Featured Article

Getting Started Enriching K–12 Curriculum with Internet Resources

By Patricia Deubel

A tutorial approach of a teacher's exploration of the Internet with its enormous resource of materials to enrich K–12 curriculum.

Subject: Internet Resources
Audience: Teachers, teacher educators,
Grade Level: K–12 (Ages 5–18)
Technology: Internet Browsers

Introduction

The television adventures of the Ingels Family on *Little House on the Prairie* portrayed the children in a one-room schoolhouse using their slate tablets. The

teacher was in charge of educating all the students from the town across all curricular areas deemed important at that time. She was expected to be the expert on all subjects, but had limited, hard-to-come-by materials. For the most part, this 19th Century paradigm for teaching and learning has not changed much. According to Rogers (1996), the education industry requires teachers to deliver a prescribed body and sequence of information.

Books, photography, telephones, and television have enabled an increase in global awareness and have transformed education. With the rise in computer use and the growth of the Internet, education is undergoing another transformation. More and more students are studying in a new schoolhouse where their slate tablets are computers. Resources are endless and the social space enormous. Imagine winds of change thrusting the 19th century teacher and students into this new environment–the Internet. Problems for the teacher getting started would include redefining the environment for teaching and learning, discovering exactly what new resources are available and their value, the process to use in discovery, and what steps students should take. What follows is this hypothetical teacher's adventurous exploration of the constructivist environment of the Internet.

The Winds Blow

The day the winds of change thrust us onto the Internet, I found myself alone in a classroom that was familiar in many ways, but the walls were gone. Books, papers, and strange machines called computers were everywhere. I had no idea where my students were or if they were learning. I began to explore the environment and encountered people speaking a strange language. I heard going online requires a computer with access to a modem, an Internet Service Provider, and a password for security. Information is found using a search engine and a browser. A URL address is needed to travel from one Web site to another. I thought clothes were hung on a line, spiders built webs, and security meant locking my doors at night! I needed to learn the language, find a description of this new environment, and discover exactly what was available and how to use it. These are my adventures that eventually led me to my students.

The Constructivist Environment

The Internet is more than a worldwide network of computer systems linked by various telephone wires. It has enabled a worldwide network of people to interact, share information, and create new communities online. The technology that the Internet uses has been around for more than 30 years, but it was Tim Berners-Lee's creation of the World Wide Web in 1990 that led to schools and educators to become interested in the potential of the Internet as a new educational tool. The Web turned the Internet into a point-and-click, hypertext environment and turns every computer connected to it into a library (Lewin, 2001).

A constructivist environment exists in which the Web and e-mail play a major role for learning. Inspiration for the pedagogy comes from Piaget's child as scientist and Dewey's call for students to engage in projects sparked by their interest (Gomez & Gordin, 1995). Jones, Valdez, Norakowski, and Rasmussen (1994) added indicators of meaningful learning. Students become engaged learners responsible for their learning. Tasks are challenging, authentic, multidisciplinary, and often involve sustained amounts of time. Learning involves project-based collaborative experiences. Brainstorming and Socratic dialogue are common instructional strategies. Assessment involves observing, interviewing, and/or examining student artifacts and presentations to assess what they actually know and can do. For assessment to be fair, new rubrics are needed for objective and comparable measurement.

Means (1998) pointed out most teachers are not ready for this approach because it requires a major shift in how they think about curriculum, their instructional approach, how they organize a classroom, and how they think about discipline. Gomez and Gordin (1995) noted that open-end inquiry reform fails if the larger context demands the teacher present and learners regurgitate the facts.

Books by Lewin (2001) and Leu and Leu (2000) contain specific examples and resources that will help educators to gain confidence to use the Internet as part of a school's curriculum to support, enhance, and extend instruction. Reading magazines such as *Classroom Connect, T.H.E. Journal,* and *Learning & Leading with Technology (L&L)* will help in the discovery process and provide news and ideas affecting Internet use for teaching and learning. For example, Classroom Connect (www.classroomconnect.com) offers Internet lesson plans, articles about online teaching, and many Web site reviews. T.H.E. Journal has a 2000–2001 Roadmap to the Web for Educators (www.thejournal.com/roadmap). It offers URLs for lesson plan sources, search engines, information indexes, curriculum resources by subject area, and extensive K–12 teacher resources. Special sections for cultures and disabilities/special education are included. For newcomers and experienced Internet users, the links provide a quick start for what is available and are extremely useful. *L&L* emphasizes practical ideas about how to use technology in K–12 curriculum to help ease a teacher's job, save time, motivate students, and to help students to deal with difficult concepts or the creative process. But, as Means (1998) stated, it is possible to waste a lot of time and money with technology as people browse aimlessly on the Internet. Exploration requires a plan.

Taking Charge—What's Out There?

Professional development can begin at the Online Internet Institute (http://www.oii.org/) and T.H.E. Institute (www.thejournal.com/institute/). For example, I learned about conducting Internet searches (http://oii.org/cyberu/html/searchengines.htm). Each search engine is different.

Searches are conducted by subject in Social Issues Resources and Yahoo; or by keywords in Lycos and Infoseek; or by using a multithreaded search engine such as Metacrawler. The more than sixty huge databases, organized A–Z, at InfoZone (2001) are perfect for K–12 students learning the research process. Selections include current events such as CNN News and topics such as art, bats, castles, dinosaurs, elements, inventions, juggling, pirates, rainforests, smoking, volcanoes, weather, and zoos. Students learn how to select and evaluate resources, organize information, produce a useable product, and to evaluate the process and product.

Curriculum and Projects

Education World (2001) selects ten best practical articles from the past publishing year for each of the main sections of their homepage. The best of 2000 deals with lesson planning, curriculum, technology in the classroom, books in education, administrators, teacher-submitted lesson plans, and school issues. Schrock's Guide for Educators (1995), a must see adventure, has a complete source of K–12 curriculum materials, search engines, and articles of interest updated daily with new Web sites. Links to a wealth of information include curriculum in agriculture education, art and architecture, business, mathematics, performing arts and music, health, physical education, science and technology, history and social studies, special education, sports, reference sources, vocational education, weather, literature and language arts, and world languages and regions. Of particular value are the links to designing and conducting WebQuests, which are inquiry-based activities in which all or some of the information that students interact with comes from resources found on the Internet.

Model curriculum sites are rich with primary sources for all grades, a key advantage for using Internet resources. For example, Global School Net (2001) features authentic collaborative projects from across the globe that are organized by topic, project date, and grade level. Students can join expeditions and follow real explorers as they travel around the globe. Distant classrooms can follow participating students on real-life field trips as they share their discoveries. Students can join CyberFair, whose yearly challenges have involved more than 500,000 students from more than 70 countries. The theme of the 2002 international challenge is "Care and Unite!" It was chosen as a result of the September 11, 2001 tragedy. K–12 students around the world are encouraged to produce an educational Web site that tells a story about how their local community cares.

Projects redefine collaboration and illustrate a multidisciplinary approach to learning. At ThinkQuest (2001), students from around the world collaborate, use the Internet to research a topic in science, mathematics, literature, the social sciences or the arts, and publish their research as Web sites. The ThinkQuest Library of Entries has more than 4,500 educational web sites designed by participants in ThinkQuest Competitions, as illustrated by the following

examples:

- Anatomy of a Murder (http://library.thinkquest.org/2760/) takes students through our nation's legal system while they study an actual criminal murder trial. They read a drama which has been researched, is legally accurate, and includes details of a criminal trial that are often glossed over on television and in movies. This story describes the events of criminal prosecution as they would actually unfold. Legal terms, where they are used, are found in the glossary. Students have access to Supreme Court rulings and can interact with e-mail on controversial issues as the death penalty and parole.

- CHEMystery (http://library.thinkquest.org/3659/) is a virtual online interactive chemistry textbook. Topics included are those found in a typical chemistry classroom, including atoms and molecules, states of matter, and energy. For the visual learner, a virtual reality browser enables students to see modeling of molecular structures.

- A full annotated, on-line version of the Shakespearean tragedy Macbeth (http://library.thinkquest.org/2888/) gives students an interactive alternative to conventional ways of understanding this masterpiece. Each unfamiliar vocabulary word of the era is linked to the glossary. Students can access audio and quick time video scenes from the play, and songs related to this and other Shakespearean plays. They can see artistic renderings of the characters. Teacher resources include on-line lecture notes and a shareware software program with notes and quizzes. This adventure truly provides a multiple-intelligence view of learning.

- Newspapers in Education (NIE) (www.nieonline.com) is a cooperative effort between schools and more than 50 newspapers from around the country to promote use of the newspaper as a teaching tool in the classroom. According to F. Grabowski, president of Online Publications Inc., which owns and manages NIE Online.com, teacher and student materials are developed to encourage students to use the newspaper to learn concepts and skills in a variety of subjects at all grade levels. NIE Online has developed a variety of features to encourage repeat traffic to the Web site to help expose teachers to new offers and special programs from the newspapers throughout the school year. Local news quizzes, lesson plans, national current events discussions and a diversity calendar are among the features maintained and updated weekly (personal communication, October 26, 2001). Their 36-category library of useful links includes curricular areas, career education, consumer education, English as a second language, health, safety, special needs, and virtual field trips, for example.

Virtual Field Trips

The Internet offers a valuable resource for virtual field trips. Luckily, these trips can be done on-site during the school day. NIE Online.com contains links to

field trips as the Canadian Museum of Civilization, the Grand Canyon Explorer, the Crusades: A View from Jordan, and the Odyssey adventure into world cultures. Of particular interest is the The Field Trips Site (2001) whose topics include rainforests, endangered species, salt marshes, volcanoes, Shakespeare, the American Presidency, and more. Each trip begins with a page listing vocabulary words and concepts to be learned from the trip. Users then start the trip and follow links selected by experts. Each page of the trip is a stop that describes a site. Educators can get teaching objectives, student printouts, a teacher's guide in the teacher's resources section, and help to create their own virtual field trips.

Cromwell (1998) lists science, industry, natural history, and art museums online. Take a trip to the Franklin Institute Science Museum in Philadelphia to learn about volcanoes, quakes, and raging rivers; and the Museum of Science and Industry in Chicago. Learn about the Apollo 8 command module, coal mines, hatching chicks, the human heart, or animated industrial gears–a real smorgasbord of activities. View one of the largest collections of art in the world at The Metropolitan Museum of Art, but be aware of the occasional nude.

A trip to nearly anywhere in the world is possible. Access to a virtual reality trip can be slow, depending on your connection speed, but the trip is worth the wait. I toured several cities at Wandering Italy (2001) and experienced a 360-degree panorama while being serenaded by Italian music. I saw San Marco Plaza and the Rialto Bridge, for example. This would provide a marvelous experience for students of world geography and cultures. At Earth and Moon Viewer (2001) I saw the Earth from a satellite of my choice and was able to rotate the Earth to view different features on the continents.

E-mail and Experts

Connecting students to experts in the field is an excellent way of expanding their horizons, supplementing the curriculum with current information, and integrating Internet resources into classrooms. Hundreds of subject matter experts (SME) including authors, astronomers, anthropologists, naval officers, meteorologists, and university professors have collaborated with K–12 educators in the Electronic Emissary Project from the University of Texas (Harris, 2001), which went online early in 1993. Harris believes it is the longest-running Internet-based telementoring and research effort serving K–12 students and teachers around the world. Teachers submit project ideas being researched by students and special requests of the SME. Parental consent is required. If chosen, the teacher and class communicate with the SME at least twice per week. At the end of each project, results are posted on the Internet for other educators. Examples include:

- Fourth and fifth grade students compared the experiences of their families on the Texas "La Frontera" to colonial life in the original 13

colonies, with the help of the director of a historic preservation center and museum in Fredericksburg, Virginia.

- An advanced placement Spanish literature class in California corresponded in Spanish with a professor at Ball State University about how the literature they were studying fit into the culture and history of Spain.

- 16–18 year old students from British Columbia corresponded with computer scientists working at Boeing and NASA to help them understand virtual reality technologies.

Sustaining Innovation

Gomez and Gordin (1995) warn that changes in the classroom can be aided or stymied by factors beyond the classroom. Achieving a new activity structure, such as projects, requires material and social supports. A great deal depends on the creativity and devotion of the individual teacher combined with the excitement he or she derives from it (Means, 1998).

Material support and help to sustain innovative projects is available at NickNacks Telecollaborate (2001), which provides easy to follow instructions for assessing existing resources and capabilities, models of innovative thematic telecollaborations with supporting instructional resources and extension activities, and tips for getting the most from the project-learning experience. Also available are a project planner template for designing your own collaborative project, guidelines, links to a long list of telecollaborations on the Web, mailing lists, useful tools, lesson resources, online publications, and e-mail assistance.

Update skills for using technology in the classroom with free multimedia online tutorials provided by the Association for Supervision and Curriculum Development (2001). Tutorials are presented by experts and practitioners, and conclude with a listing of additional resources. Twenty-three current topics include, for example, standards, performance assessment, multiple intelligences, problem-based learning, constructivism, and learning styles.

For social support, consider joining a listserv, perhaps at Teacher Universe (TU) (www.teacheruniverse.com), which is a member of Riverdeep Interactive Learning. TU's list is a forum for educators to share curriculum integration ideas and tips, and to receive updates relating to technology and K–12 education. Educators can bounce ideas off experienced teachers, throw out questions and concerns about software or online resources and other topics, and find collaborators for projects. TU also provides professional development courses designed to help teachers raise achievement through integrating technology into the curriculum and classroom experience. Links to funding sources and individual state standards are included.

Safety Rules for the Internet Schoolhouse

My quest to explore the Internet for resources to enhance K–12 curriculum and to get started in a new way of teaching eventually led me to Internet Island and Payton (1997). To my surprise she had found a group of young people wandering the Internet fearing for their safety. My students! Payton set down the rules and indicated some Internet service providers can assist parents and teachers to block access to certain materials that may be too adult for children. She reminds students to follow parent and teacher rules to go online and never give out your address, telephone number, picture, or password. Use first names only to ensure privacy. Never agree to get together with someone you meet online. She adds, if you come across information that makes you feel uncomfortable or receive inappropriate messages, tell your parents or your teacher. They can save this information. Often computer experts can find the source.

Payton's (1997) guidelines include teaching children wordprocessing skills to acquaint them with the computer keyboard prior to their first Internet adventures. A tutorial page explains the structure of a Web page, where to use a mouse on each page, and how to click onto hyperlinks to other pages and then return. She recommends the children's search engine Yahooligans and explains how to publish student work on the Web.

Our time on Internet Island came to an end. We all had acquired new skills to get started in this new land. Returning home, the students were puzzled because they thought their classroom had been blown away. But I smiled and told them we still have our schoolhouse; it is just bigger. I showed them the view of the Earth I had seen. And their response was that learning in this new schoolhouse would be awesome.

Conclusion

The teacher who made this journey could be any educator who is accustomed to the 19th Century paradigm of teaching and learning. When thrust into the land called Internet, the teacher learned about a constructivist environment in which the Web and e-mail play a major role for learning and found an enormous resource of materials available on the Internet to enrich K–12 curriculum. She found professional development opportunities to learn to use technology in instruction and to remain current on educational issues. Rogers (1994) observed there is no question that curriculum will change as more and more schools join the net. Students who have opportunities described here have already begun to make their own paradigm shifts regarding their place in the world, and how to relate to it. As a teacher, you, too, can follow this tutorial to begin your adventures in the one-room schoolhouse.

References

Association for Supervision and Curriculum Development. (2001). Tutorials. Retrieved October 23, 2001 from: http://webserver2.ascd.org/tutorials/

Cromwell, S. (1998). Take a Museum Field Trip–Without Leaving Your Classroom. Retrieved October 23, 2001 from: www.education-world.com/a_curr/curr057.shtml

Earth and Moon Viewer. (2001). Retrieved October 24, 2001 from: www.fourmilab.ch/earthview/vplanet.html

Education World. (2001). "Best Of" series. Retrieved October 25, 2001 from: www.educationworld.com/best_of/

Field Trips Site. (2001) Retrieved October 29, 2001 from: www.field-guides.com/

Gomez, L., & Gordin, D. (1995). Establishing project-enhanced classrooms through design. In D. Jonassen & G. McCalla (Eds.), *Proceedings of ICCE '95 International Conference on Computers in Education* (pp. 20–27). Charlottesville, VA: Association for the Advancement of Computing in Education. Retrieved October 24, 2001 from: www.covis.nwu.edu/info/papers/ E-mail: l-gomez@nwu.edu, gordin@covis.nwu.edu

Global SchoolNet. (2001). Retrieved October 24, 2001 from: www.gsn.org

Harris, J. (2001). The Electronic Emissary. Retrieved October 24, 2001 from: http://emissary.ots.utexas.edu/emissary/index.html E-mail: jbharris@emissary.ots.utexas.edu

InfoZone. (2001). Retrieved October 23, 2001 from: http://www.assd3.org/infozone/ Updated September, 2001.

Jones, B., Valdez, G., Nowakowski, J., & Rasmussen, C. (1994). Designing Learning and Technology for Educational Reform. Oak Brook, IL: North Central Regional Educational Laboratory. Retrieved October 24, 2001 from: www.ncrel.org/sdrs/engaged.htm

Leu, D. D., & Leu, D. L. (2000). *Teaching with the Internet: Lessons from the classroom (3rd ed.)*. Christopher-Gordon Publisher. ISBN: 1-92-902420-7.

Lewin, L. (2001). *Using the Internet to strengthen curriculum.* Alexandria, VA: Association for Supervision and Curriculum Development. ISBN: 0-87-120511-4.

Means, B. (1998). Technology and constructivist learning. *Leaders for Tomorrow's Schools, 5*(1), 11-16.

NickNacks Telecollaborate (2001). Retrieved October 24, 2001 from:
http://telecollaborate.net/

Payton, T. (1997). Getting started on the Internet: Searching the Web is as easy
as ABC! Retrieved October 24, 2001 from:
www.education-world.com/a_curr/curr028.shtml

Rogers, A. (1994). Global Literacy in a Gutenberg Culture. Retrieved October
24, 2001 from: www.gsn.org/teach/articles/gutenberg.html

Rogers, A. (1996). The Failure and the Promise of Technology in Education.
Retrieved October 24, 2001 from: www.gsn.org/teach/articles/promise.html

Schrock, K. (1995, June 1) Kathy Schrock's Guide for Educators. Retrieved
October 23, 2001 from: http://discoveryschool.com/schrockguide/

Teacher Universe. (2001). Retrieved October 24, 2001 from:
www.teacheruniverse.com

ThinkQuest. (2001). Retrieved October 24, 2001 from: www.thinkquest.org

Wandering Italy. (2001). Retrieved October 24, 2001 from:
www.wandering.com

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