Today’s students tend to be impatient. They have grown up in a world where fast is good and instant is better. The leisurely dinner is replaced by fast food.

Many of the resources students need to complete their higher education assignments are now available in electronic format. They can be accessed via computer, and many times they can be accessed from outside the library building. This creates certain efficiencies for the students. They can save time by working from their dorm rooms, homes, work places, or public libraries. They no longer have to visit the library to find information useful to their needs.

Unfortunately for the future of research, not everything is available electronically. Some information is only available in paper, some information is only available on microform, and some information is only available in the library building. This creates a choice for the student. Most students understand that nonelectronic resources exist. But to use them, one must overcome the inertia involved in leaving home. This could be as simple as a one-minute walk to the library. However, many students today do not live in dorms or even on campus. In today’s commuter and distance-education environment, tr avel to the library resources can be a significant investment of time and energy. The alternative is to stay home and limit oneself to what is available electronically.

By limiting themselves to the information that is available electronically, students limit the thoroughness of their research. It is not yet possible to exhaustively survey the literature of any discipline or topic by using electronic tools alone. Most students understand this, but many do not or cannot overcome the obstacles involved in traveling to the resources they could use in the library.

In an effort to obtain what is needed from home, many students will simply surf the Internet for information and accept anything they find regardless of its quality. Of course, they will usually find information in abundance, but the quality of what they find will inevitably be mixed. Even though time seems to be of the essence for students, they would rather use copious amounts of time sifting through web sites for something usable than make a trip to the library. The faster they can accomplish their assignments, the happier they are, even when the resulting grades are less than stellar.

Many students don’t know how the library materials available electronically are different from those they find surfing the Web. Some students have never learned to use a periodical database or an on-line catalog. Unless they are taught the hows and whys of electronic resources, they are likely to use random web sites for their information need, thinking that one source is as good as another.

In the face of this situation, it becomes imperative for academicians to step in and teach students (1) how to find quality information using electronic sources and (2) that tools and resources exist in nonelectronic format. Using those resources may save them time and effort in the long run Students need to see that the tool that seems to be saving them time may do so at the cost of achieving a good grade because they have inexpertly selected the wrong tool for the job.

Evaluation of resources is critical to the success or failure of the students. Until this is understood a student can only succeed accidentally. The benefit of using library-selected and provided sources lies in the fact that those materials have been written by expert and reliable sources and chosen by expert and reliable professionals. The major evaluation considerations for library materials have already been accomplished by the time the student uses them. This evaluation process is invisible to students for the most part. This, coupled with the fact that so much information is available via the Web, makes students forget—if they ever knew—that not all sources are equally reliable or accurate. For that reason, librarians, instructors, and teaching assistants must be ready to explain this critical difference while training students in the more manual skills of pushing buttons and opening new screens.

Out in the vast world and beyond, there is an endless amount of information. We have the means to access more information than we will ever be able to process. Today anyone can provide information to others anywhere in the world, on any subject, via the Internet. As the mountain of information gets larger and larger, people begin to suffer from what Richard Saul Wurman calls “information anxiety.” 1 As with many other types of anxiety, having some knowledge and training about information and its uses can help reduce information anxiety. Transmission of information is not strictly a human trait. Many animals, birds, and even insects convey information to one another. Much of this information is very basic: “Go two clicks north to find good nectar.” “You are in my territory––get out.” “Look out, here comes a tiger!” These are basic survival messages.

People began to specialize in dealing with the various kinds of documents, books, and other information that were being produced. They also specialized in the analysis and application of the information contained in the documents. The storage of information grew in importance as well. Some information was centrally located. Other information was stored at distributed locations. Information needed in multiple locations required reproduction of that information, either manual or mechanical.

Recently another fundamental economic and social shift has taken place, moving significant segments of the world’s working population into service occupations. Storing, managing, manipulating, and understanding information are now the primary activities of many of the jobs performed by educated workers, while food production has moved into the economic background.Information flows quickly via radio, television, phone, and the Internet. With the amount of available information doubling every seven or eight years,the amount of information we will encounter during our lifetimes is almost incomprehensible. 2 This explosion of information has led to a huge increase in the number of workers who manage, analyze, and interpret it. Many have referred to the time in which we now live as the Information Age.

Close to a million books are published internationally each year.

It is estimated that there are about three billion home pages available through the World Wide Web, which is growing at the rate of 5 million new pages daily.

The volume of printed information doubles every seven or eight years.

The amount of electronic information is doubling every 60 minutes.

A weekday edition of the New York Times contains more information than the average person was likely to come across in a lifetime in England in the 1600s.

THE CHARACTERISTICS OF INFORMATION

Some information is factual. Factual information is a statement that can be proved. For example, the atomic weight of carbon is 12, or 2 + 2 = 4. Factual information will always be the same. It doesn’t matter how many times you look it up or in how many different places. You will always find the same answer. Some information is analytical . This information is an interpretation of factual information. For example, “Four out of five dentists surveyed recommended sugarless gum for their patients who chew gum.” The facts are gathered and used together to arrive at some conclusion. Using analytical information takes some care and thought. If the U.S. Census Report says that families in the United States have an average of 2.7 children per family, what does that mean? Can there actually be .7 of a child? How many families were counted? How was the average found? Who did the calculation? It is important to consider what is actually being reported and how the analysts arrived at their conclusions. See figure 1-1. Some information is subjective , meaning that it is presented from only one point of view. The information represents only one person’s opinion or viewpoint. Your personal opinion that the best ice cream flavor is mint chocolate chip is subjective. Objective information synthesizes information from a number of different sources and presents findings that can be replicated. For example, a researcher reports that she used five sources and that the authors in all five sources agreed on X. Another resea rcher could go back to those five sources and read about X in order to replicate the results presented by the first researcher.

INFORMATION QUALITY

How do students know when they have found information that answers their information need? How can they select the best information from all the sources available? Students must examine the specific information need in order to answer these questions.

What Is the Information Need?

The sources of information and the specific information selected will be determined by the information need. Therefore, an information need must be clearly defined. Most students start with a general topic that gives a general frame of reference or a starting point. This general topic must be narrowed and clearly stated as a question based on the specific information needed. For example, a student may start with the topic “open heart surgery.” However, if the student really wants to know about by-pass heart surgery, then information about valve replacement heart surgery will not be relevant even if the information is of high quality. If the student wants information about how many by-pass operations were conducted in 1999, then information about the techniques used for making incisions in the human body is irrelevant. Making the topic specific and framing the search as a question can help identify the appropriate information. Using the specific question, the student will search for information that may answer that question.

What Information Is Appropriate?

Everything is information, but not all information is equally appropriate to use in every situation. So how does a student identify the most appropriate information? A student may find a book on the shelf, an article in a journal, or a web site page. In thoroughly researching a question, a student may find an abundance of sources that will provide information. Sorting through the sources, evaluating those sources, and selecting the information that best supplies the answer to the information need are the heart of information literacy. When information on a topic is identified and acquired, it is necessary to evaluate it. The evaluation process will tell the searcher whether the information is appropriate to answer the information need. The following questions need to be considered: What kind of information is it? Information can be categorized to some extent. “Consider the source” is good advice. For example, some information is original or primary. Other information has been filtered, analyzed, processed, or selected by someone other than the original producer. This information is secondary. Information further removed from the original or information about information is tertiary. It must be stressed that the further removed the source is from the original, the more the information may have been changed.

WHO IS THE AUTHOR OF THE INFORMATION FOUND?

What credentials does this person have to answer your information need? Who is the expert on your topic? Whose opinion do you want to rely on? Your mom might be the best person to ask how to feed a baby or how to create a budget, but is she the person to rely on for information about open heart surgery? If she is a cardiac surgeon, she may be just the person. The point is, you must think about the author of the information and how likely it is that that person knows what he or she is talking about.

WHO IS SUPPLYING THE INFORMATION FOR THE AUTHOR ? Point of view is another concept to consider. When receiving information it is important to note whether it is subjective or objective. At first, this may not be clear, and it may be other than it appears. Many times advertisers present a product as “the best,” “the fastest,” “the most reliable,” and so on. The presentation of the advertiser can lead the unwary buyer to believe that the information has been presented objectively. However, the advertiser’s job is to make the product seem like or sound like the best or the fastest or the most reliable. Advertisers get paid by the manufacturer of the product to do so. One can infer that their presentation of a product is somewhat biased. In contrast, an agency whose job it is to compare a wide range of things, using equal criteria for each comparison and with no incentive from any manufacturer or seller, will present a more objective view of the products. WHY IS THE INFORMATION BEING PROVIDED? The next item to consider is why someone is providing information and who is supporting that person’s ability to do so. For example, a doctor who works for the American Cancer Society and a doctor who works for the tobacco industry may provide very different information about the effects of smoking on the body. Both may have equally good credentials. Their reasons for providing the information may be very different.

WHO IS THE AUDIENCE FOR THE INFORMATION? Are you looking for something geared toward an audience of four-year-olds? The amount of information, the detail involved, and the language used will be different for an audience of four-year-olds than it will be for an audience of adults. Teen magazines may not appeal to members of the U.S. Supreme Court, because the Supreme Court is not the target audience for teen magazines. Again, language, subject, detail, and accuracy may all be influenced by the target audience.

WHERE DID THE INFORMATION COME FROM?

Is the author the primary source of the information? Did the author use other sources in gathering information used in what he is telling you? If so, does the author tell you so and name the sources? If so, are the sources of information sources you would trust? Are they also reliable and accurate? Is there a list of sources provided—a bibliography, for example—to which one can refer to check on details or obtain more information? Or do you just have to take the author’s word for it that the information is correct?

IN WHAT KIND OF PUBLICATION IS THE INFORMATION PROVIDED?

Is your information in a glossy magazine with lots of advertising? Is it in a clinical research journal supported by subscription or membership only? Is it from a web site supported by a university or a special interest group?

HOW CURRENT IS THE INFORMATION?

In some cases it doesn’t matter how current the information is. If you are looking for the 25th decimal place in pi, it really doesn’t matter when the calculation was done. The number should be the same in all cases if the calculation was done correctly. If you are looking for the temperature outdoors today, a temperature reading for last summer is not helpful. If you are performing open heart surgery, having the most current information can be a matter of life and death. Knowing the currency of the information can help you put it in perspective. It can also help you decide whether it is appropriate to use it.

HOW ACCURATE IS THE INFORMATION?

Again, in some cases, precision is not vital. If you need to know in general what time it is, almost any working clock will do. An Olympic speed skater, however, will obviously need an extremely accurate report on the time it took to complete her race. In gathering information, the greater the need for accuracy, the greater the number of sources that should be consulted. This is especially important if the researcher knows little about the subject. In most cases, to determine the accuracy of any information, at least two sources should be consulted.

THE QUALITY OF INFORMATION

The definition of quality information changes with the information need. Some needs can be addressed only by an expert in a particular field. Some needs can be met by casual conversation at the water cooler with no expertise required. It is important to find information of the quality that suits the information need. The expert in a specific field may not be able to supply the appropriate quality of information for the discussion you have at the water cooler, and vice versa.

**Getting Ready for Research**

**Planning is the key element to producing a good research paper, report, or presentation. However, planning is not a strong suit for many students. It takes time, it takes practice, and it seems irrelevant when faced with a formidable task such as writing a twenty-page term paper. The daunting task of producing that many pages of writing is overwhelming to most people. There is an anxiety about taking on a big project that is difficult to overcome. Many students have years of real life experience. A growing number of students are older individuals with responsibilities for job, family, homes, and cars. There are many difficult and complicated tasks people take on every day. However, when confronted with a scholarly task, students frequently assume that the process is something new, something completely different from anything they have done before, and they become intimidated. To make matters worse, students often wait too long to begin their research. Beginners often have no concept of how long the information-collection phase of their project is going to take. As normal humans, students put off tasks they see as difficult and unpleasant. So students may have to rush to find sources, take the first sources that appear, select quotes from those sources without regard to the context in which they were said, and insert them into their own text—where they may or may not support the argument the writer is trying to make.**

**TOOLS FOR BACKGROUND INFORMATION**

**At the beginning stages of research, general information is necessary, especially for the beginning researcher who may have little or no knowledge of her topic. A typical example of a general-information tool is an encyclopedia. An encyclopedia article about abortion should provide enough description to suggest narrower categories of inquiry. It might also suggest the size and scope of the general topic. A subject-specific encyclopedia would give more precise information relevant to the discipline in which the topic falls. For example, a medical encyclopedia would emphasize the medical aspects of abortion, while a social sciences encyclopedia would examine social aspects, and a psychological encyclopedia would deal with psychological aspects of the topic. Simply learning that discipline-specific encyclopedias and dictionaries exist is usually a revelation to students new to research. The encyclopedia’s main use is to provide an overview of a subject or topic. In addition, encyclopedias can introduce language specific to the research subject area. Knowing the language and terminology of their research area can aid students in designing their research question**