



Library “Science:” Make It Work!

Science teaching is taking on a whole new approach in the 21st century thanks in many ways to technology. Students of today learn differently.

The National Science Education Standards (NSES, 1995) (<http://books.nap.edu/readingroom/books/nses/>) present a vision of a scientifically literate populace. They describe an educational system in which all students demonstrate high levels of performance, in which teachers are empowered to make the decisions essential for effective learning, in which interlocking communities of teachers and students are focused on learning science, and in which supportive educational programs and systems nurture achievement. While

Science literacy, then, overlaps information literacy with its principles of accessing, finding, and evaluating information. In fact, both literacy frameworks have a common objective: to produce confident, competent, and competitive students. Therefore, collaboratively led and inquiry-based teaching and learning that includes both the school library media specialist and the science teacher can be the setting for both information and scientific literacy mastery.

Promoting Collaboration

Some federal initiatives do encourage increased collaboration between school media programs and teachers. The *Improving Literacy through School*

Although the ILSL program does not specifically encourage collaborative ventures between school media specialists and science teachers, Marcia Mardis’ article “School Libraries and Science Achievement: A View from Michigan’s Middle Schools” (*School Library Media Research* 10 (2007), (<http://www.ala.org/ala/aasl/aaslpubsandjournals/slmrb/slmrcontents/volume10/michiganscience.htm>)) can serve as a starting point for school library media specialists who are at wits end with how to collaborate and encourage science teachers to use the library media center.

Asking questions, making discoveries, gathering data, analyzing explanations, and communicating scientific arguments are key ingredients in a classroom where energetic inquiry is taking place. Many high school students see little connection between the subject matter they learn in science classrooms and real-world applications. School library media specialists can be the catalyst that connects school science to the outside world.

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the NSES do not contain the words “school library” or “media center,” they do call for the integration of diverse learning resources, collaborative teaching, and curriculum coordination. The NSES state that students must be able to describe, explain, and predict

phenomena, understand articles about science, debate opposite sides of scientific issues, and evaluate the quality of scientific information.



By Terrence E. Young Jr.

Libraries (ILSL) (<http://www.ed.gov/programs/lsl/index.html>) grants permit districts to: purchase up-to-date school library media resources; acquire and use advanced technology that is integrated into the curricula to develop and enhance the information literacy, information retrieval, and critical-thinking skills of students; facilitate Internet links and other resource-sharing networks; provide professional development for school library media specialists and provide activities that foster increased collaboration among library specialists, teachers, and administrators; and provide students with access to school libraries during nonschool hours, weekends, and summer vacations.

The Power of Digital

Digital libraries offer a unique and unprecedented resource through which teachers can facilitate student inquiry. The NSES emphasis on inquiry is pervasive. Yet, when it comes to today’s textbooks and curricula, the clear emphasis is on learning science content disconnected from experience. Although digital libraries can’t change pedagogy or textbooks, they can make it possible for students to have access to scientific information and data that interests them, a fundamental requirement for authentic inquiry. Digital libraries can provide teachers with a feasible way to let students pursue their own interests within the bounds of the curriculum and without

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creating an enormous amount of extra work in providing students with materials to support their investigations.

The National Science Digital Library (NSDL) (<http://nsdl.org>) was created by the National Science Foundation to provide organized access to high-quality resources and tools that support innovations in teaching and learning at all levels of science, technology, engineering, and mathematics education. NSDL provides resources and information organized especially to fit the interests of teachers, media specialists, and others working with K-12 students.

Today’s students live part of their lives online. Mass collaboration has changed everything; students want to talk to each other. Old and new media are converging. Enter blogs. A blog, or Web log, is a Web site where the author, or “blogger,” periodically posts news, personal thoughts, links, or—in some cases—picture/audio/video files to which visitors to the site usually can comment/respond.

NSDL’s Blogosphere (<http://expertvoices.nsdl.org>) provides some of the best engaging blogs for today’s science students. In *Boneyard Science: Investigating Forensics* (<http://expertvoices.nsdl.org/k12forensics>), the discovery team talks about forensics, why it is interesting, and what students want to know as they explore the field.

Blogs can also help students become subject-matter experts and increase student interest and ownership in learning. Blogging can give voices to students who often feel uncomfortable speaking up in class and can have a powerful impact on a greater number of students in the classroom as it supports more learning styles.

Blogs are being safely used by science teachers to help students develop and refine their abilities to write and communicate effectively, especially in the area of lab reports and science fair project research. Virtual lab notebooks and experiment records enable electronic science collaborations.

Serious science is being reported and discussed on blogs. If you visit some, you’ll also notice that the people writing and reading these blogs are having fun. Blogs by science writers often enjoy high Technorati rankings. Technorati (<http://technorati.com>) is the recognized authority on what’s happening on the World *Live Web* and currently tracks about 70 million blogs.

The Pods Are Coming!

Get caught up in the podcasting frenzy, but in a sciencey way! Your students and patrons are listening to podcasts. Are you?

Podcasting is a way to automatically deliver audio programming to your portable device. To do this, you subscribe to the podcast by downloading a small piece of software that manages all of your podcast subscriptions. When connected to the Internet, the software searches for the latest edition of the program on its Web site, and will download it to a folder on your computer, ready for when you next plug in your iPod or other portable device. This means that you don’t have to manually search for new programs to download. It happens automatically!

Podcasts with science content are popping up all over the Internet. Some are news-like programs providing video- or audio-bytes on the latest, hottest topics with a mixture of entertainment that appeal to a general audience. Some are in-depth presentations by

the leading researchers directed at the scientific community. Many programs can be downloaded into your MP3 player. Some come with subscriptions that will automatically update your iTunes directory.

With the proliferation of portable MP3 players (iPods, digital audio/media players, etc.), these free digital audio shows can be found on every topic, including science. Science podcasts present an opportunity for teachers to increase their cool factor with today’s tech-savvy students, while introducing science concepts and connecting them with daily life. Some podcasts, like Science Friday, tie their content to national standards. Others include links to relevant resources, discussion questions, suggested activities, and transcripts, making podcasts a practical and valuable resource. And don’t forget video podcasting, which is gaining popularity.

Check out some of these interesting science podcasts:

- Naked Scientists Science Podcast (http://www.thenakedscientists.com/html/shows/streaming_media.htm)
- This Week in Science Podcasts (<http://www.podcastdirectory.com/podcasts/834>)
- Science Friday with Ira Flatow: Making Science Radioactive: (<http://www.sciencefriday.com>)
- What’s Next in Science & Technology: Today’s Research, Tomorrow’s Reality (<http://www.whatsnextnetwork.com/technology>)
- Education Podcast Network (<http://epnweb.org/index.php>)

As with all materials that may be used in the classroom, podcast content should be previewed by the teacher before being made available to students.



Another collaborative technology is the wiki—a Web site that any visitor can add to and edit. Supporters say wikis offer a forum for broader and timelier discussion. Wikinside is a search tool based in Google Coop that looks for information on wikis. Check out (<http://science.wikinside.com>) to search for science and health wikis.

The Power of Video

Science textbooks haven't changed in years; they consist of pictures and text. Today's medium is video. Everyone would rather watch a video clip than a stock photo in a science textbook. Using videos and video clips, the latest information can easily be brought into the classroom or media center. For many students, the abstract concepts associated with science come alive with video. Enter *unitedstreaming* (<http://www.unitedstreaming.com>). Discovery Education *unitedstreaming* is a digital video-on-demand and online teaching service to help improve students' retention and test scores; it is aligned to U.S. state standards. *Unitestreaming* lets users search digital video content by curriculum standard, keyword, subject area, and grade. It is best to download the videos from *unitedstreaming* to your computer, rather than playing them as streaming video. School library media specialists can work with their science teachers to identify and download the best video clips that correlate to their lessons.

The American Association for the Advancement of Science (AAAS) provides a wealth of resources for K-12 science educators, one of which is Science NetLinks (<http://www.sciencenetlinks.com>). Science NetLinks' role is to provide a wealth of standards-based resources for K-12 science educators, including lesson plans, interactives, and reviewed Internet resources.

"Real-Time" Data in the Classroom and Media Center

"Real time" is when the occurrence of an event and the reporting or recording of it is almost simultaneous. Therefore, real-time data are the most current information available being collected and posted as you read this. Today's students can participate in interactive science projects with students around the world. For example, they can retrieve real-time data to explore the relationship between earthquakes and plate tectonics, to discover the mysteries of the Gulf Stream. They can also download digital images such as Jupiter's moons from NASA. They can ask questions of scientists or participate in real research. An excellent place to begin is The Center for Innovation in Engineering and Science Education (CIESE) (<http://www.k12science.org/currichome.html>). CIESE has an excellent collection of classroom data projects. These interdisciplinary projects all use real world applications based on data from the Internet. The project descriptions include connections to the both the National Science Education Standards and the National Council of Teachers of Mathematics Standards.

There are many science concepts and themes that cross curriculum areas. Here is an example of a collaborative learning scenario that involves not only the science teacher and the school library media specialist, but also the English, math, and social studies teachers:

- "Hurricane Season Blog"
Authors: NWS hurricane expert, Earth science teacher, and a school media specialist familiar with NSDL
- Expert: "Hurricane Gertrude is heading for Fort Lauderdale; 15-foot storm surge expected; undergoing eyewall replacement cycle"

- Media specialist: NSDL resource links, *unitedstreaming* video clips
 - Hurricane Hunters site
 - Latest satellite photos
 - USGS flooding and flood plain Web page
- Teacher: relevant standards and appropriate pedagogy
 - English teacher posts comments about grammar, sentence structure, etc.
 - Math teacher presents data and explores extrapolation of data.
 - Social studies teacher proposes social consequences as a result of the hurricane.
- Students: engaging real-time, real-world applications of science lessons.

School library media centers must adapt to how the 21st century student learns. This generation of students has grown up with computers and video games and has become accustomed to multimedia environments: figuring things out for themselves without consulting manuals, working in groups, and multitasking. School library media centers—along with digital information resources—can play a critical role in the education of today's students. Today's school library media centers must provide collections that promote access, in-person, and virtual assistance, to encourage students to pursue their education beyond the classroom. ■

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