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Abstract

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Keywords

Assistive Technology, Educational Policy, Special Education, Reading Disability

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Assistive Technology Policy: Promoting Inclusive Education for Students with Reading Disabilities

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Over the past two decades federal policy initiatives have increasingly mandated the consideration of Assistive Technology (AT) as a means to provide individuals with disabilities with improved access, participation, and progress in the K – 12 general education curriculum. This policy is based on a growing body of evidence suggesting that AT can serve as a cognitive prosthesis for students with exceptionalities by supporting their abilities to comprehend, analyze, and synthesize information that would be otherwise inaccessible. Unfortunately, the goals associated with AT policy are not being realized due to a number of institutional, situational, and dispositional barriers that extend from preservice teacher preparation programs to K-12 school district policy guidelines. This article identifies current federal AT policy, discusses implementation barriers, and provides recommendations for teachers and districts who wish to enhance the learning experiences of students with reading disabilities.

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More than twelve million students in the United States experience significant difficulties learning to read (National Center on Educational Statistics [NCES], 2003). The majority of these students are educated in general education classrooms (Wagner, Newman, Cameto, & Levine, 2006). This practice, commonly referred to as inclusion, is part of the least restrictive environment mandate included in the Individuals with Disabilities Education Act, a federal law that ensures the rights of individuals ages three to 21 with disabilities. The inclusion movement offers a variety of positive academic, social, and behavioral opportunities for students with special needs (Bond & Castagnera, 2006). Despite these positive attributes, current research clearly

indicates that students with reading difficulties often fail to make adequate yearly progress toward their annual learning goals (De La Paz & MacArthur, 2003; Gersten, Fuchs, Williams, & Baker, 2001; Mastropieri, Scruggs, & Graetz, 2003).

The ability to decipher and comprehend printed text involves a complex series of neurological events that are based on spoken language. Proficient readers fluently recognize print on a page, convert it to linguistic code (i.e., phonetic code), and accurately interpret its meaning. Three regions of the brain are involved in the reading process; the inferior frontal gyrus (commonly referred to as Broca's area) which is responsible for word analysis and articulation,

the parieto-temporal region which assists in sounding out words, and the occipito-temporal region which processes visual symbols on the page and transforms them into words (Shaywitz & Shaywitz, 2004). Each of these areas, as well as their connecting pathways, must function symbiotically for fluent reading to occur. Unfortunately, a considerable percentage of the school-age population struggles with this reading process. For example, thirty-eight percent of eighth grade students in the United States are identified as possessing “below basic” reading skills (NCES, 2005). Clearly there is a need to provide additional supports and learning opportunities for these students if they are to become literate citizens capable of active participation in a democratic society.

Assistive Technology Policy

Students with the most profound reading difficulties are eligible for special education services and supplemental academic supports such as assistive technology (e.g., text-to-speech, speech-to-text, and spell checking devices) under the Individuals with Disabilities Education Act (IDEA). When a student qualifies for special education services an individual education program (IEP) is developed. Federal policy mandates that “Each public agency [IEP team] shall insure that assistive technology devices or assistive technology services, or both...are made available to a child with a disability if required as part of the child’s special education” (Pub. L. No. 101-476, § 300.308). This policy is supported by a growing body of evidence suggesting that assistive technology (AT) can act as a cognitive prosthesis that enhances students’ abilities to access, participate, and make progress in the general education curriculum (e.g., Boone & Higgins, 2007; Edyburn, 2000; Hitchcock, Meyer, Rose, & Jackson, 2002; Lange, McPhillips, Mulhern, & Wylie, 2006; MacArthur, Ferretti, Okolo, & Cavalier, 2001).

Current AT policy is the product of a more than a century of legislative initiatives beginning with Public Law 58-171 (1904), which promoted the circulation of reading materials

among the blind. In the more recent past, the Technology Related Assistance for Individuals with Disabilities Act (1988) became the first comprehensive federal law that focused solely on AT. The “Tech Act,” as it was commonly referred, provided fundamental definitions for AT services and devices while promoting the availability and quality of AT for individuals with disabilities. In 1990, a reauthorized IDEA included AT language that mirrored the Tech Act while mandating that K – 12 students have access to AT whenever it was necessary for the student to receive a free appropriate public education (FAPE).

Reauthorizations to IDEA in 1997 and 2004 added language mandating that students be educated alongside their general education peers to the maximum extent possible and that AT service provision be expanded to areas outside of the school (e.g., the student’s home). These mandates had important implications for students with reading disabilities. First, students would be increasingly educated in general education classrooms where textbooks that were written above the students’ reading ability levels were used as a primary means to deliver new content material (Dyck & Pemberton, 2002). Second, AT could be used to help students compensate for the discrepancy between the readability level of the text and their performance skills (Edyburn, 2006). Third, the device could be sent home with the student so that the associated remedial and compensatory benefits could extend learning beyond the school day. The use of AT as a means to promote learning for students with reading disabilities in inclusive classrooms represented a fundamental shift in the theoretical perspective guiding federal policy. Exclusionary education practices that were common prior to the middle 1970s were replaced with an IDEA mandate for classroom environments where diversity and learning could be enhanced through the use of technology.

Assistive technology was traditionally considered for individuals with low incidence disabilities who needed assistance with their functional capabilities (e.g., their ability to com-

municate). For example, an individual with a hearing impairment might utilize a classroom amplification system or a person with a severe physical limitation may use a switch to respond to questions with yes or no answers. Individuals with reading disabilities have different AT considerations. Assistive technology can enhance students' reading by bridging the neurological gaps in students' reading processes. For example, AT can provide translational resources that allow students to select a section of text, hear the pronunciation of the words, and see a pictorial representation of the words' definitions (Horney & Anderson-Inman, 1999). Other AT devices can provide students with background information about concepts, summarize the contents of expository text, and reinforce essential reading skills (McKenna, Reinking, Labbo, & Kieffer, 1999; Wepner & Bowes, 2004). Assistive technology also includes text-to-speech, speech-to-text, and spell check software.

Barriers to Assistive Technology Use

While policy and research examining the efficacy of AT overwhelmingly supports the notion that all IEP teams should consider AT, implementation by practitioners has been limited due to institutional, situational, and dispositional barriers. One of the primary institutional barriers associated with AT is the definition. IDEA defines an AT device as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain or improve the functional capabilities of a child with a disability" (Pub. L. No. 108-446, § 300.6). This definition has remained virtually unchanged since its inception twenty years ago because advocates for the definition argued that the ambiguity inherent in the language allowed IEP teams to use their best judgment in determining which types of AT were most appropriate for individual students. Unfortunately, the ambiguity led to diverse interpretations of the policy, which, in turn, have undermined the continuity of AT services for students with disabilities (Edyburn, 2004).

Numerous examples of the gap between assistive technology policy and practice are evident throughout the northwest United States. Consider the following Citizen Complaint filed in Washington State (Office of Superintendent of Public Instruction, 2004). A sixth-grade student with an IEP utilized assistive technology software (e.g., ReadPlease, CoWriter, Write Outloud, and Inspiration) to compensate for her disability. During the course of an academic year, the student received training to use the assistive technology at the rate of twenty-five minutes per day, three to four times per week until she was proficient with the software. The software was then made available to her in both general education and special education classrooms. In the late spring of that year, the student's IEP team changed to include the general education teacher she would work with during the subsequent school year. A new special education teacher was assigned to manage her case. This new team revised the student's IEP in June.

During the fall of the following academic year, the student told her mother that she was allowed to use AT only when the class was working on group projects. The mother, mindful that the school might not be following AT policy, contacted the school requesting information regarding the student's AT services. A complaint was filed with the state after repeated unsuccessful attempts to obtain information about the student's AT use and progress. The Office of Superintendent of Public Instruction found that the new IEP team's revision of the student's IEP failed to include AT services. The magnitude of this failure was amplified because the student missed valuable academic instruction during the period when she was receiving AT training. Unfortunately, a collective misunderstanding of the interpretation and implementation of AT policy resulted in a discontinuous educational experience for this student that is similar to other examples available on State Department of Education websites across the West.

If students' AT needs and services are not continually documented in the IEP, as in the previous case, a student who has learned to com-

pensate for a reading disability using AT must learn new content materials in addition to a new strategy for accessing the information. Simply stated, the IEP team has asked a student with a documented disability to do more work than a student without a disability. Edyburn (2006a) refers to the practice of teaching students to use AT and then saying it is not necessary as *naked independence*, a dispositional barrier where IEP teams view student performance without AT devices as more valuable than students' successes with the devices. If the student had an obvious physical disability, such as paralysis, would we teach that student to use a wheelchair and then say that it was no longer acceptable to use it when they move to a different educational placement? Perhaps we should consider this analogy as we interpret AT policy for students with cognitive disabilities.

Another institutional barrier affecting AT policy implementation is a lack of teacher training (Cavanaugh, 2002; Todis, 1996). Despite the inclusion of technology standards for teachers (e.g., the Interstate New Teacher Assessment and Support Consortium [INTASC], National Board for Professional Teaching Standards, and the National Council for Accreditation of Teacher Education [NCATE]), there are limited opportunities for teachers to learn appropriate strategies for selecting, purchasing, evaluating, and customizing AT devices (Nelson, 2006). In fact, many teachers have only limited knowledge of the most basic AT devices (Pucket, 2004). School districts have traditionally contracted with consultants to ensure they are in compliance with federal policy under IDEA. Edyburn (2004) points out that there has been little to no increase in the number of AT specialists who are currently employed in U.S. schools over the past decade. As a result, many students with reading disabilities who would benefit from AT services are advised by IEP teams who are unfamiliar with the selection, implementation, and assessment procedures necessary to ensure the longitudinal viability of the AT.

Alper and Raharinirina (2006) identify a lack of funding for AT devices, services, main-

tenance, and training as a situational barrier that leads to school level abandonment of AT, even after appropriate technology has been selected. The lack of funding for IDEA mandates is a systemic problem. Beginning in 1975 with the passage of the Education for All Handicapped Children Act (Pub. L. No. 94-142), which was reauthorized and renamed in 1990 as the IDEA, Congress stipulated that the policy mandates included in the law would be increasingly federally funded to a level of forty percent by 1982. This funding promise has never been realized. For example, in 2006 the federal allocation to support IDEA was 13.2 billion dollars short of the forty percent level (IDEA Funding Coalition, 2006). As a result, States and LEAs have been forced to absorb the cost, which in many cases leads to a lack of AT funding for students with reading disabilities (Alper & Raharinirina, 2006).

Circumventing Barriers to Achieve AT Policy Goals

The goal of AT policy for students with reading disabilities is to provide the supports necessary for students to access, participate in, and learn from the general education curriculum (Rose, Meyer, & Hitchcock, 2005). Despite the barriers highlighted previously, a review of AT literature indicates a number of common themes in districts that successfully implement AT policy. The ambiguity of AT's definition can be addressed at the district level by developing a policy that explicitly identifies the devices the district will consider as AT. A starting point for this policy could be the Assistive Technology Quick Wheel, a tool that identifies a range of devices ranging from low-tech to high-tech (Technology and Media Division of the Council for Exceptional Children, n.d.). Another useful tool in this process is the Wisconsin Assistive Technology Initiative's Assistive Technology Checklist (<http://wati.org/loanlibrary/checklist.html>), a two-page guide to AT devices that support students in areas such as reading, writing, and mathematics. This checklist can be helpful by providing specific examples of AT devices based on common areas of student need. This district-level policy decision should include all

stakeholders in the educational process including community members and students with disabilities. Once the document is ratified, teachers, administrators, and IEP team members should receive training that enables them to make an appropriate decision regarding the selection, implementation, and evaluation of all AT items included in the policy.

IEP teams must understand students' individual needs, the classroom environment, and the tasks a student must complete as they evaluate whether AT is necessary (Zabala, 1995). Marino, Marino, and Shaw (2006) present a summary of questions that can guide this initial AT conversation including: "Is the physical arrangement of the learning environment conducive to student success? What activities must the student complete as an active member of the learning community? Would assistive technology improve the student's ability to participate in the general education curriculum?" (p. 22). It is important to point out that a student's baseline performance in the classroom where the AT will be used must be documented *prior* to selecting and implementing any AT intervention. This will enable team members to analyze the efficacy of the AT once it has been implemented. The assessment procedures for determining the longitudinal viability of the AT device should also be documented in the child's IEP (Raskind & Bryant, 2002). The student's progress can then be monitored using curriculum-based measures or other valid assessment instruments at regular (e.g., weekly) intervals. Bowser and Reed (1998) offer Education Tech Points as a framework for collecting student performance data at six strategic points during the IEP process. The framework assists teams with discussing AT in the context of broad educational experiences, as opposed to a single question: "Does the student still need AT?" Monitoring students' progress allows the team to make data-based decisions regarding future AT use and transition plan development.

A final barrier is the lack of federal funding for AT. Despite specific plans to fully fund IDEA policy mandates (e.g., IDEA Fund-

ing Coalition, 2006), historical trends indicate that states and school districts will continue to be required to fund a considerable proportion of AT expenditures. This can be done effectively if districts invest strategically in AT devices that hold the potential to benefit a maximum number of students. For example, many students with reading disabilities benefit from text modification software (Edyburn, 2006b). A school district can ask teachers to create a profile of students' reading needs at each grade level in the general education curriculum. This profile should include details such as whether students need assistance with compensatory or remedial instruction that is specific to the reading process. For example, the district might ask middle-level classrooms teachers to identify the percentage of their student population who would benefit from graphic organizing software. Note that these questions should address the entire population, not just students who have been formally identified as learning disabled.

Research indicates that students who have been formally identified with a disability in reading and those who struggle with reading in the absence of a severe discrepancy between their IQ and academic achievement possess highly similar reading growth curves and abilities to profit from effective instructional interventions, such as the use of AT (Fletcher et al., 1994; Lyon et al., 2001; Vellutino, Scanlon, & Lyon, 2000). Once a district identifies the types of technology that will benefit the greatest number of students, schools within the district can collectively bargain for the software, customer support, and training for teachers. The district can then pilot the software, use assessment data to determine its effectiveness, and make informed future purchasing decisions. Additional funding supports are available in many states. For example, the Washington Assistive Technology Act Program (<http://watap.org/>) and nonprofit organizations such as Access Technologies, Inc. (http://accesstechnologiesinc.org/statewide_at_program/) in Oregon, offer AT loans and funding resources.

Future Assistive Technology Policy Considerations

We have argued that AT policy as mandated in IDEA holds the potential to support a vast portion of students with reading disabilities who are educated in general education classrooms if the barriers affecting its implementation can be circumvented. Now we propose a different perspective for future policy discussions. At what point does the educational community stop thinking about AT as an individual support system for students who qualify for IDEA and start considering technology as a tool that can provide remedial and compensatory support across the entire spectrum of students who are served in our inclusive classrooms? Instead of mandating that we consider AT for students who qualify for IDEA, shouldn't we mandate that all teachers include a diverse range of technologies in their instructional practice?

This new policy would hold the potential to support a Universally Designed curriculum, one that is created to support diversity at the outset by using technology to enhance student learning. The Universal Design construct originates from the field of architecture where it was defined as a means to create products and environments that were usable by all people, without the need for adaptation or specialized accommodations (Center for Universal Design, 2007). Universal Design is quickly gaining support throughout the national educational community (Curry, Cohen, & Lightbody, 2006; Hitchcock et al., 2002; Karger, 2005). For students who struggle with reading, Universal Design holds the potential to eliminate the gap between AT policy and practice by making AT available to anyone who needs it. Future discussions should examine how AT, Universal Design, and educational technology can be combined in a policy that promotes learning across a broad spectrum of diverse learners.

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