Rethinking Assistive Technology

by Dave L. Edyburn, Ph.D.

Most citations of the definition of assistive technology can be traced back to the 1988 passage of Public Law 10-407, The Technology-Related Assistance Act for Individuals with Disabilities. Commonly known as the Tech Act, the law defined two critical aspects of assistive technology: assistive technology devices and assistive technology services.

§300.5 Assistive technology device.

As used in this part, Assistive technology device means 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. (Authority: 20 U.S.C. 1401(1))

§300.6 Assistive technology service.

As used in this part, Assistive technology service means any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device. The term includes- (a) The evaluation of the needs of a child with a disability, including a functional evaluation of the child in the child's customary environment; (b) Purchasing, leasing, or otherwise providing for the acquisition of assistive technology devices by children with disabilities; (c) Selecting, designing, fitting, customizing, adapting, applying, maintaining, repairing, or replacing assistive technology devices; (d) Coordinating and using other thera-

pies, interventions, or services with assistive technology devices, such as those associated with existing education and rehabilitation plans and programs; (e) Training or technical assistance for a child with a disability or, if appropriate, that child's family; and (f) Training or technical assistance for professionals (including individuals providing education or rehabilitation services), employers, or other individuals who provide services to, employ, or are otherwise substantially involved in the major life functions of that child. (Authority: 20 U.S.C. 1401(2))
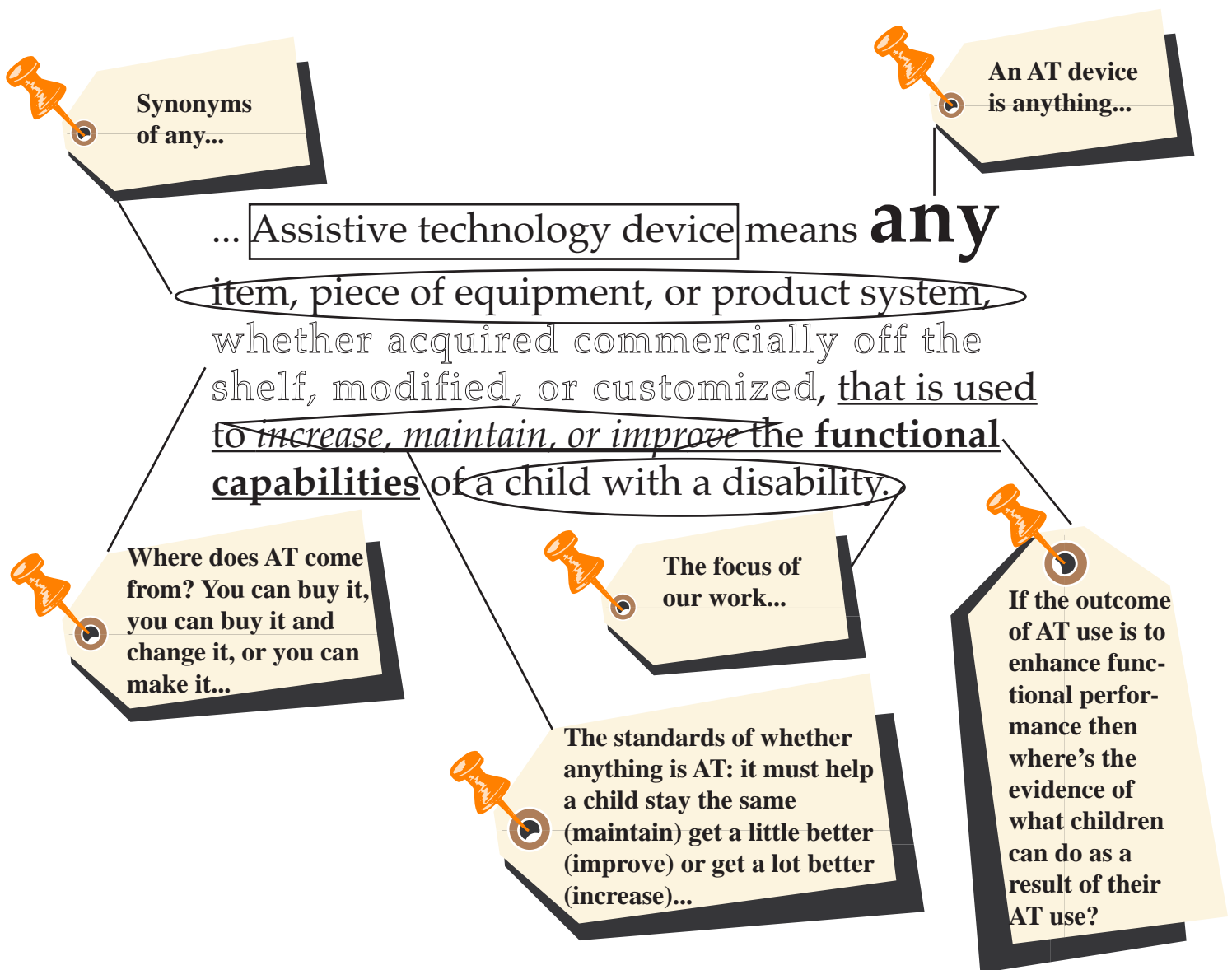
Definitions Legacy

These definitions subsequently have been cited or incorporated into all technology and disability legislation (i.e., Americans with Disabilities Act, 1990; the Individuals with Disabilities Education Act Amendments, 1997; Telecommunications Act of 1996; The Assistive Technology Act of 1998). The two definitions provide a comprehensive perspective on processes that enable individuals with disabilities to acquire and use assistive technologies that enhance functional capabilities (Blackhurst & Edyburn, 2000).

Given the universal acceptance of the legal definitions of assistive technology devices and services, some may wonder if it wise to question their utility. However, 15 years following the passage of the Tech Act, I wonder if it is time to revisit the concept of assistive technology and rethink its core elements. Aware of the risks associated with challenging the sacred tenets of our field, in the sections that follow, I share some observations about 13 issues associated with the current state of practice relative to assistive technology use in schools. Subsequently, I outline a modest agenda for rethinking assistive technology by describing specific actions that could be implemented to improve the efficacy and utility of the assistive technology consideration system.

> **Fifteen years following the passage of the Tech Act, is it time to revisit the concept of assistive technology and rethink its core elements?**

Dissecting the Definition of Assistive Technology

Synonyms of any...

An AT device is anything...

... Assistive technology device means **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.

Where does AT come from? You can buy it, you can buy it and change it, or you can make it...

The focus of our work...

If the outcome of AT use is to enhance functional performance then where's the evidence of what children can do as a result of their AT use?

The standards of whether anything is AT: it must help a child stay the same (maintain) get a little better (improve) or get a lot better (increase)...

State of Practice: Assistive Technology in Schools

The following personal observations highlight some issues relative to current state of practice of assistive technology use in schools.

• Confusion about what assistive technology looks like.

The current definition of AT is problematic when the operational word is "any." AT is any-thing (see Figure 1). Put another way, what isn't assistive technology? AT is increasingly viewed by some as blank check legal mandate that requires schools to purchase devices and services based on the hope that it will work for a specific child. Since the regulations do not require the systematic collection and evaluation of data, no evidence is required that assistive technology actually im-proves a students' academic performance. The magnitude of this definitional problem escalates considerably in the context of the following prob-lem: Jimmy has trouble remembering things. Therefore he needs a laptop computer so he can use Ask Jeeves as assistive technology. (If AT is

anything, how can you deny AskJeeves isn't AT?) And, Jimmy needs the school to install a wireless network so he can access his AT in all classrooms.

• Insufficient number of AT leadership personnel.

Most states have one, or less, certificate or graduate programs that offer advanced training with an emphasis on assistive technology. In addition, the mandate to consider AT as part of each IEP, in effect added 3.8 million students with high incidence disabilities to the AT case load. Over the past six years there has been no discernible increase in the number of AT specialists being prepared or hired in response to the federal mandate. As a result, there is little evidence that each school district has adequately trained personnel in every school building to provide leadership on the issues associated with assistive technology use in schools.

• Current assistive technology delivery systems require teachers to make a referral for an assistive technology evaluation before a child can receive assistance.

Most policies and procedures for assessing the need for assistive technology devices and services are based on a deficit model, similar to the referral, identification, and placement model for special education. As a result, the assistive technology referral and evaluation system is subject to the same inherent limitations of the special education referral and evaluation system: inefficiency, significant delay in the provision of intervention services, high cost, and inadequate emphasis on follow-up after the initial evaluation.

• IEP teams are mandated to consider AT.

The mandate to consider the use of assistive technology has been translated into a task of procedural compliance. That is, a check box has been added to the IEP to indicate whether or not assistive technology has been considered. No documentation is required to provide evidence of what was considered or how the decision was derived. Conversely, checking the "no" box is an invitation for compliance monitoring since federal law requires that consideration take place. There appears to be little relationship between the IEP task of AT consideration and in-depth AT evaluation.

• Most members of the IEP team have had little or no training in assistive technology.

The current teacher certification standard in many states involves simply a three-credit course in educational technology. Assistive technology may or may not be covered in that course. In most special education certification programs, coursework in assistive technology is generally an elective rather than a required course. As a result, there is little evidence to indicate that professionals have adequate preparation for the selection and use of assistive technology through their preservice preparation. Inservice professional development programs are often viewed as inadequate for providing the high-level of knowledge and skills they feel they need to encourage and support assistive technology use.

• Teams lack the tools and training to effectively implement the consideration mandate.

There is little evidence that preservice teachers receive adequate training in assistive technology to prepare them for their responsibilities to consider assistive technology in each IEP meeting. Similarly, there is little evidence that inservice professionals have received adequate training. Hence, the paradox of consideration: How am I supposed to consider AT when I don't know what the options are? (Edyburn, 2000). Likewise, there are few tools to support the many decisions associated with assistive technology consideration.

• Theoretical models describe procedural processes associated with assistive technology consideration but fail to provide information about specific interventions.

Edyburn (2001a) identified 12 models, theories, and frameworks which provide the theoretical foundations of the discipline of special education technology. Several models have had significant impact in the development of state and district

level policies concerning assistive technology consideration. However, none of the consideration models offer specific guidance on how to access appropriate assistive technology devices. As a result of the emphasis on procedural processes, there is a significant gulf between procedural compliance with the mandate for assistive technology consideration and classroom practices that use technology effectively to enhance student performance.

• Little is known about the number of students with disabilities that currently use assistive technology in schools.

While assistive technology consideration has been mandated since the 1997 reauthorization of IDEA, state and federal education agencies are not required to monitor and report on the number of students that use assistive technology. Theoretically, this data could be extracted from IEPs. However, no mechanisms are currently in-place for systematically collecting and analyzing data concerning the use of assistive technology in schools. As a result, we have no way of knowing whether the federal mandate to consider assistive technology has resulted in more students with disabilities having access to assistive technology or not.

• There is no evidence to suggest that all students who need AT have access to the devices and services they need.

Similar to the issue above, inadequate attention to monitoring the mandate to consider assistive technology for each student with a disability means that we currently do not know the number of unserved or underserved students. That is, what percentage of students could benefit from assistive technology but do not have access to appropriate devices and services?

• Performance problems are not limited to individuals with disabilities.

By definition, assistive technologies are tools for individuals with disabilities. However, in every classroom, there are a considerable number of students who's performance fails to meet the expected standards. As a result, why are students

without disabilities denied the opportunity to use appropriate technologies that could enhance their performance? Isn't everyone entitled to the tools they need to be successful?

• AT and IT systems exist in parallel in most schools.

Most schools have two parallel systems in place for supporting technology. Assistive technology devices are managed by assistive technology specialists for students with disabilities. The AT staff are challenged to work within the larger context of a school district where network coordinators and technology specialists manage the instructional technology (IT) infrastructure for students without disabilities. There are considerable differentials between these two systems in terms of power, authority, and control (i.e., you can't put that adaptive software on the network because it will make the network crash...). It is relatively rare to find a school where IT and AT have been integrally linked in ways that support the success of all students.

• The changing nature of assistive technology.

What does assistive technology look like? Historically, assistive technology has taken various forms and is most widely associated with applications that help individuals who are blind, visually impaired, deaf, hard of hearing, or physically impaired. Applications of technology which serve as cognitive prostheses are considerable less accepted and understood. For example, for a student with short and long term memory problems documented on his IEP, can the search engine *Ask Jeeves* (http://www.askjeeves.com) serve as a cognitive prosthesis to help him complete test items he doesn't know or remember? Or, could the *Job Coach* (http://www.attainmentcompany.com) be programmed to remind him of the sequence of steps for completing a task? Is the software product *Inspiration* (http://www.inspiration.com), AT or IT? Are text-to-speech products only for students with disabilities or could all students benefit from having the computer read selected words or whole passages? Over the past 15 years, the marketplace has made outstanding advances that challenge us to rethink the form, function, and purpose of assistive technology.

- **Unknown outcomes of AT.**

To-date, little evidence documents the outcomes of assistive technology. For example, when an individual with a disability uses their assistive technology, is their performance on selected tasks comparable to their nonhandicapped peers or is there still a performance gap? Are there changes that result in gains in quality of life, goal attainment, or job satisfaction? Current federal mandates concerning assistive technology are uncharacteristically silent about the need to collect and report on the outcomes of assistive technology. Stated another way, what proof do we have to document a claim that a specific assistive technology device is effective? One considerable problem in K-12 education is the mandate of participation in high stakes assessment and the narrow range of acceptable accommodations involving assistive technology. As a result, how do we know a child's score on a state exam is a reliable and valid measure of what he knows and can do when he is not permitted to use assistive technology?

A Modest Agenda for Rethinking Assistive Technology

When I testified about assistive technology issues concerning the current reauthorization of IDEA (Edyburn, 2001b), I was optimistic that assistive technology would be among the top issues addressed in the legislative process. Obviously, this has not been the case. While it is clear that the potential of assistive technology has been recognized, we are far from achieving the potential that was envisioned by its proponents.

In order to stimulate discussion about future scenarios where the potential of assistive technology is realized on ever larger scales, the following recommendations are advanced as a modest agenda for rethinking assistive technology. It is my intent to engage stakeholders in a conversation that allows us to think deeply, share passionately, and act thoughtfully to ensure that students experience the routine and empowering impact of technology enhanced performance.

Recommendation #1: Develop a unifying theory that clarifies the relationships among assistive technology, instructional technology, and universal design.

Rather than emphasizing the differences between assistive and instructional or educational technology, clarify the theoretical constructs associated with using technology to enhance teaching, learning, and performance. Why is the software product *Inspiration* assistive technology for a student with a disability but instructional technology for everyone else? And, how does the design of learning environments and instructional materials that utilize principles of universal design, impact the need for assistive technology? Theoretical models which unify these disparate constructs will reduce the artificial boundaries that have developed among these related disciplines and contribute to advances in research, practice, and development.

Recommendation #2: Consider using the concept of "technology enhanced performance" as a replacement for the term "assistive technology."

Current assistive technology service delivery systems have over-emphasized tasks associated with selection of AT and devoted little effort to enhanced functional outcome. Morphing the concept of AT into a new updated form allows a subtle shift in emphasis. That is, it matters little what form the technology comes in (i.e., low-tech, high-tech), rather what matters is that appropriate tools have been acquired and used to enhance functional performance. Refocusing our attention away from the stuff of assistive technology to the results, will signal a developmental maturation of the profession. Further, the concept of technology enhanced performance eliminates the artificial boundaries between technology use by individuals with disabilities and their nonhandicapped peers.

Recommendation #3: Provide increased state and federal leadership and resources for personnel preparation in technology enhanced teaching, learning, and performance.

Limited evidence suggests that teachers and administrators are being adequately prepared to assume their decision-making roles relative to using technology to enhance educational achievement. There is a severe shortage of personnel preparation programs to provide advanced training in assistive technology. State and federal leadership and resources are sorely needed for preservice and inservice personnel preparation.

Recommendation #4: Implement a screening system, comparable to the Special Education Child Find mandate, that identifies students with performance problems who may be as yet unidentified but in need of technology to enhance their academic performance.

The National Assessment of Educational Progress (NAEP) indicates that only one-third of American students are performing at the proficient level in reading and math at the fourth grade level (National Center for Educational Statistics, 2003). This means there is a significant population of students with and without disabilities who could perhaps benefit from interventions that use technology to enhance performance. Without a screening system that systematically identifies struggling students and engages them in diagnostic assessment to determine if appropriate technology tools can enhance their performance, we run the risk of perpetuating discriminatory AT assessment practices that provide AT only to those students with advocates that challenge the system.

Recommendation #5: When planning the instructional program for individual students, explicitly discuss the percentage of intervention effort that should be devoted to remediation and compensation.

When a student has struggled to achieve a given performance objective, how do we decide if the best course of action is remediation (i.e., additional instructional time, different instructional approaches) versus compensation (i.e., recognizing that remediation has failed and that compensatory approaches are needed to produce the desired level of performance)?

Historically, educators have focused their energy and efforts exclusively on instruction and remediation. However, if remedial approaches always worked, we would never see high school students that couldn't read independently beyond the second grade level. What happens when a student fails to learn to read? Typically, educators search for different instructional methods or materials. Seldom do they raise the question: Are there other ways of performing the task?

Routine failure to attain appropriate levels of academic performance should trigger assistive technology consideration. That is, compensatory strategies that use technology to enhance performance. Few guidelines are available to inform decision-making about assistive technology for learning. If a child has repeatedly fails to read and understand printed text, how much failure data do we need before we have enough evidence that the child can't perform the task? When do we intervene? And, what do we do? The key question in the No Child Left Behind era is: What do we do about below grade level academic performance?

Whereas the current assistive technology consideration process provides a mechanism for addressing the critical decisions associated with whether to pursue remediation or compensation strategies, the question should be explicitly addressed rather than assumed that the question is intrinsic to the process. Further, it may not be an either/or decision. Rather, it may be necessary to ask, what percentage of time and effort will be devoted to remediation and what percentage of time and effort will be devoted to compensatory approaches? Thinking of these comparable strategies as components that equal 100% provides a viable solution. Use of compensatory tools will allow students to experience success and achieve the functional outcome expected in their academic classes.

Recommendation #6: Foster development of technology consideration menus that can be used by teachers, administrators, and parents to explore the variety of technology supports available for enhancing performance of specific tasks.

The intent of the AT consideration mandate will not be met until there are new tools that allow

non-assistive technology specialists to understand the array of possibilities for addressing deficits in academic performance. Presently, AT specialists serve a gate-keeping function. That is, we restrict access about AT products until a person has passed through our assessment system. Teachers, administrators, and parents are in desperate need of easy-to-use decision-making tools that help them identify categories of products that may be useful for individual or groups of struggling students. As a result, the assistive technology community needs to capture its individual and collective wisdom and package our mental diagnostic models in a form that allows others to navigate our knowledge base and locate appropriate types of technology supports.

Recommendation #7: Establish local, state, and national data collection systems that document the use of technology supports by students with disabilities.

If local, state, and federal educational policy is to be informed by data, considerable commitment will be required to establish data collection protocols in order to collect valid and reliable data concerning the use of technology by students with disabilities. Much remains to be learned about the number of students with disabilities who use assistive technology, whether or not certain disability groups are underserved, and whether or not progress is being made in achievement the intent of the federal mandate to consider assistive technology.

Closing Thoughts

Given that the current definition of assistive technology devices and services are referenced in five federal laws, change will not be easy or quick. Nonetheless, if the discipline of special education technology is to advance, periodic review and modification of its core tenets is essential. In this article I have described 13 issues associated with current practice relative to assistive technology in schools that impact the unrealized potential of assistive technology. This perspective has afforded me the opportunity to reflect on what could be done to create future scenarios in which all students have access to appropriate technology tools for enhancing academic performance. I am hopeful the modest agenda for rethinking assistive

technology I have advanced will be provocative in ways that stimulate debate, dialogue, and action.

References

Blackhurst, A.E., & Edyburn, D.L. (2000). A brief history of special education technology. *Special Education Technology Practice*, 2(1), 21-35.

Edyburn, D.L. (2001a). Models, theories, and frameworks: Contributing to understanding special education technology. *Special Education Technology Practice*, 4(2), 16-24.

Edyburn, D.L. (2001b). IDEA Reauthorization testimony. October 23. Minneapolis. MN.

Edyburn, D.L. (2000). Assistive technology and mild disabilities. *Focus on Exceptional Children*, 32(9), 1-24.

National Center for Educational Statistics. (2003). National Assessment of Educational Progress: The Nation's Report Card.Retrieved on November 15, 2003: http://nces.ed.gov/nationsreportcard/

About the Author

Dave L. Edyburn, Ph.D. is an associate professor, Department of Exceptional Education, University of Wisconsin-Milwaukee; email: edyburn@uwm.edu.