Dave and Mary Campbell

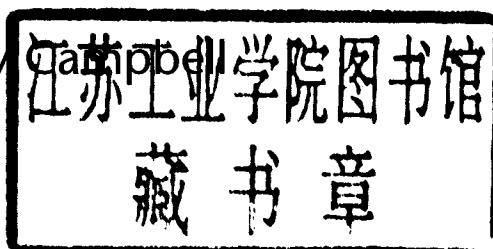# The Student's Guide to
Doing
Research
on the
Internet

► Get help for your studies on-line

► Discover the best research sources for each class

► Learn how to use Gopher, World-Wide Web, and WAIS to find information

The Student's Guide to Doing Research on the Internet

Dave and Mary Campbell

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Introduction

IN THE PAST, COLLEGE STUDENTS had to rely almost exclusively on the resources that were physically on their campus to enhance their program of study. Their learning sphere was dictated by the knowledge of their instructor, the participation of the students in their classes, and the holdings of their campus library. Today, the Internet extends any student's learning resources to schools and organizations around the globe. Students can read articles and text stored on computers in Europe or Australia as easily as they can access materials in their campus library. They can collaborate with students in Norway or Russia or just chat about the ways of campus life in different locations. Although the technology and resources to do all of this are available on many college campuses today, it is primarily the graduate engineering and science students who are tapping into this resource potential. Undergraduate students in all disciplines can reap the benefits offered by the Internet by learning a little about the rules of using it and identifying rich sources of information in specific disciplines that interest them. This book is designed to provide both a basic skill set in using Internet tools and a set of resources in each of the major disciplines to meet the needs of students in any program of study.

ORGANIZATION OF THIS BOOK

This book is organized into two parts. The first discusses the tools that you will use to access Internet resources. You will learn how to establish a Telnet session to tap into a database at a particular site or to participate in a virtual reality session called a MUD. You will learn to use an FTP client on your computer to contact a host computer in a remote location for copies of files in their archives. You will also learn how to use a Gopher client or one of the currently popular Web browsers that extend the capability of the Internet beyond text to video, graphics, and sound.

The second part of the book consists of a series of chapters, each focusing on a major area of study. There are hundreds of sites listed that can be used to support all types of research efforts in these disciplines. You can connect to a site for SEC filings or current stock prices if you are studying business. If you

are an English major, you will appreciate some of the online book projects that allow you to tap a vast online source of books. Other professional disciplines such as medicine and law are covered, as are subjects in the arts and humanities. Finally, at the end you will find an appendix of sites that can help you land your first job when you complete your program of study.

EXAMPLES IN THE BOOK

Most of the screens in this book were captured using the Netscape browser to access the various sites of interest. Since the Web is the fastest growing segment of the Internet with a growth rate of over 15 percent a month, we felt it was important to show examples of a browser for the Web for those students who do not have current access to one on their campus. We have provided instructions for using all of the Internet tools directly for those students who are either restricted to a UNIX command entry or those who prefer this more direct approach. You can choose the method you prefer to connect to sites listed in the book.

CONVENTIONS USED

There are instructions in some of the first eight chapters that direct user input to perform a specific task. This user input is shown in a monospace font, Courier, to distinguish it from surrounding text.

Unless an entire site is important, the specific document or directory is often included in the address for the site. The possibility exists that the school or organization responsible for the data may reorganize their site between the time we checked its location and you attempt to locate it. If you get a message indicating that a particular document or directory cannot be located, you should specify only the site location and look through the top level menu to locate it. In all likelihood, the data has not been deleted but was simply moved to another directory. As the amount of material at a site grows, it can become necessary to split many directories into two to better categorize the data stored there. If you are having difficulty locating the data, many sites will have a search feature for the site, but you can always fall back on the various search tools that you learned about in the first part of this book.

KEEPING IN TOUCH

As you work with the Internet you are certain to discover some gem sites on your own. If you would like to make any suggestions for future versions of this book, please contact us at drc3@po.cwru.edu. Also, we will be providing you with some new site ideas on a monthly basis at the Addison-Wesley Web site: http://www.aw.com/devpress/campbell. We hope you will find these additions useful as you add to your knowledge about the Internet's vast resources.

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Chapter 1

What the Internet Offers the Researcher

THE INTERNET OFFERS THE RESEARCHER access to a vast source of information scattered at locations around the world. It also offers the tools to put these information resources to work for you. The Internet can assist your research efforts whether your research is connected with a college course assignment, a job search, new product development, or self-study efforts to further your learning. If this makes the Internet sound like some magic elixir, good for whatever you need to do, in a sense that is correct. The Internet offers vast stores of text, databases of information, electronic journals, bibliographies, software programs, and forums for information. There are search engines and indexes to locate the information that you need, utilities to transfer data to your system, and browsers to make it easy to view data at many locations. Once you connect to the Internet, everything is offered for a very reasonable monthly rate. For most college students, the connection cost is already built into your tuition and fees; once you are enrolled, the Internet is free. If, however, you're working on research without the benefit of university access to the Internet, there are some low-cost alternatives to tapping into the Internet's power that you'll learn about in Chapter 2.

WHAT IS THE INTERNET?

The most important aspect of the Internet is the information it contains, made possible by an unbelievably large interconnected network of thousands of networks around the world. Although there are critical backbone networks that form its framework and utilize satellite technology and fiber optics to move data at extremely high rates of speeds, thousands of smaller networks are also an integral part of it. The software at these sites make it possible to access the huge repositories of data at various sites on the Internet.

But the Internet is more than machines and software. In a sense, it is actually the millions of people who use it. Many of these individuals have contributed to the information that is available to everyone. Whether you participate in a

discussion group, send e-mail, or post a research paper for others to browse, it is really you, your thoughts and creative energies, and the talents of the millions of individuals like you that make the Internet such a worthwhile resource for the researcher. At first, you may use the Internet to glean answers, find resources, and complete your research. However, as you learn more about how to use the tools it provides, you will use the Internet to share your work with others.

NEW RESEARCH DIRECTIONS WITH THE INTERNET

The Internet holds the potential for revolutionizing the way research is done. A quick look at how it eliminates some of the constraints of the past paints a picture of the changes that are just beginning to affect what is possible for students doing research:

- The Internet levels the playing field, making it possible for students at schools with limited resources to access the same material as students in schools with large endowments and well-stocked libraries.

- The Internet is available 24 hours a day, making it possible for the student who leaves work at midnight to be able to work into the wee hours of the morning.

- Its electronic information can be scanned more quickly and thoroughly via the computer than is possible with the human eye. Topics of potential interest can then be read in more detail.

- Students can share ideas with others on the Internet via chat or e-mail. This opportunity to bounce ideas off others often adds creativity to the final efforts.

- Staleness of information is not a problem since current information can be placed there immediately—publishing, shipping, and shelving delays are eliminated.

- Global cross-cultural exchange is facilitated.

Information Source for All Disciplines

There are thousands of sites connected to the Internet. Many of these are large universities with a diverse information base that you can tap from afar. Others are more specialized information sources offered by a specific department within the university or a government agency.

Companies are also quickly establishing sites on the Internet. Although their main objective may be to garner new customers or increase customer loyalty, many have realized that they have to offer something of real value if consumers are going to visit online. For this reason, you'll begin to see more company sites offering something besides their merchandise. For example, a company that provides online stock prices might allow you to get five quotes a day at no charge. Although this isn't sufficient to manage a large portfolio, it might be just what you need for a finance project.

As you will see as you explore the subject areas at the back of this book, the Internet contains resources for all disciplines. Although the sciences may have had a head start in making materials available, other areas are quickly catching up as new Web and Gopher sites are added each day. Since you will also be learning the skills needed to explore Gopher and Web sites on your own in Chapters 5 and 7, you will have the skills needed to chase after new sources of information that are added daily. Here are a few of the Gopher and Web sites that will link you to a variety of resources:

- Uncover's Index to 17,000 periodicals

- The Journal of Statistics Information Service

- The University of Michigan's College of Engineering Technology Transfer Site

- Online Job Listings

- InterNic Internet Directory of Directories

Downloadable Text and Software

Millions of files are stored at Internet sites worldwide. You can find research papers to stimulate your thinking, software tools to save time, graphics to spiff up a presentation, and electronic books and other sources to aid your research efforts. See Chapter 4 for ways to tap the power of FTP to access these files and how to use Archie to locate resources you need. Here are some of the resources available to an Internet user:

- Gopher clients for the PC, Mac, and UNIX environments

- Molecular biology software

- Document collection on UFOs

- Microsoft Systems Journal source files

- Recipes

- Aviation information

Once you've downloaded data that might be able to assist your research efforts, you can use a text editor to scan for entries of particular significance to your work.

Databases of Information

The Internet has huge databases of information. Fortunately, you can use excellent search tools to locate information. For example, Wide Area Information Service (WAIS) can search hundreds of Internet databases. The techniques covered in Chapter 6 give you more searching power than you would have with your own personal research librarian at your side. The following list of a few WAIS sources beginning with the letter "a" suggests how many sources are available:

- Ancient DNA Studies

- Asian Computing

- Aboriginal Studies

- Agricultural Market News

- Ask ERIC Infoguides (Education)

Course Syllabi and Bibliographies

Faculty members at various schools have made course syllabi and bibliographies available on Gopher and Web servers worldwide. Since each faculty member has a different slant on the same course, you may find some research ideas and bibliographic entries that will help with your research projects.

Electronic Journals

Costs of printing and mailing have caused many libraries to scale back their subscriptions to printed journals, and this may limit the resources available in your local libraries. Electronic journals available through the Internet can supplement the resources available to you. Academic journals published through university departments are increasingly moving to an electronic format as it stretches their limited budget and eliminates some of the time lag in making materials available to the academic community. As these journals are more

commonly accepted as refereed research outlets for faculty publishing, their numbers will continue to grow. As you learn to use the Internet tools throughout this book, you'll discover how easy it is to work with the electronic form of a journal when you want to search for specific information. Many of the electronic journals are small, specialized publications that may not be available in your library. For example:

- Academe This Week
- Sky and Telescope Weekly News Bulletin
- Air Force News
- GAO Day Sheets
- Malaysia News
- Mathematical and Physical Science Letters
- Physics News Update

Global Collaborators

In the past it was difficult to collaborate with others who shared your research interests. There was no easy way to identify those with similar interests until completed research was published. Print, distribution, and shelving delays meant that the latest studies were not available until your research was completed. The instant availability of online versions of material can cut this lag time and make you aware of the latest developments as you are working. This is more important than ever with technological developments occurring at such a rapid pace that information that is even a few months old can be quite dated in certain fields.

Even if you are aware of others with similar research interests, the long-distance charges for talking with them on a regular basis are too high unless, of course, they live in your dorm or at least the same town. For the average student, participation in national and regional conferences where the latest research results are discussed is also not an option, because registration fees, travel, and hotel charges can quickly exceed almost any student's budget. The Internet changes all this by making it possible to converse with students living on the opposite coast as easily as you converse with a student in the next dorm room. See Chapter 3 for ideas about how e-mail and IRC can put you in touch with the world; see Chapter 8 for ways in which news and discussion groups can connect you with others having similar research interests.

BENEFITS EXTEND BEYOND THE CURRENT PROJECT

Although this book focuses on helping you develop the research skills to get the grades you are looking for in college courses, the skills you will learn extend well beyond your classroom efforts. Businesses are just beginning to think about using the Internet on a large-scale basis, and they will be looking for individuals who are knowledgeable about the Internet and what it offers. In a competitive business environment that faces rapid global change, the need for ongoing research efforts to stay ahead of the competition will increase.

Chapter 2

Getting Connected

IN ORDER TO HAVE ACCESS to the Internet, your computer must be connected to a network that is part of the Internet. Many colleges have already taken care of the connection details for you. It's likely that the computers in your campus computer lab are connected to the Internet. However, colleges with older PCs might not be connected.

In this chapter you'll learn about Internet connections and a few topics that will be applicable to all the Internet tools discussed in Chapters 3 through 8:

- Elements of an Internet connection

- Different types of Internet connections

- Community resources such as freenets that may allow you to connect with the Internet over breaks and vacations

- A connection through a commercial provider

- How Internet addresses uniquely identify each site

- Establishing a command-line connection to another site

TYPES OF CONNECTIONS

There are several ways to connect your computer with the network of Internet sites:

- A direct wire connection from your computer to your campus local area network (LAN)

- A dial-up connection to campus or a local freenet provider that offers Internet access

- A contract with a commercial provider such as Prodigy, Netcom, or Delphi

The easiest connection for you is a hard-wired connection from a computer on campus to a network that is part of the Internet. Response time is much faster when you make a request, and there's no need to deal with the technical details and frustrations of getting software up and running on your system. If you are not so lucky, you can use dial-up connections to either your campus or a third-party provider.

Campus Network

If your PC or workstation is directly connected to your campus network and the network is connected to the Internet, you have full access to everything the Internet offers. You may have a menu for all systems on your network that provides access to a Gopher, the Web, or FTP. You may be able to choose one of these options or work with command-line entries through one of the UNIX servers.

The difference between using the menu to select various tools and working at the command line is similar to the difference between working with DOS through the DOS shell or making command-line entries at the DOS prompt. Some people insist that menus are the only approach that is efficient, while others feel you don't really understand what's happening unless you are typing on the command line. Also, some prefer command-line entries because this approach provides complete flexibility in the services they can access. Others are willing to let the structure of a menu-based system dictate some decisions if the result is less typing. A quick look at menu options for Case Western Reserve University's Weatherhead School of Management shows that students and faculty are fortunate to have both approaches available to them—they can either select Gopher or Web access, or choose to work with the Sun Workstations and connect via command-line entries with options like these:

```
WSOM Sun Workstations
Gopher
World Wide Web
```

Dial-Up Links

If your university supports dorm access to the Internet, it may be from a hard-wired connection to its network. It can also be from a dial-up connection that may also serve students and faculty working from home. A dial-up connection to the university may be from a community freenet or it may be through an Internet Protocol (IP) link. The IP connection provides a much wider array of services, including graphics and sound. Most freenet connections are limited to text access, and some freenets only provide access to Internet's mail capability.