

## Supporting Literacy in Individuals with ASD through the use of Assistive Technologies



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A division of the ESC of Central Ohio

### Session Handouts

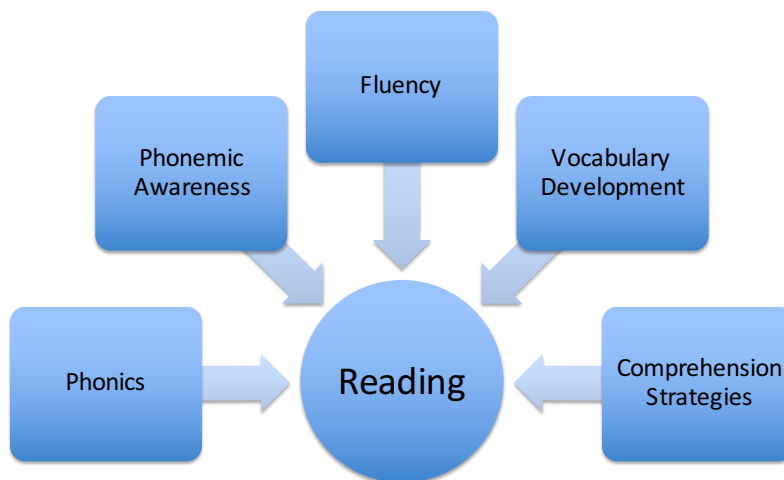
[http://www.ocali.org/project/document\\_archive](http://www.ocali.org/project/document_archive)

## Objectives

- ✓ Gain understanding of common reading barriers for students with ASD
- ✓ Gain understanding of features of technology that address reading barriers
- ✓ Gain an understanding of the process for feature matching student needs and technology features



## Components of Reading



Adapted from Ambruster et al. (2003)



The reading problems of those with autism spectrum disorder may not be obvious initially and may worsen over time.




## Autism Spectrum Disorder Characteristics

DSM-5	Federal Definition of Autism
<b>Fixated Interests and Repetitive Behaviors</b>	
a) Stereotyped or repetitive speech, motor movements, or use of objects	<ul style="list-style-type: none"> <li>•Engagement in repetitive activities and stereotyped movements</li> <li>•Disability affecting verbal communication</li> <li>•Disability affecting nonverbal communication</li> <li>•Disability affecting social interactions</li> </ul>
b) Excessive adherence to routines, ritualized patterns of verbal or nonverbal behavior, or excessive resistance to change	<ul style="list-style-type: none"> <li>• Resistance to environmental change or change in daily routine</li> </ul>
c) Highly restricted, fixated interests that are abnormal in intensity or focus	<ul style="list-style-type: none"> <li>• Engagement in repetitive activities</li> </ul>
d) Hyper-or hypo-reactivity to sensory input or unusual interest in sensory aspects of environment	<ul style="list-style-type: none"> <li>• Unusual responses to sensory experiences</li> </ul>



## Autism Spectrum Disorder Characteristics


DSM-5	Federal Definition of Autism
<b>Qualitative Impairments in social communication</b>	
a) Deficits in social-emotional reciprocity	<ul style="list-style-type: none"> <li>•Disability affecting social interactions</li> <li>•Disability affecting verbal communication</li> <li>•Disability affecting nonverbal communication</li> </ul>
b) Deficits in nonverbal communicative behaviors used for social interaction	<ul style="list-style-type: none"> <li>•Disability affecting social interactions</li> <li>•Disability affecting verbal communication</li> </ul>
c) Deficits in developing and maintaining relationships, appropriate to developmental level	<ul style="list-style-type: none"> <li>•Disability affecting social interactions</li> </ul>





## Socialization and Literacy Impact

Adapted from Iland 2011

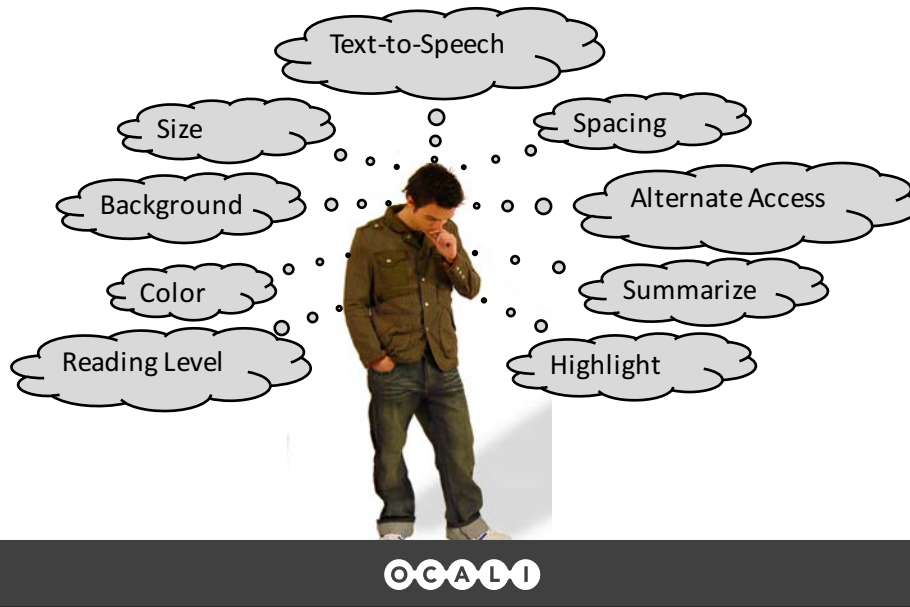
Area of Developmental Concern	Possible Effect on Literacy and Comprehension
Play skills	Cognitive development, learning and literacy
Shared enjoyment	Decreased time in shared activities including reading
Joint attention	Limited attending to reading activities with others
Imitative play	Practice of roles and actions in real life may impact understanding of those roles and actions in storybooks
Imaginary play	Understanding of imaginary content in books
Conversations with adults	Decreased language development
Social experiences	Limited SE yields limited understanding of vocab and storyline (plot, characters, etc.)
Social understanding	Difficulty relating to story lines and characters
Perspective taking	Understanding of characters and interactions



Communication and Literacy Impact	
	Adapted from Iland 2011
Area of Developmental Concern	Possible Effect on Literacy and Comprehension
Language development	Comprehension of word, sentence and text
Oral language	Spoken language relates to written language
Recognizing and responding to non-verbal language	Misses context cues and foreshadowing
Literal interpretation of language	Difficulty with idioms, connotation, multiple meaning words, metaphors, figurative language, hyperbole and personification
Understanding relationships between words and meaning	Difficulty organizing and categorizing words impacting recall of information
Interpretative language abilities	Generating inferences, resolving ambiguity, cause and effect, monitoring comprehension
Difficulties with pronouns	Loss of meaning and confusion of characters
Difficulty generating questions while reading	Difficulty establishing meaning and relevance
Listening and understanding oral language	Misses out on content of oral literacy activities
	

Restrictive and Repetitive Behavior and Literacy Impact	
	Adapted from Iland 2011
Area of Developmental Concern	Possible Effect on Literacy and Comprehension
Limited general fund of knowledge	Understands less
Narrow focus of interest/knowledge	Generalization of info may be difficult
Exposure and then repeated exposure to a narrow range of topics	General reading materials less motivating and interesting, socialization impacted
Restricted or repetitive play, leisure, or academic activities	World, word and social understanding may result in decreased flexible thinking
Reading as a restricted and repetitive activity	Isolation results in decreased social understanding and application to materials
Literal, specific, and concrete understanding	Generalization and imagination may be limited and impact understanding
Restricted focus	Difficulty with multiple meaning words
Over-selective attention	Shifting focus or attends to multiple details
Self stimulatory behaviors	Limits engagement in reading activities
	

## Accessible and Usable Text



## SETT Framework

- Student
- Environment
- Task (what is the purpose?)
  - Connected to the standards
  - Need identified in the IEP
  - ID of weak skills through formative assessment
- Tool

## Kim

- Very happy and social preschooler (4 years old)
- Word reading ability at a 5<sup>th</sup> grade level (Hyperlexic)
- Vocabulary understanding is below age range
- Generally gross and fine motor manipulation skills appropriate, but some difficulty with coordination and imitation
- Communication skills are delayed with difficulties in using vocabulary appropriately and word ordering
- Recites content of many different TV commercials and shows
- Visual motor skills delayed for prewriting
- ESL but family speaks primarily English
- Special interest is Nascar racing



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## Environments

- Integrated preschool program in elementary building
- Twelve students (8 students neuro-typically developing, 4 students with special needs), one preschool teacher, one paraprofessional
- Center based activities involving hands-on/experiential learning, kinesthetic, music, sensory, etc.
- Receives speech and language therapy in classroom in small group (2 x's weekly)

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## Tasks

- Ask and answer questions and comments about characters and major events in familiar stories
- Retell or re-enact familiar stories
- Communicate with others about text, listens to others, takes turns talking and stays on topic
- Recognize and read familiar words or environmental print



## Matching Features to Student Needs

Needs	Features
Ask and answer questions and comment about characters and major events in familiar stories	Picture communication supports of relevant vocabulary text to aid in retelling and connecting words with the vocabulary meaning
Retell or re-enact familiar stories in appropriate order	Picture communication supports with sequencing features
Continue vocabulary development	Picture supports for vocabulary development
Find alternate ways to show what he knows since drawing, writing, & speaking skills are delayed	Manipulatives and/or technology choices
May need to capitalize on his special interest when possible to foster motivation and engagement	Use of Nascar when needed
Communicates with others (e.g., listens to others, takes turns talking and speaking about the topic or text being discussed)	Social narratives to support appropriate behavior





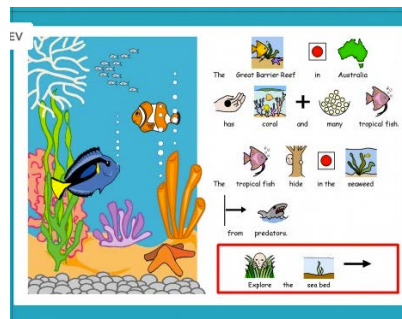
## Tools for Trial



## Picture Supports –Creating



Boardmaker  
Mayer-Johnson

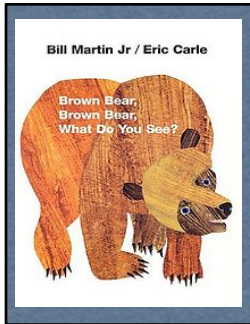


Writing with Symbols  
Mayer Johnson (Win Only)



symbolstix™  
Symbolstix by N2Y





communication board



symbols for book adaptation

<http://www.baltimorecityschools.org/site/Default.aspx?PageID=1446>



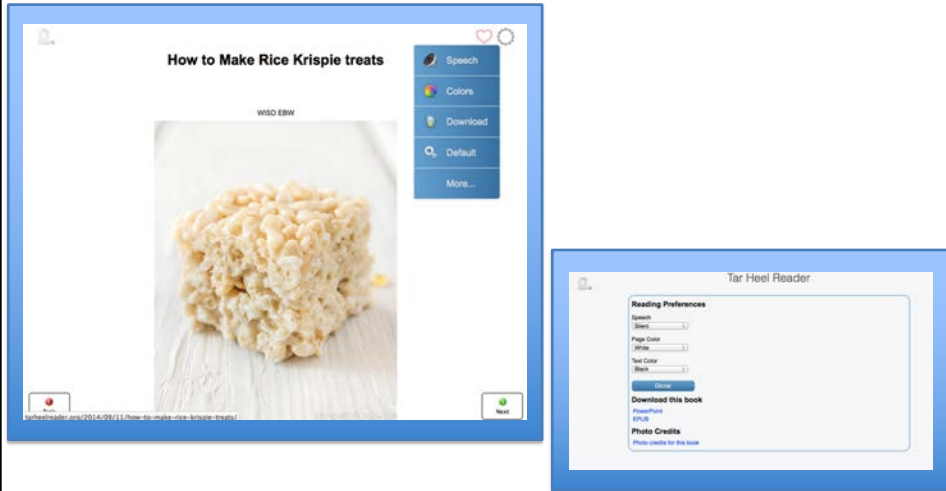
## Picture Supported Digital Books and Supplemental Activities



<http://www.setbc.org/setbc/accessiblebooks/>



## Tar Heel Reader



<http://tarheelreader.org/>



## Picture Supported Digital Books and Supplemental Activities



Digital Book



Listen and Match Activity



Sentence Construction

Clicker 7

<http://www.cricksoft.com/us/home.aspx>

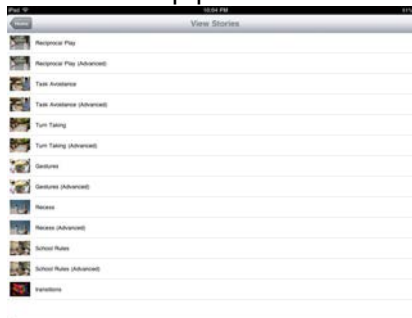
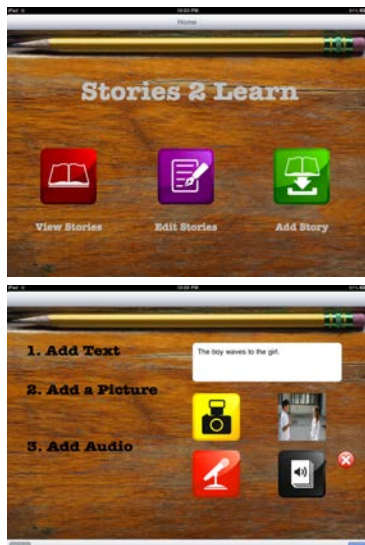




# My Turn



## Social Narratives-Apps



Stories2Learn  
App by MDR

<https://itunes.apple.com/us/app/stories2learn/id348576875?mt=8>



## Jonah



- Third grader in general education setting
- Enjoys electronic media
- Uses iPad at school for recreation and leisure
- Excels in math computation
- Good word recognition and spelling but has difficulty understanding the true meaning of many vocabulary words
- Struggles with sequencing, listening capacity, cause-effect, interpreting, predicting, summarizing and making inferences
- Tends to keep to himself in social situations



## Environments

- 3<sup>rd</sup> grade general education classroom
- 24 students in the class
- Students sit at tables (4 students per table)
- Jonah sits at table next to teacher's desk
- Attends small group social skills lesson once a week for 30 minutes with SLP/Guidance Counselor



## Tasks

- Can share own point of view and identify how it is different from that of the narrator or characters
- Describe the relationship between events, steps and ideas in a text, using time, sequence, and cause/effect language
- Follow conversational rules (i.e. listening to other, taking turns and speaking one at a time)



## Matching Features to Student Needs

Needs	Features
Describe the relationship between events, steps and ideas in a text, using time, sequence, and cause/effect language	Graphic organizers
Can share own point of view and identify how it is different from that of the narrator or characters	Embedded notes and prompts within a story Highlighting of key points in books
Understand meaning of vocabulary words in text	Picture/video dictionaries
Follow conversational rules (i.e. listening to others, taking turns and speaking one at a time)	Video Modeling



## Tools for Trial



**Picture View**  
Students create maps, diagrams and webs.

**Integrated Picture and Writing Views**

**Math View**  
Students use visual math tools to understand essential math concepts.

**Writing View**  
Students expand their ideas into written expression.

<http://www.inspiration.com/>

The screenshot displays the Inspiration software interface. At the top, a concept map for 'Charlotte's Web' is visible, with nodes for 'Charlotte', 'Templeton', 'Wilbur', and 'Zuckerkorn'. Below the map, a 'Math View' window is open, showing a problem-solving interface for addition and subtraction. It includes a number line, a grid, and a calculator. To the right, a 'Writing View' window is open, showing a text editor with a character named 'Charlotte' and a paragraph of text. The interface is colorful and user-friendly, designed for educational use.

**Kidspiration 3**  
The visual way to explore and understand words, numbers and concepts.

The Kidspiration 3 logo features a yellow, smiling character with a lightbulb above its head, surrounded by various icons representing different subjects like science, math, and language. The character is standing on a red path that leads towards the right.



## Reading/Writing Software



<http://www.freedomscientific.com/LSG/products/wynn.asp>

## Read&Write GOLD

<http://www.texthelp.com/North-America/our-products/readwrite>



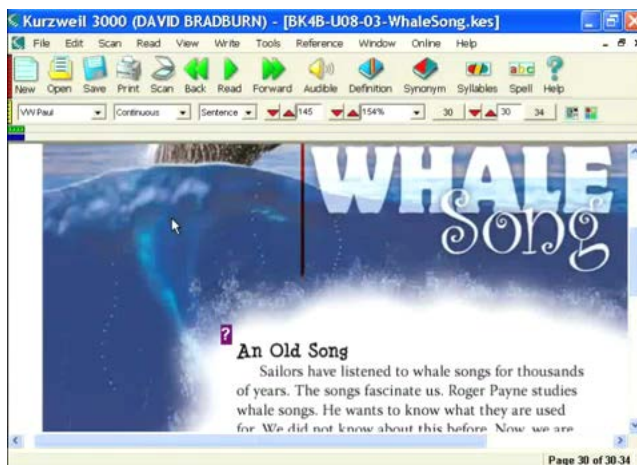
<http://www.kurzweiledu.com/products/kurzweil-3000-firefly-overview.html>



<http://donjohnston.com/solo/#.UvpmuF6prGs>



## Embedded Notes



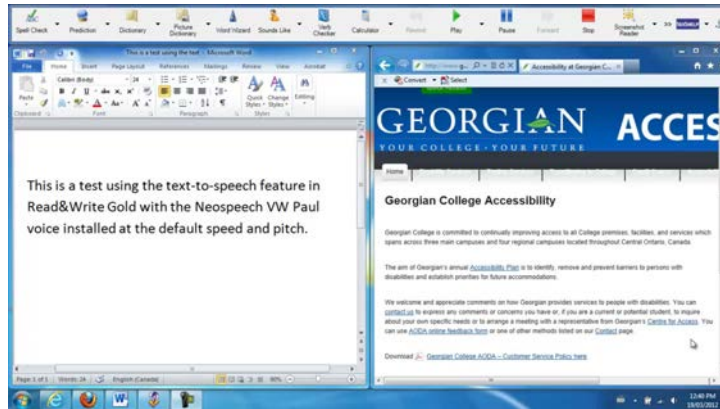
Kurzweil 3000

<http://youtu.be/6TJlpZKlasQ>





## Highlighter Feature with Extraction

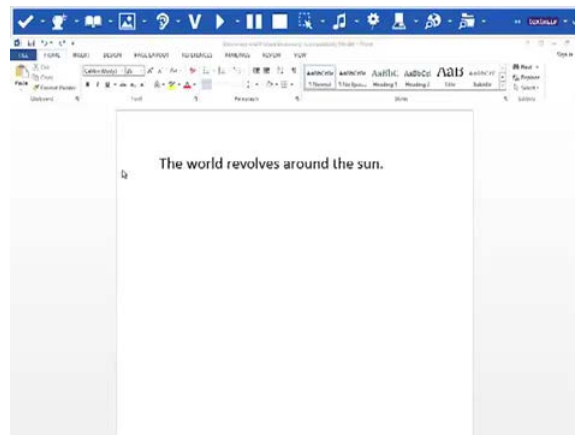


Highlighting and Collect Highlights-Read and Write Gold

[http://www.youtube.com/watch?v=Hv\\_OWdF1c20&feature=share&list=PLD2510358B7CFD5A5&index=1](http://www.youtube.com/watch?v=Hv_OWdF1c20&feature=share&list=PLD2510358B7CFD5A5&index=1)



## Picture Supported Dictionary



Picture Dictionary-Read Write Gold

<http://youtu.be/8Nf0KZEKYrA>



## Vocabulary Support

# Using Read&Write GOLD's Vocabulary List Builder for New Word Attainment

Vocabulary List Builder

<http://www.youtube.com/watch?v=2lq8UjZS06E&list=PL942D07588DD28062&feature=share>



## UDL Book Builder Editions by CAST

The screenshot shows the UDL Book Builder interface. At the top center, there is an illustration of a green tadpole. Below the illustration, the text reads: "Then, tadpoles' legs begin to grow. The back legs are bigger than the front legs." To the right of the text, there is a "Terry's Tips" box with a cartoon giraffe icon, containing the text: "Notice how Pedro asks a very specific question about the text that is important to know and remember." On the left side, there is a "Pedro" character box with a question: "How many legs do you see? What do they look like?" and a "Listen Again" button. At the bottom, there are icons for "Pedro", "Hall", and "Monty", along with a "Created with CAST's UDL Book Builder" footer and a "of 13" page indicator.

<http://bookbuilder.cast.org>





## GCF Vocabulary Videos

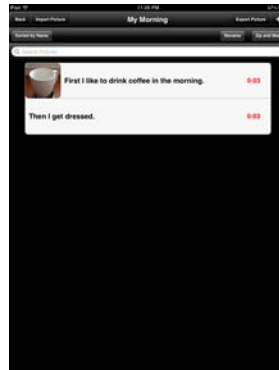
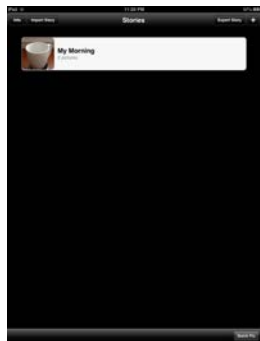


<http://www.gcflearnfree.org/>

<https://itunes.apple.com/app/gcf-vocabulary-videos/id418426036>



## Video Modeling-Apps



My Pictures Talk – Video Modeling Tool  
Grembe

<https://itunes.apple.com/us/app/my-pictures-talk-video-modelin-g/id368388315?mt=8>



## Adam



- Junior in high school
- Attends career center
- Prefers working independently
- Interested in how technology works (repair/technician)
- Literal comprehension skills are fairly good
- Detail oriented
- Deficits in working memory, organization skills, sequencing and planning and accessing relevant background knowledge
- Pragmatic skills deficits
- Verbalization skills more advanced than comprehension of vocabulary



## Environments

- Attends high school for required language arts and math courses
- Participates in Interactive Technology Program at career center (2 year program)
- "Case manager" connects with Adam weekly at career center



## Tasks

- Determine meaning of symbols, words and phrases when used in scientific or technical context
- Organize self, materials and information for school and work
- Answer questions or solve problems using a variety of media or formats
- Respond appropriately to social situations in the work place



## Matching Features to Student Needs

Needs	Features
Mobile solutions for school and work environment	Mobile technologies
Determine meaning of symbols, words and phrases when used in scientific or technical context	Dictionary support, homophones, Confusable words in DJ or RWG
Organizational skills support	Graphic Organizers
Answer questions or solve problems using a variety of media or formats	Adapted websearch tools, video chat tools, voice activated electronic personal assistant "tell me the definition of....."
Pragmatic skills support	Video modeling



## Tools for Trial



## Full Featured Reading/Writing Software



<http://www.donjohnston.com/products/solo/index.html>

**Read&Write GOLD**

<http://www.texthelp.com/North-America/our-products/readwrite>



<http://www.freedomscientific.com/LSG/products/wynn.asp>



**Kurzweil**  
EDUCATIONAL SYSTEMS®

<http://www.kurzweil.edu.com/default.html>






## Merriam-Webster Dictionary



## Electronic File Management Systems




Popplet



popplet: Facts About Earth

home view all edit share



Magnetic field is due to spinning iron core.

Earth is 11 million miles from the sun.

Earth is 4.54 billion years old.

The diameter of the Earth is 7,926 miles.

Earth has only one moon.

Atmosphere is 78% nitrogen and 21% oxygen.


Earth is almost a perfect sphere.

Rotates once every 23.934 hours. Not 24 hours!

# of the axis is 23.4 degrees.

popplet: NY Notes.

home view all edit share



Best Burgers

Prune

Brooklyn Pizza


Best Cupcakes

Two Little


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## Inspiration and Inspiration Maps

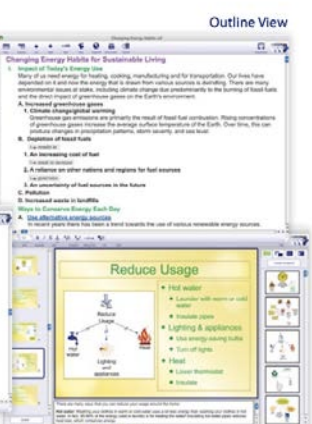
Diagram View



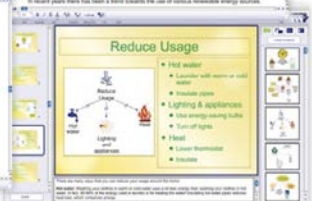
Map View




Outline View



Presentation Manager



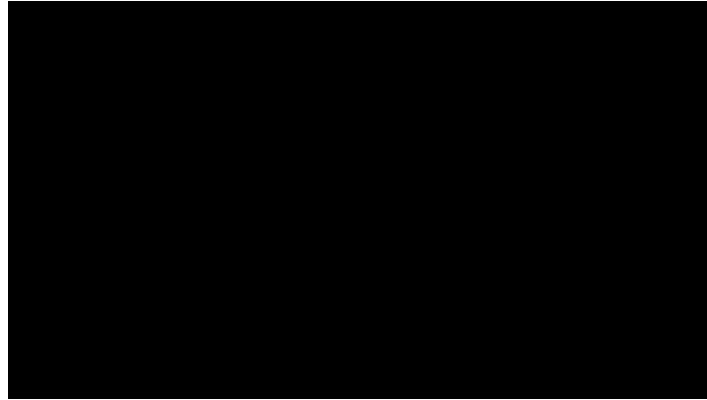


<http://www.inspiration.com/>  
<https://itunes.apple.com/us/app/inspiration-maps/id510031612?mt=8>

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## You Tube Tutorials

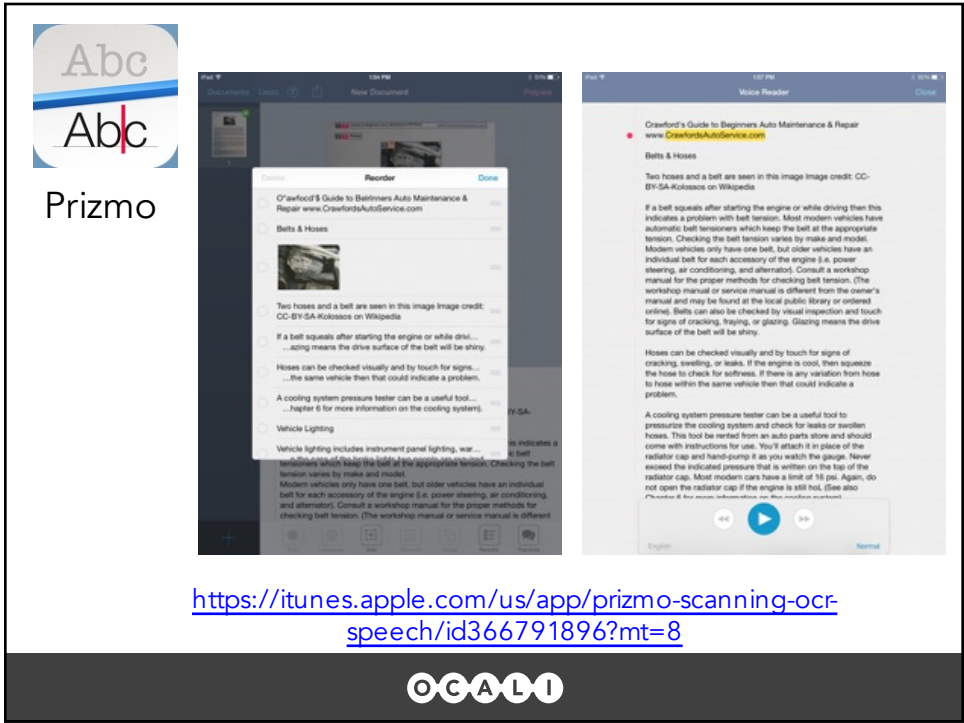
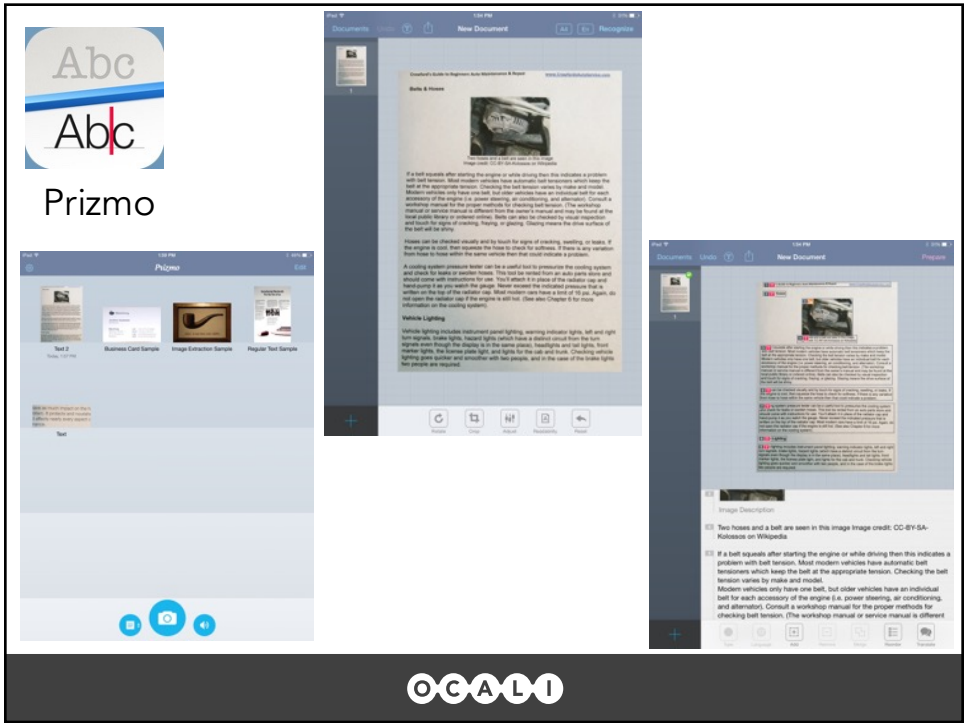


<https://www.youtube.com/watch?v=GHloD6zECsM>



Siri  
Apple iOS





<https://itunes.apple.com/us/app/prizmo-scanning-ocr-speech/id366791896?mt=8>



## Virtual Mentoring-Synchronous



<https://www.apple.com/ios/faceetime/>



<http://www.skype.com>

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## Virtual Mentoring-Asynchronous/Video Modeling



<http://voicethread.com/>

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## Making Final Decisions

- ✓ Trials of tools
- ✓ Data collection on relevant variables related to the tasks, environments, and needs
- ✓ Ongoing progress monitoring



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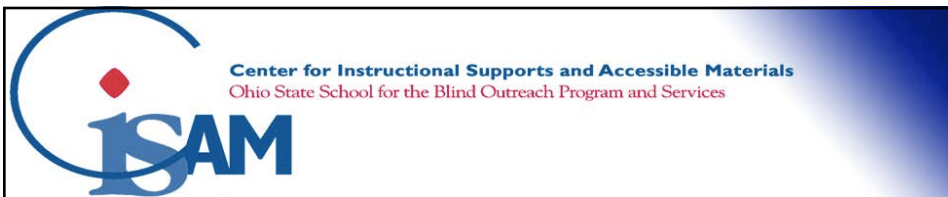
## Resources

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<http://www.nimac.us/>

Text books published prior to 2006 may not be available



Paula Mauro, Project CISAM Coordinator  
614.644.8465

[pmauro@cisamoh.org](mailto:pmauro@cisamoh.org)



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GO SET A WATCHMAN

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[www.bookshare.org](http://www.bookshare.org)

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## Assessment Tool for Technology Based Reading Accommodations

Grade Level	Silent Read	Adult Read	Text Reader
12			
11			
10			
9			
8		10%	67%
7		75%	75%
6			
5			43%
4			
3			
2			
1			

Protocol for Accommodations in Reading

Developed by Denise DeCossa, Ed.D. and Linda Bashert Wilson, MA

DON JOHNSTON

<http://donjohnston.com/upar/#>

<http://donjohnston.com/par/>

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## Access for Learning

Welcome to the National Center on Accessible Educational Materials. This site provides resources for educators, parents, students, publishers, conversion houses, accessible media producers, and others interested in learning more about AEM and implementing AEM and NIMAS.

[Learn about Accessible Educational Materials](#) >



<http://aem.cast.org/navigating/aem-navigator.html#.Vbfg88bFilw>



## ASSISTIVE TECHNOLOGY INTERNET MODULES

Reading Access – WATI – Part 1  
Reading Access – WATI – Part 2  
Communication – WATI – Part 1  
Communication – WATI – Part 2  
Organization – WATI – Part 1 (coming soon)  
Organization – WATI – Part 2 (coming soon)  
Organization – WATI – Part 3 (coming soon)  
Organization – WATI – Part 4 (coming soon)

[www.atintemetmodules](http://www.atintemetmodules)



