WCASS Guide: How to Provide Students with IEPs Accessibility to the Printed Page Through Text To Speech

March 2021

This Publication Provides Information on Why and How to Use Text To Speech (TTS) in Daily Classroom Instructions for Students with IEPs Who Have Print Disability

DPI Compliance Statement

Updated 11/30/20
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Introduction Chapter by Dr. Thomas Hehir

It is disappointing to note that while IDEA 2004 provides opportunities for students with disabilities to access and progress in the general curriculum by using Accessible Educational Materials (AEM) such as Text To Speech, this provision is significantly underused by educators around the country.

As I wrote in my 2015 book “How Did You Get Here”, I had just taken a teaching position at Harvard after years of working in the field of special education, most recently as the Director of the Office for Special Education Programs (OSEP) for the U.S. Department of Education. I was pleasantly surprised to find many students with disabilities, including dyslexia enrolled in my classes. I wanted to hear their stories on how they are functioning at Harvard with dyslexia, among other questions. After all, I considered this to be my life’s work - expanding educational opportunities to students with disabilities. I had examples right before my eyes. I expected to hear triumphant stories of effective IEPs. Not quite. While it was true to some extent, it was not the whole story. These students are succeeding at Harvard by relying on Text to Speech or Audiobooks, the technology that was not afforded them in their respective schools growing up. This is disappointing, since IDEA 2004 does mandate the use of Accessible Educational Materials (AEM) for students with disabilities to access and progress in the general curriculum.

These students experienced challenges and barriers in navigating the massive amount of reading assignments at Harvard. They needed to find a ‘different way’ as they told me. ‘Text To Speech’ was that ‘different way’. One of my students, Eric, developed a clearer understanding of himself as a dyslexic person, and what he needed to be successful. He said “I learned after my Masters here that I need to go up to the faculty at the beginning of the semester, introduce myself, explain that I am dyslexic, and explain what that means. Mostly it means that I am going to have digitized text for any classroom reading assignment. I will have my computer, plug in my
headphones, I can listen to it, and we will be all set”. Eric continued “Everything is Text to Speech”.

Another one of my students, Laura was diagnosed with dyslexia at age seven and struggled with reading growing up attending a Montessori school. She said “I knew I wasn’t reading as well as the students in the class. I recall other students snickered when I read aloud. I remember feeling upset that I read books that were at the same level as the younger kids in the classroom rather than my friends”. Laura continued, “…my parents would get my sisters to read aloud and tape-record books for me so I would continue to get access to books”. Laura’s parents had the right idea in creating audiobooks to support children with dyslexia, a strategy now replicated by Learning Ally, a major national Accessible Media Producer (AMP).

Many students with reading disabilities receive inappropriate instruction that exacerbates their disabilities. For example, while requiring these students to engage in grade level reading materials, they are not provided with the IDEA 2004 Accessible Educational Materials (AEM) such as the use audiobooks, or Text To Speech. This is a violation of the Free Appropriate Public Education (FAPE) provision in IDEA 2004.

It is my hope that the readers of this publication will see the value of providing students with disabilities access to grade level materials through the use of either Text To Speech or audiobooks like Laura’s parents did. Laura is now an adjunct lecturer at the Harvard Graduate School of Education, a Senior Education and Disability advisor on the Committee on Education and Labor, and worked for the White House’s Domestic Policy Council and the Senate Health, Education, Labor and Pension Committee in the Obama administration. Laura is also my co-author on the book “How Did You Get Here” where we included all our interviews with students with disabilities attending Harvard.

Laura’s success reflects the intent of IDEA 2004 in establishing the National Instructional Media Access Center (NIMAC) to ensure that Accessible Educational Materials such as audiobooks and Text To Speech are available to students with dyslexia and other reading disabilities through Accessible Media Producers (AMPs). This is what FAPE is all about. We need other students with disabilities to achieve their true potential like Laura.
Executive Summary

It breaks our hearts to see students with IEPs have an ever-growing gap between their reading skills and grade level expectations. The graphs in the next few pages only tell part of the story. They do not express the level of frustration felt by 4th grade students with IEPs who read at the 1st grade level and are not able to meaningfully participate in classroom discussions that are based on 4th grade reading books.

It should come as no surprise that with each passing year the gap widens, the frustration turns sometimes to anger, withdrawal, behavioral issues, and even dropping out of high school.

Traditional reading interventions are often designed to address important areas for reading development including phonemic awareness, phonics and fluency. While systematic instruction benefits many children, there is a group of students who may never achieve the level of speed, fluency, and accuracy that is required for their grade level. The problem is one of information processing: by the time they have successfully decoded a word, they have little to no energy or cognitive capacity left to solve the word, let alone make sense of it, and then do something with it.¹

The Text To Speech technology which reads digital text aloud, provides instant access to all sorts of instructional materials including text books, articles, websites, newspapers, and even instructional materials prepared by the classroom teacher. Providing Text To Speech to students allows them to gain access to grade level reading materials. Listening to text enables students to gain new information and expand their vocabulary. When students have access to information, at or above grade level, they can participate in classroom discussions and feel they are part of the group, both academically and socially. In addition, this is also an education equity issue, ensuring that every student has access to the educational resources and rigor they need at the right moment in their education. As an educational equity issue, it needs to occur across race, gender, ethnicity, language, ability, sexual orientation, family background,

¹ https://www.learninglandscapes.ca/index.php/learnland/article/view/Text-to-Speech-Technology-as-Inclusive-Reading-Practice-Changing-Perspectives%2C-Overcoming-Barriers/618
and/or family income. This may stop the cycle of frustration, anger and withdrawal for many of these students. It is imperative that students, educators, and parents explore the possibilities of Text To Speech in order to determine if this ubiquitous form of assistive technology helps them achieve.

In IDEA 2004 legislation, Congress established the National Instructional Materials Accessibility Center (NIMAC) to help states work with Accessible Media Producers such as Bookshare or the American Printing House (APH) so students can gain access to their grade level materials and curriculum. Unfortunately, many teachers around the country are unaware of the IDEA 2004 provision of NIMAC, AEM, Text To Speech or Audiobooks for students with IEPs.

This publication attempts to connect the dots in the process of developing a guide on why and how to provide students with IEPs access to their grade level curriculum, addressing:

- The failing academic performance of Students with IEPs.
- IDEA 2004’s requirement that school districts provide Free Appropriate Public Education (FAPE) to students with IEPs to ensure that more than ‘minimal progress’ is gained from year to year (Supreme Court interpretation of the FAPE standard in Endrew F.). The perspective of a school attorney and a parent’s attorney is presented.
- What are AEM / Text To Speech and Print Disability?
- Where should the IEP team record “Print Disability” and “Text To Speech” in the IEP form?
- Review publications that call for the use of Text To Speech / Audiobooks.
- When to provide Text To Speech?
- Classroom use of Text To Speech applications / tools and Audiobooks
- The use of Text To Speech in statewide assessments.
- Important information for parents.
- Public policy implications: how to best ensure that the widest number of Students with IEPs are not denied accessibility to their grade level curriculum.

**Final Comment**

The goal is to ensure that all students who could benefit from Text To Speech tools will have routine access to the tools and skills to close the achievement gap, and ultimately graduating college and career ready.
Why Develop this Publication?

Because of Failing Academic Performance

Since the 2015 introduction of the current statewide assessment tools (Forward Exam, ACT Aspire and ACT Statewide), over 80% - 90% of students with IEPs have scored at the non-proficient level in Reading, ELA, Math, and Science. Scores have continued to decline in these areas over time. See the graphs below:
Based on the OSEP Annual Reports to Congress on the Implementation of IDEA, about 80% of Students with Disabilities (Swd) are not proficient in Reading. National scores also show a decline over time.

Clearly, students with IEPs, who are not able to access grade level curriculum due to reading barriers, will have significant difficulties in performing on statewide assessments as we can see from the Wisconsin and OSEP graphs above.

Many of these students showing poor academic performance may have a “Print Disability”. They may greatly benefit from and be in need of “Accessible Educational Materials (AEM)” such as “Digital Text” which provides these students with an instant access to grade level curriculum. These terms, AEM and Text To Speech are part of Free Appropriate Public Education (FAPE) in IDEA 2004, but may not be widely known and practiced in schools around the country yet.

To assist IEP Teams identify in the IEP that a student has a Print Disability and is in need for AEM / Text To Speech, the 2019 Wisconsin DPI Bulletin 20.02 on Legal Requirements for AEM, guides the IEP Team on where to document this in the IEP. This information is included on page XX of this publication.
Because it’s the Law: The Perspectives of a Parent and School Attorney

Parent Attorney
Jeff Spitzer Resnick

School Attorney
Mary S Gerbig
IDEA 2004: the Legal Basis for AEM

The Creation of NIMAC (the National Instructional Media Accessibility Center).

As part of the 2004 re-authorization of IDEA, Congress included a number of provisions designed to improve the quality and delivery of educational materials in accessible formats to ensure that Students with Disabilities have access to, are involved in, and make progress in the general education curriculum. In particular, IDEA 2004 established the National Instructional Materials Accessibility Standard (NIMAS), a technical standard to be used in the conversion of print instructional materials into accessible formats [i.e., braille, audio, digital text (Text To Speech), large print], and the National Instructional Materials Access Center (NIMAC), a national repository for NIMAS source files.

The NIMAC receives digital source files from publishers and makes these files available to states for use in producing the accessible formats needed by students. NIMAC does not produce or distribute any materials for use directly in schools. NIMAC is a "behind the scenes" resource that states use through their designated accessible media producers (such as Bookshare and the American Printing House (APH) to produce braille, digital text large print and audio files.

NIMAC accounts are only available to:
1. Authorized Users (AU). Wisconsin’s AU for Print Disability is Donna Hutson donna.hutson@cesa2.org
2. Accessible Media Producers (AMPs), like Bookshare or Learning Ally (most suitable AMPs for Text-to-Speech files).
3. State Coordinator (Wisconsin State Coordinator is Donna Hutson form CESA 2)
4. Publishers

In most all cases, teachers or individual schools do not interact in any way with the NIMAC to obtain the materials they need for their students. They will go through whatever organizations or agencies their state has designated to produce and distribute the accessible formats needed by students. Wisconsin designated Bookshare as the Authorized User of the NIMAC.
1. The first step for Wisconsin teachers looking for Text To Speech / Audiobooks for students who have been identified by the IEP team as having a Print Disability and in need of AEM, is to use the NIMAC’s search engine, Louis Plus, to find out if this book is already available. Louis Plus is a national database that contains information about accessible materials available from Bookshare, Learning Ally and many other agencies and organizations, including files available from the NIMAC. To avoid duplication of effort, it is suggested that users search Louis Plus first, to see if the format they need may already be available.

2. If a book is available through Bookshare or Learning Ally, the two major Accessible Media Producers for Text To Speech or Audiobooks, the searching teacher should then contact Bookshare or Learning Ally directly to obtain the book in the desired Accessible Format of choice (either Digital Text, Audio, Large Fonts or Braille).

3. If a book is available on NIMAC, but not on Bookshare or Learning Ally, teachers should then contact Donna Hutson through the CESA 2 Submit a Request form. Donna will then contact the AMPs.

The graphic below describes the role of NIMAC within a broader picture.

![Diagram](image_url)
This short video below explains how the NIMAC works with state and local agencies to provide students with accessible learning materials.

![NIMAC Logo]

Please use this Louis Plus link below to search for Accessible Education Materials:

Louis Plus Search Engine
How does a Student with a Disability qualify for NIMAC Materials?

As noted on the previous page, Congress created a Center, a national repository of files that includes accessible materials. However, to qualify for these materials:

- The student must have an IEP, and
- The student must fall into one of these four eligibility categories:
  - blindness
  - visual disability
  - physical limitations
  - reading disability (the previous description of ‘Organic Dysfunction’ has been eliminated as a result of changes in U.S. copyrights laws on May 8, 2019).
- Each of these four categories must be certified by a “competent authority” as meeting the eligibility criteria.
  - For the first three categories, the “competent authority” includes school and district personnel such as teachers of the visually impaired, special education teachers, school psychologists and medical professionals.
  - Up until recently, the only “competent authority” who could certify a reading disability was a medical doctor. However, with the changes in the 2019 U.S. copyrights laws, the National Library Service is expected to publish by January 2021 new regulations, which are to include who can certify an “eligible person”. Our expectation is that the medical doctor requirement will be eliminated. In fact, Bookshare, a major Accessible Media Producer (AMP) that provides schools with NIMAS materials (including Text To Speech) relies on IEP team members like special education teachers and / or school psychologists to function as the ‘competent authority’, among others, to certify that the student has a reading disability or print disability (these labels may be used interchangeably).

Once the student is certified by members of the IEP team as having reading disability or print disability, the school district would then contact an Accessible Media Producer (AMP) such as Bookshare to obtain materials developed from NIMAS source files including Text To Speech, if so determined necessary by the IEP team.
What if the Student Does Not Qualify for NIMAC Materials?

- A student experiences reading deficits, however, these deficits do not qualify the student for any of the above four categories.
- Regardless of the non-qualification, the IEP team determines that the student still needs Accessible Educational Materials (AEM) in order to receive a free appropriate public education (FAPE).
- Since obtaining AEM through NIMAC for students who don’t meet one of the four eligibility categories is not an option, the school district instead must obtain these materials directly from an AMP who is not affiliated with NIMAS, like Learning Ally, or contact publishers directly in a timely manner.
What is a Print Disability?

According to the National Accessible Educational Materials (AEM) Center, **Print Disability** is in part: “…Generally speaking, the term refers to individuals who are unable to read or use standard print materials because of a disability”.

According to the Maine Center for Accessible Instructional Materials\(^2\), a print disability is not a new disability classification, but actually refers to disabilities such as blindness, low vision, learning disabilities, or physical disabilities, or the general inability to access the printed page for a wide range of reasons.

Clearly, in a typical classroom where teachers rely heavily upon printed materials as the main tool for teaching, it is a challenge for these students to access the classroom materials.

A print disability is easiest to understand when considering how the student interacts with printed materials. A student with a print disability is one who is unable to gain information from printed materials at an anticipated level for their grade, and thus needs Accessible Educational Materials (AEM) in a specialized format (i.e., braille, large print, audio or digital text/Text To Speech) in order to access that information.

David Rose, chief scientist at Center for Applied Special Technology (CAST), describes in this video how the medium itself, the printed page can become a barrier, an actual disability for some students. In fact, Rose asserts that the print disability is not located in the child, but rather resides in the interaction between the child and his/her learning environment. The term “Print Disability” emphasizes the role of the learning environment, the printed page in creating the disability.

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\(^2\) [https://maine-aim.org/what-is-a-print-disability](https://maine-aim.org/what-is-a-print-disability)
What should IEP Teams Consider as Indicators of Print Disability?

Indicators of Print Disability According to the Wisconsin AEM Center information:

A student with a Print Disability is one who cannot access print in the way most students do and therefore needs alternative or specialized formats such as digital text, large print, audio, or braille. Print disabilities are related to blindness and low vision, physical impairment, traumatic brain injury, or learning disabilities (emphasis).

Consideration of the need for Accessible Educational Materials (including Text To Speech) is required for all students with disabilities, regardless of the nature of the student’s disability. IEP teams determine which students require Accessible Educational Materials to use and learn from standard printed materials. Teams may assess the extent to which a student can:

- Decode or extract meaning from print materials at or near grade level
- Read for required lengths of time without tiring, hold a book and turn pages
- See printed materials
- Read with fluency

Once IEP teams have determined the necessary formats, school districts can acquire AEM through direct purchases from publishers or non-profit Accessible Media Producers that operate in the U.S. under a copyright exemption which are able to make books available to individuals with print disabilities.

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3 [https://www.cesa2.org/programs/wiaem](https://www.cesa2.org/programs/wiaem)
Indicators of Print Disability According to Bookshare:

As a Major Accessible Media Producer (AMP) affiliated with NIMAC, Bookshare defines Print Disability as:

If a student finds it difficult to process or comprehend words, see text in books or on a screen, or physically manage books or reading devices, Bookshare may be able to help. For a student to join Bookshare, an expert, or Qualifying Professional, must confirm that the student has a qualifying condition that significantly interferes with his or her ability to read or process printed text. Following are some indicators that a student might have a qualifying condition:

Specific Learning Disability (SLD) that Affects Reading:

- A disorder in the basic psychological processes involved in understanding or in using written language, which manifests itself in the imperfect ability to read. Dyslexia is one example. Students in this category often have SLD on their Individualized Education Plans (IEPs) and/or have a diagnosed learning disability.
- Need for Reading Accommodations
  - The student struggles with reading and does not respond to instructional interventions to improve reading. Students in this category are sometimes served under Section 504 of the Rehabilitation Act of 1973.
- Blindness or Visual Impairment – Including low vision
- Physical Disability
  - A disability that hinders the student’s ability to hold a book, turn pages, move his or her head, or otherwise physically manage the activity of reading a book.
Indicators of Print Disability According to Learning Ally:

As a major Accessible Media Producer (AMP) not affiliated with NIMAS:

Learning Ally uses the term “Reading Deficit” instead of “Print Disability”. A reading deficit is determined by a student’s need for a reading accommodation due to an impairment in decoding, fluency and/or comprehension that does not allow a student to keep up with content at the same level as students without an impairment. An IEP or 504 is not required (this is why obtaining materials from NIMAC is not an option).

A reading deficit is determined by a student’s inability to keep up with content due to an impairment in at least one of the following areas:

- **decoding**
  - phonological awareness
  - phonemic awareness
  - orthographic awareness
  - oral language

- **fluency**
  - automaticity
  - fluency
  - processing speed

- **comprehension**
  - morphology
  - syntax
  - semantics
  - pragmatics

- **verbal reasoning**
  - verbal working memory
  - visual working memory
  - long term memory
  - attention,
  - vocabulary
Where to document in the IEP ‘Print Disability’, AEMs, and Text-to-Speech?

**DPI Bulletin 20.024:**

DPI Bulletin 20.02 notes that students who exhibit a “reading disability” qualify for NIMAS derived materials such as Text to Speech books if they:

1. Receive special education under IDEA, and
2. Are unable to read printed materials to substantially the same degree as a person without a disability.

In order for the IEP team to document in the IEP that the student has a reading disability (interchangeable with Print Disability, it has to go through a 2 step process:

**Step 1:** the IEP team considers the question: **“Can the student learn and gain information from the same print-based and other instructional materials selected for use by all students”?**

If the answer is “no”, the IEP team records the existence of a reading Disability” on the “Disability Related Needs” section of the I-4 IEP form (Linking form).

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Step 2: After determining the existence of a “reading disability” in step 1, the IEP Team now moves on to determine what accessible format(s) the student needs. In addressing the IEP Linking form, I-4, item 5 of the Special Factors section, the IEP team considers: “Does the student need assistive technology services or devices, including any services or devices needed to assist with reading? Consider the need for accessible education technologies or materials available to students regardless of formats or features, including NIMAS files from the National Instruction Materials Access Center (NIMAC)”.

| 5. Does the student need assistive technology services or devices, including any services or devices needed to assist with reading? (Consider the need for accessible education technologies or materials available to students regardless of formats or features, including the National Instructional Materials Access Center/NIMAC.) |
|-----------------|-----------------|
| □ Yes            | □ No            |
| If yes, describe the student’s assistive technology needs: |

Document necessary services or devices in the Program Summary.

DPI Bulletin 20.02 also suggests what types of accessible formats should the IEP team consider, how can the IEP team determine which digital features are best for the student, and how to obtain these materials in a timely manner. Please see below:

5. What types of accessible formats should the IEP team consider?
AEM may be provided in audio, braille, large print, digital text, or text-to-speech application. AEM are not limited to these formats. AEM include an alternative manner or form that gives an eligible person access to the work when the copy or phonorecord in the accessible format is used to permit him or her to have access as feasibly and comfortably as a person without such disability.

6. How can IEP teams determine which digital features are best for the student?
Many of the features that previously required the purchase and installation of specialized software are now often included as standard options on the devices many students already own. This makes the process of finding a good feature match for a student easier and less costly. Personalizing the Reading Experience provides guidance on how to activate built-in accessibility options (e.g., display options and text to speech) for customizing the reading
experience. By experimenting with the various options, educators, students and families can work together to determine which digital features are best for the student.

7. How do I, as district staff, ensure materials will be available in a timely manner? LEAs should take all reasonable steps to provide students with disabilities accessible instructional materials at the same time as other students receive their instructional materials. To that end, LEAs should submit requests to the WI AEM Center or WCBVI as early as possible.

For additional information on how IEP team members can search for the availability of AEM materials, please check the following 2 chapters in this publication:
- The Chapters on AEM and NIMAC, pages X, X-X
- Wisconsin NIMAC State Coordinator and Authorized User(s), page X

The National Instructional Media Accessibility Center
What is Text-to-Speech (TTS)?

The National Center of Accessible Educational Materials (AEM)\(^5\) defines Text To Speech (TTS) as an artificial production of human speech, using special software and/or hardware which reads digital text aloud. TTS can be helpful for a number of readers: those who struggle with decoding, a key skill for learning to read.

The ‘Understood’ website\(^6\) describes Text-to-speech (TTS) as a type of assistive technology that reads digital text aloud. It’s sometimes called “read aloud” technology. With a click of a button or the touch of a finger, TTS can take words on a computer or other digital device and convert them into audio. TTS is very helpful for kids who struggle with reading. But it can also help kids with writing and editing, and even focusing.

How Text-to-Speech Works. TTS works with nearly every personal digital device, including computers, smartphones and tablets. All kinds of text files can be read aloud, including Word and Pages documents. Even online web pages can be read aloud.

Students describe the use of Text-To-Speech in the classroom

The voice in TTS is computer-generated, and reading speed can usually be sped up or slowed down. Voice quality varies, but some voices sound human. There are even computer-generated voices that sound like children speaking.

\(^5\) [http://aem.cast.org/search?query=text+to+speech](http://aem.cast.org/search?query=text+to+speech)

Many TTS tools highlight words as they are read aloud. This allows kids to see text and hear it at the same time. Some TTS tools also have a technology called optical character recognition (OCR). OCR allows TTS tools to read text aloud from images. For example, the student could take a photo of a street sign and have the words on the sign turned into audio.

Check the chapter on *Text-To-Speech applications on page XXX* in this publication detailed descriptions of the various applications and how to download and use them in the classroom.
Describing the benefits of using Text To Speech (TTS) technology in the classroom (Using Prizmo Go as the TTS)

Describing the benefits of Text To speech for students (using ReadSpeaker as the TTS)
Dr. Dave Edyburn, Senior Research Scientist and Professor Emeritus at the University of Wisconsin at Milwaukee notes that Individuals wanting to use text to speech often find it helpful to recognize the different ways in which text to speech is developed and implemented in products. When software developers want to add audio support for text into their product, they must select one of two programming techniques: *Synthesized Speech* or *Digitized Speech*.

One of the most common approaches for implementing text to speech involves the use of *synthesized speech*. Synthesized speech is machine generated by computationally parsing text through a database of words and phonemes, and outputting it through a speech engine. Of course, this is much harder than it sounds because of the complexity of language and context. For example, the number 1922 might refer to a quantity of items ("one thousand nine hundred and twenty"), a year or a time ("nineteen twenty two"), or a padlock combination ("one-nine-twenty two"), each of which needs to be read differently.

There are several attributes that make synthesized speech desirable in the eyes of a software developer. First, synthesized speech is inexpensive to implement since there are a variety of open-source libraries that support these features. Second, synthesized speech is flexible to use and the quality has drastically improved in recent years. In some cases, users do not even realize that they are benefitting from speech generated by a computer. Finally, synthesized speech can be designed into produces to provide support in navigating a product, available on-demand by the user to have specific works spoken, or provide audio support for a large section of text. However, these attributes are not valued in the same way by end users.
To experience state-of-the-art digital speech, visit the following web page to enter your own text into the Nuance Text to Speech engine:

Try Nuance Text-to-Speech

The second approach for implementing text to speech involves what is known as *digitized speech*. Digitized speech involves recording a human voice and storing the sound file to be played whenever the user wants the text read aloud. Web page developers can add a digitized speech file to any web page with just a few lines of code:

```html
<audio controls>
  <source src="yourfilenamehere.mp3" type="audio/mpeg">
</audio>
```

which will render a media player for the user to click on and listen to the audio:
The National Center on Accessible Educational Materials

This Center contains the most comprehensive resources on accessible educational materials including AEM for remote learning, AEM publications, AEM online courses, information for K-12 teachers, parents, higher education institutions, and multimedia resources on AEM and much more. Please see links below.

Links to the National Center on Accessible Educational Materials (AEM):

- National Center on AEM Home Page
- Remote Learning
- Early Learning and AEM
- K-12 and AEM
- Best Practices for Educators
- Use of AEM
- Personalizing the Reading Experience
- Information for Families
- NIMAC
- NIMAS
Publications calling for the use of Text-To-Speech or Audiobooks for Students with IEPs

Audio-Supported Reading and Students with Learning Disabilities

By Richard Jackson, Ed.D. and Joanne Karger, J.D., Ed.D. Published: March 9, 2015

This article, posted on the National Accessible Educational Materials (AEM) website, suggests potential benefits of using Accessible Educational Materials such as Text To Speech for Students with Specific Reading-Related Learning Disabilities.

For students whose difficulty rests with decoding or rapid naming of words, it is reasonable to assume that listening to pre-recorded or synthesized (computer-generated) speech can serve several vital functions.

For example, pairing written text with speech helps to sustain engagement during the reading task. Listening while viewing text can connect students directly to the text itself while the meaning of the text can be captured through listening.

Additionally, listening to text presented synchronously with speech may possibly serve a remedial function, particularly with regard to building speed or fluency. Moreover, early use of voice recorded text may limit the ever-widening gap in learning that is all too often observed in elementary grades with struggling readers (Cunningham & Chen, 2014; Stanovich, 1986).

http://aem.cast.org/about/publications/2015/audio-supported-reading-learning-disabilities-asr-ld.html
Typical learners who receive high-quality literacy instruction develop rapidly in their acquisition of reading skills. Their general knowledge and vocabulary expand as they read about life in general and the world beyond their direct experience.

Without audio recordings of printed text, these students would be denied the opportunity to learn about and to discuss what their peers are benefiting from through text reading. Thus, for many who struggle with text reading, listening to text affords an opportunity to access and participate in the general education curriculum - i.e., the same curriculum offered to students without disabilities.
Reading Difficulties in the General Education Classroom: A Taxonomy of Text Modification
By Dave L. Edyburn, February/March issue of Closing the Gap, Vol. 21, No. 6

The article describes a range of remedial approaches to teaching reading skills and poses the premise that if remedial approaches always worked, we would never see high school students that couldn’t read independently beyond the second grade level or middle school students who failed to master the basic math facts. Routine failure to attain appropriate levels of academic performance should trigger assistive technology consideration. That is, compensatory strategies that use technology to enhance performance. (Emphasis)

8 https://www.qiat.org/docs/resourcebank/ReadingDifficulties.pdf
Assistive Technology and Reading

By Ted S. Hasselbring and Margaret E. Bausch

In this article, the authors suggest that Literacy is one area in which well-applied assistive technologies can act as a lifeline to students with learning disabilities. As many as 8 of 10 students with learning disabilities have reading problems so significant that they cannot read and understand grade-level material (Lerner, 2003).

Learning disabilities often interfere with students’ ability to grasp principles of phonetics, decode text, or comprehend what they read. In our work with schools, we have seen assistive technology break down barriers to full literacy in two ways: as a reading support, meaning that computer-based applications help students with learning disabilities successfully access grade-level text as they read, and as a reading intervention, meaning that the technology helps students strengthen and improve their overall reading skills.

Supportive assistive technology approaches should work symbiotically with learning interventions. In an ideal situation, students can use an assistive technology…

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Center on Inclusive Software for Learning (CISL)\textsuperscript{10}

CISL is a CAST (Center for Applied Special Technology) project and funded by the U.S. Office of Special Education Programs (OSEP).

CISL views the ability to have text read aloud is a vital access point for many students, and a helpful support to others. Students who may have challenges seeing or decoding text, including those with visual impairments, dyslexia, or learning a second language, use text-to-speech technology as well as recorded and in-person human voice to access rigorous academic content. One of our student testers noted that she would use a read aloud feature while reading along with the text in order to stay focused in a noisy environment.

\textsuperscript{10} \url{http://cisl.cast.org/research/read-aloud}
Reframing the Text-To-Speech vs. Human Audio Debate: Both Make Reading Easier

Published May 2019, by Christine Jones, Associate Director, Bookshare Global Literacy

In this Bookshare blog, Jones notes the value of TTS for the person who is visually impaired and depends on audio interactions to provide directions, read emails, and complete everyday tasks. Or the person with dyslexia who can read with greater ease and comprehension with narrated books because he or she doesn’t have to struggle to decode every word.

For individuals with reading barriers, audio is a necessary mode of receiving and processing information. And although some of what they consume today will be human narrated, more and more information will be communicated through technology. Let’s face it: digital text-to-speech (TTS) voices are here to stay, and they will only become more common. Thankfully, the quality has improved significantly and will continue to improve every year. Soon, the distinction between human and text-to-speech voices will be negligible.

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This article discusses text-to-speech technology as an inclusive reading practice that allows students to access their grade level curriculum and improve comprehension / meaning.

It seeks to illuminate concerns and questions teachers, students, and parents might have with regard to the use of text-to-speech technology. (This article will be addressed in more detail in the section on “When to Introduce Text To Speech”).

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12 https://www.learninglandscapes.ca/index.php/learnland/article/view/Text-to-Speech-Technology-as-Inclusive-Reading-Practie-Changin-Perspectives%2C-Overcoming-Barriers/618
Exploring Text-To-Speech Readers for Students with Disabilities

By Kara Sevenma, March 7, 2014

Students with disabilities who struggle with grade-level, content area texts can improve their reading comprehension by using technology to have texts read aloud (e.g., Anderson-Inman & Horney, 2007; Higgins & Raskind, 2004).

Over the past ten years, rapid innovations in text-to-speech (TTS) technologies have created new and affordable ways to help students read print-based or digital texts that have no audio equivalent. TTS technologies provide students with the ability to hear virtually any text read aloud with a synthesized voice.

Students can access PDFs, word processing docs, EPUB files, webpages, emails, and more from virtually any computer, phone, or tablet. There are many TTS readers available and the following list provides recommendations for teachers and students that are either already integrated into common classroom devices or are offered as low-cost add-ons that still provide comparatively high voice quality.

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13 https://literacyworldwide.org/blog/literacy-now/2014/03/07/exploring-text-to-speech-readers-for-students-with-disabilities
Text-To-Speech Technology and Top Reading Tools for Dyslexia/Learning Disabilities

The Learning Disabilities Resources Foundation suggests that TTS offers a more efficient, practical solution to reading by allowing the user with a learning disability to listen to written words and speech sounds through a read-aloud function.

The read-aloud function addresses the problems experienced by an individual with reading disabilities that include the misidentification of words, slow word reading and connecting text that often results in difficulties with comprehension. It helps with proofreading.

Listening to your own text will enable you to catch mistakes and easily improve your writing, text messages, email, and social media posts. You can edit the text while listening, pause the text and make the corrections. We recommend the tools that have the option of highlighting the sentence as each word is converted to speech, especially for students, as it gives them a multi-sensory learning experience that can improve their ability to focus, retain information and improve comprehension. See assistive-technology tools. It’s also helpful when you suffer from eye fatigue as you can sit, relax and listen.

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Supporting Struggling Readers in Secondary School Science Classes

By Kelly D. Roberts, Kiriko Takahashi, Hye-Jin Park, First Published July 1, 2012

The article notes that many secondary school students struggle to read complex expository text, such as science text books. How can teachers foster expository skills for struggling readers in secondary school science classes?

Combining Text To Speech (TTS) software (as a reading compensatory strategy) with a reading comprehension strategy can provide students with both access to grade level material and an approach to reading complex material. This teaching strategy can improve students’ attitude toward reading, improve engagement in reading, improve vocabulary and increase comprehension as well as improve their performance in science classes.

15 https://journals.sagepub.com/doi/10.1177/004005991204400604
Is Text-To-Speech Technology Beneficial for Struggling Readers?\textsuperscript{16}

Published on the Getting Smart website by Amy Foxwell on June 27th 2015, this article suggests that using text-to-speech as an educational technology to help struggling readers is becoming more common in today’s classrooms. However, some may feel that using this technology, which reads text aloud as students follow the highlighted text on the screen, is a ‘crutch’. Teachers, parents and even students themselves may see this not as a tool, but as cheating.

But recent light being shed on the question shows that not only is text to speech not a ‘crutch’, but it is indeed an invaluable tool to help students improve results and importantly, stay motivated.

\textsuperscript{16} https://www.gettingsmart.com/2015/06/is-text-to-speech-technology-beneficial-for-struggling-readers/
Use of Text-To-Speech Software to Improve Reading Skills of High School Struggling Readers

The purpose of this paper is to present research findings on the effectiveness of a TTS software intervention in two pilot studies with approximately 104 high school students (grades 9-12) with a disability and at-risk for referral to special education services because of reading difficulties. The conceptual framework underlying the research is that the use of TTS software with content reading materials (e.g., social studies) for a minimum of 30 minutes per week improves subjects’ reading performance when they are not using the software. Improved reading is also expected to improve subjects’ academic performance and aspirations. The results indicated that study participants had significantly improved reading skills in the two pilot studies. The researchers attribute this improvement to students’ exposure to more text and incidental vocabulary learning through the use of the TTS software.

Assistive Technology as Reading Interventions for Children with Reading Impairments with a One-Year Follow-up

By Emma Linfeblad, Staffan Nilsson, Steffan Gustafson, and Idor Svensson

The paper shows that using AT can create transfer effects on reading ability one year after the interventions were finished. This means that reading impaired children may develop at the same rate as non-impaired readers. Also, increased school motivation and an increase in independent learning and family effects have been shown. This provides implications in how to facilitate reading impaired pupils’ learning process and realizes the need to challenge the concept of reading to change to fit modern means of gaining information.

18 https://www.tandfonline.com/doi/full/10.1080/17483107.2016.1253116
On the Importance of Listening Comprehension

By Tiffany P. Hogan, Suzanne M. Adlof and Crystie Alonzo

This publication reviews evidence showing that listening comprehension becomes the dominating influence on reading comprehension starting even in the elementary grades. It also highlights a growing number of children who fail to develop adequate reading comprehension skills, primarily due to deficient listening comprehension skills (i.e., poor comprehension). Finally we discuss key language influences on listening comprehension for consideration during assessment and treatment of reading disabilities.

These authors also site numerous studies documenting that the contribution of listening comprehension to reading comprehension increases over time. Students who don’t get enough practice with listening become poorer and poorer communicators in relation to their peers.

Supported eText: Assistive Technology through Text Transformation.


This publication's conclusion suggests that although transforming electronic text in ways that might promote text comprehension by struggling readers has generated interest in the research community for more than two decades, we are far from unraveling the complexities of how to do this well. Further, as new technologies emerge, the possibilities for new forms of text transformations and new delivery methods increase. Clearly, there is need for a national research agenda focused on the ways in which transforming text through supportive resources can foster improved comprehension and learning by students with disabilities, as well readers of all ages struggling to learn from printed materials. Virtually all text materials used in schools today and in the future will soon be available in electronic form.

Federal legislation, for example, mandates that all required and supplementary texts adopted by schools be available to students with print disabilities in an electronic form that meets the National Instructional Materials Accessibility Standard (NIMAS, 2003). This gives the need for research on supported eText a sense of urgency as accurate information is needed to guide the development of appropriate materials, instructional interventions, and educational policy related to this form of assistive technology. Ultimately, our vision is of a world in which supported eText is a ubiquitous and effective option for all students, not an accommodation for a select few. We hope our thoughts here about new directions in research related to supported eText as assistive technology will make a contribution toward that end.

20 https://www.semanticscholar.org/paper/Supported-eText%3A-Assistive-Technology-through-Text-Anderson-InmanHorney/77a199eb2cb9635c3f0b46ebc85b83b1e885a06f
Supported eText: Effects of Text-To-Speech on Access and Achievement for High School Students with Disabilities

By Margo Vreeburg Izzo, Amanda Yurick, Bianca McArrel, Journal of Special Education Technology Volume 24, Number 3, 2009 ISSN 0162-6434

The purpose of this study is to examine the effects of a text-to-speech screen reader program on the academic achievement of high school students with disabilities in an online transition curriculum emphasizing information literacy. The text-to-speech support was introduced and withdrawn in a reversal design across 10 curriculum units. Findings suggest that the text-to-speech support increased unit quiz and reading comprehension performance with large effect sizes.

21 https://www.learntechlib.org/p/130514/
Assisted Reading with Digital Audiobooks for Students with Reading Disabilities

By Kelli J. Esteves, Butler University and Elizabeth Whitten, Western Michigan University, Elizabeth.whitten@wmich.edu

Results showed that while all students demonstrated growth in reading fluency as calculated by words read correctly per minute, the growth of the treatment group (using Digital Audiobooks) far outweighed that of the control group (using Sustained Silent Reading). There was no significant difference in reading attitude scores. Consequently, this study shows that teachers can promote greater growth in reading fluency when assisted reading with digital audiobooks is implemented in place of Sustained Silent Reading.

https://scholarworks.wmich.edu/cgi/viewcontent.cgi?article=1021&context=reading_horizons
Factors Influencing the Intelligibility of TTS and Selection of Voices

An OSEP Funded CISL Publication: the Intelligibility of Text-To-Speech is Critical if it is to be used to aid Children’s Reading Comprehension and Research Shows Multiple Factors can Influence Intelligibility:\(^\text{23}\):

- **Longer passages and shorter sentences may lead to increased intelligibility.** A study of 12 young adults and 12 older adults found intelligibility increased when longer passages (5 - 9 sentences) were read by synthesized speech versus a single sentence. The shorter sentences would further increase intelligibility versus longer sentences. Drager Reichle, 2001

- **Providing students with the ability to alter the rate of speech might help optimize their use of text-to-speech software.** Research as early as 1985 has shown that the rate and pitch of synthesized speech also affects intelligibility. A study with 48 undergraduate students found that if the speech rate is too fast or if pitch does not sound similar to human speech, there can be negative effects on reading performance. Slowiaczek Nusbaum, 1985

- **Text-to-speech systems should make efforts to provide synthesized speech as close to a natural human voice as possible to increase intelligibility.** Two studies conducted more recently compared people’s preferences regarding the naturalness of text-to-speech systems. Both studies found people preferred voices that sounded more natural, choosing a live human or a recorded human voice over synthesized speech. Couper, Singer, Tourangeau, 2004 Stevens, Lees, Vonwiller, Burnham, 2005

\(^{23}\) [http://cisl.cast.org/research/read-aloud](http://cisl.cast.org/research/read-aloud)
• There may be other ways to increase users’ satisfaction with read-aloud features that are not directly related to intelligibility: One option is to use professional human voices. A study of 826 Amazon Mechanical Turk participants found that professional human voices are perceived as better than amateur human voices and synthesized voices, and that some types of synthesized voices are perceived as better than amateur human voices. Georgila, Black, Sagae, Traum, 2012

• If users are able to choose the gender of the read aloud voice, they may be more motivated to engage with the reading. If users are able to choose the gender of the read aloud voice, they may be more motivated to engage with the reading. Two studies conducted with undergraduates on the effects of gendered voices in synthesized speech found that gender stereotypes did in fact extend to synthesized speech. Additionally, Lee, Nas, and Brave (2000) demonstrated that male listeners identified more strongly with the male computer voice, while female listeners identified more strongly the female computer voice Nass, Moon, Green, 1997 Lee, Nass, Brave, 2000
• Emotional tone and pitch also play a role in listeners’ perceptions of content and its credibility. The two studies below explore how synthetic speech affects listeners. In one with 56 university students, researchers investigate if adding emotion to synthesized speech could affect listeners’ perceptions of the content. They found happy voices made both happy and sad content seem happier than when a sad voice was used. However, there was less of an effect with text-to-speech software than with human-recorded speech. There was also an effect on listeners’ perception of the credibility of the voice. A neutral voice was perceived as more credible even though listeners preferred the happy voice. The other study looks at how software interprets the connotation of text compared to humans. Researchers found that there was poor alignment between how text was interpreted by humans and the software, where the software would tend to interpret text as more negative. They hypothesize that this could be a reason that synthetic TTS voices are seen as inferior to human voices and are often interpreted as “sounding off” by listeners.

Nass, Foehr, Brave, Somoza, 2001
Hillaire, Iniesto, Rienties, 2019
UDL and Text To Speech

Where does Text To Speech fall within the UDL framework?

As noted on the UDL framework chart above (see enclosure in orange), Text To Speech falls within the

- Representation Guidelines, which includes:
- The Perception Principal, which includes:
  - Checkpoint 1.1 Offers way of customizing the display of information:
    - Text To Speech
The following information, obtained from the CAST website, describes in more details how Text To Speech fits within the above UDL framework.

**Representation**

Learners differ in the ways that they perceive and comprehend information that is presented to them. For example, those with sensory disabilities (e.g., blindness or deafness); learning disabilities (e.g., dyslexia); language or cultural differences, and so forth may all require different ways of approaching content. Others may simply grasp information quicker or more efficiently through visual or auditory means rather than printed text. Also learning, and transfer of learning, occurs when multiple representations are used, because they allow students to make connections within, as well as between, concepts. In short, there is not one means of representation that will be optimal for all learners; providing options for representation is essential.

**Perception**

Learning is impossible if information is imperceptible to the learner, and difficult when information is presented in formats that require extraordinary effort or assistance. To reduce barriers to learning, it is important to ensure that key information is equally perceptible to all learners by: 1) providing the same information through different modalities (e.g., through vision, hearing, or touch); 2) providing information in a format that will allow for adjustability by the user (e.g., text that can be enlarged, sounds that can be amplified). Such multiple representations not only ensure that information is accessible to learners with particular sensory and perceptual disabilities, but also easier to access and comprehend for many others.
Checkpoint 1.1 Offer ways of customizing the display of information

In print materials, the display of information is fixed and permanent. In properly prepared digital materials, the display of the same information is very malleable and customizable. For example, a call-out box of background information may be displayed in a different location, or enlarged, or emphasized by the use of color, or deleted entirely. Such malleability provides options for increasing the perceptual clarity and salience of information for a wide range of learners and adjustments for preferences of others. While these customizations are difficult with print materials, they are commonly available automatically in digital materials, though it cannot be assumed that because it is digital it is accessible as many digital materials are equally inaccessible. Educators and learners should work together to attain the best match of features to learning needs.

- Display information in a flexible format so that the following perceptual features can be varied:
  - The size of text, images, graphs, tables, or other visual content
  - The contrast between background and text or image
  - The color used for information or emphasis
  - The volume or rate of speech or sound
  - The speed or timing of video, animation, sound, simulations, etc.
  - The layout of visual or other elements
  - The font used for print materials
UDL – Toolkit on the CAST website

The CAST website includes an excellent resource on UDL and Text to Speech. Here are some excerpts:

The barriers
Printed text can often become problematic for learners, such as dyslexics, with text processing disabilities. In addition, many students prefer hearing as well as reading text. Inflexible formats that do not provide the option for multiple representations of textual content therefore limit accessibility for various types of learners. While text-to-speech is not a built-in part of the UDL Curriculum Toolkit, providing a text-to-speech option is essential for making curriculum material accessible to a wide range of learners.

How Text-to-Speech Functionality addresses these barriers
Text-to-speech makes printed text accessible to a wide range of learners and gives readers options to choose the best way to receive and process information. Text-to-speech is a tool used by the widest range of students; as it decreases the barriers presented by printed text, it enhances learner engagement and understanding in content areas.

- Text-to-speech functionality allows learners to choose the way to receive information that is best for them. [Checkpoint 7.1: Optimize choice and individual autonomy]
- Flexible formats that allow for text-to-speech support text decoding for all students, particularly those with print disabilities. [Checkpoint 2.3: Support decoding text, mathematical notation, and symbols]
- Text-to-speech allows learners to hear their own work, providing a self-check tool learners can use to monitor their responses. [Checkpoint 6.4: Enhance capacity for monitoring progress]
- As research suggests, reading aloud to learners aids in reading comprehension. Thus, digital environments that contain text-to-speech-functionality are changing the nature of reading and comprehension for many learners and opening up possibilities for access and inclusion in areas that traditionally were unavailable. [Checkpoint 3.3: Guide information processing; Checkpoint 3.4: Support memory and transfer; Checkpoint 7.3: Reduce threats and distractions]
Another informative article on UDL and Text To Speech can be found on the website UDL for English Language Learners. Here are parts of the article with implications for all Text To Speech users:

**How it works**

Text-to-speech tools allow users to listen to text as they read. There are many tools available depending upon the format of the text. For example, some e-textbooks include text-to-speech options within the textbooks themselves. Other texts may need external readers. *Natural Reader* is a typical example of an external text-to-speech software/app. Users can paste text or open documents in *Natural Reader*, including PDF documents, word documents, and even iBooks shared with *Dropbox*. From there, the tool reads to users while highlighting the words on the screen. Users can select the speed, voice, and volume of the reader to ensure that each of these categories matches preference and need.

**Supporting English Language Learners**

Proctor, Dalton, and Grisham (2007) suggest the use of text-to-speech technologies to, “Provide access to content” (p. 72). If a teacher’s goal is to help students gain content knowledge through a text, text-to-speech tools improve students’ access to content by allowing them to both see and hear the words they read. This is especially helpful because many English Language Learners acquire a proficiency in speaking and listening before developing reading fluency. The opportunity to select a reading speed allows students to read at a slower pace than they might encounter with an audiobook. Meanwhile, words highlighted on the screen help students connect the words they hear to those they see.

**How it addresses Universal Design for Learning**

Text-to-speech tools meet UDL checkpoint 1.1 by allowing students to customize the display of information. Text alone can be intimidating for English Language Learners, students with specific learning disabilities, students with visual impairments, and any other students who do not feel confident in their reading abilities. Providing audio alternatives allow all of these students to access the information. In addition, the customized element of individuals using *Natural Reader* or similar products means that, “Auditory information may be adjusted in
volume, speed, pitch, and timing to meet students' needs" (Brand, Favazza, & Dalton, 2012, p. 134).

**Example of Use in Context**

As a social studies teacher, I know that reading skills are a subtle but important component of my subject. As I select articles and other texts for students to read, I can provide digital copies to students in a format that will allow easy transfer to *Natural Reader*. For example, it would not be difficult for students to open a PDF I created about the Korean War through the tool. I recently taught in a school that placed students in book clubs during social studies classes to read short novels related to a unit from each quarter. Depending upon school resources, these books may be available in digital formats to allow for text-to-speech.
When to Introduce Text-To-Speech?

This chapter will discuss:

1. What are the important areas for reading development?
2. At what grade level are these areas mastered by regular education students? And,
3. Can Text to Speech and Reading Instruction co-exist? Yes, according to the article 

   **Supporting Learners with Dyslexia: Technology and Intervention CAN play nice.**

   This article and others are discussed leading to a conclusion.

What are the Important Areas for Reading Development?

- The 2019 publication on Children Experiencing Reading Difficulties by the International Literacy Association\(^{23}\), highlights the work of **Catherine Snow** in identifying areas that are specifically important to:
  - reading development
  - phonemic awareness (discriminating individual sounds in words)
  - phonics (linking letters and sounds)
  - fluency (reading words automatically with understanding)
  - comprehension (making sense of text)
  - vocabulary (knowing what the words mean), and
  - writing (composing and spelling)

- Other studies substantiated the importance of the above important areas for language development. For example, Michael F. Hock and his colleagues conducted a 2009 study on What Is the Reading Component Skill Profile of Adolescent Struggling Readers in Urban Schools\(^{24}\)?

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Participants were assessed in the domains of word level, fluency, vocabulary, and comprehension. Analysis of the results found that 61% of the struggling adolescent readers had significant deficits in all of the reading components listed above. Subgroups of struggling readers showed similar but more severe patterns. For example, students with learning disabilities scored significantly below the levels of the struggling reader group at large.

**What is the Typical Progression of Reading Skills by Grade Levels?**

While there are multiple framework describing the developmental stages of reading skills, the following framework also includes a grade level expectation for each stage. This framework that outlines 5 distinct stages, is identified on the last page of the Developmental Stages of Learning to Read\(^{25}\):

- Awareness and Exploration of Reading Stage (**pre-K**),
- Emergent Reading Stage (**pre-K to early Kindergarten**),
- Early Reading Stage (**Kindergarten to Grade 1**),
- Transitional Reading Stage (**Grade 1 to Grade 2**) and
  - Fluent Reading Stage (**Grade 3 and above**)  

Introducing Text To Speech as Soon as a Gap is emerging

IDEA 2004 intent is to ensure that students with disabilities have access to, are involved in, and make progress in the general curriculum. How then, can a student with disability, reading at the 1st grade level, participate in the 4th grade level curriculum, despite consistent and intensive efforts by dedicated teachers? IDEA 2004 recognized that in order for these students to access the general curriculum, they need Accessible Educational Materials such as Text To Speech. For that purpose, Congress created the National Instructional Media Accessibility Center (NIMAC) that makes Text To Speech available (through Accessible Media Producers (AMPs) to qualifying students.

Many studies, cited throughout this publication suggest that Text To Speech (TTS) and the traditional reading instruction can coexist side by side. The use of TTS provides instant access to grade level books and materials. TTS may prevent the cycle of frustration, anger and withdrawal attributed to inaccessible curriculum / reading deficits in decoding. These studies suggest to introduce Text To Speech as soon as a gap is emerging.

An article in the International Literacy Association noted that Students with disabilities who struggle with grade-level, content area texts can improve their reading comprehension by using technology to have texts read aloud. TTS technologies provide students with the ability to hear virtually any text read aloud with a synthesized voice.

Kelsey Hall and Diana Petschauer noted in their 2017 article posted in the Closing the Gap website: Supporting Learners with Dyslexia: Technology and Intervention CAN play nice, that in addition to technology that supplements skill acquisition, individuals may benefit from using speech-to-text and text-to-speech software to effectively and efficiently participate in classroom tasks and assignments.

Some educators may question the use of audiobooks or text-to-speech software for individuals who are learning to read, however, it is important to allow individuals access to grade level (or above) text to encourage continued vocabulary and language growth. Many educators are unaware of federal laws that protect individuals with disabilities and their rights to accessible educational materials (AEM such as audio books). Additionally, this technology
bridges gaps by supporting access to the same content and curriculum as their peers, which aids in reducing frustration and prevents learners from falling behind in classwork.

Another article that addresses this issue is Text-to-Speech Technology as Inclusive Reading Practice: Changing Perspectives, Overcoming Barriers\textsuperscript{26}, By Michelann Parr, Schulich School of Education.

Dr. Parr states the dilemma that many educators are confronted on a daily basis that if a child repeatedly fails to read and to understand printed text, how much data documenting this failure needs to be gathered before we have enough evidence that the child can’t perform the task? (Edyburn, 2006) When do we intervene? And what do we do? (Edyburn, 2007, p. 149).

The reading research has long investigated reader differences, why readers struggle, what happens when readers struggle, how best to intervene, and how best to support. Traditional reading interventions (Dolan, Hall, Banerjee, Chun, & Strangman, 2005; Rose & Meyer, 2000) are often designed to support readers’ ability to decode and make the connection between the sounds heard and letters read.

While systematic phonics instruction (Adams, 1994; National Reading Panel, 2000) benefits many children, there is a group of students who may never achieve a level of speed, fluency, and accuracy that supports their emotional, social, cognitive, and intellectual development. The problem is one of information processing: by the time they have successfully decoded the word, they have little to no energy or capacity left to solve the word, let alone make sense of it, and then do something with it (i.e., comprehend, respond) (Hirsch, 2003). As a result, many of

\textsuperscript{26} \url{https://www.learninglandscapes.ca/index.php/learnland/article/view/Text-to-Speech-Technology-as-Inclusive-Reading-Practice-Changing-Perspectives%2C-Overcoming-Barriers/618}
these students enter into a vicious cycle of withdrawal from text, which widens the gap between those who read well and those who don’t, referred to as the Matthew Effect (Stanovich, 1986).

Bypassing decoding issues, Text To Speech Technology (TTST) may prevent the cycle of withdrawal often attributed to inaccessible curricula, low levels of motivation, lack of confidence, and/or reading deficits in phonemic and phonic awareness (Bryant & Bryant, 1998; Day & Edwards, 1996; Dolan et al., 2005; Hitchcock & Stahl, 2003; Hodge, 2003; Lewis, 1998; Kellner, 2004; Raskind & Higgins, 1998; Sipe, 1999). It may also reduce reliance on “human” supports in a variety of contexts, therefore enhancing independence (Cople & Ziviani, 2004; Labbo & Reinking, 1999; LD Online, 1998; Pisano, 2002)."

The solution, suggests Dr. Parr that text-to-speech technology (TTST) offers a solution to this dilemma, particularly if it is viewed as an inclusive practice or way of reading. Now, this is not to recommend that TTST be used as a teaching reading program, nor that we bypass decoding issues in lieu of teaching decoding. Instead, Dr. Parr suggests that TTST may circumvent frustration and reader withdrawal due to inadequate decoding and fluency, freeing readers to do the real work of reading, which is making meaning. In this way, TTST supports the overall acquisition of literacy, and learning, as students continue to receive other forms of intervention such as systematic phonics instruction.

**Conclusion:**

*Introduce Text To Speech instruction as soon as an apparent gap is emerging between the student reading achievement and classroom expectations, or perhaps as soon it is apparent that a student is unable to access grade level readings without Accessible Educational Materials (AEM).*
Ableism – Society’s Pervasive Negative Attitude about Disability

In an article about Confronting Ableism\(^\text{27}\), and in his important book, “How Did You Get Here”, Dr. Thomas Hehir wrote on the negative cultural attitudes toward disability that can undermine opportunities for all students to participate fully in school and society.

Dr. Heir emphasizes that society’s pervasive negative attitude about disability—which he terms ableism—often makes the world unwelcoming and inaccessible for people with disabilities. An ableist perspective asserts that it is preferable for a child to read print rather than Braille, walk rather than use a wheelchair, spell independently rather than use a spell-checker, read written text rather than listen to a book on tape, and hang out with nondisabled kids rather than with other disabled kids.

In education, considerable evidence shows that unquestioned ableist assumptions are harming disabled students and contributing to unequal outcomes (see Allington & McGill-Franzen, 1989; Lyon et al., 2001). School time devoted to activities that focus on changing disability may take away from the time needed to learn academic material. In addition, academic deficits may be exacerbated by the ingrained prejudice against performing activities in “different” ways that might be more efficient for disabled people - such as reading Braille, using sign language, or using text-to-speech software to read.

Because students identified as having learning disabilities are such a large and growing portion of the school population, we might expect that these students would be less likely to be subjected to ableist practices. The available evidence, however, contradicts this assumption. Many students with dyslexia and other specific learning disabilities receive inappropriate instruction that exacerbates their disabilities. For example, instead of making taped books

\(^{27}\) [http://www.ascd.org/publications/educational-leadership/feb07/vol64/num05/Confronting-Ableism.aspx](http://www.ascd.org/publications/educational-leadership/feb07/vol64/num05/Confronting-Ableism.aspx)
available to these students, many schools require those taught in regular classrooms to handle grade-level or higher text. Other schools do not allow students to use computers when taking exams, thus greatly diminishing some students' ability to produce acceptable written work.

The late disabilities advocate Ed Roberts had polio as a child, which left him dependent on an iron lung. He attended school from home in the 1960s with the assistance of a telephone link. When it was time for graduation, however, the school board planned to deny him a diploma because he had failed to meet the physical education requirement. His parents protested, and Ed eventually graduated (Shapiro, 1994)

We can hardly imagine this scenario happening today, noted Dr. Hehir, given disability law and improved societal attitudes. Yet similar ableist assumptions are at work when schools routinely require students with learning disabilities to read print at grade level to gain access to the curriculum or to meet proficiency levels on high-stakes assessments. Assuming that there is only one “right” way to learn—or to walk, talk, paint, read, and write—is the root of fundamental inequities (emphasized).
Wisconsin NIMAC State Coordinator and Authorized User for Print Disability

As previously noted on the NIMAC section, school staff or school administrators cannot order Accessible Educational Materials (AEM) directly from NIMAC. The only NIMAC accounts in Wisconsin are available to the NIMAC state Coordinator and to the Authorized Users (AU).

The Wisconsin NIMAC state Coordinator is Donna Hutson. Donna is also the Authorized User for Print Disability (see below when to reach out to Donna). Special education teachers who wish to obtain Text To Speech or Audiobooks for students who have been identified by the IEP team as having a Print Disability and in need of AEM need to follow this process:

1. The first step for Wisconsin teachers looking for Text To Speech / Audiobooks for students who have been identified by the IEP team as having a Print Disability and in need of AEM, is to use the NIMAC’s search engine, Louis Plus to find out if this book is already available. Louis Plus is a national database that contains information about accessible materials available from Bookshare, Learning Ally and many other agencies and organizations, including files available from the NIMAC. To avoid duplication of effort, it is suggested that users search Louis Plus first, to see if the format they need may already be available.

2. If a book is available through Bookshare or Learning Ally, the two major Accessible Media Producers for Text To Speech or Audiobooks, the searching teacher should then contact Bookshare or Learning Ally to obtain the book in the desired Accessible Format of choice (either Digital Text, Audio, Large Fonts or Braille). Contact information for both Bookshare and Learning Ally are available on the AMPs chapter.

3. If a book is available on NIMAC, but not on Bookshare or Learning Ally, teachers should then contact Donna Hutson through the CESA 2 Submit A Request form. Donna’s email is: donna.hutson@cesa2.org. Donna will then contact these AMPs and inquire about securing it from NIMAC, or search for these AEM with other publishers.
Accessible Media Producers (AMPs)

Bookshare Materials

- **What is Bookshare?**
  
  Bookshare is an e-book library that makes reading easier. People with reading barriers like reading difficulties like dyslexia, blindness, and physical disabilities can read in ways that work for them with a huge collection of titles in audio, audio + highlighted text, braille, and other formats.

  Around the world, people with reading barriers use Bookshare for school, work, and the joy of reading. Membership is free for qualified U.S. students and schools, thanks to funding the U.S. Department of Education, Office of Special Education Programs (OSEP). Bookshare is an initiative of Benetech, a nonprofit that empowers communities with software for social good.

- **Who qualifies to receive materials from Bookshare?**
  
  If a student finds it difficult to process or comprehend words, see text in books or on a screen, or physically manage books or reading devices, Bookshare may be able to help. For a student to join Bookshare, an expert, or Qualifying Professional (for example a Learning Disability teacher, School Psychologist, Speech and Language Pathologist, a teacher of the Visually Impaired), must confirm that the student has a qualifying condition that significantly interferes with his or her ability to read or process printed text. Following are some indicators that a student might have a qualifying condition:

  - **Specific Learning Disability (SLD) that affects reading.** A disorder in the basic psychological processes involved in understanding or in using written language, which manifests itself in the imperfect ability to read. Dyslexia is one example. Students in this category often have SLD on their Individualized Education Plans (IEPs) and/or have a diagnosed learning disability.
Need for Reading Accommodations. The student struggles with reading and does not respond to instructional interventions to improve reading. Students in this category are sometimes served under Section 504 of the Rehabilitation Act of 1973.

- Blindness or Visual Impairment, Including low vision.
- Physical Disability, A disability that hinders the student’s ability to hold a book, turn pages, move his or her head, or otherwise physically manage the activity of reading a book.
• How to join Bookshare?

There are three steps to becoming a Bookshare member:

1. **Register online.**
   a. Click “Sign Up Today”
   b. Click Sign Up Individual
   c. Complete all of the required fields
   d. A welcome email will be sent to confirm your account submission.

2. **Provide proof of disability.** Review the list of qualifying disabilities.

3. **Pay membership fee (if needed).**
   a. U.S. student members and schools—FREE
   b. If you are not a U.S. student or school—A subscription costs just $50 per year!

All forms should be submitted to:

Email: membership@bookshare.org OR Bookshare
Fax: 650.475.1066 OR ATTN: Membership
480 South California Avenue,
Suite 201
Palo Alto, CA 94306

Help Center: [https://www.bookshare.org/cms/help-center/search/topic/sign](https://www.bookshare.org/cms/help-center/search/topic/sign)

*Have more questions?*

**Ask the Community** Email Bookshare OR **Call Us** 650-352-0198

**Hours:** M-F 9-5 Pacific Time
Please see the two videos below on using Bookshare in the Classroom.
Dolphin Easy Reader App for Bookshare Materials

Easy Reader is a FREE accessible reading app for readers with dyslexia, low vision or blindness. Browse & download from the World's largest collection of talking book and newspaper libraries, including Bookshare. Or copy text from anywhere on your phone & hear Easy Reader read it back to you. Experience perfectly synchronized text & audio. Or for text only titles, Easy Reader can add a human sounding voice of your choice. Boost comfort or contrast - choose colors, text size and highlights to suit your visual needs.

A better way to read Bookshare!

Make your books' text as big as your eyes require. Unlike other mainstream reading apps, there's no restriction with Easy Reader. Zoom in with a standard 2-finger pinch or make fine adjustments with the simple sliders. There's never any blurry text or fuzzy fonts - your books' words are always crystal clear and always easy on the eye. Navigate your books or newspapers by skipping directly to specific pages or headings. Search your book for words or phrases. Add text bookmarks or record your own audio bookmarks and return to them with ease.

Download Dolphin EasyReader
Learning Ally Materials

Learning Ally is a leading nonprofit education solutions organization dedicated to equipping educators with proven solutions that help new and struggling learners reach their potential.

Our range of literacy-focused offerings for students in Pre-K to 12th grade and catalog of professional learning allows us to support more than 700,000 students and 135,000 educators across the US. The Learning Ally Audiobook Solution is our cornerstone award-winning reading accommodation used in approximately 19,000 schools to help students with reading deficits succeed. Composed of high quality, human-read audiobooks, and a suite of teacher resources to monitor and support student progress.

The results of a meta-analysis, conducted to determine the effects of read aloud and text-to-speech tools on reading comprehension of students with reading disabilities, showed a significant effect size of .35 and is consistent with a previous meta-analysis on read-aloud accommodations for students with disabilities. In addition, this study suggests that human-read audio had 50% greater effect on student comprehension versus synthetically narrated audio. Does Use of Text-to-Speech and Related Read-Aloud Tools Improve Reading Comprehension for Students with Reading Disabilities? A Meta-Analysis. Journal of Learning Disabilities28

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Learning Ally is the only provider of all human-read audiobook content that meets the needs of students with textbooks, titles aligned to ELA curriculum and books that students want to read. Learning Ally intently focuses on matching characters in books to the tone and texture of the human narrators that evokes emotion and brings characters to life in an authentic way. The human narrator also models oral reading fluency and provides clarity of words through accurate word decoding.

- Case Study: Closing the Achievement and Access Gaps with the Learning Ally Audiobook Solution at Lake Tahoe
- This audio sample of authentic narration of Islandborn by Junot Diaz, showcases how human-read audiobooks can make a story come alive for children.

Eligible students are those that have a reading deficit, are blind or visually impaired or have a physical impairment. Check out the Learning Ally Eligibility Guide to learn more about each of these categories. Learning Ally does not access files out of the NIMAC and therefore an IEP or 504 is not required for student eligibility.

Educators have access to an online student management system that allows for easy monitoring of student progress.

Students have full access to the human-read audiobook library featuring over 80,000 titles that match school curriculums for what students need to read and best-selling titles that students want to read. Students can own or from a curated list of featured titles. This feature has allowed the Learning Ally data sciences team to discover that students are six times more likely to read when they select their own titles.
Students have enhanced learning outcomes with integrated tools that include dictionary look-up, vocabulary list builder, embedded note-taking, page navigation, speed control and push notifications for motivation.

**Learning Ally Videos on Classroom Strategies**

**How to Access Learning Ally**

![Learning Ally Website Screenshot]

Visit [www.learningally.org/educators](http://www.learningally.org/educators) or call 800-221-1098.

**Securing the Learning Ally Audiobook for your school or district.**
1. Call to speak with a Manager of Education Partnerships at 800-221-1098
2. Request more information by filling out the online form, a representative will contact you.
3. Request a virtual demo to be scheduled at your convenience.

**Request Pricing and Get Started**
1. Contact Jessica Austin or Scott Burns, at 800-221-1098 for pricing information. A variety of purchasing options are available including district-wide implementation with launch support as well as single school implementations.
2. Consider adding professional learning support for your educators. Select from 9 courses including Integrating Audiobooks into the Classroom, and more.
3. Send PO to order The Learning Ally Audiobook Solution, per instructions on the estimate.

4. Learning Ally Registrar will process the sales order, create an account in the Educator Portal for your Master Admin, and send an email with login information. Make sure accurate information has been provided for the Master Admin including the address for this important launch email to be received.

**How to Integrate the Learning Ally Audiobook Solution in the Classroom**

1. Your Learning Ally Educator Success partner will reach out to ensure system requirements, technical readiness, and review easy implementation steps as outlined online.


3. Review the Audiobook Strategies Guide to learn more about how to integrate into the classroom. Integration can happen during independent reading, small group or whole group instruction.
Text-To-Speech and Audiobooks for Classroom Instruction Use

This chapter includes descriptions of the ‘Speech’ feature embedded in different Operating Systems as well as multiple Text-To-Speech applications and Audiobooks and information on how to use them in the classroom.

Mac Operating Systems ‘Speech” Feature
(From the National AEM Center website)

Like iOS devices, the Mac also has a built-in text to speech option. This feature is activated with a simple keyboard shortcut once it has been set up in System Preferences (under Accessibility, Speech). Pressing the default shortcut of Option and Escape on the keyboard will read the selected text with any of the system voices.

For learners who require more customizable text to speech support, Wrise is a commercial word processing software that has a reading view where you can listen to text with word or sentence highlighting. A unique feature of Wrise is the ability to “tag” text so that it can be spoken by different voices and with different pitch, etc. This makes it possible to create a kind of re-enactment of the text using text to speech to simulate dialogue (it is also helpful for multilingual texts). It costs $29.99.

Download the Wrise Application

The Wrise TTS allows students to listen to webpages and various documents read aloud by computer voices. The words are highlighted as they are read aloud, making it easier for the students to follow along. They can change the voice, speed and volume of the text as it is read aloud.
iPhone and iPad Operating System’s ‘Speech’ Feature
(From the AEM Center website)

There are three built-in options for text to speech on iOS devices such as the iPad: Speak Selection, Speak Screen and Typing Feedback. These options can be used to read the content aloud in web pages and other documents as long as they contain text that can be recognized by the text to speech. The iOS text to speech features are found in Settings under General > Accessibility > Speech.

• **Speak Selection** speaks the selected text in email, web pages and any document where the text can be selected. This feature requires a few steps:
  o Turn it on: go to General, Accessibility, and Speech in Settings and tap the On/Off switch for Speak Selection. Use the slider to adjust the speaking rate (a third of the way in seems to work well for most people who are just getting started with listening to a text to speech voice).
  o Select text (this will depend on the app, but in Safari you can tap, hold and let go, then use the blue handles to make a selection).
  o Choose Speak from the popover menu.

• **Speak Screen** (iOS 8 and later) is similar to Speak Selection but does not require the user to make a selection first. Performing a special gesture (swiping down with two fingers from the top of the screen) will start speaking everything that is on the display (including buttons and other interface elements). Speak Screen should really be called “continuous reading” mode, because in addition to hearing the content read aloud, it can also flip the pages in an e-book or scroll to the next screen on a long web page. You can also use Siri to activate Speak Screen. Just say “Speak Screen” and it should start reading the current screen aloud.
• **Typing Feedback** (iOS 10 and later): this option will provide spoken feedback as you type individual words or characters. One of the settings also lets you hover over the word prediction suggestions to make sure you have selected the desired option.

Since iOS 6, both Speak Selection and Speak Screen can do word highlighting as the selected text is spoken aloud. This option is found in Settings under Accessibility, Spoken Content, and Highlight Content. You can choose to highlight by word, sentence or both. You can also choose between an underline and a background color for the highlighting.

Most iOS devices also support the same advanced Alex voice that has been available on the Mac, providing even higher quality text to speech support. Alex is unique in that it actually reads ahead in the background to pick up contextual clues that help it figure out how to pronounce words that typically trip up text to speech. Alex also can take a breath every once in a while, just like we do in conversation (and it even has different breaths depending on the word to follow each pause). For those times when even Alex struggles with pronunciation (proper names, brand names, etc.), iOS provides a pronunciation editor.

Some learners may need even more customization than is possible with the built-in text to speech. At that point, it may be necessary to explore a third-party app. In addition to Voice Dream Reader, the free [Dolphin Easy Reader](#) app provides many options for customizing the display of the content and includes built-in text to speech (with support for the purchase of additional high-quality voices). Dolphin Easy Reader can also download books from the [Bookshare](#) service for students with qualifying for Print Disabilities.

Sometimes the content students need to read is only available in a print version. To make it more accessible, the free [Office Lens](#) app from Microsoft (also available for Android) makes it possible to scan a document and convert it into a digital version that can be read aloud with text to speech. Office Lens includes Microsoft's Immersive Reader, which in addition to the text to speech also includes a number of reading supports: color overlays, focus mode, highlighting the parts of speech and more.
Windows’ 10’s Narrator to Read Your Screen Aloud
(From PC Magazine)

How to use Windows 10’s Narrator as a Text-To-Speech and Screen Reader

Windows has long offered a screen reader and text-to-speech feature called Narrator. This tool can read web pages, text documents, and other files aloud, as well as speak every action you take in Windows. Narrator is specifically designed for the visually impaired, but it can be used by anyone. Let’s see how it works in Windows 10.

Turn on Narrator
If you want to use Narrator, the feature must first be turned on. Click the Start button and open Settings > Ease of Access > Narrator to view the Narrator pane. Turn on the Narrator button and a message may appear explaining how the Narrator keyboard layout has been updated more closely match your experience with other screen readers.

Click OK to dispense with this message, and check the box next to “Don’t show again” if you don’t want to see this message each time Narrator starts.
How to Use Narrator

Now, if you want to use Narrator as a helpful text-to-speech reader, you’re ready to go. You just have to turn on the functionality when inside a webpage, document, or file. Move your cursor to the area of text you want Narrator to start reading. Press **Caps Lock + R** and Narrator starts reading the text on the page to you. Stop Narrator from speaking by pressing the **Ctrl** key.

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**How to Use Windows 10’s Narrator to Read Your Screen Aloud Update**

*Offering you a way to hear your text and screen elements read aloud, Narrator has been a fixture of Windows for years. How can you customize and use it in Windows 10?*

Windows has long offered a screen and text-to-speech reader called Narrator, which lets you hear every action you take in Windows spoken aloud. Narrator can also read aloud to you any text in a document or other file. It’s designed for the visually impaired, but it can be used by anyone who wants the screen or text read aloud. Let’s see how it works in **Windows 10**.

Click the **Start button > Settings > Ease of Access > Narrator**. The Narrator pane appears.
Listen to Kindle Books on your iPhone or iPad

How to Enable Text-To-Speech on iPhone or iPad in order to listen to Kindle book:

1. Start the iPad’s Settings app and then tap Accessibility.
2. Tap Spoken Content
3. On the Spoken Content page, tap Speak Screen
4. Now that Speak Screen is enabled, start the Kindle app and open a book to the page you want to read.
5. Using two fingers, swipe downward from the top of the screen.
6. Then the Speak Screen control should appear, and the Kindle page should start to be read aloud.
Claro Read Application

Using the TTS option, students can listen to webpages and various documents read aloud by computer voices. The words are highlighted as they are read aloud, making it easier for kids to follow along.

Using the OCR option, students can scan and read unlimited image files.

Using the screen masking, the software can also mask or hide parts of the screen while kids are reading, to reduce distraction.

The talking dictionary can read aloud definitions for better comprehension.

With the pronunciation dictionary, if the TTS is mispronouncing a word, you can type in the word phonetically. From then on the TTS will pronounce it correctly.
Snap & Read Application

Download Snap & Read

Application cost is $4.99 per month for Mac or Windows.

Students can listen to webpages and various documents read aloud by computer voices. The words are highlighted as they are read aloud, making it easier for kids to follow along. As students highlight text, the text is automatically added to an outline they can use for writing or study. There is also an integrated web browser that students can use when they are on the internet.
Speak It, a Google Chrome Extension

Download Speak It

SpeakIt converts text into speech. The application reads selected text using Text-to-Speech technology with language auto-detection. It can read text in more than 50 languages.

How to use Speak It

- First select the text you want it to read.
- Then click the icon to start listening.
- When it is ready to read, the number of sentences is shown on the icon.
- To stop listening at any time click pause

After installation you may need to restart Chrome so SpeakIt can function correctly
Kami, a Google Extension

Download Kami Extension through Google Chrome

What is Kami?
Kami is a digital classroom app built to transform any existing document into an interactive learning experience. It contains Text to Speech (see video below), it can also be used with Google Classroom (see video on next page). Kami is a PDF and document annotation app used in schools.
Video on Improvements in Kami Text-To-Speech Features

Video on how to use a free version of the Kami extension with Google Classroom
Read & Write for Google Chrome

The Read & Write application is free for teachers under the Texthelp Company
(See Texthelp section on page ???)

Students can listen to webpages and various documents read aloud by computer voices. The words are highlighted as they are read aloud, making it easier for kids to follow along. They can choose from several natural-sounding voices. With the OCR option, students can scan and read unlimited image files. With the highlighting and outlining option, students can highlight text and then collect the highlights.

Webinar by the National AEM Center Staff on Accessibility:
Google Chromebook Tools in Practice
Text-To-Speech for Google Chrome

Download Text-To-Speech for Google Chrome

As an extension on Google Chrome, you can highlight a webpage, text and listen to it. There are over 10+ accents and voices to choose from as well.

This software also supports many languages, it is FREE of charge and easy to use.

You can configure the voice and speed options by changing the settings on the options page.
Read Aloud: A Text to Speech Voice Reader

Read Aloud is an extension available on Google Chrome and Firefox that uses text-to-speech technology to convert webpage text to audio. It works on a variety of websites, including news sites, blogs, fan fiction, publications, textbooks, school and class websites, online universities and course materials.

Read Aloud is aimed at users who prefer to listen to content instead of reading, people with dyslexia or other learning disabilities, children learning to read, or simply to provide users with alternative way to consume web content.

Read Aloud allows you to select from a variety of text-to-speech voices, including those provided natively by the browser, as well as by text-to-speech cloud service providers such as Google Wavenet, Amazon Polly, IBM Watson, and Microsoft. Some of the cloud-based voices may require additional in-app purchase to enable.
Text-To-Speech by the Hewizo Company

The Text to speech by the Hewizo company removes ads and reads articles in over 30+ languages using state of the art AI text to speech engine TTS

Text to speech (TTS) extension that reads articles aloud in 30+ languages using state of the art AI. Hewizo is not only a text to speech (TTS) application, the extension offers multiple productivity features like, cleaning ads, saving articles for later use and aggregating top news from around the world

The Features include:

- Text to speech (TTS) article reader
- Listen to articles using a natural reader to produce the most human sounding voice in over 30+ languages
- Aggregates news from major publications and converts them to audio
- Text to speech TTS feature that converts article URLs to audio
- Conveniently opens/saves web articles on hewizo.com from our chrome extension
- Syncs progress across multiple devices - Start reading on your laptop, continue where you left off on your smartphone
- Allows personal customization - Only see news you care about
- Offers a clean reader view by removing ads from webpages so you can enjoy your articles distraction free
- Save your favorite articles and enjoy them right from your pocket whenever you choose
- You can use Hewizo text to speech as a podcast for your articles collection
Helper Bird: Accessibility & Dyslexia Software

Helper bird is software gives you the features to make more web more accessible and productive to your needs. Providing you features like dyslexia fonts, change the font & background color, text to speech with natural voices, overlays, dyslexia rulers, immersive reader, reader mode, and much more to tailor the web to your needs.

Application software includes:

- Change the font on the page to over 15 fonts.
- Dyslexia fonts, like OpenDyslexic, Lexa pro, Lexend, and 12 others.
- Reader Mode.
- Annotation software.
- Line Focus.
- Overlay to increase reading focus.
- Font sizes.
- Full-screen mode.
- Analyze text.
- Google docs support
- Remove ads with our Adblocker.
- Removes ads and distractions from any webpage.
- Immersive Reader by Microsoft.
- OCR (Optical Character Recognition) App.
- Dictionary and vocabulary features.
- Auto scrolling.
- Increase and decrease cursor size.
- Take a screenshot of any webpage.
- Google translate to over 100 languages
- Color blindness features including Emphasize Links and stroke text
- Volume booster for audio and videos on the web page.
• Text to speech options with pitch, speed, and 25 natural voices.
• Spell check highlighter.
• Page zoom and text magnifier.
• Hide images and Gifs to improve reading focus.
• Pause and autorun mode.
• High contrast any web page.
• Shortcuts.
• Dyslexia ruler to increase reading focus.
• Change the background, font, and highlight the color of the web page.
• Color overlay for scotopic sensitivity syndrome users and for people who don't like a bright white background.
• Use cognitive load to better your reading experience. 4 different options.
• Sign Language support, custom font to change the font to American Sign Language.
• Highlight heading and links
• Adjust the word spacing.
• Adjust the letter spacing.
• Adjust the font size.
• Adjust line-height.

Other Features:
• Dictation feature (Speech to text)
• Note-taking app with the feature-filled editor.
• Bookmarking app, too easy bookmark, and manage apps.
• Sync settings across browsers.
• Premium support.
• 0 plus natural voices.
• Fully integrated Google Docs support.
• COPPA and FERPA compliant
• Customize the text to speech settings.

To see all the features and learn more, check out https://www.helperbird.com/features
Select and Speak – Text-To-Speech

Download Select and Speak – Text-To-Speech, a Google Extension

Select and Speak uses iSpeech's human-quality text-to-speech (TTS) to read any selected text in the browser.

How to use:
- First select the text you want it to read.
- Then click the icon to start listening.
- To stop listening at any time click stop

Select and Speak uses iSpeech's human-quality text-to-speech (TTS) to read any selected text in the browser. It includes many iSpeech text to speech voices in different languages. You can configure the voice and speed options by changing the settings on the options page.
**Texthelp**

The Text help company includes the Read & Write software *(free for teachers)*. It provides support and solutions for schools, including Remote Learning as well as support for parents. **Use this link** to access the texthelp company and scroll down to see their education solutions.

You can access the above downloadable links here

**Texthelp Training Guide in using Read & Write**

**Free Premium Subscription for Teachers**
Libby by Overdrive

Libby is a free app where you can borrow ebooks and digital audiobooks from your public library. You can stream books with Wi-Fi or mobile data, or download them for offline use and read anytime, anywhere. All you need to get started is a library card. You'll need a library card for each library you want to borrow from. You can add multiple libraries to Libby, and you can even add multiple cards for each library.

If you don't have a card, you can learn about getting a card in this help article. Libby is completely free. The device app content's app install is free to install from your store, and all the digital your library is free to valid library card. There subscription costs, no purchases, and no late are automatically their due dates).

You can download the Libby app on: iOS 9+ (get it from the Apple App Store), and Android 5.0+ (get it on Google Play).

If you have a Windows computer, Mac computer, or a Chromebook, you can use Libby in your web browser at libbyapp.com. We suggest using the latest version of Chrome, Safari, Firefox, or Edge (Chromium).

Your library chooses which digital books they'd like to provide in Libby. They also set lending policies, like how long you can borrow books and how many you can borrow at a time. Libby is only for digital books. It doesn't include any physical materials from your library.
Voice Dream Reader

Voice Dream Reader is a most accessible reading tool. With advanced text-to-speech and a highly configurable screen layout, it can be tailored to suit every reading style from completely auditory to completely visual, plus synchronized combination of both.

Voice Dream Reader is Available for Download on the Apple Store for iPhone, iPad & iWatch

Voice Dream Reader supports reading PDF and Word documents, DRM-free EPUB and DAISY eBooks, Web pages and more. It's directly integrated with Bookshare, Dropbox, G-Drive, Evernote, Pocket, Instapaper, and Gutenberg.

It features:
- Built-in voices, as well as in-app purchases of higher-quality voices
- Listen to documents like it’s music, with play-pause button, gestures or remote control
- Synchronized word and line highlighting, font choices, customizable color themes
- Easy extraction of common file types, as well as full integration with Bookshare
- Full text sea and playlists to find text or your books on your iOS device

Short Video: Voice Dream App Demo
Natural Reader
(Described on the National AEM Center)

Download Natural Reader

Users like Natural Reader because it's easy to use, has a "One-click" technology, and there is no difficulty in copying and pasting the text into other forms that TTS software requires. All you need to do is have Natural Reader select the text you'd like to read out loud and press one single hotkey.
Oddcast

Based in New York City, Oddcast is a Media and Technology company that develops conversational character products. The company's flagship product, Vhost, allows businesses to create brand-appropriate online characters that intelligently interact with customers on websites, including learning / educational systems.

Download Oddcast for Education

As you can see from the demo picture/video below, you simply paste text on the box on the left, and the software reads the text aloud, in real time and with accurate lip-synching. Special effects can also be applied to the audio, including emotive cues and expressions. This makes it easier for students with learning disabilities to have an opportunity in reading to follow the text.

There are no programming skills required. Just type in the text bin what characters you would like to be read out loud. Users like this feature as it allows them to read their text.

Click on this picture as it will take you to a video. You can insert text in the box to the left and change the character by clicking on the dice.
From Text-To-Speech
From Text to Speech is the best text to voice software if you’re on a budget. There’s no paid version available, just a single text box that allows you to paste in your desired text. It will then read the text out loud and have it downloadable in MP3 format.

Download From Text To Speech Here

With over 8 languages available, you'll have no problem reading the difficult text. Also, each language has over 2-3 voices with it, ensuring that you get the right reader to assist your listening needs. So think about using this software if you want to have full control over your reading needs.

And the voice speed can be adjusted using this software. For users needing to skim through text quickly, switch it to a very fast setting. But, if you’re trying to comprehend reading, then the very slow feature will help. While this TTS software appears simple, its functionality is a great way to help international students read outside their native tongue.
Readspeaker Voice Demo
(From the AEM Center website)

*Readspeaker Voice Demo* uses humanlike, realistic voices to help readers engage with their content. With over 20+ languages and 70+ voices, it's one of the larger TTS applications on this list. Thus making it the best text to speech software for someone that's struggling to learn their native language.

How does it work? Simply go on their website and type in the desired text you want to be read out loud. You'll have a limit of 250 characters, so you'll be able to have a few sentences read in audio format.

You'll like Readspeaker because of the quality they place behind their voice talents. Each voice actor is set under weeks of training and is given a script to help them produce a natural sounding voice. Because of this, you'll have a reliable TTS system that can help you boost your reading comprehension. Readspeaker is an online platform that provides TTS solutions that are used by multiple websites. Readspeaker was the first to create a speech-enabling application for websites, making it one of the best free text to speech applications available.

Also, Readspeaker has helped students with learning disabilities by improving their reading comprehension and speed. Now, they can consume the same information in a way that gives them learning challenges and suits their style.

With over 35 languages and 100 unique voices, you won't have any issue learning in your native language. Readspeaker has a customized reading area and highlights colors to help you read faster. Thus, you won't have any issues getting your reading levels up to speed.
Storyline Online

Storyline Online is a children's literacy website created by the SAG-AFTRA Foundation, which provides free storytelling videos and resources for parents and teachers to foster a love of reading in children. Storyline Online®, streams videos featuring celebrated actors reading children's books alongside creatively produced illustrations. Readers include Oprah Winfrey, Chris Pine, Kristen Bell, Rita Moreno, Viola Davis, Jaime Camil, Kevin Costner, Lily Tomlin, Sarah Silverman, Betty White, Wanda Sykes and dozens more.

Access Storyline Online Here

Storyline Online receives over 100 million views annually from children all over the world.

Reading aloud to children has been shown to improve reading, writing and communication skills, logical thinking and concentration, and general academic aptitude, as well as inspire a lifelong love of reading. Teachers use Storyline Online in their classrooms, and doctors and nurses play Storyline Online in children’s hospitals.

Storyline Online is available 24 hours a day for children, parents, caregivers and educators worldwide. Each book includes supplemental curriculum developed by a credentialed elementary educator, aiming to strengthen comprehension and verbal and written skills for English-language learners.

Storyline Online is a program of the SAG-AFTRA Foundation. The Foundation is a nonprofit organization that relies entirely on gifts, grants and donations to fund Storyline Online and produce all of its videos.
Lit2Go provides free audiobook versions of books that are no longer protected by copyright laws. Lit2Go offers downloadable PDFs of books so the student can read along while listening to classics like *The Call of the Wild*.

Other sites, like [LibriVox](https://librivox.org), provide a similar service.

The site also categorizes books by [reading level](https://lit2go.org/reading-level/).
Immersive Reader (Microsoft Learning Tools)

Download Immersive Reader for multiple platforms here

With this software students can listen to text read aloud in several Microsoft applications. Words are highlighted as they’re read aloud, making it easier for kids to follow along.

With the OCR option students can convert images of text into electronic text and upload it to OneNote or Word. The screen masking option hides all but a few lines of the screen while reading, to reduce distraction.

With the display control, students control how documents are viewed. Spacing, fonts, and margins can all be customized. The color of the text and background can also be changed.

With the picture dictionary, students can click on a word within the Immersive Reader, they can hear the word read aloud and see a picture of what it means. This is in addition to the standard dictionary and thesaurus tools already in Microsoft Word.

With the grammar options, this software can divide words into syllables, which can help with decoding. Words can also be labeled according to parts of speech, like nouns, verbs, adjectives, and adverbs.
Clicker

What is Clicker?
Clicker is a child-friendly word processor that offers extensive scaffolding options to emergent, developing and struggling readers and writers. It provides support throughout the writing process, from planning, to writing, to proofing. With Clicker, children of all abilities can independently access the curriculum and make significant gains in their literacy skills.

Clicker 8 is compatible with Windows/Mac computers. Clicker Writer is compatible with iPad/Chromebook devices.

Where and how to obtain these materials?
Clicker is purchased from Crick Software. Customers can buy Clicker through Crick Software’s website, or by getting in contact via email at usinfo@cricksoft.com or phone at 203 221 2697.

After a customer has purchased Clicker, they are sent an email containing their access codes and installation instructions.

How to use these materials in the classroom (in plain language)?
Clicker provides extensive text-to-speech support. Each time a student completes a sentence, it is automatically read aloud in a clear, child-friendly voice, with each word highlighted as it is spoken. Those needing more support can choose to have each word or letter read aloud as it is entered. Users can also customize the pronunciation of unusual words and children's names with Clicker. In addition, all of Clicker’s writing tools are speech supported, including the intelligent word predictor and spell checker, so students can check a word before they use it. Students also have access to speech feedback when using Clicker 8’s mind map feature.

Clicker includes access to thousands of ready-made curriculum resources, including sentence building sets, word banks, writing frames and Clicker Books, all of which are speech supported. Clicker can be used in various classroom scenarios, including collaborative whole-class work on an interactive whiteboard, group assignments and independent literacy tasks.
DocsPlus

What is DocsPlus?

DocsPlus is a supportive word processor designed for struggling readers and writers in middle and high school. DocsPlus can also be used by students who qualify for additional access arrangements during exams. DocsPlus is compatible with Windows/Mac computers. The DocsPlus App is compatible with iPad/Chromebook devices.

DocsPlus is purchased from Crick Software. Customers can buy DocsPlus through Crick Software’s website, or by getting in contact via email at usinfo@cricksoft.com or phone at 203 221 2697.

After a customer has purchased DocsPlus, they are sent an email containing their access codes and installation instructions.

How to use these materials in the classroom (in plain language)?

DocsPlus provides extensive text-to-speech support. Each time a student completes a sentence, it is automatically read aloud in a clear, human-sounding voice, with each word highlighted as it is spoken. Those needing more support can choose to have each word or letter read aloud as it is entered. Users can also customize the pronunciation of unusual words and specialist curriculum vocabulary. In addition, all DocsPlus writing tools are speech supported, including the intelligent word predictor and spell checker, so students can check a word before they use it. Students also have access to speech feedback when using DocsPlus’ mind map feature. DocsPlus includes access to hundreds of ready-made curriculum resources, including word banks, writing frames and mind maps, all of which are speech supported.

DocsPlus’ speech feedback is especially useful for students with dyslexia, helping them to focus on what they want to write rather than having to think about each word individually. In addition, DocsPlus has an integrated ‘DocReader’ that will read aloud any PDF or Word document (such as worksheets), enabling students who struggle with reading to access the curriculum more independently.
Talking Word Processor

You can download the Talking Word Processor with the same download link on page 114.

The Premier's Talking Word Processor for Google Chrome is an easy-to-use, full-featured word processor with text-to-speech capability. It includes text dictation, word prediction, content summarization, integrated dictionary and a variety of tools to assist in proofing your documents. Talking Word Processor for Google Chrome works with industry-standard word processing file formats. It is an invaluable tool for teaching word processing and for general literacy. You can use Talking Word Processor to write and organize documents easily and efficiently.

Talking Word Processor includes key features:
- Read any text aloud
- Dictate directly for composition assistance
- 250,000+ word Dictionary
- Word Prediction
- Summary and Writing Analysis
Born Accessible

Born Accessible is a Benetech initiative supported by the U.S. Department of Education, Office of Special Education Programs (Cooperative Agreement #H327D170002).


The digital revolution and ongoing advances in technology have made it possible to get more content, in more ways, to more people. At the same time, they have also given publishers and content creators a new digital imperative—if content is “born digital,” it can—and should—be “born accessible.” Accessible content must be a priority.

This could truly be a golden age of access to books and information for people with print disabilities—such as people who are blind or are dyslexic. There are millions of readers that can’t access a print book because of blindness or low vision, mobility impairments or learning disabilities such as dyslexia. For them, ebook technology promises a new world of opportunity for accessible content. In fact, for the first time in history, people with print disabilities may be able to purchase and fully utilize an entire world of newly published books, instantly upon publication.

As the nonprofit tech company operating Bookshare, the largest library of accessible ebooks in the world, Benetech believes the time is right for the publishing world to seize this era of
opportunity. We believe that all content born digital can—and should—be born accessible. We understand how to navigate this new world of opportunity—both by identifying the possibilities and working to resolve the challenges.

Tremendous progress has been made when it comes to retrofitting books, especially those that are primarily text, but as digital content becomes richer and more complex, such as with STEM materials, the challenge of making it born accessible will require broader partnerships and technological innovation.

**Accessibility Requirements**

Global Certified Accessible (GCA) assesses titles for the full range of accessibility features currently detailed in the EPUB Accessibility 1.0 Specification (also known as the “Baseline”) and Web Content Accessibility Guidelines 2.0 (WCAG 2.0) for levels A, AA, and AAA. Additional features specific to ebooks are also included. Benetech works with a publisher to extensively evaluate their production process for creating accessible books. Benetech certifies that the publisher has demonstrated their conformance to the accessible EPUB creation guidelines set forth by the Global Certified Accessible Consortium and which are based on standards put in place by the W3C and the international publishing community. While Benetech certification denotes confidence that the publisher has demonstrated its ability to regularly produce accessible books, any books that do not fully conform to the Global Accessible Certification standard remain the responsibility of the publisher.
OCR capabilities

Joy S. Zabala, EdD, director of technical assistance at CAST and the National Center on Accessible Educational Materials for Learning wrote this on OCR capabilities, posted this ‘plain language’ article on the Understood website.

Optical character recognition (OCR) plays an important role in transforming printed materials into digital text files. These digital files can be very helpful to kids and adults who have trouble reading. That’s because digital text can be used with software programs that support reading in a variety of ways.

OCR is built into the software of many programs and devices, including some computers, tablets, phones and printers. Many of these devices can automatically convert a scanned or photographed document into digital text.

Digital text is one of several formats that make printed information accessible to more people (other formats include audio, large print and Braille). Digital text is especially helpful for struggling readers, including those who have learning differences such as dyslexia. The digital format makes it possible for readers to see words on a screen and hear them read aloud at the same time. This provides more ways to engage with the information. It can also help kids develop independent reading skills.

What’s the connection between something printed on paper, digital text and OCR? One way to convert printed material to digital material is by using a scanner. The scanner creates a photo of the printed material. This photo, often called an image, can be displayed on a device that has a screen.

But scanning is only the first step. The photo on its own won’t enable software programs to highlight words or add other options that can assist your daughter with reading. This is where OCR comes in.
OCR “looks” at the photo (this is why its name begins with “optical”) and recognizes the shapes of the different letters, numbers and other characters. It uses character recognition to convert the photo of the document into a text file. In many cases, the digital version will maintain the “look and feel” of the original.

OCR makes it possible to make changes to the digital text. What can be done with the digital text depends on which reading software you’re using. Common options include:

- Highlighting words, sentences or paragraphs
- Speaking words aloud using text-to-speech
- Changing the colors and the size of text
- Placing digital “bookmarks” that enable users to move around within the text (such as moving directly from the Table of Contents to Chapter Four)

In essence, OCR lets you make changes to the scanned document and maneuver from place to place within it—just as you can with any text document on your computer.

Let’s say your daughter has a homework sheet that she’s struggling to read. You could scan and transform the homework sheet into digital text. You can learn how to do this by watching tutorials on YouTube. (Enter the term “optical character recognition” in the search box.) Once you convert the sheet into a digital file, she can use the tools on her computer to assist her with reading.
Screen Reader for Text To Speech

There are at least four different options for using a screen reader for text to speech. They include: NVDA, ChromeVox (Chromebook only), Voiceover (Mac/ iOS devices only), and JAWS. JAWS is the only program that is an added cost and the others are either built into the computer system or free. Generally, those with visual impairments use screen readers to assist with accessing computers and other mobile devices. Though we are finding that there are a variety of features that can be useful for those students who have a print disability.

A few features found to be useful include reading key commands, mouse echoing, and navigation shortcut keys. Reading commands may consist of reading the full page, a paragraph, sentence, or a single word. It also consists of commands to listen to the spelling of a given word. Mouse echoing is where the screen reader would read where the mouse is located. It may be as the mouse moves or with the use of a key command. Lastly, students can use navigation key commands to navigate a webpage more efficiently rather than visually reading to find a heading or section. You will also notice a few of the screen readers will have a “visual cursor” that will follow the screen where the screen reader is speaking. This can assist teachers and students better in using the screen reader. Also, the screen readers that are built into the system often have a “practice” feature which gives the user a time to learn to use the screen reader. Newer updates for screen readers are now including gestures for computers with touch screens. This would allow students to combine touch and key commands to access a variety of text.

If choosing to have a student use a screen reader for the added feature of text to speech and there is not a need for assistance in visually accessing the computer, it would be
recommended to use the screen reader on a laptop (mac or pc), desktop (mac or pc), or Chromebook. This is because the student can continue to use the computer normally without the screen reader becoming a nuisance. It would not be recommended to use a screen reader if using a tablet (like the iPad) because there are other gestures needed to navigate the tablet when a screen reader is enabled and can become frustrating for a student if did not have time to fully learn how to use the screen reader.
Premier Chrome Toolbar

Download Premier Chrome

The Premier Toolbar Extension is a convenient way to access all of the Premier Literacy Tools for Google Chrome. Using only a single login, you quickly have access any of Premier’s Tools: One Click Reader, One Click Dictionary, One Click Summary, One Click Dictation, Worksheet Wizard, Talking Word Processor and Talking Pointer. With an easy-to-use license from Premier, you’ll be able to use any of these tools on Chromebooks, PC’s and Mac’s from anywhere using the Chrome browser.

Talking Pointer:  The popular Premier Talking Pointer is great for reading web content. It converts the mouse pointer into a reading tool - simply point and listen.

Talking Word Processor:  The Talking Word Processor is a full-featured word processor that can handle a wide variety of documents, including PDF files. It includes word prediction, content summarization, built-in dictation, and an integrated dictionary.

One Click Reader:  To have any text read aloud with highlighted tracking, simply select text from any webpage or document and click the Reader icon. Change the voice, the speaking rate, and other personalized reading features.

One Click Dictionary:  Definitions at your fingertips!! Select any word from text you are viewing and click the Dictionary icon to get the definition and have it read aloud to you. You can even speak to the Dictionary and have it look up any word! The One Click Dictionary also combines the power of a Thesaurus and Interlink vocabulary for superior writing assistance.

One Click Summary:  If you need to focus on the most important information in an article, Summary is the tool for you. Select any amount of text from a passage, click the Summary icon and paste it in. Set the Summary to any percentage, and within seconds you can have the summarized version of the text read aloud to you. One Click Summary makes quick work of studying and research involving large amounts of information.
**One Click Dictation:** Why type when you can just talk? One Click Dictation lets you talk instead of type!!! In fact, there’s no need to “train” it for your voice. With outstanding accuracy, One Click Dictation even handles different spellings for U.S. vs. Canada / U.K. English. You can proofread your dictated text aloud and copy it into any other application like email, word processing and online forums!

**Worksheet Wizard:** Worksheet Wizard is a great tool for working with any type of worksheets. Simply access PDF files from any source (including scanners or phone apps) and load them into the Worksheet Wizard. Flexible capabilities allow you to have text read aloud to you, edit text, copy and paste graphics, add annotations and save your changes directly to the PDF file. It even has the ability to dictate text, and includes robust word prediction.
Use of Additional Voices
Contributed by Professor Dave Edyburn: Text to speech users are encouraged to explore the various voices offered within their technology operating system to find the voice that they find most agreeable. This is a form of personalization since there is no best single voice. Text to speech users may discover that they need to use multiple voices because their preferred voice may not be available on all devices in all applications because of the programming tools that were used.

Apple
Mac Voice Over Screen Reader
https://www.apple.com/accessibility/mac/vision/

Chrome
You can buy voices through Acapela to personalize the voice that reads text aloud to you on your Chromebook.
https://www.acapela-group.com/
https://support.google.com/chromebook/answer/9032490?hl=en

There are various web-based voice synthesizers that work with any operating system:

AT&T Natural Voices
https://nextup.com/attnv.html

Free TTS
https://freetts.sourceforge.io/

Read Aloud (Firefox add-on)

Watson Text-to-Speech
Classroom Barriers to the use of TTS / Audiobooks and How to Eliminate / Reduce Barriers

The following table summarizes some of the issues and offers strategies for overcoming each potential barrier (Teachers and other stakeholders – please add additional barriers and solutions that you experienced in using Text-To-Speech)

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Strategies for Overcoming Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudinal: “Text-To-Speech is not really reading”</td>
<td>Text-To-Speech offers an alternative format for obtaining information. It can provide access to the curriculum for students who cannot read independently at grade level. Reading is more than decoding – reading comprehension involves making sense of text and applying the knowledge.</td>
</tr>
<tr>
<td>Classroom Management</td>
<td>Introduce Text-To-Speech to all students and encourage them to explore when, why, and how to use it most effectively.</td>
</tr>
<tr>
<td>“Won’t the noise be disruptive?”</td>
<td>Using Text-To-Speech in the classroom requires that every student have their own headphones to prevent the audio from disturbing other students. Encourage students to bring their own headphones and leave a set in their desk. Ensure that each classroom has several extra sets of headphones for students who forget their personal headphones or replace headphones that are broken.</td>
</tr>
<tr>
<td>Lack of awareness</td>
<td>Some teachers may not be aware that text-to-speech is built into the operating system of all recent technology devices. Explore the accessibility control panel on your device to learn how to activate text to speech tools.</td>
</tr>
<tr>
<td>Lack of training</td>
<td>Teachers and parents may need a short presentation to learn how to make the most of text-to-speech tools. Check with your district technology specialists or assistive technology specialist on how to learn more about text-to-speech.</td>
</tr>
</tbody>
</table>
Using text-to-speech does not involve more planning time for teachers once students have been training how to use the tools on their devices.

Text-to-speech tools are built into a variety of technologies. Encourage students to explore the applications of their favorite text-to-speech tools when reading a webpage, viewing a PDF, viewing an e-book, writing in their word processor, as well as completing a worksheet.
Data Collection

How to Collect data to monitor student progress

Using the above TTS or audiobook

Protocol for accommodations in Reading (PAR/UPAR)

Data could also be used in the report to parents on the I-6 IEP form, Interim review of IEP goals.
The use of TTS in Statewide Assessments

Forward Exam, Section II: Designated Supports

Please note that the TTS support option that is highlighted below is part of the Designated Supports section only, not the Accommodations section. SwD may use TTS in the Forward Exam if it is part of their classroom instruction.

This section describes the designated supports currently available for the spring 2021 Forward Exam. Designated supports are those features that are available for use by any student for whom the need has been indicated by an educator or team of educators (with parent/guardian and student input as appropriate) and are part of the student’s classroom instruction. They are either provided as part of the online testing system (embedded) or separate from it (non-embedded). Students should have time to practice using the accommodation with the Forward Exam Online Tools Training (OTT) prior to actual testing.

<table>
<thead>
<tr>
<th>Embedded Designated Supports</th>
<th>Test Ticket Abbr.</th>
<th>Description</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTS</td>
<td>TTS</td>
<td>The text-to-speech (TTS) function allows the student to listen via headphones or speakers to test information displayed on the screen. Words and numbers, test directions, questions, answer choices, and other information is read aloud by the computer and may be replayed as necessary. NEW: TTS automatic playing (autoplay) can be turned off if a student only wants to use this feature on demand.</td>
<td>Text-to-speech (TTS) (computer voice) is allowed as a designated support for all grades in mathematics, science, social studies, and English language arts (ELA) as appropriate (not allowed for ELA Session 4 reading passages). With this feature, test content is read aloud by the computer in the English language. The TTS designated support is intended only for students who are struggling readers who may need assistance accessing the assessment or for students with reading-related disabilities. Students should use a similar support on a regular basis in the classroom. Allowing TTS for all students is not a proper use of this support. Students who use this support will need headphones unless tested individually in a separate setting. See Appendix E for more information about TTS vs. Read Aloud, and Designated Support vs. Accommodation. The majority of students who require test read to them should use the TTS designated support, to ensure these students are provided a standardized support across the state. This includes students who have IEP or 504 plans. Human readers (Read Aloud) are only permitted in cases where students cannot manage to work with the computer audio voice (e.g., some students with autism or hearing impairments). NOTE: Read Aloud (human reader) and TTS (computer voice) are mutually exclusive and must not be assigned together, because they are the same support provided in different formats (human read vs. computer read). Both supports provide the information auditorily, therefore only one needs to be selected. If you are unsure which support to provide, have the student use the Online Tools Training (OTT) with TTS (computer voice) prior to assigning.</td>
</tr>
</tbody>
</table>

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ACT Aspire, Accessibility System, Level Support 3, Accommodations

Support Level 3: Accommodations

Please note that the TTS option (highlighted in yellow below) is available for SwD.

Beyond the accessibility features available to all examinees, assessment accommodations are available to some examinees with a documented disability who have an IEP, 504 plan or other formal education plan. Assessment accommodations are changes made to assessment procedures that provide an examinee with access to comprehensible information without affecting the reliability or validity of the assessment.

Accommodations used on the ACT Aspire must be used regularly by examinees in their educational environment, including during interim and summative assessments. Specific accommodations and their use must be documented on their formal educational plan. Qualified testing staff may request these tools on behalf of an examinee through the PNP. Some examples include:

- Text-to-speech English audio (online)
- Text-to-speech English audio + orienting description for blind/low vision (online)
- Text-to-speech Spanish audio (online)
- Word-to-word dictionary (online and paper)
- Human reader, English audio (online and paper)
- Translated test directions (online and paper)
- Braille + tactile graphics (online and paper)
- Sign language interpretation of items
- Cued speech of items (online and paper)
- Electronic spell checker (online and paper)
- Extra time (online and paper)
- Breaks: securely extend session over multiple days (paper)
ACT Statewide

Please note that the TTS option (highlighted below) in the ACT is available for SwD

<table>
<thead>
<tr>
<th>Description</th>
<th>Support Level</th>
<th>Content Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Paper</td>
<td>Online</td>
</tr>
<tr>
<td>Audio-Recording, Full Test (USB)</td>
<td>A</td>
<td>—</td>
</tr>
<tr>
<td>Reader Script, Full Test</td>
<td>A</td>
<td>—</td>
</tr>
<tr>
<td>Screen Reader</td>
<td>A</td>
<td>—</td>
</tr>
<tr>
<td><strong>Test to Speech</strong></td>
<td>—</td>
<td>A</td>
</tr>
<tr>
<td>Translated Written Directions—20 Languages</td>
<td>A¹</td>
<td>A¹</td>
</tr>
<tr>
<td>Provided (ELs)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Translated Audio, Full Test¹</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Word-to-Word Dictionary (ELs)*</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>American Sign Language (ASL), Directions Only</td>
<td>LÀ</td>
<td>LÀ</td>
</tr>
<tr>
<td>Signing Exact English (SEE), Directions Only</td>
<td>LÀ</td>
<td>LÀ</td>
</tr>
<tr>
<td>Signing Exact English (SEE), Full Test</td>
<td>A</td>
<td>—</td>
</tr>
<tr>
<td>Cued Speech</td>
<td>A</td>
<td>—</td>
</tr>
<tr>
<td>English Braille American Edition (FBASE/Nemeth),</td>
<td>A²</td>
<td>A²</td>
</tr>
<tr>
<td>available with Tactile Graphics and Nemeth code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>for Math and Science (Contracted)</td>
<td></td>
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</tr>
</tbody>
</table>
Important Information for Parents

The PACER Center
This is a parent training and information center for families of children and youth with all disabilities from birth to young adults, funded by OSEP.

Located in Minneapolis, it serves families across the nation, as well as those in Minnesota. Parents can find publications, workshops, and other resources to help make decisions about education, vocational training, employment, and other services for their children with disabilities.

The Pacer Center information on Reading with Audiobooks and Text to Speech

Introduction
Listening to books and other material read aloud can help individuals to better focus and comprehend the content. To understand reading materials, an individual must first be able to perceive (recognize or identify) the content through one of the senses such as sight (e.g., reading text with the eyes), hearing (e.g., audiobook or text-to-speech), or touch (e.g., braille). For some individuals, hearing may be the only meaningful way to receive information. In this case, listening to content may be helpful.

Technology offers options that can lead to greater independence by helping individuals with disabilities to perceive, focus on, and understand the content of reading materials. For example, audiobooks (typically audio files narrated by a person) and text-to-speech or TTS (a computerized voice that reads digital text aloud) are two helpful options for many people.

First Steps: Trying Audiobooks and Text-to-Speech (TTS)

Step 1: Find a free audio book or TTS program
- To decide what kinds of options could be helpful for you, borrow audiobooks from the library and try free versions of TTS programs (e.g., Natural Reader, Read & Write for Google Chrome extension, Voice Dream Reader) to read digital text on websites or other digital text files.

Step 2: Identify the settings that work for you
- Try the various voices offered and choose one that helps you hear the content best.
- Try different reading speeds to find what fits best for you and the content. You may prefer different speeds for different content at different times.
- Consider whether it is important to see the text while listening to the content. Most TTS programs will display the digital text while the digital voice reads aloud. Some TTS programs also provide synchronized highlighting for visual tracking. Most audiobooks do not provide text and audio pairing, but you can follow along in a print book or digital text.

Step 3: Read without distractions to help focus
- Use these tools in a quiet, distraction-free environment to reduce competition for your attention.
- Use the tools you need to help with focus and attention while you are listening.

Step 4: Use comprehension strategies to actively listen and engage with the content
- As you listen, pause the reading periodically to use active listening skills and engage with the content: reflect, reread, interpret, and analyze.
- Take notes as you actively listen and engage with the content.
- If you encounter a word you don’t know, pause the reading to look up the definition and take notes. Then rewind a little before you resume reading so that you hear the new word again in context.
- If parts of the reading don’t make sense, or if you were distracted for a moment, stop the reading and rewind to listen again. If you still don’t understand the content, ask questions or look up more information on the topic.
- Use a timer to remind yourself to pause and use these strategies and techniques.
Ask yourself: Does listening to the content and using these strategies help improve your comprehension?

Next Steps: Acquiring Reading Materials and Tools

Step 5: Acquire the needed audiobooks or digital text

- If listening is helpful and effective, you will need to find the books and other reading materials in an audio or digital text format.

Options to find free content
If the book is a classic, out of copyright, or not protected by copyright, you might be able to find it from a free source such as Project Gutenberg or Librivox (online resources).

Check with the library to see if audio books and digital books are available for loan. Many libraries have current books available.

Options to buy content
Many different stores and websites sell audiobooks and digital books. When you buy a digital book you are often committed to read that book using the sellers' provided program or app (e.g., Kindle or Nook devices or apps). Review the features of a specific device, program, or app to determine if text-to-speech is provided.

Options for individuals with a print-related disability
If you have a disability that affects your ability to read traditional print materials, talk with a professional who provides disability services at your school. The school may be able to provide you with free access to Bookshare.org or Learning Ally (online resources).

Step 6: Create digital text when necessary

- Some content looks like text but is actually an image that TTS programs aren't able to read. If you encounter this issue, you may want to use a program such as Read & Write Gold by Texthelp or Snap & Read by Don Johnston that applies optical character recognition (OCR) to screen shots of the text.
If audio or digital text cannot be found for a particular item, it can be created using a scan-and-read software or technology that utilizes optical character recognition (OCR) to create digital text. Note: Some material may be subject to copyright law.

Step 7: Learn more about audiobooks and digital text

- The Center on Technology and Disability (CTD) provides a variety of resources on Accessible Educational Materials (AEM), including information on audiobooks and digital text. Learn more at ctdinstitute.org.
- PACER Center offers many helpful resources. Learn more at PACER.org/STC.
- Visit The National Center on Accessible Educational Materials (AEM) at aem.cast.org where you'll find two helpful articles on this topic: “Acquisition of AEM” and “Higher Education and AEM.”

Step 8: Explore and select your TTS tools

- To learn more about the different TTS tools, talk with school professionals, disability services staff, an assistive technology center, or a state assistive technology program.

Example
Emma is a bright, cheerful 9th grader who loves animals. She really enjoys math and science, but not reading. Emma doesn’t like reading because it takes her a long time, is exhausting, and after making the effort to read the material she still has a hard time understanding the content. Emma has a reading disability. She can understand the content of her reading materials faster and better when someone else reads it aloud and she follows along in the text.

Emma joined Bookshare so she can access textbooks and other reading material in a digital text format. With digital books from Bookshare, she is able to see the text and hear it read aloud at the same time with a text-to-speech program.
Emma uses an app on her iPad called Voice Dream Reader by Voice Dream, which she purchased from the iTunes app store. She can download reading material directly into the app and use the text-to-speech features to hear the materials read aloud along with synchronized highlighting, which highlights words as they are read by the program. This helps her follow along and be more focused. She also uses a fidget (a handheld object such as a stress ball or wad of silly putty), and sits on a balance ball in a distraction-free area. After Emma selected a “voice” she liked from the various options, she tried different listening speeds and chose one that works well for her. She also changed the visual settings for background color, font color, font type, font size, and margins in order to see the text more clearly.

In addition to listening and following along in the text, Emma uses many comprehension strategies to help her better understand what she is reading. Here are some examples:

- Emma stops when she encounters a word she doesn’t know and looks up the definition. She then rereads the sentence to understand what the word and sentence mean.
- To help her remember and understand what she is reading, Emma uses the highlighter tool provided in the app to highlight and save information to review later.
- For complex topics, Emma pauses after every paragraph or section to review what she learned and find answers to her questions. If she doesn’t understand something, or missed some information, she replays those sections.
- Using the note taking feature in the app, Emma frequently writes summaries and her interpretation of what she is reading. She relates that to her personal experiences, opinions, knowledge, and information about the topic.
- Emma occasionally sets a timer to remind herself to use these strategies while reading.
Emma likes to learn about animals, and she will often look up information online and read journals and magazines about the subject by using text-to-speech tools, such as Read & Write for Google and Snap & Read which allow her to read with her ears.

Sometimes she encounters words that look like text but she is not able to select the words and use her reading tools. When this happens, Emma uses the snapshot tool in Snap & Read to convert the image to digital text that the program can read aloud.

Some material is only available in printed form. In this case, Emma uses a scan-and-read program, or an app such as Prizmo, which uses optical character recognition (OCR) to convert a picture of the print copy into digital text. The text can then be sent to Voice Dream Reader to read aloud and use the study tools.

Thanks to innovative technology and the comprehension techniques and tools she now uses, reading is much easier. Emma can read faster, read more, read independently, and better understand the content. Most importantly, Emma can now enjoy reading!
Both audiobooks and text-to-speech (TTS) can help kids who have reading issues like dyslexia. These types of assistive technology let kids listen to a book being read aloud as they look at the words. But audiobooks and TTS are different in key ways. Use this chart to find out the differences.

Did you know that your child may be eligible for free digital text-to-speech books? Learn more.

There are many different TTS voices. As technology improves, the voices sound more and more natural. But since TTS is a digital voice and not a human voice, the reading may have:
- Words pronounced wrong.
- Pauses in places that don’t make sense.
- Words read in a tone or with an emotion that doesn’t make sense.

<table>
<thead>
<tr>
<th>Audiobook</th>
<th>Text-to-Speech</th>
</tr>
</thead>
<tbody>
<tr>
<td>What it is</td>
<td>An audio recording of a book being read aloud.</td>
</tr>
<tr>
<td>Type of reading voice</td>
<td>Human voice</td>
</tr>
</tbody>
</table>
| How the voice sounds | Audiobooks are usually read aloud by actors. Because a person reads the text, audiobook readings tend to include things like:  
• Changes in tone and emotion. | There are many different TTS voices. As technology improves, the voices sound more and more natural. But since TTS is a digital voice and not a human voice, the reading may have:  
• Words pronounced wrong. |
<table>
<thead>
<tr>
<th>Pauses in the reading at natural places, like at the end of sentences.</th>
<th>Pauses in places that don't make sense.</th>
<th>Words read in a tone or with an emotion that doesn’t make sense.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Format</td>
<td>Typically a digital file. Audiobooks are often formatted as MP3 files that can be played on a computer or mobile phone.</td>
<td>Software or program. Many electronic devices come with TTS built in. TTS is also available in a wide range of apps and programs.</td>
</tr>
<tr>
<td>How it’s used with visual text</td>
<td>Kids listen to the book read aloud. They may have a printed copy of the book and turn the pages to follow along. Or they may follow the words on a screen.</td>
<td>Kids listen to the text spoken aloud as they follow the words on a screen.</td>
</tr>
<tr>
<td>Highlighting words</td>
<td>Most audiobooks don’t highlight words as they’re read aloud. However, some newer versions of audiobooks sync the audio recording to digital text. In that case kids can hear words read and see them highlighted on a screen.</td>
<td>Many TTS tools highlight words as they are spoken.</td>
</tr>
<tr>
<td>Moving around in the text</td>
<td>You can jump around to different parts of an audiobook. But it can be hard to find a specific passage or sentence, since you have to rewind or fast forward to locate it. Some newer audiobooks sync with digital text. In that case, you can scroll or use Control/Command+F to search for with TTS, it’s easy to find a specific part of a book. You can search the table of contents or look for particular words using Control/Command+F. TTS then reads the text that’s found.</td>
<td></td>
</tr>
</tbody>
</table>
| What to know about cost | An audiobook is a recording of just one specific book. You can buy an audiobook for every book your child wants to read. Or you can use a service and pay a yearly fee for as many audiobooks as your child chooses to read. Costs vary:  
- Audiobooks can be free or inexpensive. You might find them at your local library.  
- Newer types of audiobooks that sync to digital text cost more but can still be reasonably priced. | TTS software can be used for any digital text. Once you have it, you can use it for multiple book and for other uses, such as reading email. Costs vary:  
- TTS software may be free if it's built into a mobile phone, tablet or other device.  
- TTS programs can range in price. Many come with a more natural-sounding voices and features like a built-in dictionary or the option to speed up or slow down the reading speed. |
| Where to find it | Some places to look for audiobooks:  
- Learning Ally  
  - $49/quarterly for four audiobooks; $119/year for unlimited audiobooks  
  - Must have documented print disability to be eligible for membership  
  - 75,000+ audiobooks available  
  - Learning Ally is a nonprofit organization | Some places to look for TTS resources:  
- Bookshare:  
  - Free for U.S. students with a documented print disability  
  - $50/year plus one-time $25 setup fee for other users with a documented print disability  
  - 660,000+ digital TTS books |
<table>
<thead>
<tr>
<th>Commercial Services</th>
<th>A project of Benetech, a nonprofit organization and Understood founding partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Audible.com: $14.95/month for one audiobook, from a selection of 100,000+ titles</td>
<td></td>
</tr>
<tr>
<td>• Kindle: $9.99/month for unlimited access to 3,000+ audiobooks</td>
<td></td>
</tr>
<tr>
<td>• Amazon Immersion: Prices vary; allows some audiobooks to sync to digital text</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Apps for Purchase</th>
<th>Built in TTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• For example, Shakespeare in Bits ($14.99)</td>
<td>• Mobile Devices using iOS or Android have free TTS features</td>
</tr>
<tr>
<td>• Explore more audiobook apps in Tech Finder</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Apps for Purchase</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>• For example: Voice Dream Reader ($9.99)</td>
<td></td>
</tr>
<tr>
<td>• You can explore more TTS apps in Tech Finder</td>
<td></td>
</tr>
</tbody>
</table>
Assistive Technology Resources from the Understood Website

Explore Other Assistive Tech

Chrome Tools for Kids With Learning and Attention Issues
Software for Kids With Learning and Attention Issues
Free Online Assistive Technology Tools to Help With Reading, Writing and Math
Assistive Technology Platforms: What You Need to Know
Assistive Technology That’s Built into Mobile Devices
8 Examples of Assistive Technology and Adaptive Tools

# Strategies for Assistive Technology Negotiations

adapted from an Advocacy Institute presentation on Assistive Technology

by Dave Edyburn, Ph.D.

University of Wisconsin - Milwaukee

<table>
<thead>
<tr>
<th>If a School Official Says…</th>
<th>A parent might respond (in writing)...</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. We’ve considered your child’s need for assistive technology and have determined that s/he will not benefit…</td>
<td>...I would like to review the documentation that supports your decision. In particular, I would like to see the data regarding performance with assistive technology and performance without.</td>
<td>Remediation vs. Compensation, WATI Assessing Student Needs for AT - 5th Edition, Chapter 1 - Consideration Guide, WATI Assessment Package</td>
</tr>
<tr>
<td>2. Best practice suggests you always begin with no-tech solutions first...</td>
<td>...Consideration should not be a linear process of trial and error. Rather, all possible solutions should be explored.</td>
<td>WATI Assessment Package</td>
</tr>
<tr>
<td>3. We can’t afford that...</td>
<td>...Cost is cannot be considered a factor in AT consideration.</td>
<td>Funding AT</td>
</tr>
<tr>
<td>4. We are not sure what types of AT are out there...</td>
<td>...What steps will you take to fulfill the AT consideration mandate?</td>
<td>Texas AT Training Modules, AT Parent Guide - AT Tools</td>
</tr>
<tr>
<td>5. It’s not clear that (the student) actually</td>
<td>...I would like to see the data that supports such a conclusion.</td>
<td>How do you know?</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>does better with the AT...</td>
<td>Typically, we need to review performance data over time, with and without the technology to come to such a conclusion.</td>
<td></td>
</tr>
<tr>
<td>6. We don’t want him to become dependent on a text-reader...when will he ever learn to read...</td>
<td>...Since the student doesn’t have the independent reading skills and the expectation in grade 4 and beyond is to access large amounts of text, how will you demonstrate that he has access to the curriculum without a text-reader?</td>
<td>Learning from Text</td>
</tr>
<tr>
<td>7. Your child is not the only one that struggles with this problem...</td>
<td>...I can appreciate your concern, but my primary interest is the success of my child. As a result, what are you going to do to ensure that my child is successful?</td>
<td>Teaching Every Student</td>
</tr>
<tr>
<td>8. We will provide some specialized technology but there is no need to write it on the IEP...</td>
<td>...I am pleased to hear that assistive technology will be provided. However, to ensure the rights of all parties are protected, our plan for acquiring and using AT should be written on the IEP.</td>
<td>Documenting AT Needs in the IEP</td>
</tr>
<tr>
<td>9. We are not authorized to make a decision about AT...</td>
<td>...I am disappointed to hear that. I guess we will need to adjourn the meeting until an appropriate administrator is here.</td>
<td>Texas AT Training Modules</td>
</tr>
<tr>
<td>10. The textbook is not available in digital format...</td>
<td>...That’s unfortunate. That means that the textbook must be scanned using a “scan and read” program such as Kurzweil or WYNN or be professionally scanned.</td>
<td>Scan to Speak Programs</td>
</tr>
</tbody>
</table>
11. Copyright laws do not permit us to have your child’s textbook scanned. Because my child is reading is ____ grades below grade level, s/he requires alternative ways to access the general curriculum. *

12. The student isn't eligible for AT because he does not meet criteria for a "print disability" under Chafee... Many students with learning, hearing, or other cognitive disabilities who need AIM will not qualify under copyright law as a student with a “print disability” (e.g., dyslexia); yet it is still the responsibility of SEAs (State Education Agencies) and LEAs (Local Education Agencies) to provide AIM to them.

13. The student must have an Assistive Technology evaluation before s/he can be provided with grade level textbooks in accessible formats... Accessible Instructional Materials (AIM) must be provided in a "timely manner" ("at the same time as other children receive instructional materials").

**“With the advent of cost-effective and efficient digital scanning technology, local districts have significantly increased their capabilities to digitize books directly into more accessible digital formats. … in the absence of accessible materials from publishers, scanning a book may be the most effective method of providing instructional materials to print-disabled students, at least for the immediate future.”

An Educator’s Guide to the Acquisition of Alternate Format Core Learning Materials for Pre-K-12 Students with Print Disabilities
Implications for Public Policy
Glossary