

# What's on the Web?

## Sorting Strands of the World Wide Web for Educators

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Note: This is posted for archival purposes.

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For a chart showing these Types of Applications found on the Web, see the summary we made for Blue Web'n

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### Overview

A wide variety of information and human connection is afforded students and teachers who have access to the Internet. This article was written as a starting point for teachers who want to integrate the Internet into their curricula. My premise is that through classifying and defining aspects of the Internet that are useful to teachers, we can begin to intelligently pull in the aspects that serve our learning goals. Seven types of applications are categorized and examples are provided. Predominantly, the content of the Net is information and opinion; what tends to be in shorter supply are specific learning activities that make use of this wealth. So the bottom line stands: the Internet is an embarrassment of riches that is next to worthless without an educator (You!) to facilitate learning and integration in your classrooms.

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### Introduction

On Sunday, March 12th, 1995, I evaluated three class sets of essays explicating Robert Frost's wonderful "After Apple-picking," tabulated 6 week grades, organized and cataloged my collection of laser disks and CD-ROMs, cleaned-off hard drives on the 6 Macintosh LC 575's and AV that I had scrounged-up only last summer, carted off boxes of handouts, and, paused, before bidding a temporary farewell to classroom teaching. I had become a "Fellow." A Pacific Bell / San Diego State University "Education First" Fellow to be exact. After nine years teaching English at Poway High School in San Diego, I had the incredible opportunity to work full-time designing "applications" that infuse the Internet and videoconferencing into daily classroom learning. It was only after gaining the appointment that I had the nerve to ask our advisor Professor Bernie Dodge, "What exactly are 'applications?'" Obviously, "applications" means something like "using the technologies to do neat stuff." Teaching synonyms might be "projects" or "activities," but because the Design Team (i.e., the "Fellows:" Linda Hyman, libraries; Jodi Reed, community colleges; and myself, K-12) was charged with creating compelling "applications" for all sites who enroll in the Education First Initiative, we needed clearer definitions. Also, for all educators who use or will use the Internet and/or videoconferencing

with their students, more detailed brushstrokes are needed to facilitate an intelligent infusion of the technologies into classroom life. The following article is an attempt to understand, classify, and provide this detail.

After weeks spent surfing the net, surveying the literature, networking with key players, and cogitating from a classroom teacher's perspective, seven main categories of applications were differentiated. The risk of confusing matters with such a large number is a danger, but the hope is that through specificity, educators can get beyond genuflecting before the god of the "info superhighway" and begin to intelligently integrate the Web's usefulness into their curriculum. The remainder of this article will define each type and offer examples that can be explored.

## **Enrichments**

The range of fun and games that make the Web a belly laugh for individuals can create a belly ache for educators. The bawdy limericks, Find the Spam innuendo, and explicit videos have quickly added AUP (Acceptable Use Policy) to the educator's vegetable soup. However, there are some good-natured sites that while they may border on the risqué - like the terrific Museum of Bad Art - can also offer an entry for students stultified by hyper-filtered textbooks. Science teachers might want to use The T.W.I.N.K.I.E.S. Project as a clever introduction to the scientific method. Another idea is to use the Web's parodies to help students look more closely at society and the new technologies continually coming online (RealAudio?, now FunPhone? What Next?). So you might think of a judicious use of enrichments as motivational springboards to other activities just like sliding a cartoon onto the overhead or beginning a lesson with an unusual story.

## **Lessons / Online Tutorials**

A second general content type found on the Web is the Lesson or online tutorial. A Lesson targets specific learner outcomes and guides a user through instructional steps, often with feedback or checkpoints. Classic examples are the frog dissection sites. The Interactive Frog Dissection is a guided tutorial with feedback, video, and scanned images. The Virtual Frog Dissection Kit, version 1.2 provides excellent computer-generated graphics. Such detailed and methodical Websites should sound like great applications for teachers, and they are. Unfortunately, because of the "cost" involved in creating them, and the need to focus the audience, not many Lessons currently exist. However, as we all get up to speed on the new technologies, software, and strategies needed to be skilled Internet users and sophisticated Web publishers, it's fortunate that the hi-tech community has tended to post very useful Lessons such as WebMonkey's How-to Library. Look for more cutting edge examples like this as browsers become more sophisticated, but don't neglect the abundance of simpler "How-to's" like Creating Title Headers in Photoshop. Finally, the relative dearth of online Lessons shouldn't put teachers off. Instead, e-mail the educational technology departments of universities and your professional organizations to let them know what Lessons you'd like developed. A robust World Wide Web is in its infancy; the best is yet to come.

## Tools

When a teacher wants to accelerate a process, she may use a tool such as a calculator or a wordprocessor. Older-fashioned tools could even be considered: pencils, worksheets, even a raised hand. In all these cases, one thing each "tool" has in common is that learner input is more quickly turned into an output. The dominant Tool most Web-users encounter is the search engine. These handy sites take your input (keywords) and quickly search databases of over 50 million Webpages before generating an output of potentially useful Internet links. One interesting example is Metacrawler which searches a handful of other popular search engines, compares the results and returns a list that often contains less false hits and deadends.

Going back to the more traditional tools found in the classroom, we can see some interesting online similarities. For example, one neat version of an online calculator is the The Budget Explorer, a site put out by Heman Robinson. Here, users can guesstimate how the U.S. budget is apportionated and then immediately see how their figures compare to the actual amounts.

An online version of a word processor could be Jodi Reed's HomeMaker Online, a "fill-in-the-blank" Webpage that converts your text into an HTML (HyperText Markup Language) file that can be read by a Web browser. The lowly pencil's equivalent might be what's been called "The Killer App" (application) of the Internet: e-mail. Here anyone can immediately transmit their thoughts around the globe with no per-use charge. E-mail software is often a part of newer browsers, but educators can get excellent e-mail software like Eudora at no cost.

Often teachers want to scaffold student thinking, to provide a process that facilitates more advanced cognition or output. This is often the time to use worksheets. The Web has its corresponding sites that interactivate a learning process. One example is a javascript prototype we created called "Thesis Builder" located at the ElectraGuide Website. Here students working on controversial issue essays are prompted to input their thoughts and then Thesis Builder generates a persuasive thesis statement.

Finally, the raised hand might find its twin in the threads of a listserv where people with shared interests can broadcast their queries and opinions. Look to the Liszt (now Topica) directory to find a mailing list related to your interests. You could also join in a Usenet Newsgroup discussion and avoid what can sometimes be a barrage of e-mail. Explore Newsgroups at DejaNews (now Google Groups).

Most educators will find Tools useful devices to facilitate some aspect of their own or their students' learning. Educators will not, however, tend to be creators of software Tools. With all the handouts and bulletin boards to create, we might as well leave the programming to the pro's.

## References

Reference materials provide one of the main supplements to an educator's instructional program. Textbooks, encyclopedias, and media collections are comprehensive or definitive references that may be searched, studied, or browsed in order to supply additional information. Similarly, Websites exist that can provide the same kind of support for teachers and students. Thus, Web-based References are the first main **informational** type of sites that educators will invariably find useful. References can be in the form of databases that collect a wide body of information, like The CIA World Fact Book and the Statistical Abstract of the United States, while regular on-line use of the Merriam-Webster's WWWebster Dictionary is likely to sharpen anyone's vocabulary. Another way to use References is to go directly to sites that catalog other Web sites into hierarchical lists. Such locations as The WWW Virtual Library or YAHOO (Yet Another Hierarchically Organized Oracle) are good places to start if you're curious about a range of topics and don't want to limit your investigation to the keywords needed by search engines. A browse through the headings will give you an idea whether enough References exist on a topic to make it worth pursuing. Other References, like The Ultimate Band List (now Artist Direct), attempt to be a clearing houses on aspecific topic. Finally, actual encyclopedias, such as the Encyclopedia Britannica, are also commercially available on-line if you choose to subscribe (or take a free trial).

Educators will most likely find several key References in an area of interest and then get comfortable with what is available. The vastness of the Internet guarantees exhaustion if you think you've got to find every last piece of information on a topic. Instead, by finding References appropriate to interests, degree of expertise, and grade level, educators can tap into support material that could not be obtained this easily anywhere else.

A caveat should be extended here. The Internet is not the world's largest encyclopedia. Educators, students and parents who use it under this misconception will likely be frustrated: how reliable are the sources? why can't I find much on The Fertile Crescent? Who's letting all that pornography on? A nice statement from Net educator Ferdi Serim is that the Internet is not "content, but context:" an egalitarian meeting place where each individual can crank up their own printing press and where the best netizens post their best work for others to access freely.

## Resources

According to the HyperText Webster Dictionary, a "resource" is "a new or a reserve source of supply or support." Educationally, this usually refers to extra supporting experiences/materials like field trips, videotapes, guest speakers, libraries and special interest magazines. These differ from references in their scope and depth: a reference attempts to be a complete collection that is often searchable; a resource makes no attempt at completeness, but targets providing a deeper sliver of additional information or experiences. Use these as your essential examples: an encyclopedia is a reference (complete, indexed, sometimes searchable) while a magazine is a resource (news magazines, hobbyists' newsletters, etc. focusing on one topic or area). Also, while we're showing how resources differ from references, it's helpful to highlight their differences from lessons: resources provide information or experiences (it's up to the teacher or learners' to integrate the Resource into a learning activity). Lessons, by definition, instruction with clearly stated learning objectives. Therefore to recap the concept: Web-Resources enhance educational programs by making learning more relevant and by tapping into specialized expertise.

Web-based Resources are very similar, but with some key advantages. First, unlike Web-based Lessons, and to some extent References, Resources abound on the Web. In fact, specialized information tends to be the main type of content on the Web. One major type of resource are collections. Here, an organization or even a motivated and passionate individual may take on the service of providing a collection on a given topic to the world. Two examples of individuals who have made tremendous contributions are Nicolas Pioch with the WebMuseum and Dennis Boals and his History/Social Studies Web Site for K-12 Teachers. Both of these only exist because one motivated person decided to take on the task. Besides solo netizens, more traditional content providers like museums, organizations, and the media have chosen to provide resources: look at such sites as the Selected Civil War Photographs Homepage from the Library of Congress, Common Birds of the Australian National Botanic Gardens and CNN Interactive or The Atlantic Monthly Unbound. Finally, Web developers themselves have realized that providing specialized content provides a service to Web-users. You might want to explore Teaching.com's KeyPals Club, Pacific Bell Education First's Blue Web'n and the History Place's YAHOO's "Great Speeches Collection." Many of the above Websites perform the "hotlisting" function of searching, gathering and collecting links to other sites on the Internet. Because the net is loaded with Resources it might be useful to find a favorite "hotlist" that collects sites germane to your areas of study. One of the best hotlists for educators is posted by the Franklin Institute.

Besides a wealth of diverse and robust collections, like the traditional classroom resource we call the field trip, the Web offers an array of online examples. Take virtual field trips to The Human Heart (from the Franklin Institute) or visit the PandaCam at the World Famous San Diego Zoo. Also as the technology advances, look for more advanced uses of multimedia to enhance the experience as is available through such things as the Video Flyby of Giza Plateau from Nova's The Pyramids of Giza.

But if you really want to provide a more interactive virtual experience (the kids might be looking for the permission slips pinned to their shirts!), you might want to get started with interactive videoconferencing. By using ISDN lines or Internet-based conferencing systems such as Cornell University's CU-SeeMe you could connect with real people and content providers from around the country. Currently a wide array of not-for-profit organizations are developing videoconferencing-based versions of their popular presentations. Look to The Liberty Science Center, The Museum of Television & Radio and The San Diego Zoo to provide outstanding experiences for your students. Also, once you are connected for videoconferencing it's likely that you will begin to look to a broader spectrum of guest speakers and famous celebrities. Perhaps even more effective to student learning is reaching students from around the world to share ideas, information, and insights with peers.

The last type of resource is one with no equivalent in the classroom and stands as the aspect of the Web that makes it so compelling. Individuals and small groups of people can learn a little HTML, find a few megabytes of cyberspace on someone's server and post their own Webpages. What I'm calling "homespun pages" usually represent a person or group of people's overriding interest and passion. Explore diverse pages passionate about such things as history, off-the-wall information, professional interests, fanzines, quirky hobbies, etc. These homespun pages might offer information, images, videos, sounds, and personal perspectives on their topics (at least until the copyright police crack down!). Imagine students connecting with homespun pages that share their passions: what better place for students to foster their love of learning! What makes this even better is that students can actually connect with mentors or role models via e-mail or through personal homepages. Speaking of which, once students are inspired and learn a little Web publishing, students can and should post their own homespun pages. A nice example is Mrs. O'Haver's 5th grade class which studied the designs, icons, and lore of Native Americans, then created and published "Native American Commemorative Stamp Designs." Also if your school is near an important event such as an earthquake or catastrophe or has a special local story to tell, you can post a Web page that provides first-hand information to the world as the students of Pocantico Hills School did with their Early History of The Pocantico Area page. Thus, creating homespun pages is an easy and effective way for teachers to engage students in a rich learning experience for a real audience.

One plea I would make, however, is not to pander to posting unpolished student work. The power of a world-wide audience is its ability to motivate students to do their best. Students do not benefit when less than this is paraded before the world, because it's not the publishing, but the process of truly pursuing quality, that students respond to. Too much drivel currently litters the Web, so remember the maxim,

## **"Post no page before it's sage."**

In terms of publishing your students homespun pages, knowledge of HTML code need not be extensive. Tap into YAHOO's directory of World Wide Web Resources or explore a very up-to-date homespun page, Ellen's Potpourri of Internet links, to put you in touch with all the techno stuff you'll need to get started. For more educational support, you might try Wikipedia.

### **Projects**

Long-term projects have always held an important role in quality education. Research shows that students bring more cognitive tools to bear when they can turn their attention to a problem over a long period of time. Teachers typically create longer units or projects around topics central to grade level requirements or frameworks. Often the projects involve interdisciplinary research, reading, writing, and artistic creations. Full-scale, long-term, Web-based Projects start with the same premise, but then add all the features and power of the Internet to create a real world, not classroom, context. Whereas an "unplugged" class might study the Mayans by using encyclopedias, National Geographic magazines, reference books, and maybe a video, students who have Internet access can participate in Mayaquest, a "wholly kid-directed bicycle expedition into the Maya world of Guatemala, Mexico, Belize and Honduras." Students work to unravel the mystery behind the fall of the Mayan civilization. Through the process students can learned about "ancient civilizations, math, science, geography, art, architecture, and the links between the Maya and present day civilizations." Satellite-linked computers allowed cyclists and students anywhere in the United States to interact daily to come to mutual decisions along the quest. This is one example of more that is to come. Partnerships between software developers, universities, communications corporations, and schools are necessary to bring a full-scale, interactive Web project to reality, but the learning experience is unlike any ever before offered to students. World Wide Web Resources and References, teaching guides, videoconferencing, e-mail and off-line endeavors combine to empower learners as contributing experts and/or data collectors who explore particular components of the whole project's focus. The heart of Web-based Projects should be an inherently compelling "event" that benefits from in-depth examination from multiple perspectives and various academic disciplines. Participating sites should come from many (sub)cultures, age groups, and real world roles.

Obviously, with its support from CNN Newsroom, Weekly Reader, Junior Scholastic, and a toll-free hotline, creating a MayaQuest is beyond the means of classroom teachers. But on-going participation in such Projects is not. The primary source for information about upcoming Web Projects is the Global SchoolNet Foundation as well as listservs like that provided by ePals. Also, most of the Projects continue each year so build them into your semester's curriculum. Look into such sites as The Journey North, Nonprofit Prophets and The San Diego Zoo InternQuest.

## Activities

Activities are the heart of what goes on in a classroom. A teacher may begin with a challenging anticipatory set, engage students in a discussion, focus on defining key terms or concepts, and then set the students off on a group discovery using reference materials, textbooks and computers. Notice that many different types of educational strategies were involved and many different types of information was available and processed. This kind of orchestration of learning experiences into a purposeful whole is what good teachers do all the time. Treasure Hunts, campus-wide assemblies for speakers or events, guest teachers, lab experiments, and class discussions & debates serve just this kind of integrating focus.

Although hands-on, problem-solving activities are the heart of an engaged classroom, they are, unfortunately, in short supply on the World Wide Web. Again, like the scarcity of Web-based Lessons, this makes sense. Consider all the variables you take into account when you create an activity: where the majority of students are in their prior knowledge, how they responded to a similar activity two weeks ago, their understanding of group dynamics, the general feeling-tone in the class after yesterday's big test, etc., etc., etc. Besides the myriad details that make your students and your approach to them unique, the fact also remains that the Web so far is about posting information to the world. Class activities tend to integrate and pull from many References and Resources so that students can construct meaning from multiple inputs. Most Websites are doing all they can to manage their own sites, let alone concern themselves with integrating their information with that found on other servers. Therefore, **creating activities is a main strategy for classroom teachers to integrate the Web with their students' learning.**

Because people learn best with examples, let's take a mini tour showing a handful of ways the Web's bounty can be tailored into specific, outcome-oriented, learning activities. First, because many people view learning as acquiring new information, you might check out Black History Past to Present: a Treasure Hunt in which students are asked questions and are provided a matching list of Websites they must explore to discover the answers. If your goals for a particular activity turn more toward the affective - getting students to engage in the topic and find personal relevance - an example is My China. Here, students can choose from an array of activities, all of which query students not on factual information, but their opinions, preferences, and personal insights.

One specific example of a Web-based Activity that we are developing at San Diego State University is known as the WebQuest. Professor Bernie Dodge, the creator of this model, has posted The WebQuest Page as a resource to teachers trying out this strategy. Briefly, a WebQuest is a Web page that challenges a group of students with an authentic learning task and a rich set of Web Resources, References, and possibly Tools and Lessons linked directly to the page. Students work in collaborative groups, each of which explore the linked sites related to a specific role or job within the team. Through this process, students come away with an understanding that is integral to completing the group's task. The group members work together to teach what they have learned to their partners. Finally, higher-level questions serve to guide learners toward more challenging thinking and thus a deeper understanding of the topic being explored. One of the earliest examples is my own "Searching for China," in which a group of students take on the roles of a foreign investor, a human rights worker, a California state senator,

a religious leader, and a museum curator. Each team member must develop an "action plan" regarding United States policy toward China. But because the students work together as a team, they must also come to agreement on a group action plan that compromises and balances human rights interests with business concerns with religious imperatives, etc. Because the Web Resources are expansive and abundant (from the "Free Tibet Home Page" and the China News Digest to Chinese paintings and proverbs), no two groups will have the same experience, discussions, or solutions. Thus, in a few weeks, students go from the introductory knowledge acquired in the classroom to a more extended and refined understanding. Other WebQuests to explore are the outstanding Ewe Two, a WebQuest about cloning organized by Keith Nuthall and Look Who's Footing the Bill!, targeting the federal budget.

If you're getting a little nervous about how you will create such activities as these, one solution we have come up with is Filamentality. This is a fill-in-the-blank interactive Website that guides you through picking a topic, searching the Web, gathering good Internet sites, and turning Web resources into activities appropriate for learners. Support is built in, so you'll end up with a Web-based activity you can share with others even if you know nothing about HTML, Web servers, or that www-dot business.

If you still lack the inspiration to get started, perhaps abject fear and potential humiliation might shift you into gear. How about this: students are already doing much cooler things than anything we've just mentioned. Take a long spin through Design Paradise, the product of three high school students in Hawaii. This Website was a winner in the first ThinkQuest contest and is among the best educational sites on the 'Net. Moving far beyond simple point and click Web shtik, Design Paradise is an interactive simulation in which users decide how to develop a balanced and sustainable community in Hawaii.

However, teachers should still take pride in the research findings that show that how an instructor embeds or frames an activity contributes more to its success than the activity itself standing alone. So remember, even the best Web-based Activity is going to need the context that you provide.

### **It's Up to You**

My goal was to begin an analysis of the various types of content and experiences that comprise this thing we call the Internet and, more specifically, how those types can be used by educators. I have tried to compare the types to more traditional practices/strategies that educators would already be familiar with. By providing links for each example I hope this article will serve as an introduction for educators new to the Internet. I believe that with the World Wide Web and all the accompanying features of the Internet, teachers have a tool that will promote the best in cognitive and affective learning, expand the role of teachers to the mentorship that Socrates modeled, and diminish the walls that keep us in isolation. Isn't it nice to be teaching at the beginning of the golden age?