Using Assistive Technology to Meet Literacy Standards

for Grades K-3

an IEP Team Guide

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Introduction
Assistive Technology in the Schools

One of the greatest gifts you can give to a child with a disability is increased independence. The ability to take control of one's life in as many areas as possible — from freedom of movement to freedom of expression — contributes to a child's ability to define herself as an individual. This is the ambition behind the Assistive Technology (AT) initiative and one which can and must be accomplished. As experienced educators, we welcome the opportunity to use AT to move students toward greater autonomy in and out of the classroom.

Even though the application of AT principles in public schools has been federally mandated for over a decade, many districts still struggle to define how it relates to school-based services.

Some of the problem stems from vague terminology — i.e., "assistive" and "technology" — two terms which cover so much ground they can be confusing. For example, while the term 'technology' can refer to augmentative communication devices and state-of-the-art computers, it also includes pencil and paper.

In addition, part of the confusion comes from the fact that the definition of AT doesn't originate from an educational model:

Instead, it was initially imbedded in federal law; i.e., the Technology-Related Assistance for Individuals with Disabilities Act of 1988. This law broadly addresses the technology issue for all Americans with disabilities in and out of school.

Today, however, there is a pressing need to define AT solely in the context of public education. With the reauthorization of IDEA '97 came a renewed determination to "consider" AT needs for all students enrolled in special education. Because of it, school districts must take a closer look at what they are doing to honor its intent. Two major components of the law help to define the role of AT in public education:

1. *The legal definition of AT, and*
2. *The issue of access to the general curriculum.*
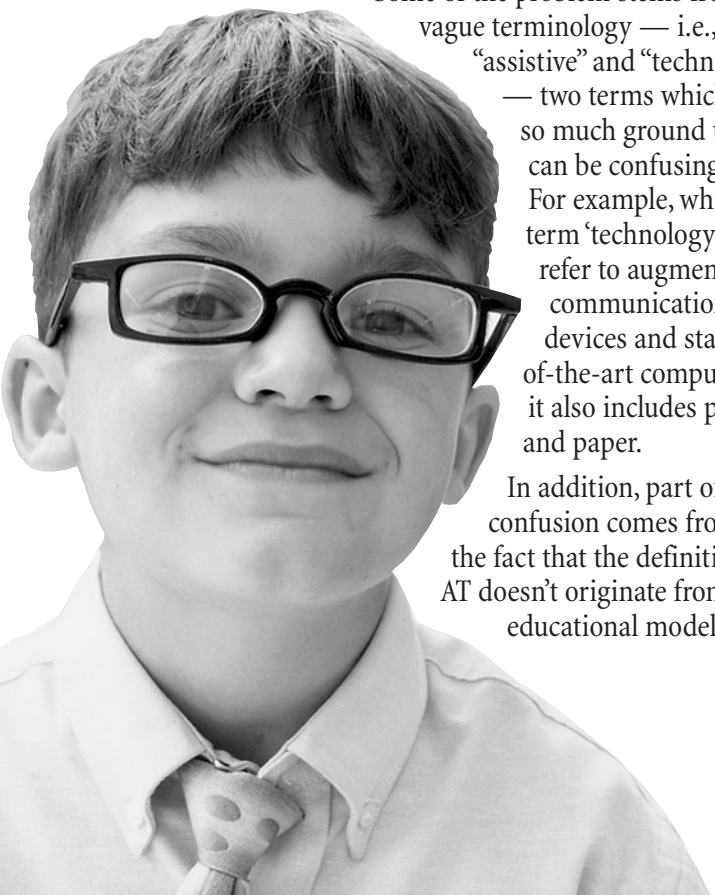
Part I

Legal Definition of Assistive Technology

The law defines AT devices 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 "functional" capabilities of a child with a disability.

Key words in this definition are "any" and "functional." 'Any' defines the types of available AT resources broadly, and it makes it clear that the intent isn't just to cover AT equipment that requires electronic components. In fact, our experience in the classroom has indicated that it's often the "low-no tech" options which benefit a student the most, because they are often more reliable than a high maintenance electronic system. School personnel need to be aware of the full array of AT options and to develop a list of ones which may be beneficial to every student who needs them. In addition, school personnel need to educate parents and other staff members about the broad range of AT options, including 'low-no tech.'

While 'any' describes the range of available technologies, the term 'functional' defines the specific types of equipment required.

To participate in classroom activities students need to see, hear, speak, process information, and use fine and gross motor skills. When a student has a disability in one or more of these areas he may experience barriers to educational performance. For example, if a student is nonverbal and the curriculum requires oral communication as part of the performance measure, the student will have difficulties functioning in that skill area. It's the school district's role to evaluate each student to determine where functional skill impairments occur and to provide adaptations and modifications to the fullest extent possible.

Low-no tech

Low-no tech is a term that counters the usual notion of technology as something that is large, expensive and plugs into a wall current for its power source. However, an assistive technology device can also be as simple as a pencil adaptation that helps students hold writing implements with a steady hand.

In this guide, while we do cover AT equipment that requires electronic equipment, we've gone out of our way to feature low-no tech options, because they often benefit the student the most.

There are several reasons for this:

- *simple accommodations are often more reliable than a high maintenance electronic system*

- *they are readily available*

- *closer to the "norm" for general education students and thus less intrusive (better accepted by peers)*

- *they represent cost effective solutions for schools with limited resources*

In other words, these accommodations offer the least restrictive environment for the student, while being the most affordable for the district.

Part II

Access to the General Curriculum

One of the fundamental changes in IDEA '97 was the mandate for public education to become more inclusive of all learners. In it, Section 614 states the following: "An Individualized Education Program (IEP) is a written statement for each child with a disability that includes a statement of the child's present levels of educational performance, including how the child's disability affects the child's involvement and progress in the general curriculum . . ."

Special education students have a fundamental right to access the general education curriculum. How we as educators provide that access is the key to their educational success.

AT can provide one avenue to this success. It is the intent of the law that all students participate in the same course of study, regardless of ability. In this educational context, for some students the use of AT resources is essential to meet this mandate.

It should be clear that AT is not about providing a separate curriculum. Rather, it's about giving students who need it access to the general curriculum. Children with disabilities present us with a variety of challenges. For them, learning is modulated through eyes that don't see, ears that don't hear, hands that don't grasp, legs that don't walk, mouths that don't speak, and brains that don't develop normally. Assistive Technology bridges the gap between a child's functional skills and his ability to participate in the educational process. *(See Fig. 1)* It breaks through the barriers associated with vision, hearing, communication, processing, and motor skills and allows students to do the same things as their general education peers.
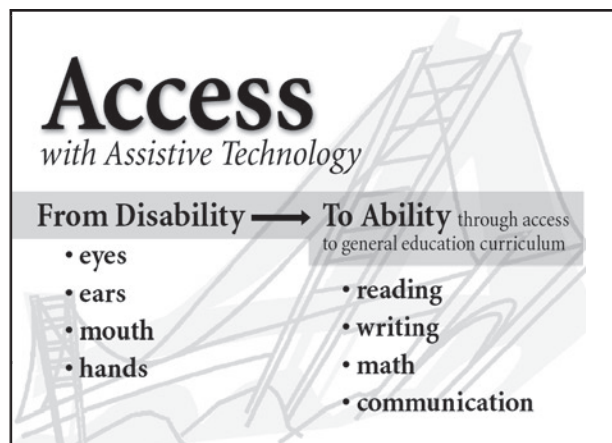

Fig. 1

A distinction needs to be made between instructional and assistive technology. Sometimes referred to as Computer Aided Instruction (CAI), instructional technology includes software programs that enhance classroom activities. Computer stores have shelves full of these programs which teachers and parents can use to provide students with extra practice and skill development during free time activities. Some of this software touts itself as being grade specific and curriculum based. However, close inspection shows that these programs are often not aligned with state curriculum and shouldn't be used as such. They offer optional instruction and should be used only as supplementary materials. *(See Appendix C, Instructional Technology.)*

Assistive differs from instructional technology in that it's not optional. For a student who can't hear, see, or talk, or who requires equipment to move or write, this technology is compulsory. Specialized keyboards and switches provide students with motor access. Augmentative and alternative communication devices give nonverbal students access to expression. Braille writers offer access to the visually impaired, while FM systems provide it for those with hearing impairments. Software that features word prediction, text-to-speech capabilities, and math formatting offer access to those facing learning, processing, and motor barriers. All these AT programs give students access to the same curriculum presented to other members of the class.

AT Solutions

As school districts come to terms with their obligation to provide access to the general education curriculum for students with special needs, they will need to align AT with the performance requirements of the curriculum. **Assistive Technology Solutions for IEP Teams** was developed with recognition of this growing need and as a result of our experiences in public education.

AT Solutions was developed using the following basic principles:

1. AT considerations for the classroom are based on a student's need to access the general education curriculum as defined by performance standards.

2. AT considerations do not necessarily require large expenditures.

AT solutions presented in this guide represent changes in materials and instructional strategies. These solutions are built on concepts related to accommodations as defined in IDEA '97: A change in the educational setting, materials or strategies that does not significantly alter the content of the curriculum or level of expectation for students' performance and which allows students to access the general education curriculum.

The AT solutions presented in this guide are designed to be consistent with the level of performance expected for each curriculum standard. And it covers changes in materials which run the gamut from low-no tech to the use of complex electronic devices. Herein, changes in instructional strategies are designed to reflect projected access issues required to meet the standard.

AT Solutions presents a host of assistive technology options that can be chosen for students who experience educational challenges. It emphasizes the low end of the technology spectrum for a variety of reasons:

First — simple accommodations are readily available and better received in the classroom than more sophisticated adaptations.

Second — such accommodations are often closer to the "norm" for general education students, and thus less intrusive and better accepted by peers. In other words, these accommodations offer the least restrictive environment for a child.

Third — schools have limited resources. Cost effective solutions, which assist a child in achieving independence in academic functioning, help meet IDEA '97 regulations for AT consideration.

The AT Solutions guide is built on the Reading/ Language Arts Framework for California Public Schools (1999), a publication of the California Department of Education. During the development of AT Solutions similar frameworks from other states were reviewed. After this comparison, we decided that there were clearly enough similarities in frameworks throughout the country to develop this guide based on the California model.

The AT Solutions guide does not address the needs of students who are deaf or hard of hearing, visually impaired or blind, or who need specialized seating or mobility. The services of deaf/hard of hearing or vision specialists, or occupational/physical therapists are required to make recommendations for assistive technology items such as hearing aids, Braille writers, wheelchairs, etc. Whereas these types of AT are important aspects of assistive technology, they are beyond the scope of this guide.

It should be noted that we have included solutions for nonverbal students in this guide because of our backgrounds as speech-language pathologists. However, students who are nonverbal also require assistance from speech-language pathologists, especially when device complexity and design are an issue.

The AT Solutions guide does not specifically address AT needs for students who are severely cognitively impaired. Even though IDEA '97 requires students to have access to core curriculum, there is recognition that some students will need modifications to that curriculum which represent significant changes in instructional level, content and performance. For these students, developmental levels determine curriculum access level. AT solutions for severely cognitively impaired students will be the topic of another guide currently in the developmental stage.

Design of Guide

The educational process is one which requires communication and action. Teachers talk and students listen. A student demonstrates knowledge by speaking or performing a task. When a student is nonverbal or has fine motor or processing difficulties, he is at risk for educational failure.

The student population focus for the AT Solutions guide includes students who have mild to moderate cognitive processing impairments, who have fine motor disabilities, and who are nonverbal. Within this population it can be reasonably assumed that curriculum standards can be achieved if accommodations, including assistive technologies, are utilized.

The AT Solutions guide is designed to be "user friendly." Curriculum standards within each content area are presented in a chart format, which includes:

* the grade and standard,
* an analysis of the access issues related to performance of the standard,
* suggestions for AT solutions,
* sample IEP goals.

The chart example *(shown below)* helps to illustrate the basic format of the manual.

AT Solutions: Key Words

The **AT Solutions** guide is designed around the use of a chart.

The AT Solutions on the chart use *key words*. The reader is directed to find the *key word* in Appendix A for the following information:

* a description of what it is, including an illustrated example for some
* suggestions for how you can make it, if possible
* information on how to buy it, including costs and vendor sources

In some cases the solutions listed on the chart are inclusive of a variety of choices a teacher could make for a student. The choice made will depend on the type and severity of the disability which presents as an academic barrier. For example, the student who has mild fine motor difficulties may only need a pencil grip to access writing tasks. A student who has a severe motor disability may require computer access for writing. Sample solutions must be selected with the individual student in mind.

A multi-disciplinary approach is needed when a student has multiple or severe disabilities, including consultation by the speech-language pathologist for a nonverbal student and an occupational or physical therapist for a student with motoric needs.

example one of chart

AT SOLUTIONS WORKSHEET   *reading grade K*

GRADE   K

DOMAIN   Reading

STRAND   1.0 Word Analysis, Fluency, and Systematic Vocabulary Development

SUBSTRAND   Concepts about Print

STANDARD   1.1 Identify the front cover, back cover, and title page of a book

SAMPLE TASKS	ACCESS ISSUE	AT SOLUTIONS	IEP GOALS
A typical task in a classroom for this standard would involve holding and turning over a book, pointing and talking about the front cover, back cover and title page.	Motor	Velcro mitt with Velcro adapted book Page fluffers Page turner	Using a Velcro mitt and page fluffers, S will locate the front/back/title page of a book with ___% accuracy ___/___ times. Using a page-turner, S. will locate the front/back/title page of a book with ___% accuracy ___/___ times.

A Word about IEP Goals

IEP goals which incorporate AT as part of the general education curriculum have three important components:

- *AT is written as a "tool" to perform the curriculum standard,*
- *The curriculum standard is used as the IEP goal,*
- *All goals conform to IDEA requirements for incremental and criteria based measurements.*

The authors have written sample goals to help illustrate how AT might be incorporated into a typical IEP goal.

The general format is:

Using (AT solution), student will (curriculum standard) with ___% accuracy __/__ times.

Example from worksheet chart illustrated on previous page:

Using a Velcro mitt and page fluffers, S will locate the front/back cover and title page of a book with ___% accuracy __/__ times.

In this example, Velcro mitt and page fluffers are the AT solution to be used by a child with a motor impairment in order to perform this standard for "Reading - Concepts About Print" which requires identifying the front and back covers and title page of a book. *(See pg. 11 chart example.)*

The following notations about the IEP goal examples found in this guide are important:

1) In some sample goals, depending on the standard which is under consideration, multiple goal components are combined. This was done in the interest of editing space only. A teacher who is considering these goals should break the examples apart in order to have a goal which is measurable according to the multiple components.

Example:

Standard

Write uppercase and lowercase letters of the alphabet independently, attending to the form and proper spacing of the letters.

AT Solutions Goal

Using adapted/alternative writing implements, S will write uppercase and lowercase letters of the alphabet independently, attending to the form and proper spacing of the letters with ___ % accuracy __/__ times.

In this example, there are four components: Uppercase letters, lowercase letters, form, spacing. The teacher who is writing this goal would need to separate uppercase and lowercase letter production into separate goals depending on the student's level of performance and couple each with form and then spacing.

Using adapted/alternative writing implements, S will write uppercase letters of the alphabet independently, with correct letter form with ___ % accuracy __/__ times.

Using adapted/alternative writing implements, S will write lowercase letters of the alphabet independently, with correct letter form with ___ % accuracy __/__ times.

Using adapted/alternative writing implements, S will write uppercase letters of the alphabet independently, with proper spacing of the letters with ___ % accuracy __/__ times.

Using adapted/alternative writing implements, S will write lowercase letters of the alphabet independently, with proper spacing of the letters with ___ % accuracy __/__ times.

2) The AT Solutions sample goals do not have specific accuracy levels or frequency statements. It is recognized that this information must be supplied by the teacher for each individual student depending on the student's performance level. Teachers using these examples will need to customize and modify these aspects of goal writing to be student specific.

3) The sample goals will also need to be customized for each student in order to specify benchmark dates. For example, using the AT Solutions goal discussed above, the teacher would need to develop the annual date and measurements for completion of the goal, as well as the interim benchmark dates and measurements.

Example of an Annual goal written on 6-1-01:

By 6-1-02

Using adapted/alternative writing implements, S will write lowercase letters of the alphabet independently with proper spacing of the letters with 90% accuracy 4/5 times

Examples of Incremental goals would be:

By 12-1-01

Using adapted/alternative writing implements, S will write lowercase letters of the alphabet independently with proper spacing of the letters with 50% accuracy 2/5 times

By 3-1-02

Using adapted/alternative writing implements, S will write lowercase letters of the alphabet independently with proper spacing of the letters with 75% accuracy 3/5 times

4) Use of the AT solutions is not meant to be absolute for any one student with a particular type of disability. Instead, teachers should analyze the student's access needs relative to performance of a standard and apply the AT Solutions creatively in order to best meet the student's needs. Teachers using this guide should read the guide for the purpose of understanding the logic behind the AT solution suggestions.

5) Teachers will need to write IEP goals to conform to local school district requirements for writing IEPs. These goals with AT solutions are designed to be models for how AT can be integrated with curriculum standards as part of a student's Individualized Education Program.

STEP-BY-STEP
How to Use the Guide

- Identify curriculum standard student can not perform

- Identify the functional access barrier (speech; motor; processing) experienced by the student when trying to perform this standard

- Locate same or similar curriculum standard in **AT Solutions** guide

- Match to student's access needs

example two of chart

AT SOLUTIONS WORKSHEET   *writing grade K*

GRADE   K

DOMAIN   Writing

STRAND   1.0 Writing Strategies

SUBSTRAND   Penmanship

STANDARD   1.4 Write uppercase and lowercase letters of the alphabet independently, attending to the form and proper spacing of the letters

SAMPLE TASKS	ACCESS ISSUE	AT SOLUTIONS	IEP GOALS
Write uppercase and lowercase letters of the alphabet independently.	Motor	Alternative writing implements Adapted writing implements	Using (specify items on the left), S will write uppercase and lowercase letters of the alphabet, attending to the form and proper spacing of the letters with_ ___% accuracy __/__ times.

- Customize suggested solutions to meet the individual student's needs

- Consult with other professionals as needed (i.e., speech-language pathologist for nonverbal student; OT or PT for motor needs; vision and hearing specialist for vision and hearing needs)

- Modify suggested goals for benchmark dates, accuracy and frequency according to individual student performance levels

- Use Appendix A for information about AT solutions (definitions, strategies, instructions for making or purchasing)

- Use Appendix B for vendor information

- Use Appendix C for definition and description of Instructional Technology

- Use Appendix D for additional web site information

- Use Appendix E for information from IDEA '97

Special HINT #1: It is recommended that the reader familiarize herself with the key words in the front of Appendix A as an initial orientation to the guide. These key words are used uniformly in the worksheets throughout the guide to refer to the various AT options which may be appropriate for performance of the curriculum standards.
By starting with a review of these keywords the reader will have an idea of how Appendix A is related to the worksheets for AT solution suggestions.

Special HINT #2: The following three AT solution key words are linked together throughout the guide and explained in detail in Appendix A:

- selection mode

- display strategy

- display system

A frequent goal statement in the AT Solution guide reads as follows:

Using selection mode (specify) and display strategy and system (specify) . . .

When these solutions are suggested the following information will be helpful:

- Determine the student's best selection mode for the task.

(Information in Appendix A fully describes the various selection modes as yes-no; pointing; writing; or scanning.)

Communication systems are built around objects, pictures, or printed words which a student selects to demonstrate knowledge for a particular task.
The mode selected by the teacher will vary with the task and with the student's abilities.

- Be specific about which selection mode the student will use for the task in the goal which is developed for the student.

Example from guide:
Using selection mode (specify) . . .

If the best selection mode for the student for the task is pointing, the goal would be written as,
"Using pointing . . ."

- Determine which display strategy and system will be used for the task.

(Information in Appendix A fully describes "display strategy" and "display system" (types).

Display strategies are related to the number of items to be displayed and to how the items are arranged. Display systems are related to the various types of displays (Velcro; boards; eye gaze frames).
The display strategy and system selected for any one student will vary depending on the task and the student's level of functioning.

- Be specific about which display strategy and system the student will use for the task in the goal which is developed for the student.

For example, if the task can be accomplished using pictures, and the student can discriminate given a choice of two, the goal (continued from above) would now be written as, "Using pointing and two pictures cards placed on a table, S will . . ."

Getting To Work

The next 200 pages are Assistive Technology worksheets. This is the nerve center of this guide. As you move through this part of the guide, you may want to refer back to this introduction frequently until the use of the worksheets becomes clear.

Again, one of the greatest gifts you can give a student with a disability is access to independence in his/her classroom relative to his/her capabilities. Use of this AT Solutions guide will help you to realize this goal for all of your students and to achieve AT compliance under IDEA '97.

Chapter 2
Curriculum Focus: Reading

Grades K-3

WORD ANALYSIS, FLUENCY AND
SYSTEMIC VOCABULARY DEVELOPMENT

CONCEPTS ABOUT PRINT	K, 1
PHONEMIC AWARENESS	K, 1
DECODING AND WORD RECOGNITION	K, 1, 2, 3
VOCABULARY AND CONCEPT DEVELOPMENT	K, 1, 2, 3

READING COMPREHENSION

STRUCTURAL FEATURES OF INFORMATIONAL MATERIALS	K, 1, 2, 3
COMPREHENSION AND ANALYSIS OF GRADE-LEVEL-APPROPRIATE TEXT	K, 1, 2, 3

LITERARY RESPONSE AND ANALYSIS

STRUCTURAL FEATURES OF LITERATURE	3
NARRATIVE ANALYSIS OF GRADE-LEVEL-APPROPRIATE TEXT	K, 1, 2, 3

Kindergarten

WORD ANALYSIS, FLUENCY AND SYSTEMIC VOCABULARY DEVELOPMENT

CONCEPTS ABOUT PRINT

PHONEMIC AWARENESS

DECODING AND WORD RECOGNITION

VOCABULARY AND CONCEPT DEVELOPMENT

READING COMPREHENSION

STRUCTURAL FEATURES OF INFORMATIONAL MATERIALS

COMPREHENSION AND ANALYSIS OF GRADE-LEVEL
APPROPRIATE TEXT

LITERARY RESPONSE AND ANALYSIS

NARRATIVE ANALYSIS OF GRADE-LEVEL
APPROPRIATE TEXT

AT SOLUTIONS WORKSHEET

GRADE   K

DOMAIN   Reading

STRAND   1.0 Word Analysis, Fluency, and Systematic Vocabulary Development

SUBSTRAND   Concepts about Print

STANDARD   1.1 Identify the front cover, back cover, and title page of a book

SAMPLE TASKS	ACCESS ISSUE	AT SOLUTIONS	IEP GOALS
A typical task in a classroom for this standard would involve holding and turning over a book, pointing and talking about the front cover, back cover and title page.	Motor	Velcro mitt with Velcro adapted book Page fluffers/turners	Using a Velcro mitt and page fluffers, S will locate the front/back/title page of a book with ____% accuracy ____/____ times. Using a page-turner, S. will locate the front/back/title page of a book with ____% accuracy ____/____ times.
When a child is nonverbal discussion of the parts of a book require an alternative access form. An appropriate alternative access mode would be the use of yes/no response or the use of a programmed VOCA.	Speech	Selection mode (yes/no) Book VOCA programmed with messages: It's the front/back/title page of the book.	Using a yes/no response, S will respond to teacher's question, "is this the front/back/title page of the book?" with ____ % accuracy ____/____ times. Using a yes/no response, S will respond to teacher's question, "Show me. . . (the front/back/title page) of the book?" with ____ % accuracy ____/____ times. Using a programmed VOCA, S will respond to teacher's pointing to book and questions, "What part of the book is this?" with ____ % accuracy ____/____ times.