Accessibility & Assistive Technology
Research Brief

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Assistive technology (AT) and accessible materials are important ingredients for facilitating positive learning experiences in education among students with disabilities. The specific AT and adaptations a student needs to achieve this aim can vary widely across the different disabilities and needs of students. For example, technologies can differ in function to address considerations of disabilities, such as the use of screen readers by students with visual impairments to change the modality of information compared to the use of augmentative and alternative communication devices to support expressive communication of students with complex communication needs. Likewise, the complexity of devices can range from high-tech (such as computer software or digital devices) to low-tech (such as a glass dome to magnify print sizes or picture cards for a Picture Exchange Communication System), which can affect the costs, portability, and range of tasks AT can perform.

The AT services and policies available to students also vary widely across educational systems within and across countries due to several factors (e.g., social, resource disparities, organization structures; MacLachlan et al., 2018). Despite the differences in implementation, the common aim of AT is not merely to serve as a tool, but also to provide students with disabilities with equitable access to educational materials, instruction, and opportunities for inclusion so that students can participate fully and independently alongside their peers (Edyburn, 2020). In the U.S., the Individuals with Disabilities Education Act (2004) has mandated the consideration of AT for all children and the provision of AT when necessary for a child. Globally, the UN Convention on the Rights of Persons with Disabilities (2006) and UNESCO's Education 2030 (2015) agenda are more explicit in promoting children's access to devices and technologies to enhance the learning and inclusion experiences of students with disabilities.

The effective use of AT in educational settings requires more than just AT assessment and procurement. As technology advances, the need for AT services beyond the procurement of AT only becomes more critical (Tuttle & Carter, 2022). Thus, meaningful implementation of AT goes beyond policies and initiatives. Educators' familiarity with technology, knowledge of how to integrate technology into instructional practice, and teach AT skills to students play a critical role in ensuring that students utilize and maximize the benefits of AT (Tuttle & Carter, 2022). Frameworks, such as SETT and Universal Design for Learning, can provide teachers and school systems with guidance on how to effectively promote and support AT, and even leverage classroom technologies, across a variety of student learning and access needs (CAST, 2018; Israel et al., 2014; Zabala, 1995).

Definition of Terms

Accessibility. Accessibility refers to the design of products, services, environments, and information so people with disabilities can equally perceive, understand, navigate, and interact with them (W3C, 2024). Accessibility draws from principles of universal design and is grounded in the belief that equal access fosters participation, independence, and opportunity (Burgstahler, 2015). Accessibility is a foundational principle in inclusive education and a categorical variable in the current research.

Artificial Intelligence. Artificial Intelligence (AI) is a computer system designed to perform tasks that typically require human intelligence, such as reasoning, problem-solving, perception, learning, and decision-making.

Assistive Technology. Assistive Technology (AT) refers to products, equipment, or systems that are used to increase, maintain, or improve the abilities of an individual. Some of the general goals of AT usage include increasing independence, improving communication, enhancing learning, and social inclusion.

High-tech. High-tech is a specific type of AT that consists of complex individualized devices or software, such as alternative and augmentative communication (AAC) and optical character recognition (OCR). Low-tech devices are typically low-cost.

Low-tech. Low-tech is a specific type of AT that consists of devices or items that do not have electronic components (e.g., pencil grip or slant board).

Mid-tech. Mid-tech is a specific type of AT that consists of simple electronic devices (e.g., audiobooks or recorded notes).

SETT Framework. The SETT Framework – an acronym for Student, Environments, Tasks, and Tools – is a set of decision-making tools used to help collaborative, educational teams gather and organize information that guides educators in selecting and supporting AT devices and services for students with disabilities.

Transdisciplinary Teams. Transdisciplinary Teams are groups of professionals from different disciplines that work together to support a common goal. The collaboration extends beyond the traditional or interdisciplinary roles to share knowledge, blend perspectives, and develop new, holistic solutions across differing service professionals encompassing the students' needs.

Usability. Usability refers to the ease with which a student can effectively, efficiently, and satisfactorily interact with an AT device or software to achieve their intended goals.

Assistive Technology Barriers and Challenges

Several barriers to the identification, procurement, and application of AT have been identified in the literature, such as limited AT knowledge, system structures and policies, and accessibility and usability. One of these barriers is limited AT knowledge among educators, which can be perpetuated by insufficient access to AT resources, training, and professional development (Abner & Lahm, 2002; Hansen & Donne, 2025). Moreover, the selection of devices and the effectiveness of AT instruction and services are critical for ensuring the adoption and use of AT devices due to the perceived benefits of AT reinforcing and promoting future device use (Lenker & Paquet, 2003). Access to high-quality AT instruction and services impacts students' successful use and adoption of AT, especially for new AT users. However, educators often report uncertainty regarding how to align AT to student needs and instructional tasks, particularly given the wide range of disabilities represented in special education settings (Williams et al., 2024). Implementation is also obstructed by logistical issues, including compatibility of AT with existing school infrastructure and lack of ongoing technical support (Shafik et al., 2025). These

barriers highlight the need for teachers to utilize frameworks and practices, such as the SETT Framework and transdisciplinary teams, to adapt to the wide-ranging needs of students and rapid AT advancements and support successful student access (Tuttle & Carter, 2023).

System structures and policies can also create challenges in providing accessible learning experiences and providing AT devices and services, and vary widely across states and countries. Clear guidance on AT policies is often lacking, and resources for funding AT procurement can be obscure (varying across disability areas) and require systemic knowledge unfamiliar to many teachers (Williams et al., 2024). For example, access to braille books is limited for students in Tanzania, who rely heavily on high-tech AT, such as screen-reading software, to provide access to educational content to students with visual impairments (Kisanga & Kisanga, 2020). However, resources, irregular power supply in Tanzania, and compatibility of applications with AT can still create persistent access issues that lead to persistent challenges. Even in the U.S., funding can limit AT procurement due to the high costs of devices and a lack of funding sources or awareness of them (Abner & Lahm, 2002; Bausch et al., 2015).

Accessibility and usability can limit the effectiveness or use of AT when materials or apps are not adapted or compatible with a student's modality or workflow (Futty, 2025). Materials must be provided in a format that allows students to access them through their preferred modality (e.g., visually, tactilely, auditorily) to be accessible. For example, images can create significant challenges for students with visual impairments. While images and scanned documents can be enlarged or brightened for students with low vision, a student who is blind and relies on a screen reader may not be able to engage with critical visuals/illustrations of content or be able to access text that hasn't been fully digitized. Sometimes, additional AT can be integrated into a workflow to facilitate accessibility, such as the use of optical character recognition software to convert images of text into digital text. However, there may be limitations in how accurately these AT perform adaptations that require additional quality control. Compatibility between devices and software can also affect how accessible or usable AT can be for students. For example, a student with physical disabilities who relies on eye-gaze can click and open a wide range of educational apps used in their classroom but may be unable to use eye-gaze with a math learning app that requires drag-and-drop actions that cannot be performed. Devices designed for a specific disability (e.g., AAC devices, braille notetakers, switches) often have more compatibility limitations than mainstream technology devices, such as tablets, adapted to meet student needs, even if they are easier for the student to operate. Moreover, some apps may be technically accessible, but the design is so poor that the app may be unusable for a student. For example, all the features of an app might be able to be read by screen reader software but there may be so many menu bars in the application that the student can't easily navigate through, and the student cannot complete the task in a reasonable timeframe.

Artificial Intelligence

In recent years, AI has become a popular topic due to rapid development. Technology labeled as AI often relies on large machine learning models and can be quite varied in application and functionality. For example, natural language processing, computer vision, prediction and classification, generative, and reinforcement learning models are different applications of AI with varied functions. Many educators have explored ways to integrate AI as AT or classroom technology. Due to the recency of AI development, most applications of AI in the literature are exploratory and demonstrate limited evidence regarding the effectiveness of AI for improving measurable outcomes for students with disabilities. Thus, teachers should integrate

AI with caution and collect their own data to ensure AI has the intended benefit with their students.

Natural language processing models, such as chatbots, voice assistants, and translation applications, have been discussed to advance augmentative & alternative communication systems as a way to help students engage in content creation quickly with AAC devices (Paola et al., 2023). They have also been used to adjust the difficulty levels of content presented to students based on student performance (Panjwani et al., 2023). Studies have explored perceptions of educators on generative AI, such as ChatGPT, used to provide real-time feedback and personalized engagement (Hadi et al., 2023). While Hadi and colleagues (2023) found that some educators saw the application as valuable for facilitating learning experiences and exploration of new topics, other educators were concerned that students may become overdependent, only engage in superficial learning, or limit opportunities to develop critical thinking skills by utilizing generative models. Additionally, AI models are imperfect and can produce inaccurate information, which could lead to misinformed or harmful learning, diminish meaningful social interaction, introduce algorithmic bias, and raise privacy concerns (Dumitru et al, 2024 The applications of AI are quite numerous, and a full accounting of its potential and risks is beyond the scope of this paper. Communities of practice, such as the Northwest Center for Assistive Technology Training's Slack channel, can provide a valuable way for educators to seek guidance from AT experts, share AI experiences, and learn about new AI applications among peers.

Promising Evidence-Informed Strategies and Practices

Much of the evidence regarding AT practices is around the assessment and procurement process (such as the SETT framework; Zabala, 1995) and ways in which AT can be applied in classrooms (such as Technology-Aided Instruction & Intervention [TAII]; Hedges, 2018). The SETT framework discourages educators from utilizing technology-first thinking (i.e., choosing a device before fully understanding the student's needs). Moreover, the SETT framework pushes educators to work collaboratively when considering where and how AT will be used, by also evaluating the environment the student is working in and the tasks a student is expected to perform. The decision-making model also has resources for services, such as written implementation plans, which serve as a flexible and iterative agreement among educational team members for clearly defining the ways the student should be expected to use a device in different educational contexts and which team member is expected to support the AT use in that context (Bausch & Ault, 2008).

There is a myriad of evidence supporting the use of AT to enhance the learning experiences of students with disabilities. These practices go by several different names: TAII, computer-assisted instruction, mobile learning (m-Learning), etc. These practices assume that technology has been well aligned with student needs in the selection and procurement process. Applications of AT in classrooms have shown promise for improving a variety of skills, such as academic achievement (e.g., math and reading scores), engagement and attention (e.g., increased on-task behavior), communication (expressive communication), and independence (reduced human prompting on task analyses) for a variety of different subpopulations (Wong et al., 2015; Tuttle & Carter, 2023). A TAII focuses on utilizing AT for a specific task. This requires educators to identify the activity and supports students need to apply AT, and should be informed by a student's individualized education plan and goals.

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