Enhancing Content Area Reading Comprehension through Technology

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Introductions
Agenda

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● Setting the Context
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  – Student Problems
  – Combining Literacy Strategies and Software Tools
  – Entry Points
● Three Examples
  – 5th Grade, ELA/Social Studies
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  – 10th Grade, Biology
● Toward Implementation
  – Self-Reflective Questions
  – Resources
Setting the Context
Defining Content Literacy

- The ability to use reading and writing to acquire new content knowledge
- The ability to build on prior knowledge
- The ability to understand specialized vocabulary
Student Problems

- Identifying relevant main ideas and details
- Sorting information
- Perceiving levels of importance
- Connecting ideas
Combining Literacy Strategies and Software Tools

Literacy Strategies

- Comprehension monitoring
- Use of graphic and semantic organizers
- Question answering
- Question generation
- Text structure
- Summarization

Software Tools

- Electronic text with speech recognition capabilities
- Use of hypertext
- Visual concept-organization programs
- Writing templates
- Word prediction software
Entry Points

- What are your curriculum goals?
- What are your students’ abilities and needs?
- What technology/software tools are available and accessible?
Three Case Examples

Example #1
5th Grade, ELA/Social Studies
Background

- Small, rural school district in western Massachusetts
- Small 5th grade class including students with disabilities
- Teacher-identified challenge for struggling students: identifying main ideas and finding supporting details
American History Idol (AHI) Curriculum Unit

- Inspired by the popular TV reality show, American Idol
- Students select an AHI from among three finalists who made important contributions to American history
  - Lewis & Clark
  - Thomas Jefferson
  - Jane Addams
AHI Instructional Goals

- Gather information from text (brief bios)
- Sort/categorize information
- Identify levels of importance in text
- Make an outline
- Draft a persuasive paragraph
Instructional Strategies in AHI

- Eliciting/linking to prior knowledge
- Asking prompting questions
- Modeling to reveal “expert” thinking
- Using think-alouds
- Using Graphic Organizers
Organization of AHI Curriculum Unit

- Introductory AHI session
- Three AHI mini-units with three sessions per mini-unit, based on brief biographical texts
- Culminating activity (AHI voting)
Draft:Builder

http://www.donjohnston.com

Students can create outlines, see a concept map, take notes, and prepare a draft.
Specific Features of *Draft:Builder*

- Enables customized presentation of text (templates)
- Provides navigational tools allowing movement within a document
- Presents visual representations of text and a summarized or condensed way of viewing text, e.g., concept map
- Offers notational tools
## Integrating *Draft:Builder* into AHI

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>1.</strong> Who?</td>
<td><strong>2.</strong> Why?</td>
</tr>
<tr>
<td>Facts that tell <em>who</em> a person is (background information)</td>
<td>Facts that tell <em>why</em> a person did something (the goal)</td>
</tr>
<tr>
<td><strong>3.</strong> How?</td>
<td><strong>4.</strong> What?</td>
</tr>
<tr>
<td>Facts that tell <em>how</em> a person worked toward a goal (the steps)</td>
<td>Facts that tell <em>what</em> the person accomplished (the results)</td>
</tr>
</tbody>
</table>
Thomas Jefferson

Who
- Lived in colonial America

Why
- Wanted freedom from Brit

How
- Wrote about freedom
  - Declaration of Independence
  - against British rule
  - law for religious freedom
Thomas Jefferson should be an AHI finalist. One reason is he wrote the Declaration of Independence in 1776 to help get freedom from British rule. Another reason is Jefferson became our third president and worked to build a strong country. One more reason is his thinking and writing about how democracy should work. The work Jefferson did has been a great influence on our democratic form of government.
Example # 2
8th Grade, Social Studies
Background

- Middle school in suburban Massachusetts serving grades 6 through 8
- 893 students
- School is well-equipped with today’s technology resources
- Collaborated with two teachers—an 8th grade social studies teacher and a special educator who were team teaching
Background

- 14% of the students in school identified as having special needs
- Approximately 50% of the 22 students were identified by the teachers as struggling learners and many were on IEP in sample class
Scientifically-based Vocabulary Strategies

- Using words in context
- Direct instruction
- Active engagement
- Opportunities for incidental learning
Features of Visual Thesaurus

- Ability to look up a word directly from a piece of electronic text
- Provides a visual array of word meanings in web format
- Can adjust the display to include a narrow or wide range of kinds of word meanings
- Additional features allow the user to search the Internet for images related to the target word, hear the word read aloud, and perform searches in a variety of languages
debut

- presentation intro
- play
- introduction
- unveiling
- launching
- first appearance
- entry
- perform
- innovate
- introduce

HOMONYMS
- the act of beginning something new
- the presentation of a debutante in society
- formally making a person known to another or to the public

ADJECTIVES
- present for the first time to the public
- appear for the first time in public
- make one's debut
- give a performance (of something)
- be performed
- bring something new to an environment

VERBS
- be performed
Clicking on “exercise” will make it the new center, revealing its definitions and word relationships.
The help tool tips will explain what you are looking at and what actions you may take to proceed.
Actions include: Pronounce Word, Search Internet (for content), Search for Images (internet images), Expand Selection (revealing more words and relationships), Make Center (the same as a single click).
For example, “Search for Images” will pull up Google Images of the word in question.
The settings panel has many sub-panels where you can control various aspects of how the Visual Thesaurus works, allowing for a customized and user-friendly experience.
Instructional Process

- Identify key social studies concept from textbook
- Read key word in context in the text
- Brainstorm using worksheet
- Look at key word using *Visual Thesaurus*
- Discuss meanings from web
- Expand, pronounce, see images, etc.
- Fill in worksheet
- Replace text with synonyms in text and discuss
- Relate back to key concept
Title of Chapter Section: Rebuilding China’s Empire

Main idea of Section: The Sui and Tang dynasties reunited and rebuilt China after years of war.

Related Chapter Question: What events led to the fall of the Tang dynasty?
After Wendi died, his son Yangdi (YAHNG•DEE) took the Chinese throne. Yangdi wanted to expand China’s territory. He sent an army to fight the neighboring Koreans, but the Chinese were badly defeated. At home, Yangdi took on many ambitious building projects. For example, the Great Wall had fallen into ruins, and Yangdi had it rebuilt.

Yangdi’s greatest effort went into building the Grand Canal. This system of waterways linked the Chang Jiang (Yangtze River) and Huang He (Yellow River). The Grand Canal became an important route for shipping products between northern and southern China. It helped unite China’s economy. An economy (ih•KAH•nuh•mee) is an organized way in which people produce, sell, and buy things.

**Web Activity** Visit jat.glencoe.com and click on Chapter 12—Student Web Activity to learn more about China.

**Linking Past & Present**

**Grand Canal and Three Gorges Dam Project**

**THEN** Opening the Grand Canal boosted Imperial China’s economy and made it much cheaper and faster to ship food and goods north and south. It also cost many laborers...
ambitious

- challenging
- unambitious
- aggressive
- pushful
- pushing
- pushy
- enterprising
- aspirant
- compulsive
- aspiring
- determined
- ambitiousness
- ambition
- overambitious
- would-be
- manque
- driven

a strong drive for success

having a strong desire for success or achievement

requiring full use of your abilities or resources

marked by aggressive ambition and energy and initiative

desiring or striving for recognition or advancement

strongly motivated to succeed

marked by imagination, initiative,
Sentence from text: At home, Yangdi took on many ambitious building projects. For example, the Great Wall had fallen into ruins, and Yangdi had it rebuilt.
Main Idea: The Sui and Tang dynasties reunited and rebuilt China after years of war.

What does this sentence mean?
That Yangdi started some hard and challenging building projects like rebuilding the Great Wall.
Example # 3
10th Grade, Biology
Background

- Small technology-based high school located in the Boston area
- 318 students
- The school is a pilot college preparatory school that focuses on preparing students for careers in technology, computer science, and engineering.
- Demographics: 54% Black, 28% Hispanic, 10% White, and 8% Asian
Background

- Sixty-one percent of students are eligible to receive free and reduced lunch, and 15% of the students are identified as having a disability.
- Two tenth grade biology teachers participated in the pilot study.
- 62 tenth and eleventh grade students participated in the intervention.
Four Reading Comprehension Strategies

1. **Selective Underlining**: Helps students to organize information, recognize the main idea and key points, and remember what they have read.

2. **Question Answer Relationships**: Helps students realize that the answers they seek are related to the type of questions that are asked.
3. **Summarizing**: A form of meaning construction: one must decide which content to include and restate it in a more concise form.

4. **Inference**: The process of creating meaning from text.
Ancient Egypt

Many people are fascinated with the pyramids of Ancient Egypt because of the mysteries around them. Why did the Ancient Egyptians build the pyramids, and why are they so fascinating?

The Ancient Egyptians believed that a pyramid provides a resting place for the afterlife.

1: favorite
2: pharaoh's
3: pharaoh
4: families
Features of SOLO

- Ability to interact with electronic text
- Text to speech
- Highlighting capabilities
- Ability to copy text into teacher-created outline
- Ability to take notes or elaborate on ideas
- Teachers can individualize instructions
Curriculum Integration

- Use of two units in *BSCS Biology: The Human Approach*
  - Homeostasis
  - Electrophoresis

- Strategy focus:
  - Selective underlining and QAR
  - Summarizing and Inference
Inference Activity

Gene-Altered Mice Are Called First True Sickle Cell Model

BY WARREN E. LEARY
Published: October 31, 1997

Two groups of scientists have developed genetically engineered mice that they say represent the first true animal model for sickle cell disease, an advance that should speed research on new treatments for the incurable blood condition.

Scientists said the development, culminating more than a decade of intense research, has for the first time produced animals that mimic the full range of symptoms seen in people with the hereditary disease.

The mice, which have been genetically altered to produce the human blood components involved in the disease, should make it possible to screen and test many new compounds...
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"The mice, which have been genetically altered to produce the human blood components involved in the disease, should make it possible to screen and test many new compounds as potential treatments and to examine different types of genetic therapy intended to cure the condition, experts said.

"This is a major advance that a lot of labs have been trying to achieve for more than a decade," said Dr. Alan N. Schechter, a sickle cell expert at the National Institutes of Health. "This is probably as good a mouse model you could ever have for sickle cell disease."
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Two groups of scientists have developed genetically engineered mice that they say represent the first true model to allow for rapid research on new treatments for sickle cell disease.

Scientists said the development may, for the first time, allow for the potential treatment of the disease, as well as the potential of the hereditary condition.

The mice, which have been genetically altered so that they mimic the disease, are being developed to serve as potential treatments for the disease. The mice are being used to test potential treatments for the disease, including new drugs and therapies.

"This is a major advance for the field, and it will allow us to test new treatments for sickle cell disease," said Dr. Alan Z. Leary, a researcher at the National Institutes of Health.

"This is probably as good a mouse model you can have," Dr. Leary said.

One of the mice is a model of sickle cell disease. The other is a model of a disease called sickle cell anemia.

Using molecular biology techniques, scientists are able to create models of human diseases in mice, called transgenic mice. These mice can mimic human diseases such as sickle cell disease, which affects the production of hemoglobin, the oxygen-carrying protein in red blood cells.

Although earlier mice have been developed that do not exhibit the range of diseases seen in human beings, the mice also protected the animals from the disease, and could not be used as models.

With the new model mice, researchers made animals that only produce human hemoglobin, mostly of the sickling variety responsible for diseased blood cells, according to the papers.

I know that they use mice to test for other cures besides Sickle Cell Anemia.
When I look at my "I wonder" questions, the notes I took from the text, and my "I know" statements, I can infer that... because...

I believe now that they have found animals that can mimic a full range of human symptoms including Sickle Cell Anemia they can find a cure.
Toward Implementation
Self-Reflective Questions

- Which content area or areas?
  - What are your curriculum and instructional goals?

- What are your students’ abilities and needs?

- What is your access to technology tools?
  - What is already in place?
  - What more do you need? Why?

- What are your next steps?
Resources

- CITEd Matrix
  http://www.cited.org

- Literacy Matters, content literacy
  http://www.literacymatters.org
Tech Matrix

Search a database of products that support math or reading.

CITED

www.techmatrix.org
Search each of the six purposes of technology that support reading for students with special needs.

Building Skills and Comprehension
Converting Text to Speech
Providing Text in Alternate Formats
Providing Electronic Resources
Organizing Ideas
Integrating Literacy Supports

To submit a product for review, click here.

This matrix is intended to serve as a resource that matches technology tools with supporting literature on promising practices for the instruction of reading for students with disabilities. Help us stay current – send us references to new products or evaluations.
Literacy Matters

What matters most in Today's Classrooms.

Making the Most of Literacy Matters [View PowerPoint]

TEACHERS  PARENTS  18 & UNDER

Yes, I want to be informed of upcoming professional development opportunities and new information added to this web site. Go!
Free online professional development environment that includes:

- Information about linking literacy to content areas
- Resources for social studies teachers that link social studies and literacy
Content Literacy

Do you teach social studies, science, or mathematics? Do you have students who struggle with the reading and writing needed to develop concepts and content knowledge in your discipline? If so, this section of Literacy Matters offers you "the best of the best on the Web"—web sites containing background information, research-based instructional strategies, lesson plans, sample activities, guidelines, book lists, and resources to strengthen your students' literacy skills, and thus, strengthen their content learning.

Check out the information within the following seven areas.

- **Overview** of Content Literacy presents you with important background information on the goals and principles of content literacy. **GO!**

- **Reading & Writing** provides you with practical information on reading and writing strategies that will help your students comprehend any content area. **GO!**

- **Social Studies** presents recommendations for helping students extract, understand, and write about social studies concepts. **GO!**

- **Text Structure** offers an overview of how knowledge of the text structures (e.g., compare and contrast, cause and effect, and sequencing) can improve your students' reading and writing skills. Don't miss our online activities titled Help Lee Decide and What Should Maria Do? which is designed to build skills in analyzing and interpreting text.
Literacy Skills for the Social Studies Classroom

The following sites feature information and strategies for helping students develop the reading and writing skills needed for success in the social studies classroom.

Sites That Matter

**Content Area Literacy**
This useful site lists fourteen strategies for teaching students to improve their reading of history-social science material. Each tells when in the lesson the strategy is appropriate and offers instructions for applying it in the classroom.
[score.rims.k12.ca.us/score_lessons/content_area_literacy/](http://score.rims.k12.ca.us/score_lessons/content_area_literacy/)

**Literacy Matters—Reading and Writing in the Content Areas**
This Literacy Matters overview page of the reading and writing in the content areas offers help with reading: questioning, reading expository text, vocabulary, how to read a textbook, and reading and interpreting diverse materials. The writing section deals with writing to learn and writing to demonstrate knowledge.
[www.literacymatters.org/content/readandwrite/intro.htm](http://www.literacymatters.org/content/readandwrite/intro.htm)

**Literacy Matters—Reading & Writing—How to Read a Textbook**
This content reading section contains specific tips on how to read a textbook.
[www.literacymatters.org/content/text/intro.htm](http://www.literacymatters.org/content/text/intro.htm)

**ReadingQuest: Making Sense in Social Studies**
This web site is designed for social studies teachers who want to engage their students more effectively with the content in their classes. The site clearly presents the underlying principles of content literacy and offers numerous strategies for the social studies classroom.
[curry.edschool.virginia.edu/go/readquest/](http://curry.edschool.virginia.edu/go/readquest/)

**THE PRACTICE: Supporting the social studies classroom through literacy development**
Knowledge Loom's "Adolescent Literacy in the Content Areas" includes a section about supporting literacy development in the social studies classroom. A variety of strategies and resources are featured on the site.
[knowledgeloom.org/practice/adolescent-literacy](http://knowledgeloom.org/practice/adolescent-literacy)
Lesson Plans

This section contains the "best of the best" lesson plans for you to use in your classroom.

Find Lesson Plans from within the following areas:

* **eWorkshops**
  Within this topic area are lesson plans adapted by Massachusetts teachers during the Literacy Matters' Professional Development eWorkshops.

* **Adolescent Literature**
  Within this topic area are links to lesson plans for adolescent literature developed by both curriculum developers and teachers.

* **Content Literacy**
  Within this topic area are links to lesson plans for different aspects of content literacy, including primary sources, reading, writing, social studies, text structure, I-search, online research, and study strategies.

Do you have a favorite lesson plan or web site that is not included in our lists?
Email: literacymatters@edc.org