Using Technology to Enhance Reading Comprehension

for presentation: tinyurl.com/techreadingcomp

Jules Csillag, BA, MS, CCC-SLP
Learning Specialist and Speech-Language Pathologist
email: j.csillag85@gmail.com (Please feel free to email me with questions, comments, etc.)
Slides are available online at: tinyurl.com/techreadingcomp

You are encouraged to view these slides digitally, so you can easily click on the numerous links throughout. Nonetheless, all links are listed on the last few slides.

(For privacy reasons, some links were for the presentation, only, so these have been replaced by screen shots)
Overview/Objectives

1. Introduction (Technology, Research)
2. Frameworks of Reading Comprehension
3. Interactive part!
4. Resources
Neuroscience & Education

- Motivation is linked to increased persistence, performance, & recall ("just right challenge" motivates; as cited in Willis, 2014)
- Students with reading disabilities benefit from multisensory input (Birsh, J.R. (Ed) 2005, Carreker, S. & Birsh, J.R., 2005)
- Cognitive Load and the positive effects of practice: when using working memory, left inferior frontal gyrus employed, but as activities become more automatic, moves to left angular gyrus (Diamond et al.)
- Visualizing an item has the same neural effect as seeing it (Kosslyn, S.M., 2005)
- Making connections to new things creates activity in the left inferior prefrontal cortex (Fletcher, P.C., Stephenson, C.M.E., Carpenter, T.A., Donovan, T. and Bullmore E.T., 2003)
Technology enhances literacy capabilities of students with special needs; positive correl (Goetze & Walker, 2004).

- Speech recognition software helps students’ reading comprehension (Raskind & Higgins, 1999)
- Positive correlation of computer intervention on reading (Foster, Erickson, Foster, Brinkman, and Torgesen 1994; Olson and Wise 1992; Torgesen 1993; Torgesen, Waters, Cohen, and Torgesen 1988)
- Technology as an assistive tool for acquiring better literacy/reading skills Fisher & Molebash (2003), Speaker (2004)
- Computers assisted in reading fluency gains (Torgensen & Barker, 2005)
Why Technology?

The SAMR model by Dr. Ruben Puentedura

- **Redefinition**: Tech allows for the creation of new tasks, previously inconceivable.
- **Modification**: Tech allows for significant task redesign.
- **Augmentation**: Tech acts as a direct tool substitute, with functional improvement.
- **Substitution**: Tech acts as a direct tool substitute, with no functional change.
Six Areas of Reading Comprehension

1. Activating Prior Knowledge (Making connections)/Predicting
2. Questioning
3. Visualizing
4. Monitoring, Clarifying, Fix Up
5. Drawing Inferences
6. Summarizing/Retelling

From Improving Reading Comprehension K-3
**Systems of Strategic Actions**

<table>
<thead>
<tr>
<th>Thinking Within the Text</th>
<th>Solving Words</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Monitoring &amp; Correcting</td>
</tr>
<tr>
<td></td>
<td>Searching for and Using Information</td>
</tr>
<tr>
<td></td>
<td>Summarizing</td>
</tr>
<tr>
<td></td>
<td>Maintaining Fluency</td>
</tr>
<tr>
<td></td>
<td>Adjusting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thinking Beyond the Text</th>
<th>Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Making Connections (personal, world, text)</td>
</tr>
<tr>
<td></td>
<td>Synthesizing</td>
</tr>
<tr>
<td></td>
<td>Inferring</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thinking About the Text</th>
<th>Analyzing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Critiquing</td>
</tr>
</tbody>
</table>

All Genres

- narratives
  - stories, short stories
- informational/expository texts
  - reports, articles, books, brochures, encyclopedic websites, etc.
- poetry
- persuasive texts
  - articles, editorials, essays, advertisements, etc.
<table>
<thead>
<tr>
<th>Input (process)</th>
<th>Output (product)</th>
</tr>
</thead>
<tbody>
<tr>
<td>● reading fluency</td>
<td>● diverse types of writing</td>
</tr>
<tr>
<td>● vocabulary</td>
<td>● speaking</td>
</tr>
<tr>
<td>● content/schema knowledge</td>
<td>● artistic: visuals, music, dance, etc.</td>
</tr>
<tr>
<td>● intra-text analyses</td>
<td></td>
</tr>
<tr>
<td>● input medium/media</td>
<td></td>
</tr>
</tbody>
</table>
Presentation Order

1. Reading fluency
2. Differentiating Input
3. Visualizing
4. Summarizing
5. Questioning
6. Making Connections
7. Research
8. Vocabulary
Reading fluency

- Audio books (audible.com, librivox.com, learningally.com)
- Tablet readers (especially Whispersync)
- Any text-to-speech (browser extensions and accessibility options available on all operating systems)

- OCR’s (including www.free-ocr.com)
- Web Extension: Speak It! (for Chrome)
- Chromebook: https://support.google.com/chromebook/answer/177893?hl=en
- Windows: http://support.microsoft.com/kb/306902
Multimodality

- **visual**
  - slideshow accompaniment (*Gift of the Magi*)
  - animation (*Sarah Sylvia Cynthia Stout*)
  - social media (e.g. *instagram & Ukraine*)

- **auditory**
  - auditory accompaniment only (see previous slide & youtube.com)

- **kinesthetic**
  - will return to at “research” (highlighting, underlining) and “making connections” (graphic organizers, categorizing)
“Harder books won't foster the growth of content learning” - Allington, 2002

(Other research that supports differentiated texts, along with other reading instruction: Allington & Johnston, 2002; Langer, 2001; Nystrand, 1997; Pressley, Allington, Wharton-McDonald, Block, & Morrow, 2001)

• Levels vs. lexiles
• Other ways of assessing your text: Readability Score, Lexile Analyzer (not very user-friendly)
Differentiating Input

Current events (nonfiction texts)

- Newsela.com
Differentiating input

- Google Sites (see “Resources” for how to build a Google Site)
- 5th grade class studying Medieval Times

Goals:

● to read & answer comprehension questions about Medieval Times (but needed to be at different levels!)
● to demonstrate expertise about 1 facet of Medieval Society & represent that knowledge multi-modally (written and visually)
Differentiating Input

**Medieval Google Site**

Castles: most difficult (most writing, more inference in questions, not as many visuals, more links)

Clothing: relatively easiest (more visuals than text, questions more direct, and requires graphic organizing & minimal writing)
**Castles**

Since the power and security of a lord depended upon his ability to defend himself, fief owners began to build sturdy castles. Castles were designed to withstand a siege and to mount a defense.

At first castles were made of wood. But they were too easy to burn down. By 1100 CE, castles were built of stone. Thick walls surrounded a castle. Inside these thick walls, there were many buildings.

At the first sign of trouble, the commoners rushed to get inside the castle walls before the gates closed and shut them out.

**Location:** Castles were usually built on top of a hill, if one was handy. That way, the lookout guards could more easily spot attackers approaching.

Mini-assignment 1:
- Click here to check out other castles
- Look at at least 5 castles
- What do all of the castles have in common? (how they look? what they look like?)
- Write a paragraph about your observations...

Mini-assignment 2:
- Click here to look at the different parts of castles.
- Pick 3 parts of the castle. For each:
  1. Label it
  2. Draw it
  3. Describe what it was for

More information below:

**The Moat:** A moat was built around many of the castles. This was a deep ditch surrounding the castle walls, filled with water. A bridge was built to cross the moat. The bridge was raised during an attack. The moat was loaded with traps and sharp spikes in case someone tried to swim across.

**The Drawbridge:** The drawbridge was the bridge built across the moat. This bridge could be raised and lowered for added protection from intruders.

**The Keep:** One of the largest spaces behind the thick walls was the keep. The keep was a storage area topped by a huge square tower with slotted windows for castle archers to use. The keep stored food, wine, and grain in case of siege.

**The Barracks:** Other buildings made up the barracks. The barracks were the homes of the knights and their families.

**The Great Hall:** The Great Hall was a passageway
Differentiating Input: Google Site

Introduction to Medieval Weapons

**How weapons changed warfare**

Medieval weapons may look decidedly low-tech today, but back in the day they represented state-of-the-art battle gear that determined the fate of nations and changed the face of warfare.

The tools and scale of battle may have changed, but the fundamentals have not. It was and is a grim, gritty business. And at the end of the day, the results are pretty much the same.

The concept of an arms race is likewise no Johnnie-come-lately. Even back in the days of knights, castles and what passed for chivalry the name of the game was escalation. The dark side of the good quest was trying to find new ways to wreak mayhem and get a leg up on your enemy.

Here's a tour of the best and brightest weaponry the Dark Ages had to offer.

**Assignment**

Click on this link and describe 3 weapons. For each:

1. Sketch an image of the weapon
2. Describe what the weapon was used for
3. Describe how the weapon was made, and by whom (if relevant)
4. Describe any current weapons that the weapon influenced (does it remind you of anything?)

Design a weapon that is inspired by your weapon. Draw it & explain what it can do!

---

**Assignment**

Click on this link, and describe trends that you notice. Write a 5-paragraph essay about how medieval weapons changed warfare. Did they change strategy? Amount of fighters? Influence current weapons?
Clothing

Most people in the Middle Ages wore woolen clothing, with undergarments made of linen. Brighter colors, better materials, and a longer jacket length were usually signs of greater wealth. The clothing of the aristocracy and wealthy merchants tended to be elaborate and changed according to the dictates of fashion. Towards the end of the Middle Ages, men of the wealthy classes sported hose and a jacket, often with pleating or skirting, or a tunic with a surcoat. Women wore flowing gowns and elaborate headwear, ranging from headdresses shaped like hearts or butterflies to tall steeple caps and Italian turbans.

Most of the holy orders wore long woolen habits in emulation of Roman clothing. One could tell the order by the color of the habit: the Benedictines wore black; the Cistercians, undyed wool or white. St. Benedict stated that a monk’s clothes should be plain but comfortable and they were allowed to wear linen coifs to keep their heads warm. The Poor Clare Sisters, an order of Franciscan nuns, had to petition the Pope in order to be permitted to wear woolen socks.
• Institute of Educational Science (IES)
• Goetze & Walker, 2004
• “Multimedia can be used to represent the content knowledge in ways that mesh with different learning styles that may appeal to different modal preferences” (Birch & Sankey, 2008; Moreno & Mayer, 2007, as cited in Birch, Snakey, & Gardiner, 2010)
Visualizing

- Clipart/Google Image Search
  - fiction
  - non-fiction
  - can be for plot (summarizing) and/or visualizing characters, settings, etc. But also inference, predicting, etc. These can be put in folders or displayed in the classroom
Visualizing

● cast the movie & go to imdb.com to find those images; extension project: make a movie poster for the book (Okay For Now movie poster)
● bring in photographs or pictures of potential sets
● graphic design (pixlr.com, or Sketchbook X or Sketchbook Pro for iPad)
● You try! The Giver movie (it’s happening...) (popular on imdb link)
Today’s teachers need to recognize the importance of visual literacy for the children of the technology generation. Visual literacy involves being able to interpret the meaning of visual images as well as being able to construct effective visuals in order to convey ideas to others. The union of reading and technology on the Internet is causing educators to take a new look at what it means to be literate in today’s world (Leu, 2002; Leu & Kinzer, 2000). These new forms of literacy call upon students to know how to read in both the print world and the digital world (Schmar-Dobler, 2003).
Summarizing & Schema Instruction

- Explicitly teach the different parts of a story (WWW+ why? + how?), or story elements
- Use short, silent movies & have students summarize it in words
  - A few of my favorites: (younger -> older students)
  - You try! Oktopodi
  - Life (has ads)
  - Alma
  - Paper Man
Summarizing

- Make their own slideshows~
  - storybird
  - animoto
  - photopeach
  - tout, Vine, Instagram
  - ThingLink (for iPad)

- For schools that have animation- have students make animations
<table>
<thead>
<tr>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Instagram, Tout, Vine, etc. for demonstrating knowledge (and learning)</td>
</tr>
<tr>
<td>- Photopeach No Talking</td>
</tr>
</tbody>
</table>
Summarizing

What’s the main idea?

- Provide a list of words to highlight (they can use the find feature to find all of these). This teaches them which words are “clue words” for important ideas.

SOME SIGNAL WORDS AND PHRASES

* a major event
* important to note
* most of all

* above all
* key feature
* principal item

* central issue
* most importantly
* should be noted

* especially valuable
* most noteworthy
* remember that

(from Florida Center for Reading Research; fcrr.org)
Summarizing

Ancient Egypt main idea Google Drive (& You try)
Questioning & Monitoring

- Model internal monologue of “Good Readers” (https://www.screencast.com/, http://www.screencast-o-matic.com/) Example from Raymond’s Run
- Good Readers ask themselves questions
  - about content
  - about their understanding
- Make this a part of their process!
- As always: fade prompts (Google Drive of Questions on Folk Tale)
The Lion and the Beetle

Lion was very proud and very vain. He loved to stomp around the savannah, roaring and growing whenever he saw his animal subjects - Giraffe or Hyena or Elephant or Gazelle or Ape - to show what a mighty Lion he was.

"I am a Very Mighty King!" he roared. And his subjects all bowed low before him. One day, Lion looked into the mirror-like waters of the lake. He was struck by his own greatness. What a beautiful and noble creature I am, he thought.

"I am a Very Mighty King!" he roared. "I am a Very Mighty King!"

Lion preened and posed and pranced in front of the glassy lake for hours, admiring his greatness. Finally, Lion said: "I will show my devoted subjects that their leader is every inch a King."

Lion put on his fancy robes, his jeweled crown, and all his gold and silver medals. His clothes were very heavy, but they made him look mighty and grand.

"I am a Very Mighty King!" he roared in delight. "I am a Very Mighty King!"

Lion sent out a message to all his animal subjects - to Giraffe and Hyena and Elephant and Gazelle and Ape. He sent messages to all the animals living on the savannah or in the jungle, inviting them to a meeting on the parade grounds in front of his palace, where they could admire him in his finery.

And so the animals came to see Lion; the Giraffe and the Hyena and the Elephant and the Gazelle and the Ape. And many more animals came as well, from the striped Zebra in his black-and-white coat to the tiny, little Beetle, who was so little that he had to walk on the side of the road so the bigger animals would not step on him by accident.

"I am small. I am little. People look down and can't see me," sang the Beetle as he scurried through the tall grass beside the road. "I am small. I am little. But inside, I'm tall as a tree!"

When the animals were assembled on the parade ground, there came a mighty trumpet blast.
“We have come to think of reading as a process in which the reader must actually interact, or negotiate meaning, with the author and text in order for true comprehension to occur” (Buehl, 2001; Rosenblatt, 1983, as cited in Cecil & Gipe, 2003)
Graphic organizers for making all types of connections

- holt
- readwritethink
- kidspiration (Lite version free, $9.99 for full)
- inspiration (Lite version free, $9.99 for full)
- corkulous (1 free board, or $4.99 for pro)
- Tools 4 Students ($0.99)
Making Connections

Current event: Ukraine

- Room for Debate (or if too hard, newsela.com) & Graphic Organizer for compare/contrast

- You try! List of events and Graphic Organizer for timeline
Making Connections/Inferences

Corkulous

How to Steal a Dog by Barbara O'Connor

Things We Know After Previewing

- Georgina wanted to steal a dog.
- Georgina has a friend named Luzanne.
- Georgina’s mom is saving up to get a house and she has 2 jobs.
- Half of Georgina wants to steal a dog but the other half doesn’t.
- The reason she wants to steal a dog is for her family. She saw a poster and thinks if she finds a dog, she’ll get $500.
- Georgina’s been a little brother named Eddie, today is not good at keeping secrets but Georgina is!
- Georgina’s dad left her mom and Georgina at home alone. He left them money but not enough.
- Luzanne just discovered that Georgina’s family lived in a car.

Things We Wonder

- Might they actually steal a dog or find one?
- If they steal the dog, how will they steal it? Is the owner a cheat?
- If they do steal a dog, will the owner give them the money?
- How is she going to steal the dog if it’s already missing?
- Will she find the dog and tie a bone to a string to catch it? (Cover picture)
Making Connections/Inferences

Corkulous
Making Connections/Inferences

Corkulous
Making Connections/Inferences

Corkulous
Making Connections/Inferences

Corkulous

- Character name & family information
  - Skellig and We don’t know

- Physical appearance (with examples or quotes)
  - creature, wings (hugged and pointed shoulder blades)
  - Young
  - Pale, blank eyes, dead bugs on him (page 2)
  - has arthritis

- Likes & dislikes
  - Likes brown ale & 27, 58

- Any changes you notice throughout the book in this character
  - getting weaker

- Personality (with examples or quotes), including how he/she feels about other people and how other people feel about him/her
  - doesn’t like people, shy
  - often Michael and Mina to go away
  - grumpy and gross
  - Michael and Mina think he is a magnet
  - creates interest in him and protective of him

- Opinion: how do you feel about this character? (Okay if it changes throughout the book, then keep adding to this sticky)
  - I think he is weird and doesn’t belong in a cold house
Making Connections/Inferences

Corkulous
Making Connections

Inspiration
Making Connections/Inferences

Kidspiration

- Stegosaurus
  - Known for: large plates on their back
  - Found in: Utah, Wyoming, Colorado
  - Lived during: Jurassic period

- Natural Resources
  - Farmer, coal, computer, fruit, teacher, tools, factory, water

- Capital Resources
  - Money, fireman, plumber, trees, tractor, salesman, cow

- Human Resources
Making Connections/Inferences

Kidspiration

[Diagram showing a story web with book title 'Clementine', character traits, and plot points.

- Book title: Clementine
- Character: Action: Answered phone in principal's office
  Trust
  Catty
  Trust
  Trust
  Trust
  Trust

- Action: Got her hair in art class
  Trust

- Action: Thinks she's trying
  Trust

- Some get in trouble
  Red
  Red
  Wordy
  Writing

- Story Title: On the court with mj

- Bro
- Michael Jordan
- Who are the Main Characters?
- He switches to baseball
- What are the events in the story?
- What is the Setting?
- Time
- Place
- Both similar

1. Kid he played basketball
2. Group college good at basketball
3. Went in the ribo]
Research

- requires multiple reading comprehension skills
- some direct quoting, some paraphrasing
Research

- **Diigo library**
  - Wind Energy research project (and Diigo library)
  - You try! Wind Energy

- **EasyBib** (4.99 per month, 14.99 for 3 months, 19.99 per year; or school subscriptions available)
  - Renewable Energy research project (You try! Add an advantage or disadvantage)
Research

EasyBib

My Projects Products Citation Guide & Educator Blog Support

Renewable Energy Notebook

VIEW

Visualize

List

ARRANGE

By Group
All notes by group Ungrouped

By Tag
All notes by tag Untagged

By Source
Source descending Source ascending

By Date
Least recent Most recent

DELETED NOTES

- Most common renewable: 
  - Biomass (including wood)
  - Hydroelectric power

- History
  - 150 years ago, over 90% of energy needs were met by wood (a renewable resource), but then we started using coal.

- How it works: Wind
  - I don't understand how the sun helps wind energy. Wind turbines capture the wind, and the wind turns the wind turbines to

- Cons of renewable... 
  - More expensive to set up, often located "in remote areas," but now oil & gas getting too expensive, so seems like worth it

- Current renewable... 
  - Uses renewable energy

- How it works: Biomass
  - Burns wood and crop waste from factories and farms can be burned to produce electricity

- How it works: Solar
  - Solar energy is generated during the day by the sun's powerful rays. Photovoltaic solar panels, built from silicon, absorb the

- Advantages
  - Never runs out
  - May help economy as you are building thermostats & to a new

- How it works: Geothermal
  - Geothermal energy is created using heat from the Earth's core.
What the research says:

- Strong relationship between vocabulary and reading comprehension (Baker, Simmons, & Kameenui, 1995; Stahl & Fairbanks, 1987)
- National Reading Panel says to provide direct and indirect vocabulary instruction
Vocabulary

- Learning vocabulary in situ (fading prompts to independence)

All tablets (kindles, iPads, etc.) and any web-based reading allow students to look up words in the moment.
Context Clues

- **Google Drive stories with prompts** (fade)
- isolated activities:
  - ixl
  - sheppard software
  - Millionaire
  - Context Clues with intro
  - 3 Matching games
Vocabulary in isolation (but based on a systematic, evidence-based approach). In context & with word roots

- **Wordly Wise**
- **Membeam**
- Other word root examples: [http://n-imagecache.aldenhosting.com/~n1studyg//vocab/prefixesjoe.swf](http://n-imagecache.aldenhosting.com/~n1studyg//vocab/prefixesjoe.swf), Appleton Area Word Study fun (some links outdated)
Activities for content-specific vocabulary (rote memorization)

- **Jeopardy**
- visualizing (google image)
- flashcards: [quizlet.com](http://quizlet.com), [gflash](http://gflash) (app)
## Resources Mentioned

### Reading Fluency
1. Chromebook: [https://support.google.com/chromebook/answer/177893?hl=en](https://support.google.com/chromebook/answer/177893?hl=en)
5. Speak It! web extension
6. audible.com
7. librivox.com
8. learningally.com
9. youtube.com (for visuals, animations, and audio)
10. Whispersync

### Differentiating input
1. [https://readability-score.com/](https://readability-score.com/)
3. sites.google.com
4. newsela.com

### Visualizing
1. imdb.com
2. Clip Art
3. images.google.com
4. pixlr.com
5. SketchBook X or Sketchbook Pro (apps)
## Resources Mentioned

### Summarizing
1. Oktopodi: [https://www.youtube.com/watch?v=badHUNl2HXU](https://www.youtube.com/watch?v=badHUNl2HXU)
2. Life: [https://www.youtube.com/watch?v=mWZ6b_l-Dig](https://www.youtube.com/watch?v=mWZ6b_l-Dig)
3. Alma: [https://www.youtube.com/watch?v=tECaYQ1AzkM](https://www.youtube.com/watch?v=tECaYQ1AzkM)
4. Paper Man: [https://www.youtube.com/watch?v=IQAI4B_2Mfc](https://www.youtube.com/watch?v=IQAI4B_2Mfc)
5. [https://storybird.com/](https://storybird.com/)
6. animoto.com
7. photopeach.com
8. tout.com
9. vine.co
10. instagram.com
11. ThingLink (app)

### Questioning
1. drive.google.com
2. [https://www.screencast.com/](https://www.screencast.com/)

### Making Connections/Inferences
1. readwritethink.com
3. kidspiration (app)
4. corkulous (app)
5. Tools 4 Students (app)
## Resources Mentioned

### Research
1. diigo.com
2. easybib.com

### Vocabulary
1. drive.google.com
4. [http://n-imagecache.aldenhosting.com/~n1studyg//vocab/prefixesjoe.swf](http://n-imagecache.aldenhosting.com/~n1studyg//vocab/prefixesjoe.swf)
5. [http://www.aasd.k12.wi.us/staff/boldtkatherine/readingfun3-6/readingfun_prefixessuffixesroots.htm](http://www.aasd.k12.wi.us/staff/boldtkatherine/readingfun3-6/readingfun_prefixessuffixesroots.htm)
6. [https://jeopardylabs.com/](https://jeopardylabs.com/)
7. quizlet.com
8. gFlash (app)
Resources

Neuroscience & Education

- http://www.brains.org/
- http://www.dana.org/
- http://www.sfn.org/
- http://www.tc.columbia.edu/bbs/neurosci/current-issues/
- http://www.sfn.org/
Resources

Technology:
- National Center for Learning Disabilities
- How to build Google Site (video; step-by-step slides)
- Instagram in Education
- Free Technology for Teachers
- ICT for education
- Edutopia Technology
Resources

Reading Comprehension:

- Fountas and Pinnell (Sample: http://www.heinemann.com/fountasandpinnell/handouts/IRA2010Handout.pdf)
- Florida Center for Reading Research (fcrr.org)
- Cecil & Gripe 2003 (Sample: http://www.hh-pub.com/client/samples/HH1857.pdf)
References (with links, when possible)

- Birch, Sankey, & Gardiner, 2010
- Hoffer & Swan, 2006
- Puuntedura, R. R., 2009
- Raskind & Higgins, 1999