COMPARATIVE STUDY OF ASSISTIVE TECHNOLOGIES AND THEIR USE IN EDUCATION

EXECUTIVE SUMMARY BY **SARAH SCHAEFER** AND **NEHALI SHAH** | AUGUST 2020

Currently, roughly 15% of the world's population, or an estimated one billion people, live with disabilities, making them the world's largest minority. An incredibly important tool to help include people with disabilities (PWDs) is assistive technology (AT). AT today has a plethora of capabilities and the ability to reach a broad expanse of PWD with varying ability levels. Such AT may include low-tech communication boards, high-tech braille printers, high-tech mobility devices, or even voice recognition software already embedded in commonplace mobile technology devices.

While AT can help with nearly every aspect of daily living, one of the most important uses of AT is in primary and secondary education. Some legislation is in place to address this need - namely, the Assistive Technology Act and the Individuals with Disabilities Education Act - which further proves the importance of AT in the classroom. Despite this, in the U.S., less than 8% of secondary students with high-incidence disabilities and less than 25% of secondary students with low-incidence disabilities reported receiving AT in school.[1] This unmet need for AT in the classroom is a major roadblock for establishing equal access to education for students with disabilities.

While the demand for AT is clearly present in the classroom, there is a severe lack of progress in terms of advancing and assessing the assistive technology supply. AT has the ability to provide great benefits to the PWD community, but there is untapped potential with regards to the accessibility and effectiveness of current assistive technology. After understanding where to improve assistive technology for a wide variety of disabilities — especially learning disabilities, mobility impairments, and visual impairments — companies and university labs can push for greater research and development in those areas. This would enable persons with disabilities to make the most of assistive technology, learn in classrooms that can better address students' needs, and live in a more inclusive society.

To determine where and how to tap into the potential of assistive technology in order to increase the accessibility and effectiveness of educational environments, we conducted this research. In order to do so, there were several different aspects that were considered. First, several visual impairment, learning disability, and mobility assistive technology products that are currently or could be used in classrooms were evaluated for

unctionality and cost effectiveness. Such analysis addressed the current AT market status. Then, a primary research study was conducted in Virginia in order to evaluate the effectiveness of assistive technology in classroom settings for students with disabilities. Finally, current legislation relating to assistive technology and students with disabilities was researched.

It is important to address some of the limitations of the research conducted. When researching AT devices, the sources used to find such AT do not encompass today's entire AT market. Due to time limitations, the number of AT devices that were researched was limited. With regards to the classroom AT survey, there is a large amount of nonresponse bias due to the timing of the survey. The COVID-19 pandemic and American social climate were factors that likely contributed to the small survey response sample. Furthermore, teachers were on summer break, some school districts requested IRBs in order to distribute the survey to their staff, and parents are generally cautious when asked to release personal information about their children.

While evaluating VI AT, several general types of AT were considered: braille labelers, refreshable braille displays, electronic braille notetakers, adaptive calculators, and writing and measuring tools. Overall, 9 braille labelers, 18 refreshable braille displays, 9 electronic braille notetakers, 13 adaptive calculators, 5 writing tools, and 5 braille measuring tools were evaluated. After dividing LD AT into nonexclusive challenge categories, the quantity of LD AT devices evaluated was as follows: 13 reading tools, 12 math tools, 10 writing tools, 10 tools for attention and hyperactivity, 12 tools for organization and time management, 4 speech and oral expression tools, and 4 listening comprehension tools were evaluated. Then, 14 wheelchairs, 14 walkers, and 4 canes were evaluated as mobility AT devices. Once the classroom AT survey was concluded, 13 responses had been received from classroom professionals, including special education teachers and paraprofessionals, and 3 parents of students with disabilities had responded to the survey. The analysis of the classroom professionals' responses demonstrated a clear need for better training with AT in the classroom, as there was a discrepancy between the training time and time needed to feel comfortable with AT. The parents' responses demonstrated that access to AT must be expanded so that students can bring their AT home. Of all the existing legislation in the US, the Assistive Technology Act is the most prominent act, as it allocates funding for state AT programs and mandates several state AT programs and activities.

After conducting research in various aspects of assistive technology in education, eight key recommendations were made to three key stakeholders - schools, the government, and companies. The recommendations are as follows:

1. Schools must provide better training for classroom professionals when new AT devices are brought into the classroom.
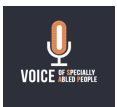
2. Schools must expand opportunities for students with disabilities to bring their AT home.

3. Schools, when possible, must embrace AT in forms that can more easily be brought home by students.

4. The government must determine a specific proportion of AT funds to be distributed to schools.

5. The government must establish guidelines for comprehensive training for teachers using AT while working with students with disabilities.

6. The government should create financial incentives to subsidize AT development.

7. Companies must include more accessibility features in their pre-existing products made for the general public.

8. AT companies must be more responsive to consumer feedback.

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[1] Emily C. Bouck and Holly Long, "Assistive Technology for Students with Disabilities: An Updated Snapshot," Journal of Special Education Technology (2020): https://journals-sagepub-com.libproxy1.usc.edu/doi/full/10.1177/0162643420914624.
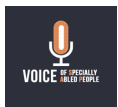
ABOUT THE AUTHORS

Sarah Schaefer is a student at the University of Southern California majoring in biomedical engineering. When she is not in class, she loves to pay it forward and help others through volunteerism. On campus, she is a part of Helenes and Troy Camp, two service organizations that she loves with her whole heart! Sarah also works in biomedical engineering research labs on campus: one is creating nanoparticle-based medical imaging methods while the other is working to understand neuromuscular relationships. In her free time, she loves to listen to music, watch movies – especially Disney movies, and try new foods with friends.

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WHY THIS MATTERS TO VOSAP

VOSAP has made 360 degree efforts to promote the use of assistive technologies for the enablement and empowerment of SAPs. This research project identified the most prominent technologies used in education in the US schools and how the government plays a vital role in its implementation in the education system.

ABOUT VOICE OF SPECIALLY ABLED PEOPLE INC.

The Voice of Specially Abled People (VOSAP) is a global advocacy organization built on the principles of Empowerment of Specially Abled People. In Special Consultative Status with UN ECOSOC, VOSAP is working to create an Inclusive and Accessible world by accelerating implementation of UN Sustainable Development Goals (SDGs) and goals of UN CRPD (Convention on the Rights of Persons with Disabilities) treaty. The organization has created the VOSAP Mobile App through which volunteers can take a pledge to volunteer and rate the accessibility of public places, creating a crowdsource platform to aggregate demand for accessibility.