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NIMAS Development and Technical Assistance Centers

NIMAS

Accessible Textbooks in the K–12 Classroom II (2010 Revision)

Selecting Specialized Formats

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U.S. Office of Special Education Programs

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Introduction

This document is the third in a series of explorations related the acquisition and use of accessible, alternate-format instructional materials for elementary and secondary school students with print disabilities. The initial document The Promise of Accessible Textbooks: Increased Achievement for All Students (2004)[HL1] was published by the National Center on Accessing the General Curriculum (NCAC) and investigated the benefits of accessible textbooks for students with sensory, physical, cognitive, and learning challenges. The article provided an historical and policy perspective on the uses of Braille, audio, and digital text versions and the legal, technological, and market challenges associated with crafting a national or large-scale distribution system designed to ensure availability.

The second article, Accessible Textbooks in the Classroom (2010)[HL2], was also updated in 2010 by the National Center on AIM and was designed as an educator's guide to the acquisition of alternate-format core learning materials for K–12 students with print disabilities. The article was intended as a resource for educators, parents, and others seeking to locate and acquire Braille, audio, digital text, and large print text for use in the classroom; and it provided an updated overview of the accessible materials mandates in IDEA 2004, associated copyright constraints, and suggested solutions and strategies for insuring that all students with print disabilities receive appropriate materials in a timely manner.

The second article in the series built and expanded upon the concepts, strategies, and resources presented in the first article. It provided updates of relevant legislation and an array of state, regional, and federal resources. What it did not provide were suggested guidelines for determining which alternate formats (and which tools to access them and exploit their flexibility) were best suited to a given student's print-related challenges. That is the purpose of this article.

Hot Tip: The primary emphasis of this document is on the acquisition and use of digital text for the simple reason that each of the other formats—Braille, audio, and large print—can be generated from one or more digital text file types. For an extended review of resources for the specific acquisition of Braille, audio, and large print, please refer to the previous article in this series, Accessible Textbooks in the Classroom.[HL3]

The Legislated Agenda

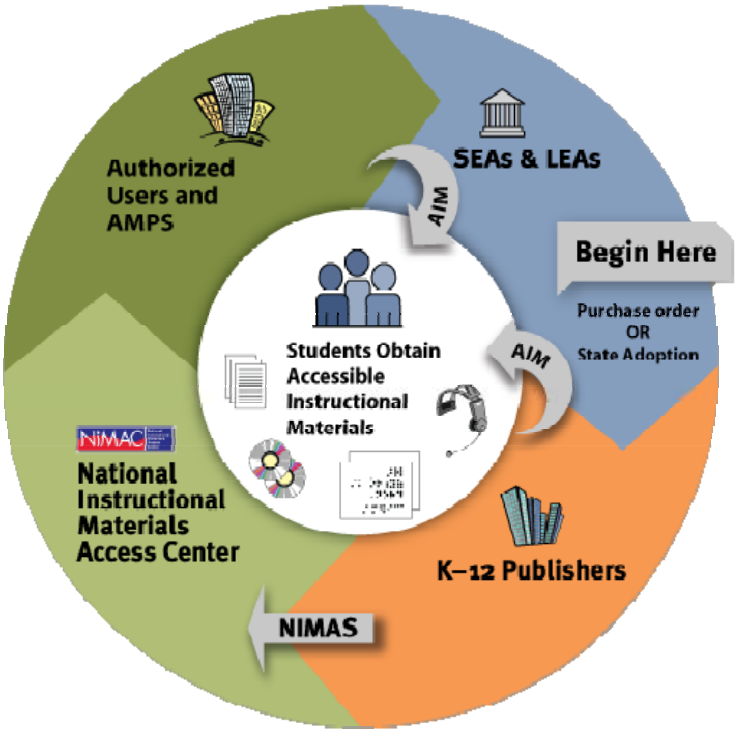
As of December, 2006, the National Instructional Materials Access Center (NIMAC) became operational. The NIMAC, and the associated technical guidelines of the National Instructional Materials Accessibility Standard (NIMAS) for publisher files, creates a national solution for the provision of accessible versions of core instructional materials—textbooks and related products—to qualifying students with print disabilities. Although the policies and technologies associated with this system are complex, the goal is straightforward: students with print disabilities are to be provided with accessible versions of textbooks at the same time that other students receive print versions.

All 50 states have indicated that they will 1. Adopt the NIMAS and 2.coordinate with the NIMAC. NIMAC coordination means that states and their local education agencies (LEAs) are obligated to require publishers to deposit NIMAS filesets of print materials to the NIMAC or to purchase specialized-format versions (Braille, audio, digital text, large print) directly from publishers. NIMAS files are not meant to be used by students, but, as source files, they provide the basis for subsequent creation of student-ready versions. This intermediary step is important since the technology upon which NIMAS source files are based is designed to be flexible enough to allow the content to be "rendered" in many ways.

One important constraint on the NIMAS/NIMAC delivery system is imposed by copyright law. Not every student with a disability is eligible to receive NIMAS-derived materials. While it is beyond the scope of this article to go into extended detail about this qualification process, it is covered extensively in the previous two articles in this series. For a general rule of thumb: only students receiving services under IDEA 2004 *and* who are unable to read standard print materials due to physical limitations (blindness, low vision, physical disability, or organically-based reading disability) are eligible.

On August 10, 2010, the United States Department of Education published an updated version of "Questions and Answers on the National instructional Materials Accessibility Standard (NIMAS)"[HL4] providing detailed responses to a variety of queries from state and local education agaency personnel regarding NIMAS implementation.

The NIMAS/NIMAC workflow looks like this:



Conceivably, there will be students who are identified as "print disabled" by an IEP or Section 504 team who require alternate formats but who are not eligible under the NIMAS/NIMAC system. State and/or local education agencies still have responsibility for providing these materials. Some states have established policies for addressing the needs of print-disabled students who qualify under copyright law and those who do not. For an overview of state policies, select a state from the "AIM in Your State"[HL5] drop-down menu on the right side of the homepage of the National Center on Accessible Instructional Materials web site. In addition to state policies and procedures, the IDEA 2004 option for states and districts to purchase accessible instructional materials is intended to provide a financial foundation for a "market model" for this type of curriculum content.

On June 29, 2010, the Office of Civil Rights, United States Department of Education, sent a joint letter to all United States college and university presidents.[HL6] In this letter, OCR attorneys affirmed that—

> *Requiring use of an emerging technology in a classroom environment when the technology is inaccessible to an entire population of individuals with disabilities—individuals with visual disabilities—is discrimination prohibited by the Americans with Disabilities Act of 1990 (ADA) and Section 504 of the Rehabilitation Act of 1973 (Section 504) unless those individuals are provided accommodations or modifications that permit them to receive all the educational benefits provided by the technology in an equally effective and equally integrated manner (Office of Civil Rights, U. S. Department of Education, (2010) Joint Letter, Washington, DC).*

The letter was intended to raise national awareness regarding the importance of read-aloud functions of e-book reading devices and the challenges associated with print access and reinforced the requirement to include alternate media representations of print in reading devices where 1) it was relatively easy to implement and 2) these devices might well find their way into instructional settings. In an interview with LRP Publications, the chief attorney for the Office of Civil Rights noted that these requirements pertain to K–12 settings also:

> *"The principles are indeed the same," she said. "This* Dear Colleague *letter grew out of settlement negotiations, and [the allegations] in the complaints that they settled pertain to higher ed." Thus, the letter "reflects the four corners of those settlements, but the principles apply to K through 12."*

It is not unrealistic to assume that the mandate to provide equitable access to digital learning materials and activities, even though focused on mobile e-book reading devices in this instance, also extends to courseware, learning management systems, instructional software programs—in short, any and all digital curriculum resources required for use in publicly-funded educational institutions. This ruling should provide additional incentive to K–12 curriculum publishers to re-visit their commercial products designed for use in elementary and secondary classrooms with an eye towards making them accessible to all students.

The Market Model

The number of curriculum publishers offering accessible versions of their print materials continues to be limited, but is steadily increasing. For an example of commercially-available core instructional materials in an accessible format, see the UDL Spotlight[HL7] on Pearson's HTML Books at the National Center on Universal Design for Learning and Pearson's web site description[HL8] of their accessible textbook products in a variety of content areas. All stakeholders interested in the alternate-format initiative, including publishers, disability advocates, the United States Department of Education, assistive technology vendors, and educators believe that, ultimately, the market model for accessible alternate-format materials is the best solution. A future is envisioned where these alternate-format curriculum materials are offered for sale alongside their print counterparts, and, as commercial products on the open market, their distribution will not be limited to students with disabilities. Flexible and customizable versions of core instructional materials could be used by English Language Learners, or students who simply prefer to lighten the load imposed by print volumes.

For a sampling of web sites that offer e-texts for sale, visit Candida Martinelli's *Simple-to-follow instructions for the computer novice on how to download e-texts and e-books to your PC*[HL9] web site. In addition to detailing the process of locating, downloading, and using e-texts, the site also has a listing—Stores and Sites[HL10]—selling e-text versions of print works. Keep in mind that this site is not specifically education-oriented, nor does it address the accessibilityof e-book formats, but it does provide a very useful overview of e-texts available from commercial sites and provides instructions for obtaining them. Other useful resources are eBooks, eTexts, & Readers[HL11] from EdTech Associates and e-textbooks—What is happening and where are we going?[HL12] from Nauman Educational Consulting. The National Center on AIM web site also offers a listing, Mainstream Sources of Digital Text[HL13], and the listed sites usually provide a catalogue of e-texts for sale.

The Formats

Section 121 (C)(3) of the Copyright Code (The Chafee Amendment)[HL14] identifies three formats eligible for use by students qualified to benefit from the Chafee exemption:

> 'specialized formats' means Braille, audio, or digital text which is exclusively for use by blind or other persons with disabilities" (Copyright Law Amendment 1996, National Library Service Factsheets, Washington, DC, 2006).

IDEA 2004 in Section 306(2)(c)(3)(B)(4)(B) modifies this statute to include large print as an allowable, "specialized" format:

> with respect to print instructional materials, includes large print formats when such materials are distributed exclusively for use by blind or other persons with disabilities."

What is "Digital Text"?

An exact definition of "digital text" in the context of the Chafee copyright exemption has yet to be determined. In an opinion paper developed by the Association of American Publishers (AAP) in response to a higher education digital text initiative (*see* Copyright Issues—AAP Position Paper Presented At AHEAD 2004),[HL15] the authors (both copyright attorneys) noted—

> To the extent "digital text" was included within the statutory definition of "specialized formats," it was understood to refer to the process by which scanned text could be used by blind persons with specialized text-to-speech translation software, rather than to digital text that might be freely transmitted via the Internet or burned into CDs like popular music. "Digital Talking Books" and other current and developing formats that not only serve special accessibility needs but could also prove attractive for use by persons without disabilities were not contemplated within the scheme of the Chafee Amendment (Adler, A. & Delfs, E. (2004) *Pre-Conference Food for Thought,* AHEAD 2004 conference session on Copyright Law, Miami, FL).

The Association of Higher Education and Disability (AHEAD) disputed this opinion and noted the following:

> While this may be true, the AAP's argument is unsubstantiated by current laws. As technology evolves and becomes more sophisticated, so do our laws. The VCR was not created nor thought of during the drafting of the copyright law, yet the [U. S.] Supreme Court held that consumers may video record programs.
>
> Students with disabilities should not be relegated to using outdated technology simply because the latest technology was not contemplated at the time the Chafee Amendment was drafted. Students with disabilities must have access to the latest technology available to improve their access to text materials and permit them to compete equally on the academic playing field (Position Statement: AHEAD's Perspective on the Issues of Textbook Access, 2006).[HL16]

In November, 2006, Congress made reference to the term "digital text" by extending a copyright exemption to—

> Literary works distributed in e-book format when all existing e-book editions of the work (including digital text editions made available by authorized entities) contain access controls that prevent the enabling either of the book's read-aloud function or of screen readers that render the text into a specialized format. ((17 U.S.C. § 1201(a)(1); Exemption 4)[HL17]

and added this definition:

> "Specialized format," "digital text," and "authorized entities" shall have the same meaning as in 17 U.S.C. §121.

The fact that Congress, in its rulemaking, expressly defined "e-book format" as "specialized" supports the AHEAD opinion that the term "digital text" should not be artificially constrained by the technological limitations that existed at the time the Chafee exemption was crafted.

For educators and other school personnel, the absolute legality of one format versus another is probably not critical information. What is important, however, is an understanding that although

the term "digital text" has not been, and is unlikely to be, specifically defined, the student-eligibility criteria for using specialized formats is clear (*see* who is eligible),[HL18] as is the fact that the Chafee exemption is for those students' exclusive use.

The next three sections provide digital text information that is important to understand in order to select the right solution for a given student. **Categories of Digital Text** describes three general "flavors" of digital text, while **What Can Be Done with Digital Text?** summarizes its benefits. Finally, **Common Distribution Formats of Digital Text** describes the most useful file formats for students with print disabilities.

Categories of Digital Text

→ **Supported Reading Software (SRS)** products that read digital text aloud using computer-generated synthetic speech (text-to-speech or TTS) are generically referred to in this document using the acronym "SRS." For a partial listing of these products, please refer to Supported Reading Software.[HL19]

→ **Digital Talking Books (DTBs)** Digital text that conforms to the DAISY Standard (Digital Audio Information System) is a multimedia format that combines easy navigation (section, chapter, heading, page, etc.) with support for synthetic speech and/or recorded human voice. Also referred to as digital talking books or DTBs, most DAISY software "players" also offer a spoken interface to support blind/low vision users. For more information about this format, see What is a DTB?[HL20] For a listing of hardware and software products that support this format, see the Comparison chart of e-book and digital talking book (DTB) hardware and software[HL21] from the National Center for Accessible Media.

→ **Commercial Digital Text (e-books)** A number of commercial electronic book products from elementary and secondary curriculum publishers and other sources may also offer embedded read-aloud functionality. For a sampling of products currently on the market see Commercial digital text and Online Resources.[HL22]

What Can be Done with Digital Text?

Digital text can be read aloud using synthetic speech. This can be accomplished using SRS: free, low-cost, or high-end text-to-speech applications.

Synthetic speech created from digital text can be saved as an MP3 file and downloaded to a portable MP3 player (iPod, etc.), burned to a cross-platform CD or saved to another storage device (hard disk, thumb drive, etc.). This is accomplished by using an SRS application that supports saving in an MP3 format (*see* Text to MP3 Conversion).[HL23]

Digital text can be easily magnified, and custom colors can be applied.

Digital text can be hyperlinked to additional content: definitions, background information, prompts, etc.

Digital text can include embedded or linked multimedia: both audio and video.

Digital text can be shared on a computer network.

Common Distribution Formats of Digital Text

→ **Adobe Flash (.swf)**, cross-**platform**, proprietary interactive animated graphics format, often used in commercial e-books. Flash products can be made accessible or can incorporate accessibility features (such as text-to-speech) if so designed.

→ **American Standard Code for Information Interchange (ACSII)**, a digital text file containing unstructured text based on the English alphabet.

→ **Braille-Ready File (.brf)**, a specialized digital text format used to create Braille.

→ **DAISY Digital Talking Book (DTB)**, a format that can be created in three different categories,[HL24] combines extensive navigation capabilities with multimedia support, has synchronized text-to-speech and/or recorded human voice, and Braille code embedded.

- Audio with NCX—DTB with structure
- Audio and full text—DTB with structure and complete text and audio
- Text and no audio—DTB without audio

→ **ePUB,** the emerging format for commercial e-books. Supported by the International Digital Publishing Forum (IDPF), ePUB is an XML-format standard that can be combined with various forms of Digital Rights Management (DRM) approaches to ensure that unauthorized distribution and use is limited. For an overview of products and publications in the ePUB format, see http://www.epubbooks.com/ebook-readers. NOTE: while the ePUB specification is compatible with the DAISY specification listed below, most publishers creating and distributing ePUB e-books do not take advantage of this. Currently, very few, if any, ePUB versions are accessible.[HL25]

→ **Hypertext Mark-Up Language (HTML)**, the format of the web. Offers some navigation structure and accessibility, images and their text equivalents can be included, cross platform, readable by many SRSs and web browsers with text-to-speech capability.

→ **Microsoft Word & PowerPoint (.doc; .ppt)**, cross platform, may have some structure, limited navigation, image support, readable by some SRSs.

→ **Portable Document Format (.pdf)**, cross-platform, can recreate exact layout of print work; includes images, hyperlinks, etc.; can be structured and made accessible via tagging. Can be read aloud via Adobe's (limited) text-to-speech support in Acrobat Reader, or read aloud via a third-party product or PDF Equalizer (http://www.readingmadeez.com/products/PDFEqualizer.html).

→ **Rich Text Format (.rtf)**, cross platform, unstructured text, no image support, no built-in navigation, readable by many SRSs.

The Process of Reading

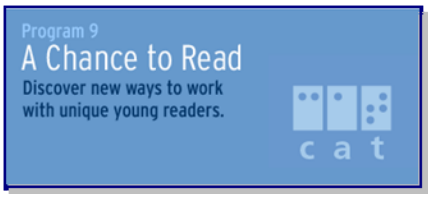
The provision of specialized-format materials is usually thought of as an "accommodation"—an alternate method for extracting information from text for students identified as print-disabled. Providing these students with specialized formats is generally perceived as a means of *circumventing* a student's inability to access print, not as an approach that might increase a student's actual reading achievement. This perception is too limiting. Sufficient evidence exists documenting a secondary effect of the use of specialized formats—the increased reading achievement of students using them (Olson, R. K. & Wise, B. W., 1992; Fletcher-Flinn, C. M. & Gravatt, B., 1995; Pisha, B. & Coyne, P., 2001; Strangman, N. & Hall, T.,2003).

The Special Education Elementary Longitudinal Study (SEELS); data repeatedly demonstrated that: 1) "print disabilities" impacted students in nearly all disability categories, and 2) read aloud, an alternate format represented the second most required testing accommodation after extended time and was included in the IEP/504 plans of 48.1% of students in 11 of 12 disability categories (excluding deaf/blind) (Blackorby, Knokey, Wagner, Levine, Schiller, & Sumi, 2007).

Logically, students who require an alternate presentation of print materials in testing would also require an alternate format in classroom instruction. For students with a range of disabilities, accessible digital instructional materials are showing promise to improve access to, participation in, and progress in the general curriculum.

The National Center on Supported E-Text (NCSeT)[HL26] has created an eleven-item typology[HL27] for categorizing different types of support for information access and comprehension provided by various e-texts. In addition to sponsoring e-text-related research projects at eight university sites nationwide, the Center also hosts a publicly-available online research literature database containing nearly 400 records of publications related to learning outcomes and digital reading materials. Citations in the NCSeT database refer to research detailing the fundamental flexibility of e-text resources and how that can be used to address the access needs of a wide range of students with print disabilities, as well as research categorized by different types of comprehension supports that these materials can offer students. From this bi-modal perspective—that specialized formats provide print-disabled students with both an accessible alternative to print *and* the potential for increasing their reading ability—it is important to reference the skills that are considered essential to reading. A number of print-disabled students can be anticipated both to require specialized formats and to continue to receive reading instruction and/or remediation.

For an eloquent video summary of the importance of both instruction and specialized formats for students with print disabilities, see A Chance to Read[HL28] from the Reading Rockets series produced by WETA with support from the Office of Special Education Programs, United States Department of Education.



In 2000 the National Reading Panel[HL29] completed its work on reading instruction and submitted recommendations to Congress regarding teaching students to read. Included in the recommendations was a delineation of five essential components of reading instruction (National Reading Panel 2000):

Phonemic Awareness	Phonemes are the smallest discrete sound units of any language (the word "door" has three phonemes but four letters, for example).
Phonics	Phonics is the awareness that letters, individually or in combination, have specific sounds (the letters "c" and "h" each have a different sound than the sound that corresponds to their pairing "ch," for example).
Vocabulary	Vocabulary is the knowledge of word meaning, both individual and in context.
Fluency	Fluency is the capacity to read text smoothly and accurately; it includes an understanding of the units of meaning: word, sentence, paragraph, etc.
Comprehension	Comprehension is the multi-faceted process of understanding what is read: extracting meaning from text.

Specialized-format versions of textbooks and related print instructional materials are not designed to teach either phonemic awareness or phonics unless they are specific commercial e-book products that offer a defined instructional sequence in these areas. With respect to fluency, vocabulary, and comprehension, however, digital text in particular (when augmented by either synthetic speech or recorded human voice) offers considerable potential for increasing student skills in these areas.

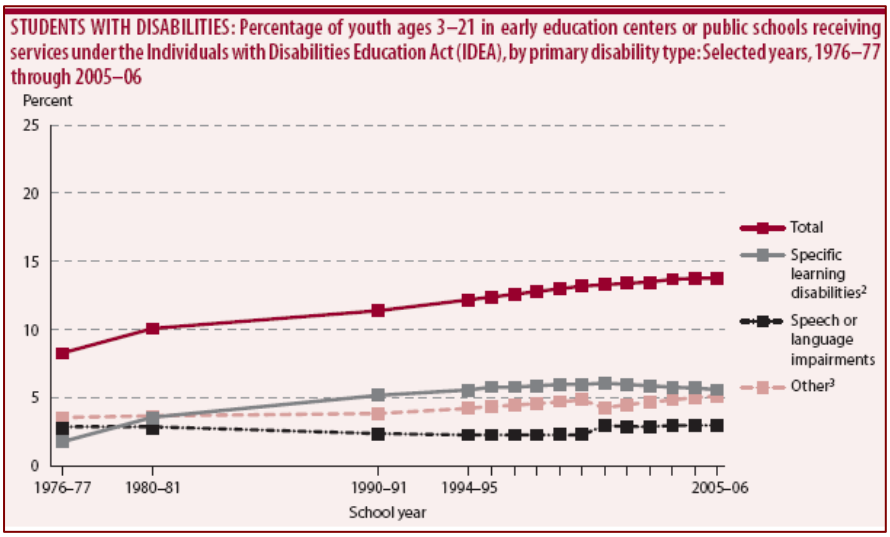
The Students

Specific Learning Disabilities

Of the 6.6 million students aged 3–21 served under IDEA during the 2007–2008 school year, the largest percentage—approximately 2.6 million students—were identified as Learning Disabled Students (National Center for Educational Statistics, 2009) in the category are defined as having—

> *A disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia* (United States Department of Education, 2006).

As graphically depicted in *The Condition of Education 2007*, specific learning disabilities not only account for the largest overall disability category of students receiving services, but the actual percentage of students so diagnosed has increased steadily during the past thirty years.



(Source: U. S. Department of Education, National Center for Education Statistics. (2007). *The Condition of Education 2007*. Retrieved 9/04/2007 from http://nces.ed.gov/programs/coe/2007/section1/indicator07.asp#info.)

There is very little available data relating to the number of students with Specific Learning Disability who require alternate-format instructional materials. The Special Education Elementary Longitudinal Study (SEELS) tracked the academic progress of a range of students with disabilities over time. One factor reported in the SEELS data was the percentage of students with Specific Learning Disability who required a specific accommodation—having test items read aloud to them—as a part of their IEP/Section 504 plan. 47.2% or nearly half the students with Specific Learning Disability studied, required print-based information to be rendered into an alternate format—audio—in order to accurately assess their content knowledge. It can logically be assumed that students who require an alternate format during testing also require an alternate format during instruction; in fact, in many states, that is the law. Based on that assumption, approximately 1.3 million students with Specific Learning Disability need alternate-format materials.

Considerations and Supporting Research

Decoding & Word Recognition

Students with specific learning disabilities who are emergent readers—most commonly those in the early elementary grades, but occasionally older students as well—often need an explicit connection made between narration (text read aloud) and the printed word. Research indicates that these students benefit from the synchronized, word-by-word highlighting of digital text as an aid to both recognition and recall (Reinking, D. S. & Schreiner, R., 1985; Olson & Wise, 1992; Pisha, B. & Coyne, P., 2001). Digital text products selected for use by these students should offer word-by-word highlighting to reinforce sound/word association.

Hot Tip: Most supported reading software products that use synthetic speech offer letter-by-letter read-aloud capability. What they speak aloud are letter *names*, however, not letter *sounds*, and this functionality is not useful for students who need to learn sound/symbol correspondences in order to decode unfamiliar words.

Students in the early elementary grades who are struggling with phonemic awareness and phonics skills are not likely to benefit from digital text versions read aloud by synthetic speech. These students require accurate, well-articulated, and well-pronounced audio, and the most appropriate option are those products that offer recorded human speech. In general, these types of e-books are commercial products specifically developed for early elementary reading instruction. See Commercial Digital Text and Online Resources[HL30] for an overview of available products.

For students who qualify under existing copyright exemptions[HL31] as print-disabled, Recording for the Blind & Dyslexic (RFB&D) offers DAISY audio formats of print instructional materials. In addition, RFB&D maintains a feature-rich web site, Learning Through Listening,[HL32] which focuses on the rationale for including audio resources in classroom instruction and provides an extensive array of strategies and lesson plans for implementing use of audio in the classroom.

Fluency

One route to automaticity for emergent readers is recognizing individual letters and their corresponding sounds, then letter combinations, then words, then sentences. The sequential highlighting of each word as it is spoken by a computer helps reinforce left-to-right visual tracking and connects each spoken word with its graphical representation. Research also suggests that control over the speed of computer-generated narration—slowing down or speeding up the rate at which the digital text was spoken—could benefit both student who struggle with word recognition (slower) and those who struggle to maintain attention (faster) (Skinner, C. H., Johnson, C. W., Larkin, M. J., Lessey, D. J., & Glowacki, M. L.,1995).

For transitional readers who have developed some fluency in word recognition, expanding the highlighting of digital text from word-by-word to sentence-by-sentence may help accelerate their move to more independent reading. Comprehending sentences as units of meaning is an essential component of reading for understanding.

Many students with specific learning disabilities who become independent readers continue to struggle with unfamiliar or multi-syllabic words. Digital text with synchronized highlighting is less crucial for these students since they often choose to read independently and may only require speech support for selected words.

Vocabulary

There is evidence to suggest that students who listen to digital text read aloud with recorded or synthetic speech improve their vocabulary skills. (Dawson, L., Venn, M., & Gunter, P. L., 2000; Hebert & Murdock, 1994). The auditory representation of written text provides an alternative perspective to the material, and much like the research that suggests that the use of spellcheckers increases students' spelling ability (McNaughton, D., Hughes, C., & Ofiesh, N., 1997); the spoken representation of text can help expand a student's word knowledge.

Additionally, if vocabulary enrichment is one of the primary goals of providing digital text, then materials should be selected that support this goal. For example, digital text formats or versions that offer hyperlinked glossary definitions, additional background information, or access to multimedia glossaries would be preferable to those that did not offer these features.

Comprehension

E-text that includes embedded supports to enhance meaning—word definitions, main ideas for each paragraph, additional background information, and simplified versions of passages was shown early on to significantly enhance comprehension (Reinking & Schreiner, 1985). Additionally, text-to-speech support has been found to improve the comprehension skills of independent readers, but not to have a significant impact on the comprehension skills of emergent readers (Lundberg & Oloffson, 1993).

The increasing use of Internet resources in the classroom creates new challenges for struggling readers. A meta-analysis of existing research related to the difference in focus, passage length, and saliency suggests that these new reading demands can be offset by the inclusion of multimedia information to the benefit of student understanding (Leu, D. J., Coiro, J., Castek, J., Hartman, D., Henry, L. A., & Reinking, D. [2008]). Interstingly, many readers who struggle with understanding information presented in a traditional linear print format prove to be more effective information extractors when they read online (Leu, D. J., Zawilinski, L., Castek, J., Banerjee, M., Housand, B., Liu, Y., et al. [2007]). Researchers analyzing these differences seem to concur that even though online reading carries with it new attentional and organizational demands, ready access to background information, multiple examples of key concepts, and multiple (different media) representations all benefit readers who have difficulty with print-only presentations.

For an extensive review these and other types of text transformations[HL33] that have been researched with respect to student achievement, including video, hypertext, multimedia, etc., across a range of content areas, please review the Strangman and Hall article of the same name linked above. At the time of this writing, the article was under revision for republication in late 2010. Similarly, the research database at the National Center on Supported E-Text contains multiple entries relatd to reading comprehension and e-text. Finally, the New Literacies Research Team[HL34] at the University of Connecticut maintains a list of current and emerging research on the effects of the Internet and new media on reading comprehension and student understanding.

Table I: Specialized Formats for Students with Specific Learning Disabilities

Table I presents an overview of recommended digital text formats for students with specific learning disabilities in grades 1–12.

Students with Specific Learning Disabilities					
READING SUPPORT	**GRADES 1 & 2**				
Functional Impact Area	**Environment**	**Task**	**Accommodation**	**Tool(s)**	**Recommended Format(s)**
Word recognition; decoding	Classroom	Small group; paired reading	Text read aloud • Human voice • Synchronized highlighting (word by word)		e-book DTB
	Home	Enrichment	Text read aloud • Human voice • Synchronized highlighting (word by word)		e-book DTB
READING SUPPORT	**GRADES 3–12**				
Functional Impact Area	**Environment**	**Task**	**Accommodation**	**Tool(s)**	**Recommended Format(s)**
Word recognition; decoding; vocabulary; fluency; comprehension	Classroom	Small group; paired reading	Text read aloud • Synthetic/human voice • Synchronized highlighting (word by word; sentence by sentence)	SRS	e-book DTB e-text: HTML, etc.
	Home	Enrichment; homework	Text read aloud • Synthetic/human voice • Synchronized highlighting (word by word; sentence by sentence)	SRS	e-book DTB E-text: HTML, etc.
Vocabulary; comprehension	Classroom; home	Enrichment	Text read aloud	MP3 player	MP3 audio

Sensory Disabilities

Blind/Low Vision

There are approximately 94,000 students with visual impairments in the pre-K–12 educational system (American Foundation for the Blind, 2007). These students receive services either under IDEA or Section 504 of the Rehabilitation Act of 1973. For the majority of these students, the provision of specialized-format instructional materials is not only important, but essential. Although approximately 10% of students with visual impairments require Braille, IDEA requires IEP teams to—

> provide for instruction in Braille and the use of Braille unless the IEP team determines, after an evaluation of the child's reading and writing skills, needs, and appropriate reading and writing media (including an evaluation of the child's future needs for instruction in Braille or the use of Braille), that instruction in Braille or the use of Braille is not appropriate for the child
>
> (Section 614 (d)(3)(B)(iii)(B) (iii))

This provision is significant in that it obligates the IEP team to *assume* Braille instruction and materials provision unless the team determines that an alternate approach is warranted. This statutory requirement helps clarify the decision-making process with respect to specialized formats for this population of students.

As with other disability sub-groups, information on the actual number or percentage of students with visual impairments who require specialized-format materials is sparse. Returning to the SEELs study data on accommodations/modifications provided to a student as part of an IEP/504 plan, 66% of visually impaired students required some sort of “physical accommodation” (which could include both Braille and large print materials), while 44% of students required that test materials be read aloud (Blackorby, J., et al., 2007). In practice, most vision specialists would agree that nearly all students with visual impairments need specialized materials.

Considerations and Supporting Research

Access to Materials

Students with visual impairments receiving services under IDEA must either be provided with Braille instruction and materials or be determined by their IEP team not to benefit from Braille. Even though a similar statutory requirement does not exist for students with visual impairments receiving accommodations under Section 504, it is presumed that a similar procedure is followed by 504 teams.

Students with visual impairments for whom Braille is not appropriate likely will be accommodated using digital text, audio, or large print materials. For additional background information on the benefits of these materials for low-vision students, please refer to The Promise of Accessible Textbooks[HL35] and Accessible Textbooks in the Classroom.[HL36]

Table II: Specialized Formats for Students with Visual Impairments

Table II presents an overview of recommended specialized formats for students with hearing impairments in grades 1–12.

Students with Visual Impairments					
READING SUPPORT	**GRADES 1 & 2**				
Functional Impact Area	**Environment**	**Task**	**Accommodation**	**Tool(s)**	**Recommended Format(s)**
Word recognition; decoding	Classroom	Small group; paired reading	Braille Large print Text read aloud • Human voice • Synchronized highlighting (word by word)	DTB player	Print Braille Large print DTB e-book
	Home	Enrichment	Braille Large print Text read aloud • Human voice • Synchronized highlighting (word by word)	DTB player	Print Braille Large print DTB e-book
READING SUPPORT	**GRADES 3–12**				
Functional Impact Area	**Environment**	**Task**	**Accommodation**	**Tool(s)**	**Recommended Format(s)**
Text recognition; vocabulary; fluency; comprehension	Classroom; home	Small group; Paired reading Enrichment; homework	Braille Large print Text read aloud • Synthetic/human voice • Synchronized highlighting (word by word; sentence by sentence)	Braille reader DTB player SRS	Print Braille Large print Electronic Braille DTB e-book E-text: HTML, etc.
Vocabulary; comprehension	Classroom; home	Enrichment	Text read aloud	MP3 player	MP3 audio

Deaf/Hard-of-Hearing

Students with hearing impairments are not commonly considered print-disabled since it is assumed that text or print-based resources will be their primary learning media in the classroom. In practice, deaf and hearing-impaired students as a group struggle to achieve a greater than 5th grade reading level, even if they become functionally fluent in American Sign Language (ASL). Consequently, specialized-format materials that offer the promise of increasing the literacy level of deaf and hard-of-hearing student should be considered for use.

Considerations and Supporting Research

As referenced in The Promise of Accessible Textbooks: Increased Achievement for All Students,[HL37] students who are deaf or hard-of-hearing show consistent academic gains when provided with sequential text highlighting and supportive captions available with digital instructional materials (Mcinerney, Riley, & Osher, 1999; Andrews & Jordan, 1997; Wald, 2005). In the past decade, research on the benefits of multimedia instructional materials for students with hearing impairments has expanded considerably. A recent literature review conducted by the CITEd Project at the American Institute for Research[HL38] referenced five components of multimedia instruction that have been shown to benefit deaf and hard-of-hearing students (Parton, B. S., 2006):

- improvement of accessible instructional design,
- creation of communication bridges,
- promotion of skills development,
- provision of distance education opportunities, and
- creation of discovery learning experiences.

The CITEd review also singles out research citing the positive effects of media-embedded digital text for increasing the academic achievement of this population of students. Particular emphasis was placed on the potential of embedding captioned videos, explanatory charts and graphics, American Sign Language avatars,[HL39] and prompts tied to comprehension strategies to enhance content understanding. Additional support for the use of media-rich technologies to teach reading to deaf students is found in a reference to the Cornerstone Approach being investigated by the Interactive Department at WGBH (Loeterman, M., Paul, P., & Donahue, S., 2002).

For additional recommendations related to reading instruction for deaf or hearing-impaired students, refer to the Laurent Clerc National Deaf Education Center resources at Gallaudet University's Keys to English Print.[HL40] Australian Lisa Herrod, a former sign language interpreter and now a web designer interested in usability and accessibility, has some thought-provoking comments on the experience of deaf readers at Deafness and the User Experience.[HL41] In particular, she comments on the challenges associated with the nuances of spoken language and the extent to which they may, or may not, be effectively translated into sign.

Although text-to-speech support is not a useful adjunct for deaf students, it may indeed be helpful for students with mild or moderate hearing impairments who can benefit from this type of alternate representation of text-based information. Because of this, it is important to have a clear understanding of the degree of a student's hearing loss when selecting specialized-format materials for their use.

Table III: Specialized Formats for Students with Hearing Impairments

Table III presents an overview of recommended specialized formats for students with hearing impairments in grades 1–12.

Students with Hearing Impairments					
READING SUPPORT	**GRADES 1 & 2**				
Functional Impact Area	**Environment**	**Task**	**Accommodation**	**Tool(s)**	**Recommended Format(s)**
Word recognition; decoding	Classroom	Small group; paired reading	Text read aloud • Human voice • Synchronized highlighting (word by word)	DTB player	DTB e-book e-book w/ASL
	Home	Enrichment	Text read aloud • Human voice • Synchronized highlighting (word by word)	DTB player	DTB e-book e-book w/ASL
READING SUPPORT	**GRADES 3–12**				
Functional Impact Area	**Environment**	**Task**	**Accommodation**	**Tool(s)**	**Recommended Format(s)**
Text recognition; vocabulary; fluency, comprehension	Classroom; home	Small group; paired reading Enrichment; homework	Text read aloud • Synthetic/Human Voice • Synchronized highlighting (word by word; sentence by sentence)	DTB player SRS	DTB e-book e-book w/ASL E-text: HTML, etc.
Vocabulary; comprehension	Classroom; home	Enrichment	Text read aloud (hard-of-hearing only)	MP3 player	MP3 audio

Physical Disabilities

Students with physical disabilities comprise the other group of print-disabled individuals for whom specialized formats may be essential to their achievement of access to the general curriculum. Physical disabilities may range from moderate to severe, and each level of involvement brings with it access challenges that may be unique to the individual. Nearly 200,000 students with physical disabilities receive special education services under IDEA or accommodations under Section 504. This category is comprised of students with orthopedic and multiple disabilities, traumatic brain injury, and other health impairments (NCES, 2007).

Print instructional materials are often inappropriate for a number of students with physical disabilities simply because these students cannot lift or orient a book or turn its pages. Over half of the students in this category require some sort of physical adaptation in order to access curriculum materials, and 65% require extended time to complete assignments; this number jumps to 72% in test-taking situations (Blackorby, J., et al., 2007). The reason that extended time becomes an increasingly significant factor for these students is that production time is proportionally related to the level of complexity of a required accommodation: students who require less accommodation and specialized equipment, software, etc., are able to complete assignments and tests faster than those who require more elaborate interventions. In general, the simpler the solution, the less time it takes students to both access information and use it to express what they know.

Specialized formats are usually mandatory for students with low-incidence (severe) physical disabilities, and may be optional for students with high-incidence (mild to moderate) physical disabilities.

Considerations and Supporting Research

Students with severe physical disabilities often require extensive mobility, communication, and/or assistive technologies to successfully engage in school-related activities. Most of these students are equipped early on with individualized technologies—hardware and software—and each of these items requires that some sort of digital content be available in order to be effective. For these students, digital text is the preferred medium.

Equally important in the consideration of digital text is assuring that the specialized formats acquired for students with severe physical disabilities are designed to work with the access and control features of the technology with which the student is most proficient: switch/scanning, Morse Code, voice, eye gaze, head-stick, etc. This process alone can be challenging since it (usually) requires the smooth interaction of three distinct components: a digital file, a player or SRS required to process or read aloud the file, and the student's adaptive software and/or equipment.

Research literature on the efficacy of assistive technology devices and services for students with physical disabilities is extensive. Information is available from the National Institute on Disability and Rehabilitation Research and the National Assistive Technology Research Institute,[HL42] and research is available from The Assistive Technology Research Institute[HL43] at

Misericordia University, Arizona State University, the University of Wisconsin, and many other research centers. In addition, the consideration of assistive technology is an IDEA mandate for IEP teams.

The identification of specialized-format instructional materials for students with moderate physical disabilities is generally dependent on the extent to which the student is able to manage the physical requirements of using print books: the ability to lift, position, and hold a book; efficiently turn its pages, etc. In most circumstances, digital text versions of curriculum materials provide the solution for these challenges. It is important to keep in mind that students with physical imitations but with functional vision need specialized formats that include all of the instructional components of a print work: graphics, images, charts, call-outs, sidebars, etc.; and they require digital versions that provide easy-to-use and accurate navigation: by chapter, section, page number, via bookmark, and through index, glossary; etc.

Table IV: Specialized Formats for Students with Physical Disabilities

Table IV presents an overview of recommended specialized formats for students with physical disabilities in grades 1–12.

Students with Physical Disabilities					
ACCESS/SUPPORT	**GRADES 1 & 2**				
Functional Impact Area	**Environment**	**Task**	**Accommodation**	**Tool(s)**	**Recommended Format(s)**
Grasping, positioning print resources; page turning	Classroom	Small group; paired reading	Text read aloud • Human voice • Synchronized highlighting (word by word)	Switch/voice/ pointer Accessible DTB player or SRS	DTB e-book
	Home	Enrichment	Text read aloud • Human voice • Synchronized highlighting (word by word)	Switch/voice/ pointer Accessible DTB player or SRS	DTB e-book
ACCESS/SUPPORT	**GRADES 3–12**				
Functional Impact Area	**Environment**	**Task**	**Accommodation**	**Tool(s)**	**Recommended Format(s)**
Grasping, positioning print; page turning	Classroom; home	Small group; paired reading Enrichment; homework	Text read aloud • Synthetic/human voice • Synchronized high-lighting (word by word; sentence by sentence)	Switch/voice/ pointer Accessible DTB player or SRS	DTB e-book e-text: HTML, etc.
Vocabulary; comprehension	Classroom; home	Enrichment	Text read aloud	Switch/voice/ pointer Accessible MP3 player	MP3 audio

Cognitive Disabilities

Students with cognitive disabilities being served under IDEA or Section 504 often present a wide range of functional challenges with respect to both print access and the development of literacy skills. The term "cognitive disabilities" may encompass students with developmental delay, traumatic brain injury, cerebral palsy, epilepsy, and autistic spectrum disorders, any or all of which may have a negative impact on areas of memory, perception, problem-solving, and conceptualizing (*see* WebAIM's Cognitive Disabilities: An Introduction[HL44] for a more detailed overview). Not all students with cognitive disabilities are print-disabled; however, the majority of these students exhibit academic limitations that inhibit learning, and, since print resources are the primary learning materials of the general education curriculum, these materials may limit opportunities to learn.

Obviously, matching students with cognitive disabilities to appropriate instructional materials needs to begin with an understanding of an individual student's array of strengths and weaknesses with respect to academic tasks. Beyond acquiring an accurate appraisal of a student's abilities, however, it is also equally important to understand the types of access and learning supports offered by provision of specialized-format materials. The WebAIM Project at the Center for Persons with Disabilities at Utah State University has compiled an extensive analysis of the needs of individuals with cognitive disabilities with respect to their use of web-based (including digital text) resources. While not specifically designed to address the design features of K–12 instructional materials, the categorization of useful features by area of impact:[HL45] memory, problem-solving, attention, etc., creates a road-map for curriculum materials consideration for this group of students.

Considerations and Supporting Research

As previously referenced in The Promise of Accessible Textbooks: Increased Achievement for All Students (2004),[HL46] students with cognitive disabilities may not only struggle with letter, phonics, and/or word recognition, but even after acquiring some of these skills continue to face challenges in the areas of fluency, vocabulary development, and comprehension. Recent research (Erickson, K. A., et al., 2005) confirms earlier findings (Koppenhaver, Erickson, & Skotko, 2001) that, as a group, students with developmental delays benefit from the same evidence-based instructional approaches recommended by the National Reading Panel for students in the general education curriculum. Additional meta-analyses have reinforced these initial impressions (Browder, D. M., et al., 2006) and re-affirmed the negative effects of expecting too little achievement from students in this population.

Table V: Specialized Formats for Students with Cognitive Disabilities

Table V presents an overview of recommended specialized formats for students with cognitive disabilities in grades 1–12.

Students with Cognitive Disabilities					
READING SUPPORT	**GRADES 1 & 2**				
Functional Impact Area	**Environment**	**Task**	**Accommodation**	**Tool(s)**	**Recommended Format(s)**
Word recognition; decoding	Classroom	Small group; paired reading	Text read aloud • Human voice • Synchronized highlighting (word by word)	SRS or DTB player	DTB e-book
	Home	Enrichment	Text read aloud • Human voice • Synchronized highlighting (word by word)	SRS or DTB player	DTB e-book
READING SUPPORT	**GRADES 3–12**				
Functional Impact Area	**Environment**	**Task**	**Accommodation**	**Tool(s)**	**Recommended Format(s)**
Text recognition; vocabulary; fluency; comprehension	Classroom; home	Small Group; Paired reading Enrichment; homework	Text read aloud • Synthetic/Human Voice • Synchronized highlighting (word by word; sentence by sentence)	SRS or DTB player	DTB e-book e-text: HTML, etc.
Vocabulary; comprehension	Classroom; home	Enrichment	Text read aloud	MP3 player	MP3 audio

Emotional/Behavioral Disabilities

Students receiving IDEA or Section 504 services due to Emotional/Behavioral Disabilities (EBD) do not typically receive specialized-format materials unless there are concomitant sensory, physical, or learning challenges. Nevertheless, this category of disability impacts learning outcomes more than any other disability (The National Agenda, 1994). Students identified in this category—

- have lower grades,
- fail more classes,
- more often fail minimum competency examinations,
- are more likely to be retained (repeat a grade),
- have a lower grade point average in high school,
- have a higher rate of absenteeism,
- are more likely to be served in restrictive settings,
- have more encounters with the juvenile justice system, and/or
- more often fail to graduate from high school.

The discussion on how best to characterize (and thereby identify) these students continues to fester within the education and mental health communities (Forness & Kavale, 2001) but the current statutory definition encompasses students who struggle with hyperactivity, aggression towards others, self-injurious behaviors, withdrawal, immaturity, or who have learning difficulties (NICHY, 2004). According to current statute these manifestations cannot be transitory but must be long-term in nature in order to qualify for special education services.

Given the seriously negative impact EBD can have on a student's school adjustment and participation, it is worthwhile to consider any interventions that might interrupt the accompanying degradation in academic achievement.

Considerations and Supporting Research

Research on the implications of digital media and technology for EBD students tends to fall into two distinct categories: investigations that focus on students with attentional disabilities (ADHD, etc.) and those addressing students who present with aggressive behaviors. With respect to digital text versions of learning resources, there are some indications that hyperlinked content that connects students to additional background information, word definitions, etc., is especially useful for students with organizational challenges since it allows them to stay "anchored" in their primary task while simultaneously reviewing supporting information (Hasselbring, T. S. & Glaser Williams, C. H., 2000). Conversely, some researchers have also cautioned that this very flexibility can also be detrimental for these students since it brings to the desktop the ability to get seriously lost. Almost all researchers note that direct instruction on web search strategies and effective use of hyperlinks is a crucial component of success (Eagleton, M.B. & Dobler, E., 2007). Multimedia has also proven to be a catalyst for sustaining student attention while simultaneously providing alternate representations of key concepts and ideas (Hasselbring, T. S & Glaser Williams, C. H., 2000).

Over the past two decades, Positive Behavioral Support[HL47] has established its efficacy as a systemic intervention. School-Wide Positive Behavioral Support (SWPBS) initiatives have proven not only to be effective for students with mild to moderate adjustment issues but also for students with severe disabilities (Freeman, R., et al., 2006). One of the key features of the SWPBS model is the delineation of three tiers of intervention: primary (all students in the school), secondary (targeted support for at-risk students), and tertiary (individualized and focused supports for struggling students) (Sugai, G. & Horner, H., 2007).

The tiered approach to behavioral intervention for EBD students creates an increasingly targeted and focused approach to help these students successfully adjust to school culture and expectations. Keeping in mind that the correlation between successful academic outcomes and behavior is very high, access to specialized-format digital learning resources across all three tiers may provide EBD students with a "safe haven." The use of "emotionally neutral" digital curriculum materials that offer multiple representations of information—text, audio, images, etc.—combined with an option for self-pacing, can create a learning refuge and a unique opportunity for success (Guthrie, J. T., 2001; Van Kraayenoord, C., Moni, K., & Jobling, A., 2001).

For a detailed overview of educational interventions and accommodations to address a wide range of EDB indications and behaviors, see the 2007 publication Children's Mental Health Disorder Fact Sheet for the Classroom.[HL48]

Table VI: Specialized Formats for Students with Emotional/Behavioral Disabilities

Table VI presents an overview of recommended specialized formats for students with emotional/behavioral disabilities in grades 1–12.

Students with Emotional/Behavioral Disabilities					
READING SUPPORT	**GRADES 1 & 2**				
Functional Impact Area	**Environment**	**Task**	**Accommodation**	**Tool(s)**	**Recommended Format(s)**
Word recognition; decoding Attention; motivation	Classroom	Small group; paired reading	Text read aloud • Human voice • Synchronized highlighting (word by word)	DTB player	DTB e-book
	Home	Enrichment	Text read aloud • Human voice • Synchronized highlighting (word by word)	DTB player	DTB e-book
READING SUPPORT	**GRADES 3–12**				
Functional Impact Area	**Environment**	**Task**	**Accommodation**	**Tool(s)**	**Recommended Format(s)**
Text recognition; vocabulary; fluency; comprehension Attention; motivation	Classroom; home	Small group; paired reading Enrichment; homework	Text read aloud • Synthetic/human voice • Synchronized high-lighting (word by word; sentence by sentence)	SRS or DTB player	DTB e-book e-text: HTML, etc.
Vocabulary; comprehension Attention; motivation	Classroom; home	Enrichment	Text read aloud	MP3 player	MP3 audio

Appendix A: Definitions & Resources

Defintions

Disability ***IDEA 2004***

IDEA identifies thirteen (13) disability categories (602(3) [(c)(1)(A)]):

(3)[HL49] Child with a disability.—

(A)[HL50] In general.—The term 'child with a disability' means a child—

(i)[HL51] with intellectual disabilities, hearing impairments (including deafness), speech or language impairments, visual impairments (including blindness), serious emotional disturbance (referred to in this title as 'emotional disturbance'), orthopedic impairments, autism, traumatic brain injury, other health impairments, or specific learning disabilities; and

(ii)[HL52] who, by reason thereof, needs special education and related services.

(B)[HL53] Child aged 3 through 9.—The term 'child with a disability' for a child aged 3 through 9 (or any subset of that age range, including ages 3 through 5), may, at the discretion of the State and the local educational agency, include a child—

(i)[HL54] experiencing developmental delays, as defined by the State and as measured by appropriate diagnostic instruments and procedures, in 1 or more of the following areas: physical development; cognitive development; communication development; social or emotional development; or adaptive development; and

(ii)[HL55] who, by reason thereof, needs special education and related services.

Specific Learning Disability (retrieved from *Building the Legacy: IDEA 2004* http://idea.ed.gov/explore/view/p/%2Croot%2Cstatute%2CI%2CA%2C602%2C30%2C)

(30)[HL56] Specific learning disability.—[IDEA 2004]

(A)[HL57] In general.—The term 'specific learning disability' means a disorder in 1 or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations.

(B)[HL58] Disorders included.—Such term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia.

(C)[HL59] Disorders not included.—Such term does not include a learning problem that is primarily the result of visual, hearing, or motor disabilities, of intellectual disabilities, of emotional disturbance, or of environmental, cultural, or economic disadvantage.

Core Academic Subjects

(4)[HL60] Core academic subjects.—The term ‘core academic subjects’ has the meaning given the term in section 9101 of the Elementary and Secondary Education Act of 1965.

(11) CORE ACADEMIC SUBJECTS—The term ‘core academic subjects’ means English, reading or language arts, mathematics, science, foreign languages, civics and government, economics, arts, history, and geography.

Areas of Academic Impact/Eligibilty:

Basic Reading (decoding, fluency, etc.)
Reading Comprehension
Math Calculation
Math Reasoning
Writing
Spelling
Oral Expression
Listening Comprehension

Components of Reading Instruction

(NCLB) TITLE 20 > CHAPTER 70 > SUBCHAPTER I > Part B > subpart 1 > § 6368

(3) **Essential components of reading instruction**

The term “essential components of reading instruction” means explicit and systematic instruction in
(A) phonemic awareness;
(B) phonics;
(C) vocabulary development;
(D) reading fluency, including oral reading skills; and
(E) reading comprehension strategies.

(5) **Reading**

The term “reading” means a complex system of deriving meaning from print that requires all of the following:
(A) the skills and knowledge to understand how phonemes, or speech sounds, are connected to print,
(B) the ability to decode unfamiliar words,
(C) the ability to read fluently,
(D) sufficient background information and vocabulary to foster reading comprehension,
(E) the development of appropriate active strategies to construct meaning from print,
(F) the development and maintenance of a motivation to read.

Section 504 reference: http://www.schwablearning.org/articles.aspx?r=777.

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Embedded Hyperlinks

HL1. The Promise of Accessible Textbooks: Increased Achievement for All Students
http://www.cast.org/publications/ncac/ncac_accessible.html

HL2. Accessible Textbooks in the Classroom
http://aim.cast.org/learn/aim4families/school/accessible_textbooks

HL3. Accessible Textbooks in the Classroom
http://aim.cast.org/learn/aim4families/school/accessible_textbooks

HL4. Questions and Answers on the National instructional Materials Accessibility Standard (NIMAS)
http://aim.cast.org/learn/policy/federal/nimas_q_and_a

HL5. AIM in Your State
http://aim.cast.org/

HL6. joint letter to all United States college and university presidents
http://www.ada.gov/kindle_ltr_eddoj.htm

HL7. UDL Spotlight
http://udlspotlight.wordpress.com/category/pearson-htmlbooks/

HL8. Pearson's web site description
http://www.pearsonschool.com/index.cfm?locator=PSZ3R4

HL9. *Simple-to-follow instructions for the computer novice on how to download e-texts and e-books to your PC*
http://home.wanadoo.nl/cecilia.mccabe/instructions.htm

HL10. Stores and Sites
http://home.wanadoo.nl/cecilia.mccabe/lesson5.htm#stores

HL11. eBooks, eTexts, & Readers
http://www.edtech-associates.com/ebooks-etexts-and-readers.htm

HL12. e-textbooks—What is happening and where are we going?
http://www.naumanedconsulting.com/front_page/Professional_Development_and_Program_Implementation_files/e-textbook_preso.pdf

HL13. Mainstream Sources of Digital Text
http://aim.cast.org/learn/practice/acquisitiondistribution/mainstream

HL14. The Chafee Amendment
http://www.loc.gov/nls/reference/factsheets/copyright.html

HL15. Copyright Issues—AAP Position Paper Presented At AHEAD 2004
http://www.ahead.org/uploads/etext/Copyright%20Issues.doc

HL16. Position Statement: AHEAD's Perspective on the Issues of Textbook Access, 2006
http://www.ahead.org/etext/etext_positionstatement.htm

HL17. Exemption 4
http://www.copyright.gov/1201/index.html

HL18. who is eligible
http://www.loc.gov/nls/eligible.html

HL19. Supported Reading Software
http://aim.cast.org/sites/aim.cast.org/files/SupportedReadingSoftware2010.doc

HL20. What is a DTB?
http://www.daisy.org/about_us/dtbooks.shtml
HL21. Comparison chart of e-book and digital talking book (DTB) hardware and software
http://ncam.wgbh.org/ebooks/comparison.html
HL22. Commercial digital text and online resources
http://aim.cast.org/sites/aim.cast.org/files/CommercialDigitalTextOnlineResources2010.doc
HL23. Text to MP3 Conversion
http://aim.cast.org/sites/aim.cast.org/files/TexttoMP3Conversion2010.doc
HL24. three different categories
http://www.daisy.org/daisy-technology
HL25. ePUB versions are accessible
http://blogs.adobe.com/accessibility/files/accessibility/assets/adobe_ebooks_csun2010.pdf
HL26. The National Center on Supported E-Text (NCSeT)
http://ncset.uoregon.edu/
HL27. typology
http://ncset.uoregon.edu/attachments/271_NCSeT_Typology_of_Supported_eText_Resources.pdf
HL28. A Chance to Read
http://www.pbs.org/launchingreaders/chancetoread/
HL29. National Reading Panel
http://www.nationalreadingpanel.org/
HL30. Commercial digital text and online resources
http://aim.cast.org/sites/aim.cast.org/files/CommercialDigitalTextOnlineResources2010.doc
HL31. qualify under existing copyright exemptions
http://www.loc.gov/nls/eligible.html
HL32. Learning Through Listening
http://www.learningthroughlistening.org/
HL33. text transformations
http://www.cast.org/publications/ncac/ncac_textrans.html#citation
HL34. New Literacies Research Team
http://www.newliteracies.uconn.edu/pubs.html
HL35. The Promise of Accessible Textbooks
http://www.cast.org/publications/ncac/ncac_accessible.html
HL36. Accessible Textbooks in the Classroom
http://aim.cast.org/learn/aim4families/school/accessible_textbooks
HL37. The Promise of Accessible Textbooks: Increased Achievement for All Students
http://www.cast.org/publications/ncac/ncac_accessible.html
HL38. CITEd Project at the American Institute for Research
http://www.cited.org/index.aspx?page_id=153
HL39. American Sign Language avatars
http://www.w3.org/WAI/RD/2004/06/sims-mov.htm

HL40. Keys to English Print
http://clerccenter.gallaudet.edu/Clerc_Center/Information_and_Resources/Publications_and_Products/Odyssey/Vol_5_Issue_1.html

HL41. Deafness and the User Experience
http://www.alistapart.com/articles/deafnessandtheuserexperience
HL42. National Assistive Technology Research Institute
http://natri.uky.edu/
HL43. The Assistive Technology Research Institute
http://atri.misericordia.edu/ATResearch/ATResearch.php
HL44. Cognitive Disabilities: An Introduction
http://www.webaim.org/articles/cognitive/
HL45. categorization of useful features by area of impact
http://www.webaim.org/articles/cognitive/design.php
HL46. The Promise of Accessible Textbooks: Increased Achievement for All Students
http://www.cast.org/publications/ncac/ncac_accessible.html
HL47. Positive Behavioral Support
http://www.pbis.org/
HL48. Children's Mental Health Disorder Fact Sheet for the Classroom
http://www.ksde.org/LinkClick.aspx?fileticket=q7IaIFgB2H8%3D&tabid=1799
HL49. (3)
http://idea.ed.gov/explore/view/p/%2Croot%2Cstatute%2CI%2CA%2C602%2C3%2C
HL50. (A)
http://idea.ed.gov/explore/view/p/%2Croot%2Cstatute%2CI%2CA%2C602%2C3%2CA%2C
HL51. (i)
http://idea.ed.gov/explore/view/p/%2Croot%2Cstatute%2CI%2CA%2C602%2C3%2CA%2Ci%2C
HL52. (ii)
http://idea.ed.gov/explore/view/p/%2Croot%2Cstatute%2CI%2CA%2C602%2C3%2CA%2Cii%2C
HL53. (B)
http://idea.ed.gov/explore/view/p/%2Croot%2Cstatute%2CI%2CA%2C602%2C3%2CB%2C
HL54. (i)
http://idea.ed.gov/explore/view/p/%2Croot%2Cstatute%2CI%2CA%2C602%2C3%2CB%2Ci%2C
HL55. (ii)
http://idea.ed.gov/explore/view/p/%2Croot%2Cstatute%2CI%2CA%2C602%2C3%2CB%2Cii%2C
HL56. (30)
http://idea.ed.gov/explore/view/p/%2Croot%2Cstatute%2CI%2CA%2C602%2C30%2C
HL57. (A)
http://idea.ed.gov/explore/view/p/%2Croot%2Cstatute%2CI%2CA%2C602%2C30%2CA%2C
HL58. (B)
http://idea.ed.gov/explore/view/p/%2Croot%2Cstatute%2CI%2CA%2C602%2C30%2CB%2C

HL59. (C) http://idea.ed.gov/explore/view/p/%2Croot%2Cstatute%2CI%2CA%2C602%2C30%2CC%2C

HL60. (4) http://idea.ed.gov/explore/view/p/%2Croot%2Cstatute%2CI%2CA%2C602%2C4%2C