

# Educational Teleresearch A Means, Not an End



*By Judi Harris*

*Learning to gather information on the Internet is a task in itself. But even students who already know how to find what they want may not always use it effectively. To address that need, Judi Harris has identified and now discusses six purposes that can help guide teachers as they design activities that incorporate teleresearch.*

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**H**ow can students use Internet tools and resources in educational ways? Although there are many answers to this question, most can be classified as either telecollaboration (working with others at a distance) or teleresearch (finding and using information from distantly located data sources). Eighteen telecollaborative learning activity structures were presented in September 1998's *Learning & Leading With Technology*. This month, we'll explore teleresearch.

Several years ago, I was surprised to discover that no teleresearch structures parallel telecollaborative activity frameworks. Instead, educational purposes for doing teleresearch are interwoven through many different kinds of online and offline learning activities. Teleresearch often supports telecollaboration in curriculum-focused, project-based learning in K-12 classrooms.

### What Is Teleresearch?

*Teleresearch* is commonly conceptualized as successfully locating information online. Granted, this becomes increasingly challenging as the Web grows exponentially, and we must all hone our searching skills. Yet it is difficult, if not impossible, to identify worthwhile educational activities in which students only find and retrieve information. Teleresearch includes much more: specifying, locating, sifting, sorting,

interpreting, evaluating, synthesizing, and applying information in different learning contexts. The *Information Skills Guide for Maine Educators* (Maine

Educational Media Association, 1990) is an excellent manual for the systematic teaching of these important skills across K-12 curricula.

Applying information-location skills, though critical to successfully using information resources, is only a small part of what we must consider when we ask students to do teleresearch. Please consider this analogy. In a well-stocked library, learning can surely happen. Yet it isn't finding the book, videotape, photograph, or CD soundtrack that constitutes the educational occurrence. What the study's visitor *does* with the located information is what determines whether learning takes place. Doing teleresearch for its own sake, beyond building prerequisite information-location skills, really isn't worthwhile. If learners can do something offline as well or better than online, then there is no sound reason for them to do teleresearch in that instance.

### Assisting Teleresearch

Merely accessing information should not be confused with constructing knowledge. The making of knowledge is an active, holistic, and idiosyncratic process for each learner that can be greatly enhanced with a teacher's guidance. As teachers, we know it is our responsibility to provide this guidance to our students.

Yet with the overwhelming amount and variety of information available online, how can we know how to do this?

The usual answer to this question is technological—and insufficient. Information-searching programs, such as Web search engines and bots, are certainly useful tools that can help our students locate large numbers of diverse and timely documents. Yet it is here, at the point of information access, that many knowledge-creation efforts falter. We find ourselves confronting a much more important educational is-

sue: what students *do* with the information once they locate, evaluate, and comprehend it. This is the step at which mechanical assistance cannot replace human interaction.

In prehistoric terms, how can the fruits of the hunt be turned to food for the clan? Part of the answer to this question lies in the plan for information seeking itself. If students know clearly how they will use the information they eventually locate, then their chances for purposeful searching, rather than aimless surfing, increase. As teachers, we can help our students formulate and enact these plans.

My travels on the Internet have revealed six purposes that teachers have implied in their suggestions for educational activities that incorporate teleresearch: (1) to practice information-seeking skills, (2) to answer a specific question or find out more about a topic, (3) to review multiple perspectives on an issue, (4) to generate data needed to explore a topic, (5) to help students solve an authentic problem, and (6) to publish synthesized or critiqued information overviews for other students to use.

I share these purposes with the hope that they will assist you in planning online activities. The Web pages for these examples are available for your perusal using an index that I have created (see "Web Sites" on page 46). Multiple examples for each teleresearch purpose can be explored with this index.



**Purpose 1: Practicing Information-Seeking Skills** Hazel Jobe's *Earth Day Challenge* helps elementary students practice finding information while they learn more about life on our planet and efforts to preserve it. Twenty different questions are revealed one by one when the site's young visitors click on the individual letters in the activity's title. Each question suggests an environmental education Web site for students to explore as they search for the correct answer; Hazel hopes that students will stay longer and learn more about the earth.

More complex activities, such as the Math Forum's monthly *Internet Math Hunt*, require participants to use searching tools and strategies to review many different sites as they seek answers to specific questions.

### Information Synthesis

Honing information-seeking skills is an important prerequisite to the successful use of Internet-networked resources for curriculum-based learning. Do not forget, though, that developing these skills is only a means to an end. The synthesis and evaluation of multiple types, formats, and sources of information are at the heart of knowledge construction. Why might a student apply information-seeking skills? Possible answers are the next four purposes as noted earlier.

**Purpose 2: Answering a Specific Question or Discovering More About a Topic.** Much online information seeking serves this purpose. Although many excellent Web sites have been set up to guide learners through rich, inquiry-based teleresearch, those developed with Bernie Dodge's *WebQuest* concepts provide exceptional depth in engaging, intellectually nourishing formats.

For example, Joan Schatz's *In the Time of the Old Ones* invites students to explore the nature and expression of the Navajo people's environmental awareness by examining their weaving

and legends. Cathy Jennings's *The World of Puppets* helps students relate familiar puppets and Western puppetry traditions to those of the Japanese Bunraku puppets, Vietnamese water puppets, and Javan and Balinese shadow puppets.

Such *WebQuest*-style sites are replete with well-selected links to related information resources, directions for multimodal and inquiry-based activities, and creative suggestions for teachers who want to incorporate teleresearch in their instructional plans. *WebQuest* text is accessibly and engagingly written, and page formats are carefully crafted for clarity, comprehension, and pleasing aesthetics.

Shelly Peretz's secondary-level *How Do We Inherit Marfan Syndrome?* is another excellent example of how Web pages can guide students' exploration of a particular topic—in this case, a genetically influenced condition. Peretz's project guidelines display an important characteristic common to many *WebQuests*: Rather than depending on assignments and assessments to motivate students, the pages use multiple paths and "hooks" to engage students in actively exploring curriculum-related topics.

Teleresearch yields many different types and levels of information, especially when it addresses recent discoveries or controversial topics. For this reason, it is important to consider ways in which the located information can be collaboratively examined and critiqued.

**Purpose 3: Reviewing Multiple Perspectives on an Issue.** Students can convince themselves that there are discrete and simply stated answers to many questions. Fortunately, the world is more complex and interesting than that. Online information seeking can help learners consider multiple perspectives about the issues they explore. For example, Keith Nuthall's *Hello, Dolly!* *WebQuest* tells students:

Hello Dolly! Out of the blue, researchers from the Roslin Institute announced that they had successfully cloned a lamb. The next day, the Pope denounced the discovery as a "lack of respect for life." The scientific community hailed the discovery as a breakthrough for mankind. Your task will be to analyze the differing perspectives and draw your own conclusion about the social, economic, and political effects of cloning on individuals, families, and communities. You will be assessed on how you support your conclusion, communicate effectively, and collaborate with your peers.

To set the stage for this inquiry, Keith tells his students that legislation has been proposed that will prohibit the cloning of humans, and he provides them with a draft of the proposed bill. Mentioning that the U.S. House of Representatives "is assembling a group of specialists to investigate the widespread implications of cloning on the social, economic, and political fabric of American society," Keith creates eight different roles for groups or individuals, each with a separate "dossier" of background information, that are to be assumed by the members of eight teams of learners. The roles are:

- the U.S. Department of Agriculture
- Friends of Animals
- professors of biomedical ethics
- CLN Pharmaceutical
- Clone Tech, "a San Diego biotech firm that currently has several cloning patents involving cloning of human body parts"
- Roslin Institute Team, the team of scientists who cloned the sheep named Dolly
- the Institute of Theology and Ethics
- a U.S. Senate subcommittee

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Each team must do research to inform itself about the perspective it is adopting. To assist the teams, Keith provides a list of links to information on cloning. The teams are directed to use information they locate in making plans for the group's report and presentation to the Senate subcommittee that is considering the proposed legislation.

Information accessed online might be more recent, more varied in form, and perhaps more plentiful than information available locally, but one should *not* replace the other no matter how much it is hyped by technocentric advocates. Instead, all kinds of information should be used in combination and as dictated by the requirements of each learning situation.

**Purpose 4: Generating Data Needed to Explore a Topic.** One of the most recent and exciting educational uses for Internet connectivity involves teleoperating robotic tools. WestEd's *Tales From the Electronic Frontier*, an inspiring collection of teacher-written stories of powerful use of telecomputing resources, includes "Penumbra," a particularly moving story by Greg Lockett, a high school physics teacher.

Penumbra is a woman caught between two worlds, one of light and one of darkness. The world of light exists within the imagination and memories of Penumbra. The world of darkness is the reality around her. Together, these worlds form a shadowland where Penumbra is lost . . .

Penumbra is the story of an artistic, isolated young woman named Karolyn who had recently moved to a small town. Fascinated by fantasy and role-playing games, Karolyn struggles to define her first student research project until she locates a comment in a magazine about astronomer Edmund Halley, who said that he "talked with elves and faeries." This inspires her to "be an as-

tronomer." Along with a new friend, Karolyn attempts to use resources available online through the **Remote Access Astronomy Project** and thus discovers her research question. To aim the telescope, researchers must determine which astronomical object to photograph, when the interstellar photo should be taken, and the photo's exposure length. Karolyn and her partner hypothesize that exposure length should be related to object brightness. While their hypothesis is correct once it has been refined, they also realize the need to learn how to use image-viewing and image-enhancing software as part of their five-month project, which is successful and satisfying.

As part of her excellent online **Mind Travels**, Margaret Riel shares details on other telerobotic tools used for educational purposes, such as a garden that can be remotely tended; a model of a house with controllable lighting, heating, and cooling systems; and a robot in Australia that can be commanded to build with blocks.

**Purpose 5: Solving Authentic Problems.** Advocates of constructivist notions of learning and teaching stress the importance of students exploring and finding solutions to complex real-world problems. Online information seeking can greatly assist these efforts.

With **The International Symposium on Environmental Issues—Sydney, Australia**, Linda Jungwirth helps students discover possible relationships between population declines among Antarctic penguins and changes in the earth's ozone layer. Students are invited to research and prepare a presentation for the forthcoming international symposium. Jungwirth describes the student's task as follows:

Your task is to investigate the Antarctic ecosystem, to determine if there could be a relationship between the depletion of high al-

titude ozone and a decline in the penguin population, to propose three actions that would most effectively prevent the depletion of high altitude ozone layer, and to present your findings to the International Symposium on Environmental Issues.

She then provides students with specific subtask requirements, advice on learning and presentations, graph-making suggestions, links to relevant online resources, evaluation and self-reflection rubrics, ideas for extension activities, and notes to teachers who want to blend this WebQuest into their curricula.

Note that the activity climax for these students' exploration of penguin population trends does not stop with their own edification. Instead, they share the fruits of their new understanding with other students in the form of technology-assisted public presentations. This points to an important and analogous goal for the use of knowledge that is synthesized from online information: publishing syntheses and critical appraisals of content from a full range of located resources. In this way, the results of students' explorations can become the information crops that other students can harvest.

**Purpose 6: Publishing Synthesized or Critiqued Information Overviews for Use by Other Students.** Perhaps the most important trend in the evolution of online resources is the development of a simple way for learners to share the fruits of their information seeking, processing, and synthesis labors. This is most commonly done with a locally maintained but widely accessible Web server. In mid-1998, more than 13,000 elementary, middle-level, and secondary schools in the world had internationally accessible Web servers, and this number promises to grow rapidly as we approach the 21st century.

## Web Sites

Site Name	Address
Information Skills Guide for Maine Educators .....	<a href="http://humanum.arts.cuhk.edu.hk/~cmc/research/higher-order.html">humanum.arts.cuhk.edu.hk/~cmc/research/higher-order.html</a>
Teleresearch Examples Collections .....	<a href="http://ccwf.cc.utexas.edu/~jbharris/Virtual-Architecture/Teleresearch/index.html">ccwf.cc.utexas.edu/~jbharris/Virtual-Architecture/Teleresearch/index.html</a> <a href="http://www.tapr.org/~jbharris/teleresearch-index.html">www.tapr.org/~jbharris/teleresearch-index.html</a>
Hazel Jobe's Earth Day Challenge .....	<a href="http://www.marshall-es.marshall.k12.tn.us/jobe/earthday98/main.html">www.marshall-es.marshall.k12.tn.us/jobe/earthday98/main.html</a>
Internet Math Hunt .....	<a href="http://forum.swarthmore.edu/hunt/">forum.swarthmore.edu/hunt/</a>
The WebQuest Page .....	<a href="http://edweb.sdsu.edu/webquest/webquest.html">edweb.sdsu.edu/webquest/webquest.html</a>
In the Time of the Old Ones .....	<a href="http://www.itdc.sbcss.k12.ca.us/curriculum/oldones.html">www.itdc.sbcss.k12.ca.us/curriculum/oldones.html</a>
The World of Puppets .....	<a href="http://www.itdc.sbcss.k12.ca.us/curriculum/puppetry.html">www.itdc.sbcss.k12.ca.us/curriculum/puppetry.html</a>
How Do We Inherit Marfan Syndrome? .....	<a href="http://www-ed.fnal.gov/help/97/peretz/inherit/inherit2.html">www-ed.fnal.gov/help/97/peretz/inherit/inherit2.html</a>
Hello, Dolly! .....	<a href="http://204.102.137.135/teach/clone/dolly.htm">204.102.137.135/teach/clone/dolly.htm</a>
Tales from the Electronic Frontier .....	<a href="http://www.wested.org/tales/00contents.html">www.wested.org/tales/00contents.html</a>
Penumbra .....	<a href="http://www.wested.org/tales/02pen01.html">www.wested.org/tales/02pen01.html</a>
Remote Access Astronomy Project .....	<a href="http://www.wested.org/tales/02sb1raap1.html">www.wested.org/tales/02sb1raap1.html</a>
Mind Travels .....	<a href="http://www.earn.org/earn/webtour/">www.earn.org/earn/webtour/</a>
The International Symposium on Environmental Issues—Sydney, Australia .....	<a href="http://www.itdc.sbcss.k12.ca.us/curriculum/ozone.html">www.itdc.sbcss.k12.ca.us/curriculum/ozone.html</a>
Web66: International School Web Site Registry .....	<a href="http://web66.coled.umn.edu/schools.html">web66.coled.umn.edu/schools.html</a>
Reinventing Schools .....	<a href="http://www.nap.edu/readingroom/books/techgap/">www.nap.edu/readingroom/books/techgap/</a>

There are many examples of online information that have been synthesized and published for educational use. Simply explore just a few of the many school-based servers online to find them. Fortunately, "Internet angel" Stephen Collins has made such investigations easier for us by creating and maintaining the centralized **Web66: International School Web Site Registry**. This useful and frequently updated page contains links to all Internet-accessible elementary, middle-level, and secondary servers, plus sites set up by local, regional, and national school administration organizations for the benefit of precollege students and teachers.

### The Challenge

Effectively using information when constructing knowledge is a principal challenge to students and teachers in the Information Age. We have much to learn and, ultimately, share about the art and practice of teleresearch.

Arthur C. Clarke's words can help guide us on this journey:

Before you become too entranced with gorgeous gadgets and mesmerizing video displays, let me remind you that information is not knowledge, knowledge is not wisdom, and wisdom is not foresight. Each grows out of the other and we need them all.

—**Reinventing Schools**  
**Web site** ■

*Judi Harris, [jbharris@ccwf.cc.utexas.edu](mailto:jbharris@ccwf.cc.utexas.edu)*

### Reference

Maine Educational Media Association (Ad Hoc Committee on Information Skills). (1990). *Information skills for Maine educators*. Augusta: Maine Educational Media Association.

For a copy of the information skills guide, write to Media Services, Maine State Library, State House Station No. 64, Augusta, ME 04333.

### Correction

In the September issue of *Learning & Leading with Technology*, several content errors were introduced during the editing process into the feature article by Judi Harris, "Curriculum-Based Telecollaboration," that were not the fault of the author. Among others, they included:

- mentions of two Classroom Connect telefieldtrips that have a registration fee to participate. Dr. Harris recommends projects that are free or offer some free material with optional for-fee opportunities, such as MayaQuest, which continues to be one of the best known and best developed examples of virtual expeditions.
- the I\*EARN Rope Pump Project that helps bring clean water to Nicaraguan villages mentioned in the Social Action Projects structure. The description should have said that each of the rope-operated water pumps costs \$200 USD, and the money was raised by classes all over the world.

The *L&L* editorial staff regrets the errors.



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