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The New Literacy

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Recently, Edgar Murphy of the North Carolina State Board of Education delivered a presentation to a group of technology-using educators in the Raleigh area. He stated that of all the positions he has held in his life, he was technically qualified for only the first one. In the case of those that followed, he convinced prospective employers that he could teach himself all he needed to know while on the job.

Some months back, Michael Cox, a chief economist for the Federal Reserve Bank, predicted to a group of students that they would have at least five jobs after they graduate, four of which haven't been invented yet.

A fundamental question for everyone involved in education — administrators, teachers, parents, and students — in this time of rapid change is, "What do students really need to be learning today in order to be ready for an unpredictable future?" If Mr. Murphy's experience is a model for our children's future, then the best thing we can teach them is how to teach themselves. This requires that students become not only literate, but also able to use that literacy within their personal information environment in order to succeed now and in the future.

The challenge to us as educators lies in keeping up with an information environment that has changed dramatically in the past 10 years, a decade during which the very nature of information has changed in appearance, location, accessibility, application, and communication. Thus, it is crucial that when teaching literacy to our students, we emphasize skills that reflect the information environment of the present, not the past.

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whether we like it or not, with the information age comes a whole new set of basic skills. Following, we will take a look at how the traditional 3 Rs, naturally and out of necessity, evolve into 4 Es to define literacy in an increasingly, and soon to be exclusively, digital and networked world.



Reading → Exposing Knowledge

Katrina Updates

Most of the readers of this article were taught to read what was handed to them.

Textbooks were given to us by our teachers, reference books by librarians, and magazines and newspapers by publishers. If we could read and understand the text handed to us by such recognized authorities, it meant we were literate.

Today, our students typically begin their information experiences in front of a global electronic library of billions of pages of information (the Internet), where materials can be published by just about anyone, on just about anything, and for just about any reason. If our students have been taught only to read and understand this information, they could be in serious trouble, possibly even in danger. Accessing information in an increasingly digital and networked world requires a range of skills of which decoding text is only a small part. Basic skills for today's students include the following:

1. **Finding information:** Locating relevant information not only from a local library or newsstand, but also from the Internet. Literacy includes the ability to identify needed information, use Web searching tools to find it, and employ research strategies that expose the best information.
2. **Decoding information:** Beyond decoding text, literacy requires reading deeply for meaning in multimedia content.
3. **Evaluating information:** It is critical that students learn to evaluate the information they encounter, and also identify its value in terms of their goals.
4. **Organizing information into personal digital libraries:** A key strategy for handling the overwhelming amount of information available to us is the construction and cultivation of personal digital libraries. When we create and organize information that is relevant to our ongoing interests and goals, then we can handily find answers to our questions.

Arithmetic → Employing Information

Before the proliferation of personal computers, most information was merely consumed. We purchased and then read text, listened to audio, viewed images, and watched video. Numbers, on the other hand, were used as a way of precisely measuring our environment and the laws that governed it, and to manipulate that environment and its laws in order to add value to our lives.

Today, just about all information is expressed in the universal language of numbers. Multimedia content is stored and communicated as ones and zeros, otherwise known as binary code. Since information is expressed in numbers today, and personal computers are available for interpreting and modifying those numbers, it becomes raw material that can be analyzed, altered, and improved in pursuit of a goal. It becomes just as important to be able to use a computer to process the invisible numbers behind images, audio, and video content as it is to be able to add, subtract, measure, count, and calculate the visible numbers.

Learning to process any and all information requires:

1. **Basic mathematical skills:** As always, students must know how to add, subtract, count, measure, and calculate numbers. They must also understand the fundamental laws of numbers and how to use these concepts to answer questions, solve problems, and accomplish goals.
2. **Computer-aided processing of numbers:** Of the numerous exabytes of information that will be generated this year, only a small percent of it will be printed. The rest will require a machine to read it. Students, while they learn the basic skills of processing printed numbers, must also learn to process large quantities of digital numbers using computer spreadsheets and other data processing tools.
3. **Processing media:** Because of affordable digital cameras, scanners, MIDI music devices, and the vast array of multimedia content available on the Web, obtaining or creating the picture (or sound) is no longer the final outcome. It is merely a part of the process. All formats of information can be moved into powerful graphic, sound, and video processing software and altered to communicate in a more precise and compelling way. Students must learn to use these software tools in order to add value to information. It's all about numbers, but also about using computers to process those numbers in order to improve the delivery of information and accomplish goals.

Writing → Expressing Ideas Compellingly

In a world bursting with information, we can use only the information that successfully competes for our attention. In the information age, content competes for our attention in much the same way as products on a store shelf were designed to in the industrial age. The information we select will be what looks the most appealing, seems to communicate itself most effectively and efficiently, and appears reliable and authoritative.

Writing will continue to be a core skill for all students, because some information is simply communicated most effectively in text. However, other information might best be expressed using pictures, sound, animation, or video. Students must master a range of practical and technical skills involved in expressing ideas effectively and compellingly.

1. **Writing effectively:** Students must learn not only the mechanics of writing, but how to use text to communicate knowledge and ideas more efficiently than ever.
2. **Communicating with multimedia:** Students must also learn to match their message with the medium that best communicates it, and then use the appropriate tools to create and or modify it in order to attract the attention of an audience.

Ethics: Right and Wrong on the Information Highway

As information becomes increasingly important to our economy and culture, it also becomes more powerful — able to accomplish enormous good and great harm. This is why it is essential that at the same time we teach our students these prevailing information skills, we also teach them the ethical use of that information.

1. **Information reliability:** Students must learn to assess the accuracy of the information that they access and use, and it is equally important for them (and for all of us) to provide evidence of the accuracy and reliability of the information products they assemble. (See [Tools for Exposing Knowledge](#))
2. **Information property:** In the information age, we are all information property owners. Most of us will make our living by producing information products. It is important that students gain an appreciation of information as property that needs to be respected in the same way that we respect each other's material property.
3. **Information infrastructure:** Today, we depend on the computers and networks through which our information flows to no less degree than we depend on our roads, rails, waterways, and airports. Planting a virus on a network is just as destructive as planting a bomb under a bridge. Students must realize the importance of our information infrastructure and how critical it is to our success in the future.

Tools for Exposing Knowledge

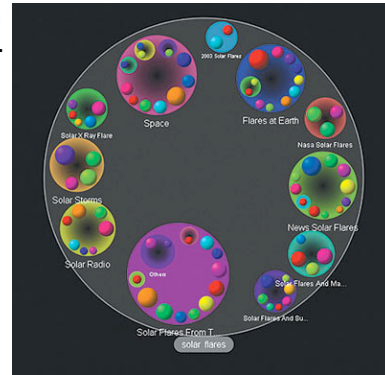
Finding Information

We are often overwhelmed by information when we search, since entering a simple term into a search engine such as Google can produce thousands of pages to peruse, presented in no particular order.

Dr. Bernie Dodge, long-time Internet aficionado, has developed "Four NETS for Better Searching." See webquest.sdsu.edu/searching/fournets.htm to learn more about the four strategies:

- Net 1: Start Narrow
- Net 2: Find Exact Phrase
- Net 3: Trim Back the URL
- Net 4: Look for Similar Pages

Grokker, a visual search tool, allows you to search for information and categorizes the results for you. You can save searches (called maps) and go through them offline to decide on which pages you will go back to online. You can also focus your search in a number of ways; for example, excluding any site that ends in .com, or including only those that end in .edu. (www.groxis.com)



Decoding Information

Asking the right questions is challenging. Helping students get deeper into information in order to develop understanding and get high-quality answers is not an easy task.

Dr. Jamie McKenzie, author, educator, and technologist, suggests a "Questioning Tool Kit." See optin.iserver.net/~fromnow/oct97/question.html for more information.

Helping students become literate when dealing with information is our job. A variety of sources are available, including:

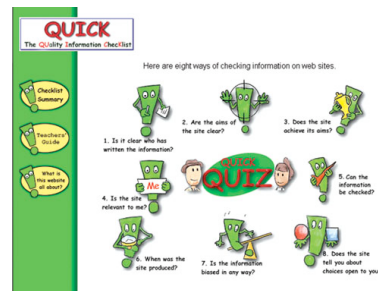
- CTAP IV Information Literacy www.ctap4.org/learning_rsrc/info_lit.htm
- Information Literacy Standards for Student Learning www.ala.org/ala/aasl/aaslproftools/informationpower/InformationLiteracyStandards_final.pdf
- QUICK: The QUality Information Checklist www.quick.org.uk

Evaluating Information

The ability to analyze information to determine its usefulness is an important 21st century skill.

Longtime librarians Marcia Tate and Jan Alexander saw the importance of applying tried and true evaluation criteria to Web sites, just as they had been applied to materials for print libraries. See www2.widener.edu/Wolfgram-Memorial-Library/webevaluation/webeval.htm to become familiar with the five criteria for evaluating Web sites:

1. Authority
2. Accuracy
3. Objectivity
4. Currency
5. Coverage



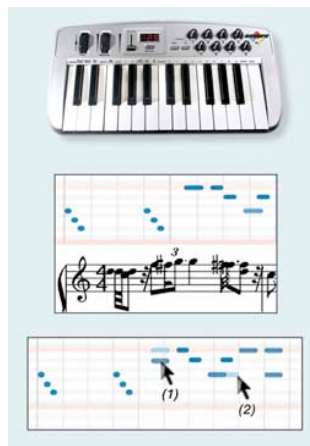
Organizing Information: Online Bookmarks

In a sense, your bookmarks or favorites are your personal Internet library. This is where you store links to Web sites that consistently have information that helps you

do your job. One drawback of using your browser's bookmarks for cultivating your Internet library is that it is difficult to take it with you. If you create a bookmark on a computer in the lab, it will not be available to you in your classroom, teacher's lounge, or at home. The following online bookmark services let you keep and cultivate your bookmarks on the Web, so that they are available to you any place and time that you are on the Internet. (This list should not be viewed as an endorsement of any of the following services.)

- BackFlip
www.backflip.com
- Bookmark Tracker
www.bookmarktracker.com
- iKeepBookmarks.com
www.ikeepbookmarks.com
- PiNet Library
pinetlibrary.com/index.php

Music and Math in the 21st Century



Most of the numbers that surround us are invisible. They are manifest in ones and zeros and generated, transmitted, and expressed by computer-assisted devices. Music composition is only one example.

The computer displays the numbers in a way that make sense to the musician. The information is often displayed as a piano roll (top) or in traditional musical notation.

The musician inputs changes and tweaks the effects. The computer then can perform the refined music, either through its own software or through external MIDI-compliant electronic instruments.

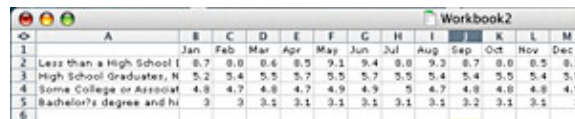
Processing Digital Numbers: Microsoft Excel

Moving data from a Web page into a spreadsheet for analysis and graphing can be a complicated process. However, it can often be as simple as the following five steps.

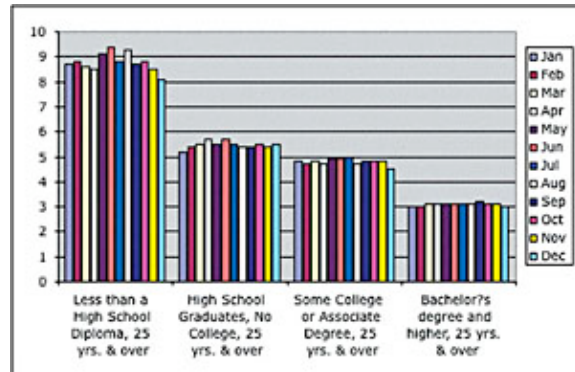
1. Open the page with the tabular data you wish to import into Excel. Using your mouse, highlight the entire data set, including column and row labels, and copy it into the clipboard.



- Open Excel, select the cell in the upper left corner of the spreadsheet, and paste the copied data into the spreadsheet.



- Sometimes the data columns will flow in perfectly, and you can start working on your spreadsheet immediately. But more often, all of the data pastes into the first column of your spreadsheet. To open the data into the appropriate number of columns, pull down the Data menu and select Text to columns.



Digital Storytelling

By combining writing (a script, presented in a voice-over), images or short video clips, sound effects, and music into a movie, students can find a way to become producers of content as well as consumers. Clear communication encompassing a variety of media is comfortable and natural for today's students and engages them in creative thinking and planning. Resources for learning this skill include the following:

- Center for Digital Storytelling
www.storycenter.org
- DigiTales: The Art of Digital Storytelling
www.digitales.us
- Scott County Community Digital Storytelling
www.scott.k12.ky.us/technology/digitalstorytelling/cdst.html
- Tech Head Stories
www.tech-head.com

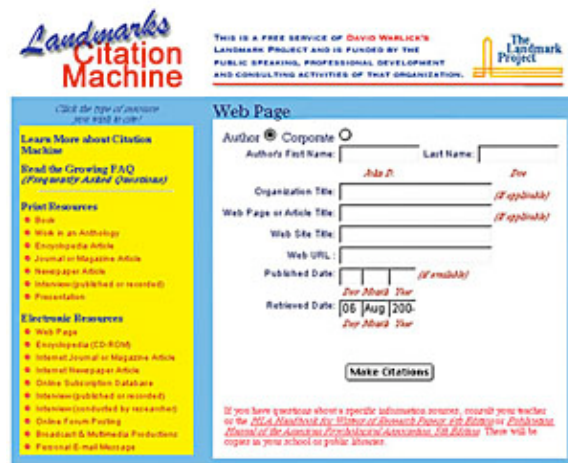
Online Ethics

As students learn to use the Internet to locate reliable information, they must be required to cite their sources, just as they will want their work cited by others who see it on the Web. Everything they come across has been created by someone else, and is covered by copyright laws.

Cyber crime goes beyond stealing and using someone else's material. Students, parents, teachers, and administrators must become more informed about such topics as piracy, hacking, financial consequences, and other possible problems.

Useful sites on the issues of copyright:

- U.S. Copyright Office
www.copyright.gov
- Copyright Web site
www.benedict.com
- "Kindergarten Copyright" by Rosemary Shaw
www.techlearning.com/story/showArticle.jhtml?articleID=13100799
- Citation Machine
www.landmark-project.com/citation_machine/index.php
- BSA/Play It Cyber Safe
www.playitcybersafe.com



20 Action Items for Administrators

Below are tips for how school and district leadership can play a key role in driving and supporting new literacy.

Central Office Administrators

- Create a standard Web page with the district's banner that provides links to appropriate search tools and other Web-based information services. Offer this page as a link to Web sites in the school district.
- Configure all systems so that each teacher (and student, if possible) can establish a personal library of bookmarks that follow the user from station to station.
- Work with other curriculum leaders in your district to integrate proper research and critical evaluation techniques into classroom activities.
- Emphasize the use of productivity tools in your technology program (word processing, spreadsheets, graphics, music, and video production). Offer professional development that supports student use of these tools as techniques for self-teaching.
- Establish an annual technology fair for your district. Feature booths where students and teachers demonstrate their digital work and discuss what they learn and teach in the process and provide formal presentations designed to help your community reshape their image of 21st century education.
- Establish a district mailing list for teachers to use to discuss how they are

integrating 21st century literacy into their classrooms.

- Explore, plan, and implement venues for teachers to display student-produced digital information products. Collaborate with the local public library, community college, banks, movie theaters, and other establishments to display student productions.
- Offer staff development opportunities for teachers and students on computer graphics, Web design, information layout, music composition, and video production.
- Work toward placing graphic software on every computer, digital still and video cameras in every classroom, and numerous music composition stations in every school.

School Administrators

- When evaluating teacher performance, document evidence that students are learning to find, decode, evaluate, and organize information. Also document evidence that students are employing information to construct new knowledge and that they are communicating what they have learned to authentic audiences.
- To the greatest degree possible, expect students to turn in their assignments digitally: on disk, tape, or over the Internet.
- Arrange computer and Internet facilities in your school in a way that offers the most access to the most people possible, and in a way that affords flexibility in their use.
- Arrange supervised after-hours access to computers for students and families who do not have convenient access at home.
- When delivering performance and demographic data to teachers for use in planning, demonstrate how you have used the data to tell a story about your school's strengths, weaknesses, and challenges.
- Purchase digital still and video cameras, and make them available for any teacher to use at any time. Work toward providing a still and video camera for each classroom, and bundles of cameras for student use.
- Frequently ask to see student-produced digital products (reports on disk, Web pages, multimedia presentations, or software).
- Establish a school Web site and enable all professional staff members to use the site in order to communicate vital information to the homes of their students and the community. Require that each teacher have a classroom Web site and to demonstrate how their Web site helps them do their jobs. Create a section of the school's Web site for showcasing student and teacher productions.
- Think of your school as more than its building. Include in your vision of the school all of the information products (text, images, songs, and video) that are created by students and teachers.
- Invite community comments on student and teacher work.
- Establish rotating video production teams and school photographers and assign them the responsibility of recording significant events of the school year. Have both upper- and lowerclassmen on the teams so the experienced students can train less experienced students.

21st Century Literacy Programs

Here are a number of programs concerned with new models for 21st century literacy:

- 21st Century Information Fluency Project
wizard.imsa.edu
- Initiative for 21st Century Literacies
www.newliteracies.qseis.ucla.edu
- The Big6
www.big6.com
- Partnership for 21st Century Skills
21stcenturyskills.org

Bibliography

Material for this article comes from the following new books:

- *Information Literacy*, by Sara Armstrong (Teacher Created Materials)
- *Redefining Literacy for the 21st Century*, by David Warlick (Linworth Publishing Inc.)

Sara Armstrong (sqaconsulting.org) is an independent educational consultant who delivers workshops and keynote addresses on literacy and technology.

David Warlick is the principal consultant with *The Landmark Project*, where he maintains a popular Web site for teachers (landmark-project.com).

Related Links

- [Get A Life Cycle: Salmon's Life](#) (01/19/2006)
- [Academy of Achievement](#) (01/18/2006)
- [T&L News](#) (01/17/2006)
- [Statistics Resources](#) (01/17/2006)
- [A Tribute to Dr. Martin Luther King, Jr.](#) (01/16/2006)

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