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## **A Teacher's Guide to Educational Resources on the Web**

By Ian G. Bron

### **Introduction**

Research into the use of information technology in education is still in its infancy, with much debate over the benefits and costs of the introduction of computers into the classroom. This is particularly true of resources on the World Wide Web – an explosive development in Internet technology that is less than ten years old. Indeed, many believe that the Web is *the* future of information technology, and that it will bring benefits to all aspects of our lives. The private sector has certainly recognized the potential, and is working hard to fill an anticipated demand in forms that range from the simple advertising of traditional paper products, to in-depth Web sites, to online schools. Canadian cultural institutions such as the National Library of Canada and Statistics Canada, as well as quasi-private institutions such as Historica and the

Canadian Institute for Historical Microreproductions (CIHM), are also leaping forward. At a time when the public seems to be crying out for more focus on the “basics”, educators are asking hard questions. Why should they use the Web in the classroom? If it is used, when should it be used? What should be used? Who should use it? This article hopes to answer these questions, and provide guidance in evaluating Web resources.

It should be noted here that the Web is only one part of the Internet. The Internet was developed in the late 1960s, and includes other technologies such as e-mail and file transfer protocol. This article, however, will focus on the Web.

### **Why Use the Web?**

Because many educators are still skeptical about the purpose and benefits of using computers in the classroom, this question must be answered first. On one level, computers are only useful inasmuch as they can support the curriculum – they cannot be treated as a novel reward system or as a second-rate replacement for traditional teaching methods and resources. This is also true of the Web. However, with the use of carefully evaluated resources, there is great potential for educators to improve teaching practice by allowing teachers to center learning around the student and to focus on the strengths of individual learners.<sup>1</sup> Indeed, there is substantial evidence supporting the efficacy of this kind of educational use.<sup>2</sup> Online resources can also save time in planning: the growth of online curriculum support is explosive, from lesson plans and student-directed learning activities to full courses at “virtual schools” and other institutions. Furthermore, the Web is a valuable research tool.

On another level, it is important that students learn how and when to use the tools that will probably dominate their adult lives. In addition, educators must accept that governments

across the industrial world are committed to “wiring” classrooms across their nations. Great Britain has its “National Grid for Learning”, which has brought training to teachers and computers into almost 90% of its schools;<sup>3</sup> the United States has its National Education Technology Plan;<sup>4</sup> and Canada has its “SchoolNet” – which has connected every Canadian school to the Internet.<sup>5</sup>

### **When Should the Web be Used in the Classroom?**

As most educators are aware, using the Web in the classroom is not simply a matter of sitting students in front of a computer and instructing them to find what they need. First, there are logistic limitations - most classrooms have only one or two computers, and computer labs are usually booked. Second, students have a wide range of abilities. Some will have acquired experience at home, others will only be familiar with games, and some will not have used a personal computer at all. For computers and the Web to be used effectively, then, several steps should be followed:

1. Teacher training and hardware/software acquisition
2. Student training in the fundamentals of how to use the technologies provided (Grades 3-6)
3. Student training in basic research methods and Web searching tools
4. Student training in advanced (i.e. discriminating) research methods

For any training to be conducted effectively, it is important that educators be proficient users themselves. As the technology is so new, most educators were trained and have worked in classrooms that were without computers (or the Internet) until very recently. In the United States, it was found that 65% of teachers had never used a computer before being introduced to

one in the classroom.<sup>6</sup> There is no reason to believe that the statistics are any better in Canada. Thus, it is crucial that school boards provide not only machines, but also training. For their part, educators must use this training and practice the skills learned.

In addition – and contrary to popular belief – most young students will have little experience using computers as an educational tool. While some may have experimented with using/navigating the Web, this should not be confused with proficiency. Thus, it is imperative that educators ensure that students are familiar with the tools they will be using. For the elementary grades, this means lessons in basic Windows or MacOS technology, including mouse and keyboard skills, the recognition and use of icons and standard tools. This can be followed by lessons in Web navigation. Students often become lost because they are not aware of basic conventions, such as the use of the “back” button, or that the logo of a site is often linked to its home page. While this is not a serious concern when “surfing” or playing games, it is an issue in the effort to keep all students on task in the classroom. This training *must* come first, or benefits from the use of Web resources will be uneven at best.

Once students are properly trained, the Web is a promising information/research tool for the Language Arts and Social Sciences. Resources currently available range from content created for the elementary grades – the National Library of Canada’s *Page by Page* exhibit on writing a children’s book, for example – to sophisticated tools such as the CIHM’s *Early Canadiana Online* database of digitized early Canadian texts. Such sites can supplement classroom content and put learning into the hands of the learner to a much greater degree than traditional textbook learning. But what resources are the most useful?

### **What is Useful on the Web?**

To say that content on the Web varies in quality is a gross understatement. Some sites are so poor that they offer little educational support. Others, however, have flaws that require closer inspection to detect. The type of content most useful to educators and students depends on the audience and the outcomes sought by educators. Given the strength of the medium as a potential research tool, sites with informational and research content will be the focus of evaluation here.

### **Web Content for the Elementary Grades**

Many young learners have already caught on to the potential of the Web, using it to create “cut-and-paste” reports and download images. Unfortunately, this crude, untrained use does not equate to real learning. There have been developments to address this issue, however, including WebQuests, the brainchild of Bernie Dodge at San Diego State University. He defines WebQuests as “an inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the Web, optionally supplemented with videoconferencing.”<sup>7</sup> WebQuests provide students with a problem to solve and a set of information resources to complete the task, and as such minimize the possibility that students learning to research on the Web become lost or distracted. As they are intended to foster higher thinking skills, they exclude “all about” activities – which tend to be collections of facts with little original thought required by the writer. Indeed, WebQuests have been compared to Problem Based Learning, but with greater structure.<sup>8</sup>

When constructing WebQuests and similar activities, though, educators must first visit the sites and evaluate them. For students in elementary grades, the most superficial criteria for usefulness in education are the need for simple text and graphics. This may seem obvious, yet

many site creators have ignored this basic fact. Sites which use an abundance of Flash (a Web-based animation tool) and other programming tools may produce aesthetically captivating sites – but often at the expense of clarity and usability.

In addition, the educator must consider how the resource will be used. Will it be as a class, an independent group, or individually? Given that there are few classrooms fully equipped with computers (outside of computer labs), educators must look to resources that are relatively easy to use and that require a minimum of guidance. This will allow students to work independently or in rotating groups.

Educators, then, must evaluate sites for use in the elementary grades using several criteria (see also Table 1 at the conclusion of this piece):

- **Quality and level of content:**

Sites should be content-rich and reliable. While there are a plethora of private sites with content on almost every subject, it is important to choose those produced or supported by respected institutions or individuals. Content must also match the level of the students. It is of little use to direct Grade 4 students to sites with complex text and difficult vocabulary.

- **Layout of content:**

Students in the early grades are still learning to navigate the Web, myths of child supremacy in this field aside. Content must be presented in a way that does not distract students when learning. While sites such as CBC4Kids provide interesting and meaningful content, there are dangers. Too many (or difficult to follow) navigation choices can lose young learners quickly. Such sites need careful guidance. *A willingness to experiment must not be confused with competence.* Sites

that are easy to navigate and that divide information into easily digested chunks will facilitate independent in-class use.

- **Lesson plans and activities:**

Generally, it will be easier to use sites which have been created with a specific set of learning outcomes in mind, and which have lesson plans and activities that match the content.

- **Loading time:**

Sites that are too slow will disrupt lessons and inhibit learning. Sites with heavy graphics are particularly guilty of this.

- **Links to other sites and advertising**

For ethical reasons, teachers need to consider what other messages are being sent with the content, in the form of banner ads and links to other sites. Some teachers have been alarmed at how quickly students can travel to pornography and other inappropriate material from sites with questionable links.<sup>9</sup>

### **Web Content for the Secondary Grades**

Secondary students generally have the advantage of being more experienced Web users. Here, the myth is partly true: though it cannot be taken for granted, many students know far more than their teachers about information technology. Educators in the secondary grades should focus on teaching students to use the Web (and the Internet as a whole) as a research tool. In the early secondary grades, basic research skills should be taught: where to find information, how to evaluate it and how to use it (or not use it) in report and essay writing. Good sites for this group will be those with the weight of reputable institutions behind them – for example, the Library of Congress *American Memory* site.

Older secondary students should be moving away from pre-packaged content to developing independent research skills on sites with primary source material. Indeed, it is here that the strength and potential of the Web is truly evident. More and more primary texts are being digitized and made available to the public. The importance and richness of these sources must be emphasized before students begin post-secondary education: university staff have long complained of the lack of research skills in first year students. Thus, even when not involved in the design of student-directed learning/research activities such as WebQuests, it is imperative that teachers in the Social Sciences and Language Arts collect a list of reputable sites containing primary materials that can be passed on to students.

It is also critical that students be able to evaluate the sources they use. The standards they should use are much the same as those used by educators (see also Table 2 at the conclusion of this piece):

- **Reliability:**
  - Bias. Whether evaluating content or a collection, users must consider whether it is an objective source versus one created for a specific purpose. At one end of the spectrum, *Early Canadiana Online* aims to digitize all early Canadian texts. Those that were considered historically significant were first online. On the other end of the spectrum, hate sites and their ilk contain material that could only be of use to one studying the phenomenon of their existence. Between the two lies the Vatican site. While a rich source of material, it was created with a specific purpose – to inform on matters of faith and the Catholic Church. It is not intended to be objective.

- Authority. Is the creator qualified to speak on the subject? There are many sites with rich content, but which may not necessarily be authoritative. Mr. & Mrs. Donn's Ancient History site may be an excellent starting point, but does not have the same weight as The Smithsonian. Students must understand that information printed on the Web does not go through the same peer review process as printed material.
- Primary source. Primary sources are the most valuable Web resources of all: they allow students to go to the original material and interpret it themselves. This fosters valuable learning and thinking skills.
- **Comprehensiveness and level:**

Is the site comprehensive in its content, or is it simply an encyclopedia-like list of information? As with print sources, students must learn to go to the most meaningful material. In addition, secondary students should not be using content created for young children, no matter how easy and convenient it may seem.
- **Ease of use:**

If the material is to be used in the classroom, it must be fairly easy to use. This includes such considerations as download time, content layout and alternative access methods, such as printable formats (PDF, Word). If there are concerns, lessons must be carefully structured to reduce time wastage. Bookmarking specific pages on individual machines can also be an effective strategy.
- **Links to other sites and advertising**

Concerns about inappropriate material are more relevant during the teen years.

This evaluation process gives educators the opportunity to consider how resources could be used in the classroom: for free research, or as a guided activity? To illustrate teaching points, or with a series of questions to be answered based on content? If so, do the questions follow content on the page? Can the text be read on screen, or would it be better to print the resources? As text is read 25% slower on screen than on paper,<sup>10</sup> and as navigation on some sites can be complex, these are important issues.

Sites that cater to educators, then, are only useful if they consist of content that is created with these issues in mind. *Early Canadiana Online*, for example, has comprehensive lesson plans created for different levels that allow students to guide themselves through learning activities. The same is true of the National Library of Canada's Web site, which has content created with the primary classroom in mind. Thoroughly developed materials such as these greatly facilitate use by educators.

Finally, educators must consider issues of copyright and plagiarizing. Studies suggest that students carefully instructed in research methods and on the ethics and dangers of plagiarizing are more likely to follow proper practices.<sup>11</sup> Most sites will state whether materials may be freely reproduced, and most educational content is free for use in the classroom – but not all. Educators must consider the implications of reproducing material from the Web, and educate their students in the same issues. Fair use usually includes private use and proper citation.

### **Obligations**

The explosive growth of the Internet and the World Wide Web have created an unprecedented opportunity to supplement and present curriculum – one that educators must take advantage of if they are to serve their students well. This implies a need not only for increased

access and teacher training – both of which have been commented on in a range of government reports – but also of the need for content created for learners of all ages. Despite many notable digitization programs, information currently available online represents only a fraction of a percent of that in print. This presents public institutions with an unprecedented opportunity – the opportunity to make information freely and universally accessible by increasing the amount of resources available online/digitally. Hopefully, few publicly funded institutions will neglect this opportunity. It is only in this way that we will progress beyond two-tier education in “the information age”, in which resources are available to only a select or lucky few.

### **Conclusion**

As the development of the Web continues at its incredible pace, it becomes more and more important that education ministries and school boards ensure that educators are properly trained in its use. Similarly, there is an onus upon teachers to practice and develop these skills. It is an opportunity – a revolution – equal in magnitude to the invention of type printing, and will ultimately enable educators and students to access vast databases of information in their quest to learn. Still, these resources must be used with caution. The role of educators will not diminish but expand, as students will need guidance. If they receive it, it will strengthen our education systems and equip our youth for the world that awaits them.

**Table 1: Sample Site Evaluation Criteria for Elementary Grades**

	1	2	3	4	5
Quality of content					
Appropriate level for grade?					
Images (useful or distracting?)					
Density/amount of text					
Ease/simplicity of navigation					
Load time					
Links and advertising					

Total Rating:

Sites with a rating less than 26 should be avoided.

**Table 2: Sample Site Evaluation Criteria for Secondary Grades**

	1	2	3	4	5
Overall quality of writing/material					
Bias					
Authority					
Amount of primary source material					
Appropriate level?					
Comprehensiveness					
Ease of use					
Alternate formats					
Links and advertising					

Total Rating:

Sites with a rating less than 31 should be avoided.

### Sites Noted in Text

- Canadian Institute of Historical Microreproductions/Institut Canadien de Microreproductions Historiques: *Early Canadiana Online/Notre mémoire en ligne*:  
<http://www.canadiana.org/>
- National Library of Canada/Bibliothèque Nationale du Canada: <http://www.nlc-bnc.ca/>
- Statistics Canada/Statistique Canada: <http://www.statcan.ca/> (education resources -  
<http://www.statcan.ca/english/edu/index.htm> and  
[http://www.statcan.ca/francais/edu/index\\_f.htm](http://www.statcan.ca/francais/edu/index_f.htm))
- Historica: <http://www.histori.ca/>
- Canada's SchoolNet/Rescol Canadien: <http://www.schoolnet.ca/>
- CBC4Kids/Club Jeunesse-FD6: <http://cbc4kids.ca/kidszone/> and <http://www.radio-canada.ca/jeunesse/>
- American Library of Congress: *American Memory*:  
<http://learning.loc.gov/ammem/ammemhome.html>  
*This site contains lesson plans, databases of digital images, digitized texts and audio files.*
- Vatican: <http://www.vatican.va/>
- Mr. and Mrs. Donn's Ancient History: <http://members.aol.com/donnandlee/>
- Smithsonian: <http://www.si.edu/>  
*This site contains lesson plans, databases of digital images, digitized texts, audio files and original research papers.*

## Some Other Recommended Sites

### Sites for Educators: Professional Issues

- Active Learning on the Web (K-12 Version):  
<http://edweb.sdsu.edu/people/bdodge/Active/ActiveLearningK-12.html>
- The Active Learning Site: <http://www.active-learning-site.com/>
- Beating the Cheating: <http://www.lane.educ.ubc.ca/LIBE/LIBE1/MD/bc.htm>  
*Includes tips on picking useful sites for students, how to avoid cheating, and a host of useful links.*
- Canadian Library Association: Copyright Information:  
<http://www.cla.ca/resources/copyrigt.htm>
- The Center for Critical Thinking: <http://www.criticalthinking.org/>
- Government of Canada Department of Justice: *Copyright Act*:  
<http://canada.justice.gc.ca/en/laws/C-42/index.html>
- The New Plagiarism: Seven Antidotes to Prevent Highway Robbery in an Electronic Age: <http://www.fno.org/may98/cov98may.html>
- Resources on Critical thinking: <http://www.calpress.com/resource.html>
- The WebQuest Page: <http://edweb.sdsu.edu/webquest/webquest.html>  
*This site is hosted by the Educational Technology Department at San Diego State University.*
- The WebQuest Design Process:  
<http://edweb.sdsu.edu/webquest/Process/WebQuestDesignProcess.html>

### Sites for Educators: Lesson Plans and Other Materials

- About: Lesson Plans page: <http://www.lessonplanspage.com/>

- Cool Lessons and Units: <http://www.coollessons.org/coolunits.htm>

*This site contains WebQuest units.*

- Discovery School: <http://school.discovery.com/>

*This site has lesson plans, tools for making puzzles, quizzes and much more.*

- PBS: <http://www.pbs.org/>

- Wisconsin Educational Communications Board: <http://www.ecb.org/index.htm>

*Maps - <http://www.ecb.org/surf/maps.htm>*

### **Information Sites for Students**

- Canada's Digital Collections: <http://collections.ic.gc.ca/>

- Canadian War Museum/Musée Canadien de la guerre (see Virtual Exhibitions):

<http://www.civilization.ca/cwm/cwmeng/cwmeng.html> /

<http://www.civilization.ca/cwm/cwmeng/cwmeng.html>

- Canpix Image Gallery:

<http://www.nelson.com/nelson/school/discovery/images/ncddcats.htm>

- Central Intelligence Agency World Fact Book:

<http://www.odci.gov/cia/publications/factbook/index.html>

- CNNfyi: <http://fyi.cnn.com/fyi/index.html>

- Discoverers Web: <http://www.win.tue.nl/~engels/discovery/>

- Harcourt School Publishers Science Glossary:

<http://www.harcourtschool.com/scienceglossary/index6.html>

- Hudson's Bay Company History: [http://www.hbc.com/hbc/e\\_hi/default.htm](http://www.hbc.com/hbc/e_hi/default.htm)

- Hans Christian Andersen Fairy Tales and Stories: <http://hca.gilead.org.il/>

- Historica: *The Canadian Encyclopedia Online*:  
<http://www.thecanadianencyclopedia.com/>
- History Channel: <http://www.historychannel.com/>
- Making of America: <http://moa.umdl.umich.edu/>
- Musée Virtuel de la Nouvelle-France: <http://www.vmnf.civilization.ca/>
- National Maritime Museum (Great Britain): <http://www.nmm.ac.uk/>
- Project Gutenberg: <http://promo.net/pg/>  
*Many, many classic texts have been digitized here.*
- Aesop's Fables: <http://www.pacificnet.net/%7Ejohnr/aesop/>

### Notes

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<sup>1</sup> The Web-Based Education Commission to the President and the Congress of the United States, *The Power of the Internet for Learning* (Online: <<http://www.ed.gov/offices/AC/WBEC/FinalReport/>>. Washington, D.C.: United States Department of Education, 2000), p. iii.

<sup>2</sup> *Ibid*, p. 79.

<sup>3</sup> Department for Education and Employment, *Statistics of Education: Survey of Information and Communications Technology in Schools*, England 2000 (Online: <<http://www.dfes.gov.uk/statistics/DB/SBU/b0197/sb07-2000.pdf>>. London: The Stationery office, 2000).

<sup>4</sup> United States Department of Education, Revising the 1996 National Educational Technology Plan (Online, <<http://www.air.org/forum/>>, 1996, accessed February 28, 2001).

<sup>5</sup> SchoolNet, *What is SchoolNet?* (Online: <<http://www.schoolnet.ca/home/e/whatis.asp#connectingcanadians>>, accessed March 1, 2001).

<sup>6</sup> The Web-Based Education Commission to the President and the Congress of the United States, p. 39.

<sup>7</sup> Bernie Dodge, *Some Thoughts About WebQuests* (Online: <[http://edweb.sdsu.edu/courses/edtec596/about\\_webquests.html](http://edweb.sdsu.edu/courses/edtec596/about_webquests.html)>, 1997, accessed February 28, 2001).

<sup>8</sup> Richard Levine, *Comparing Problem Based Learning and WebQuests* (Online: <<http://www.cl.ais.net/rlevine/compare.htm>>, 1998, accessed March 1, 2001).

<sup>9</sup> Moira Ekdahl, Daphne Elwick and Keith McPherson, *Beating the Cheating: A WebQuest for Teachers* (Online: <<http://137.82.72.1/LIBE/LIBE1/MD/process.htm>>, 1999, accessed March 1, 2001).

<sup>10</sup> Jakob Nielsen, *Designing Web Usability* (New Riders Publishing, Indianapolis, 2000).

<sup>11</sup> Joy H. McGregor, and Denise C. Streitenberger, *Do Scribes Learn? Copying and Information Use* (Online: <<http://www.ala.org/aasl/SLMQ/scribes.html>>, 1998, accessed February 28, 2001).