. E. (2024). Smartpens for students with disabilities in inclusive content-area classes. Journal of Special Education Technology, 39(1), 151-159. https://doi.org/10.1177/01626434231184877

Bureau of Labor Statistics. (2024, April 17). Computer and information research scientists. U.S. Bureau of Labor Statistics. Retrieved from https://www.bls.gov/ooh/computer-and-information-technology/computer-and-information-research-scientists.htm#tab-1

Carreon, A., Smith, S. J., Mosher, M., Rao, K., & Rowland, A. (2022). A review of virtual reality intervention research for students with disabilities in K-12 settings. Journal of Special Education Technology, 37(1), 82-99. https://doi.org/10.1177/0162643420962011

Carter, E. W., Common, E. A., Sreckovic, M. A., Huber, H. B., Bottema-Beutel, K., Gustafson, J. Gustafson, J. & Hume, K. (2014). Promoting social competence and peer relationships for adolescents with autism spectrum disorders. Remedial and Special Education, 35(2), 91-101. https://doi.org/10.1177/0741932513514618

Cohen, L., & Popoff, E. (2022). 2022 State EdTech trends report. SETDA. Retrieved from www.setda.org/priorities/state-trends

Cooney, L., Jackson, T., Murray, A., & Sudduth, C. (2020). Strategies that work: Lessons from the field on implementing technology in classrooms. U. S. Department of Education, Office of Special Education Programs. Retrieved from https://thinkcollege.net/sites/default/files/files/resources/Strategies%20that%20Work%202020.pdf

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). Effective teacher professional development. Learning Policy Institute. Retrieved from https://learningpolicyinstitute.org/product/effective-teacher-professional-development-report

EdTech Evidence Exchange. (2021). *The EdTech Genome Project report.* InnvoateEDU. Retrieved from https://www.innovateedunyc.org/success-stories

Edyburn, D. (2020). *Rapid literature review on assistive technology in education: Research report*. Knowledge by Design, Inc. https://www.knowledge-by-design.com/ukat/final_report.pdf

Every Student Succeeds Act, 20 U.S.C. § 6301 (2015). Retrieved from https://www.gpo.gov/fdsys/pkg/BILLS-114s1177enr/pdf/BILLS-114s1177enr.pdf

Evmenova, A. S., & Hrisseh, R. (in press). Assistive technology assessment approaches. In K. Floyd, T. Jeffs, & K. Puckett (Eds.), *Technology toolkits for inclusive instruction: Merging assistive technology and Universal Design for Learning*. Plural Publishing Inc.

Evmenova, A. S., Regan, K. S., Schladant, M., Hall, T. E., Bazhardt, J., Erickson, K. A., Ai, J., Sudduth, C., & Jackson, T. (2022). Stepping-up technology implementation – How does it happen? *Journal of Special Education Technology*, *38*(1), 61-74. https://doi.org/10.1177/01626434221074357

Evmenova, A. S., & Regan, K. (2019). Supporting the writing process with technology for students with disabilities. *Intervention in School and Clinic*, *55*(2), 78-87. https://doi.org/10.1177/1053451219837636

Fernández-Batanero, J. M., Montenegro-Rueda, M., Fernández-Cerero, J., & Garcia-Martinz, I. (2022). Assistive technology for the inclusion of students with disabilities: a systematic review. *Education Technology Research and Development*, *70*, 1911–1930. https://doi.org/10.1007/s11423-022-10127-7

Federal Register. (2024). Guidance on use of artificial intelligence-based tools in practice before the United States Patent and Trademark Office. *Federal Register*, *89*(70), 21010-21012. Retrieved from https://www.federalregister.gov/documents/2024/04/11/2024-07629/guidance-on-use-of-artificial-intelligence-based-tools-in-practice-before-the-united-states-patent

Finetti, M., & Luongo, N. (2023). Assistive technology for blindness and visual impairments: Supporting teachers in K-12 classrooms. In J. Bell & T. Gifford (Eds.) *Using assistive technology for inclusive learning in K-12 classrooms* (pp. 74-103). IGI Global. https://doi.org/10.4018/978-1-6684-6424-3.ch004

Fuchs, L. S., Fuchs, D., Hamlett, C. L., & Stecker, P. M. (2021). Bringing data-based individualization to scale: A call for the next-generation technology of teacher supports. *Journal of Learning Disabilities*, *54*(5), 319-333. https://doi.org/10.1177/0022219420950654

Garcia-Garcia, J. M., Penichet, V. M., Lozano, M. D., & Fernando, A. (2022). Using emotion recognition technologies to teach children with autism spectrum disorder how to identify and express emotions. *Universal Access in the Information Society*, *21*(4), 809-825. https://doi.org/10.1007/s10209-021-00818-y

Gray, L., & Lewis, L. (2021). Use of educational technology for instruction in public schools: 2019–20 (NCES 2021- 017). U.S. National Center for Education Statistics. Retrieved from https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2021017

Heath, M., Asim, S., Milman, N., & Henderson, J. (2022). Confronting tools of the oppressor: Framing just technology integration in educational technology and teacher education. *Contemporary Issues in Technology and Teacher Education, 22*(4). https://citejournal.org/volume-22/issue-4-22/current-practice/confronting-tools-of-the-oppressor-framing-just-technology-integration-in-educational-technology-and-teacher-education

Hutchison, A., Gutierrez, K., Colwell, J., Evmenova, A. S., Offutt, J., & Gross, M. A. (2022). Evaluating the role of professional development on elementary teachers' knowledge, comfort, and beliefs related to teaching computer science to students with high-incidence disabilities. *Journal of Research on Technology in Education*, *55*(6), 1003-1019. https://doi.org/10.1080/15391523.2022.2089408

Individuals With Disabilities Education Act, Pub. L. No. 108-446, § 300.324 (2004).

Kennedy, M. J., & Boyle, J. R. (2017). The promise and problem with technology in special education. In J. M. Kauffman, D. P. Hallahan, & P. C. Pullen (Eds.) *Handbook of special education 2nd Edition* (pp. 606-614). Routledge. https://doi.org/10.4324/9781315517698

King-Sears, M. E., Steganidis, A., Evmenova, A. S., Rao, K., Mergen, R. L., Strimel, M. M., & Owen, L. S. (2023). Achievement of learners receiving UDL instruction: A meta-analysis. *Teaching and Teacher Education*, *122*. https://doi.org/10.1016/j.tate.2022.103956

Knight, D. S., Hock, M., Skrtic, T. M., Bradley, B. A. & Knight, J. (2018). Evaluation of video-based instructional coaching for middle school teachers: Evidence from a multiple baseline study. *The Educational Forum 82*(4), 425-442. https://doi.org/10.1080/00131725.2018.1474985

Kraft, M., Blazar, D., & Hogan, D. (2018). The effect of teacher coaching on instruction and achievement: A meta-analysis of the causal evidence. *Review of Educational Research, 88,* 547-588. https://doi.org/10.3102/0034654318759268

Lindsay, J., Jiang, J., Wan, C., & Gnedko-Berry, N. (2021). *Supports associated with teacher retention in Michigan (REL 2021–108)*. U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Midwest. Retrieved from https://ies.ed.gov/ncee/rel/regions/midwest/pdf/REL_2021108.pdf

Long, H. M., Bouck, E. C., & Kelly, H. (2023). An evidence-based practice synthesis of virtual manipulatives for students with ASD and IDD. *Focus on Autism and Other Developmental Disabilities*, *38*(3), 147-157. https://doi.org/10.1177/10883576221121654

Lowenthal, P. R., Persichini, G., Conley, Q., Humphrey, M., & Scheufler, J. (2022). Digital literacy in special education: Preparing students for college and the workplace. In I. Management Association (Ed.), *Research anthology on inclusive practices for educators and administrators in special education* (pp. 524-537). IGI Global. https://doi.org/10.4018/978-1-6684-3670-7.ch029

Marino, M. T., Gotch, C. M., Israel, M., Vasquez, E., Basham, J. D., & Becht, K. (2014). UDL in the middle school science classroom: Can video games and alternative text heighten engagement and learning for students with learning disabilities? *Learning Disability Quarterly*, *37*(2), 87-99. https://doi.org/10.1177/0731948713503963

Marino, M. T., Vasquez, E., Dieker, L., Basham, J., & Blackorby, J. (2023). The future of artificial intelligence in special education technology. *Journal of Special Education Technology*, *38*(3), 404–416. https://doi.org/10.1177/01626434231165977

Matre, M. E., & Cameron, D. L. (2022). A scoping review on the use of speech-to-text technology for adolescents with learning difficulties in secondary education. *Disability and Rehabilitation: Assistive Technology*, *19*(3), 1103–1116. https://doi.org/10.1080/17483107.2022.2149865

Maylahan, P. (2022). *EdTech leadership survey report*. Consortium for School Networking. https://www.cosn.org/tools-and-resources/resource/edtech-leadership-survey-report-2022/

Maylahan, P. (2024). *2024 State of EdTech district leadership*. Consortium for School Networking. www.cosn.org/edtech-topics/state-of-edtech-leadership

McLeskey, J., Barringer, M-D., Billingsley, B., Brownell, M., Jackson, D., Kennedy, M., Lewis, T., Maheady, L., Rodriguez, J., Scheeler, M. C., Winn, J., &

Ziegler, D. (2017). *High-leverage practices in special education*. Council for Exceptional Children & CEEDAR Center.

Miyauchi, H. (2020). A systematic review on inclusive education of students with visual impairment. *Education Sciences*, *10*(11), 346. https://doi.org/10.3390/educsci10110346

Moore, E. (2023). Virtual reality and augmented reality in eLearning: Providing deeper engagement. eLearning Industry. Retrieved from https://elearningindustry.com/virtual-reality-and-augmented-reality-in-elearning-providing-deeper-engagement

Morris, J. R., Hughes, E. M., Stocker, J. D., & Davis, E. S. (2022). Using video modeling, explicit instruction, and augmented reality to teach mathematics to students with disabilities. *Learning Disability Quarterly*, *45*(4), 306-319. https://doi.org/10.1177/07319487211040470

Ok, M. W., Bryant, D. P., & Bryant, B. R. (2020). Effects of computer-assisted instruction on the mathematics performance of students with learning disabilities: A synthesis of the research. *Exceptionality*, *28*(1), 30-44. https://doi.org/10.1080/09362835.2019.1579723

O'Keeffe, C., & McNally, S. (2023). A systematic review of play-based interventions targeting the social communication skills of children with autism spectrum disorder in educational contexts. *Journal of Autism and Developmental Disorders*, *10*(1), 51-81. https://doi.org/10.1007/s40489-021-00286-3

Phillips, A., Pane, J. F., Reumann-Moore, R., & Shenbanjo, O. (2020). Implementing an adaptive intelligent tutoring system as an instructional supplement. *Educational Technology Research and Development*, *68*, 1409-1437. https://doi.org/10.1007/s11423-020-09745-w

Prado, Y., & Warschauer, W. (2024). *Voices on the margins: Inclusive education at the intersection of language, Literacy, and Technology*. MIT Press. https://doi.org/10.7551/mitpress/14295.001.0001

Rogers, M., Hodge, J., & Counts, J. (2020). Self-regulated strategy development in reading, writing, and mathematics for students with specific learning disabilities. *TEACHING Exceptional Children*, *53*(2), 104-112. https://doi.org/10.1177/0040059920946780

Ruhter, L., & Karvonen, M. (2024). The impact of professional development on data-based decision-making for students with extensive support needs. *Remedial and Special Education*, *45*(1), 44-57. https://doi.org/10.1177/07419325231164636

Ruvolo, A. P., & Markus, H. R. (1992). Possible selves and performance: The power of self-relevant imagery. *Social Cognition, 10*(1), 95-124. https://doi.org/10.1521/soco.1992.10.1.95

Satsangi, R., Hammer, R., & Bouck, E. C. (2020). Using video modeling to teach geometry word problems: A strategy for students with learning disabilities. *Remedial and Special Education*, *41*(5), 309-320. https://doi.org/10.1177/0741932518824974

Shaheen, N. L. (2022). Technology accessibility: How U.S. K-12 schools are enacting policy and addressing the equity imperative. *Computers & Education*, 179. https://doi.org/10.1016/j.compedu.2021.104414

Shin, M., Park, J., Grimes, R., & Bryant, D. P. (2021). Effects of using virtual manipulatives for students with disabilities: Three-level multilevel modeling for single-case data. *Exceptional Children*, *87*(4), 418-437. https://doi.org/10.1177/00144029211007150

Shire, S. Y., Shih, W., Bracaglia, S., Kodjoe, M., & Kasari, C. (2020). Peer engagement in toddlers with autism: Community implementation of dyadic and individual Joint Attention, Symbolic Play, Engagement, and Regulation intervention. *Autism*, *24*(8), 2142–2152. https://doi.org/10.1177/1362361320935689

Sulu, M. D., Martella, R. C., Grimmet, K., Borosh, A. M., & Erden, E. (2023). Investigating the effects of self-monitoring interventions with students with disabilities on the maintenance and generalization of on-task behavior: A systematic literature review. *Review Journal of Autism and Developmental Disorders*, *10*(3), 458-476. https://doi.org/10.1007/s40489-022-00304-y

Svensson, I., Nordström, T., Lindeblad, E., Gustafson, S., Björn, M., Sand, C., Almgren/Back, G., & Nilsson, S. (2019). Effects of assistive technology for students with reading and writing disabilities. *Disability and Rehabilitation: Assistive Technology*, *16*(2), 196–208. https://doi.org/10.1080/17483107.2019.1646821

U.S. Department of Education. (2024). *Expect, engage, and empower: Successful transitions for all!* Retrieved from https://osepideasthatwork.org/federal-resources-stakeholders/topical-issues/expect-engage-and-empower-successful-transitions-all

U.S. Department of Education (2023, August). *Using evidence to support EdTech adoption in schools*. Office of Educational Technology. Retrieved from https://tech.ed.gov/evidence

U.S. Department of Education. (2022, September). *Advancing digital equity for all: Community-based recommendations for developing effective digital equity plans to close the digital divide and enable technology-empowered learning*. Office of Educational

Technology Retrieved from https://tech.ed.gov/advancing-digital-equity-for-all

U.S. Department of Education, (2020, August). *A transition guide to postsecondary education and employment for students and youth with disabilities*. Office of Special Education and Rehabilitative Services. Retrieved from https://sites.ed.gov/idea/files/post-secondary-transition-guide-august-2020.pdf

VanUitert, V., Kennedy, M. J., Romig, J. E., & Carlisle, L. M. (2020). Enhancing science vocabulary knowledge of students with learning disabilities using explicit instruction and multimedia. *Learning Disabilities: A Contemporary Journal*, *18*(1), 3-25. https://www.ldw-ldcj.org/

Vroom, E. B., Massey, O. T., Yampolskaya, S., & Levin, B. L. (2020). The impact of implementation fidelity on student outcomes in the life skills training program. *School Mental Health, 12*, 113–123. https://doi.org/10.1007/s12310-019-09333-1

Wainer, A. L., & Ingersoll, B. R. (2011). The use of innovative computer technology for teaching social communication to individuals with autism spectrum disorders. *Research in Autism Spectrum Disorders*, *5*(1), 96-107. https://doi.org/10.1016/j.rasd.2010.08.002

Wainwright, B. R., Allen, M. A., & Cain, K. (2020). Narrative comprehension and engagement with e-books vs. paper-books in autism spectrum condition. *Autism & Developmental Language Impairments*. https://doi.org/10.1177/2396941520917943

Warschauer, M., & Matuchniak, T. (2010). New technology and digital worlds: Analyzing evidence of equity in access, use, and outcomes. *Review of Research in Education*, *34*(1), 179–225. https://doi.org/10.3102/0091732X09349791

Weiser, B., Buss, B., Sheils, A. P., Gallegos, E., Murray, L. R. (2019). Expert reading coaching via technology: Investigating the reading, writing, and spelling outcomes of students in grades K-8 experiencing significant reading learning disabilities. *Annals of Dyslexia*, *69*(1), 54-79. https://doi.org/10.1007/s11881-018-00175-1

Westling, D. L. (2015). *Evidence-based practices for improving challenging behaviors of students with severe disabilities*. Retrieved from https://ceedar.education.ufl.edu/wp-content/uploads/2015/11/EBPs-for-improving-challenging-behavior-of-SWD.pdf

Whitehouse Office of Science and Technology Policy. (2015). *Preparing Americans with 21st century skills: Science, technology, engineering, and mathematics (STEM) education in the 2015 budget*. Retrieved from https://www.whitehouse.gov/ostp/

Winters, M. R., Harden, L. E., & Moore, E. B. (2020). Co-designing accessible science education simulations with blind and visually-impaired teens. *Proceedings of the 22nd International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '20). Association for Computing Machinery, New York, NY, USA*, Article 59, 1–4. https://doi.org/10.1145/3373625.3418025

Zhang, L., Bashan, J. D., & Yang, S. (2020). Understanding the implementation of personalized learning: A research synthesis. *Educational Research Review*, *31*

Anya Evmenova, Ph.D., is a professor in the College of Education and Human Development at George Mason University. Dr. Evmenova teaches master and doctoral courses in technology integration, special education, and research methods. She is the recipient of the Teaching Excellence and Online Teaching Excellence awards as well as the John Toups Presidential Medal for Excellence in Teaching from GMU for her UDL-based teaching. Her research interests focus on the development and implementation of assistive technology in inclusive educational settings and academic instruction for students with various abilities and needs, Universal Design for Learning, and high-quality online teaching and learning. Dr. Evmenova has raised more than $20 million in federal and state grants to support her research. Her external funding includes two Stepping-Up Technology projects focused on the development of WEGO technology-based writing intervention package. She is the Editor-in-Chief for the Assistive Technology Outcomes and Benefits journal published by ATIA.

Anita Vermeer, M.Ed., is an Education Program Specialist in the Office of Special Education Programs (OSEP) in the U.S. Department of Education. With over 30 years in the field of education, she has worked at various settings in different levels of educational systems, and a theme throughout her career has been focusing on developing and sustaining inclusive settings. She has been a teacher, technology specialist, instructional coach and a district administrator supporting and managing early childhood grants. Anita has been with OSEP for over 5 years and uses her background in technology and implementation science to support the discretionary grant programs supported by the Individuals with Disabilities Education Act. Specifically, Anita oversees a portfolio of over $32 million in discretionary grants that provide technical assistance, technology implementation or include state personnel development funding to meet the needs of children, students and youth with disabilities.

Lori Cooney, M.Ed., is a Program Director of Inclusive Education & Curriculum Design, at the Institute for Community Inclusion at UMass Boston. She has over 25 years of extensive experience in designing and delivering professional development on universal design for learning (UDL), artificial intelligence (AI), inclusive instructional design, learning plans, curriculum development, accessibility, course design, technology integration, college and career readiness, differentiated instruction, personalized career and academic portfolios (PCAP), and assessment strategies for pK-16 students and educators. She is the Co-PI of Future Quest Island-Explorations and is a local and national technical training specialist for the Inclusive Education & Transition Team at ICI/UMB. Lori's notable achievements include receiving a MassCUE Pathfinder Award, a Technology Humanist Award from Worcester Polytechnic Institute, and is recognized as a Christa McAuliffe Teacher by the Challenger Learning Center at Framingham State University.

Jocelyn Washburn, Ph.D., is an Associate Director, Assistant Research Professor, and Director of Professional Development for the University of Kansas Center for Research on Learning. She has been a special education teacher, instructional coach, district literacy coordinator, and regional technical assistance coordinator. Her career has been dedicated to the use of evidence-based, inclusive practices to support students with and without disabilities with an emphasis on adolescent literacy. Her research focuses on adolescent literacy, evidence-based practices, professional learning models, and educator collaboration. Through federally funded research, she is iteratively designing, testing, and scaling professional learning tools for coaches as well as a technology-based adaptive writing intervention. In her role as director of professional development, she provides leadership to the international network of Strategic Instruction Model (SIM) Professional Developers.

Terry L. Jackson, Ed.D., is a co-principal at J21 Consulting Group, bringing over two decades of experience in education and mental health. He served for fourteen years as a Project Officer in the Office of Special Education Programs (OSEP) at the U.S. Department of Education, where he led OSEP's Technology Program, overseeing grants that leveraged innovative technologies to improve access to educational resources for students with disabilities. Prior to his federal service, he spent five years as a Program Specialist with the IDEA Partnership at the National Association of State Directors of Special Education (NASDSE). In addition, he has over fifteen years of experience as a child and family therapist, working in therapeutic foster care, community-based counseling, and outdoor experiential therapy. He holds a B.A. in Psychology, an M.Ed. in Counseling, and earned his Ed.S. and Ed.D. from The George Washington University.

Tolulope Sulaimon, Ph.d. is an assistant professor in the Specialized Education Services department at the University of North Carolina Greensboro. His current research interests are reading comprehension intervention, word problem solving, and integration technology and artificial intelligence (AI) with evidence-based reading and math intervention for students with or at risk with learning disabilities.