11 | Information Literacy

Before diving into the subject of information literacy, it's worth considering why a topic that might seem more suited for a book on technology or research should be considered one of the foundational skills needed for critical thinking

If you recall, the ideas in this book are based on something I refer to as "practical critical thinking," an approach to the subject rooted in what some academics think of as the only purely American contribution to the philosophical tradition: the philosophy of *pragmatism*.

Among other things, pragmatism holds that theory should be drawn from practice, from what works, rather than vice versa, a concept obviously influenced by how modern science develops its ideas.

If you think about what you have been learning in this pragmatic context, we've been pulling from a number of different traditions at different times for different purposes: modern cognitive science to look at bias, Aristotle when we talked about logic and modes of persuasion, the twentieth-century work of Toulmin to see how arguments can be diagramed, Cicero for how they can be organized, and so on. In each case, we've drawn from whichever source can most efficiently help us master the subject or technique needed to move forward with the project of using

politics (notably election politics) to develop our critical-thinking skills.

The reason information literacy—the study of how to find, assess, and use information—is such an important part of our pragmatic tool bag gets back to an idea introduced in the last chapter: background knowledge.

To repeat that earlier sentiment, if you don't understand the subject you're talking about, no amount of logic or rhetorical skill can make up for this fact. You can't have a meaningful debate over the economy with someone who has never heard of the law of supply and demand, for example. And if you don't know the difference between a Sunni and a Shiite, then no syllogism you construct, no matter how artful, will help you understand the political dynamics of the Middle East.

There are two traps people fall into with regard to background knowledge, the first being the belief that just because they have read a few facts (such as those included in an opinion piece on a controversial subject) or looked something up on Wikipedia, they have enough background knowledge to understand the matter under discussion.

On the other end of the spectrum, many people view issues like the economy or international affairs as so complex that they are beyond any lay person's ability to understand.

Both extremes—believing you possess more background knowledge than you actually do or, equally perniciously, believing there is too much background knowledge for you to ever understand anything—lead to the same place: self-imposed ignorance. And, believe me, there are lots of people who want you to do what they want ready to fill this vacuum with their own often self-serving roster of experts.

When faced with problems that exist at the extremes, we can turn to our old friend Aristotle, who in his work on ethics defined virtue as a "golden mean" between extremes. In the case of

background knowledge, this golden mean can be summed up by the word *sufficiency*.

What does "sufficiency" mean in the context of background knowledge? It's hard to create a cast-iron definition of what constitutes sufficient (enough) background knowledge since this will vary depending on the topic and on what you need to do with this information. For instance, a single fact might be sufficient to settle an argument between roommates over who directed the latest *Fast and Furious* movie. But if you're about to enter the courtroom to defend yourself in a lawsuit, sufficiency will probably consist of far more background knowledge: both of the law and of your particular case.

Two of my favorite sources on critical thinking provide insights that can help guide you in determining thresholds for sufficiency in different situations.

Kevin deLaplante from the Critical Thinker Academy talks about the critical thinker as someone who does something similar to what actors do when they have to master a new role. For example, Hal Holbrook didn't have to earn a PhD on the life and work of Mark Twain before he starting portraying Twain on stage, just as Will Smith didn't have to write a dissertation on Mohammed Ali before playing him in the 2001 biopic *Ali*. But they did have to gain sufficient understanding of these real-life people in order to give a convincing performance. Even Benjamin Walker, who played Lincoln in the 2012 classic *Abraham Lincoln: Vampire Hunter*, had to at least get the beard right.

In the case of critical thinking, deLaplante argues that we must obtain sufficient understanding of the topic we are arguing, and enough empathy with the people with whom we are debating, to be able to articulate a credible description of our opponent's beliefs—not a condemnation, not a parody, but a description that those opponents would agree accurately reflects their views.

The Critical Thinking Foundation, a California group dedicated to critical-thinking education, has another framework I find useful:

a set of traits you'll find in a genuine critical thinker that includes the paired characteristics of *intellectual humility* and *intellectual courage*.

In the context of background knowledge, intellectual humility requires you to admit (at least to yourself) that having sufficient knowledge is not the same thing as having comprehensive knowledge. There will always be holes in what we know, which is why we should be open to new information (not slaves to confirmation bias) and be willing to change our opinions as new facts become available and accepted.

At the same time, intellectual courage requires us to take a stand if and when we think we have sufficient information to support our points. For while we should be aware of and open to the possibility that new information might emerge that confounds our arguments, this should not cripple us or cause us to defer to others who claim to have all the answers (a claim that only demonstrates their lack of intellectual humility).

So if background knowledge is our goal as critical thinkers and sufficiency the threshold we have to reach, where do we go and what do we do to gain the knowledge we need?

Fortunately, there is a whole field of study that can help us on this quest: information literacy. Information literacy, like media literacy, emerged in the 1970s, before the advent of computers in the home, school, and workplace. This allowed its creators and practitioners to build an intellectual foundation that was ready to help us deal with the flood of information brought on by the computer and then the Internet revolution.

Information literacy emerged from the field of library studies. If you think about it for a moment, this makes perfect sense since during this pre-computer era, outside of a home encyclopedia, dictionary, or almanac, most research and reference material was concentrated in a place dedicated to gathering information for widespread dissemination and use: the public or academic library.

Historically, the information sources these libraries managed were printed documents (scrolls in ancient years; books, periodicals, manuscripts, and reference materials, either printed or stored on media such as microfilm, in slightly less-ancient times). But once computers and, just as importantly, valuable databases of information (often sold on CD-ROMs) came on the scene, the library was one of the few places that could afford to buy them and make them available for public use.

As librarians began to manage larger and more complex sources of information, and struggled with their traditional book-collecting role in times of uncertain budgets, they reinvented their profession, turning from book and manuscript collectors and preservers into information specialists. And the field of study they created, information literacy, provided foundational definitions for the information skills we all needed as those information sources expanded exponentially and entered our classrooms, homes, and workplaces via the Internet.

In its simplest and easiest-to-use form, mastering information literacy can be boiled down to five key consecutive steps (or, as I like to call them, canons): locating information, evaluating information, organizing information, synthesizing information, and finally communicating information.

But before you can take the first step on this journey, you must first have some kind of understanding of what you're trying to discover or learn. The best way to accomplish that is to form your quest into a question.

For example, when I analyzed several negative ads that appeared during the 2012 election (ads that are dissected in the upcoming "Case Studies" section.), those research projects began with questions those ads raised, such as "was Mitt Romney responsible for the closing of the CST steel mill?" or "did Barack Obama demonstrate disinterest in the state of the private-sector economy?"

These examples tie into the theme of presidential politics. But you can frame a question on any subject you are researching. If you're trying to discover something for school, for example, you can frame questions like "how many US presidents were unmarried?" or "why is Pluto no longer considered a planet?" Or if you need to make a decision at work, you might generate questions such as "how much will this product cost to implement and maintain?" or "how long does it take for a social-media marketing campaign to produce results?"

The reason why you should frame your goal as a question is that every step you take in the information-literacy process can then be evaluated based on how well it supports your ultimate purpose of having that question answered.

The first step of this process is locating information. Just as my generation would start by cracking open an encyclopedia to see if it contained an article on a subject, today most people start by punching the topic into a search engine such as Google, Bing, or Yahoo.

Despite some of the criticisms I heaped on the Internet in the last chapter, this is a perfectly valid place to start, as long as you keep in mind that these search engines will primarily be looking through what is called the Open Web. The Open Web contains all of the Web sites you are most familiar with: Wikipedia, Facebook, YouTube, news and reference sites, commercial and school sites, etc. While this Open Web is vast and *might* contain everything you need to achieve sufficiency, it might fall short, either because it won't lead you to the information you need to answer your question or because the information you find there might be of insufficient quality.

Also, remember that there are other sources of information outside the Open Web. Most importantly, those library data resources I mentioned earlier are today more numerous and accessible than ever. Some of them can be searched from home by anyone with a library card and the library is still your best source

for information that might not exist in digital format. In fact, one of the mistakes information-*illiterate* people often make is to assume that if something doesn't exist in a form they can see on the computer screen, then it either doesn't exist or it's not worth finding.

Finally, the Internet, in addition to being an information source, is also a communication medium that allows you to reach out to the scholars, journalists, and other experts who created the information you are looking for, or talk directly to participants by contacting people mentioned in a news piece to get their side of the story.

So while starting with a Google search is a perfectly reasonable first step in your journey, keep in mind that it is just that: a first step, not the beginning and end (unless you are trying to answer a trivial question, such as who directed *Fast and Furious 74*, which is an exercise in simply looking up information rather than critical thinking).

When I mentioned cracking open the encyclopedia a minute ago, I was describing a process similar to what you do when you perform an Internet search: basing that search on one or more key words. In the case of the encyclopedia, that key-word search might be limited to the name of the topic I'm researching (Pluto, US presidents, etc.). But one of the major advantages of the Internet is the quick and comprehensive way it will search all kinds of variations of the key words you specify.

This also represents the downside of Internet searching, as anyone who finds him or herself staring at millions of search results knows.

Because confronting those millions of results is so daunting, we have a tendency to assume that what appears on the first page of search results represents the best information available. In some cases this is true since programs like Bing and Google are built on sophisticated algorithms designed to push the most relevant and

authoritative information to the top of a search ranking while pushing less-relevant information lower in the list.

But in some cases does not mean in all cases. In fact, there are many instances when the best material might appear on page 2, page 5, or page 100 of your list of returned search entries. This points out two important tasks with regard to searching:

You can't just start and stop with your first selection of search terms (unless you are very lucky, or lazy); and

You should spend time looking at more than just what appears on page 1.

I met an instructor once who, when teaching information-literacy skills to his students, asked them to refine and refine their search until they ended up with only one result. This is a useful exercise, at least with regard to demonstrating how thoughtful and creative use of key words can help guide you to just the information you need.

One doesn't necessarily need to go to this extreme with every search you do, although some skillful modification of search terms can dramatically refine your results.

For example, one of the 2012 negative ads I just mentioned had to do with the role then-candidate Mitt Romney played earlier in his life as the head of Bain Capital (a private-equity investment firm) in the closure of a steel mill called CST Steel in 2001. To kick off that research, I plugged the words "Mitt Romney" and "Bain Capital" into Google and I ended up with a tidy six million results. But when I added the phrase "CST Steel" into the mix, I ended up with a mere one hundred eighty thousand. Then, once I put quotation marks around the words "CST Steel" (these marks tell Google to only find these words when they appear right next to each other rather appearing separately anywhere on the page), that boiled my search down from the original six million or one hundred eighty thousand links to just seventy-two.

Now this didn't mean that those were the best seventy-two links in the universe on the subject of Romney, Bain, and CST. But it

did mean that those links are likely to point to documents talking about this specific subject vs. stories linked to results from a less-specific search.

Continuing to look at ways to refine a search, search engines like Google and Yahoo have little-used advanced options that let you specify far more search criteria than just key words.

For example, Google's "Advanced Search" screen[4] provides you a way to specify not just what terms to include in your search but what terms to exclude. And when might I want to exclude a term? Well let's say you're searching for information on the planet (or former planet) Pluto and want to skip any reference to Pluto, the dog from the Disney cartoons. In this case, my search term might be "Pluto" but my terms to exclude can include "Disney" and "dog."

These advanced options also let you indicate that the search should only look through specific sources. For instance, let's say I want to find out what *The Wall Street Journal* had to say about the Obama administration's view on the state of the private-sector economy. In that case, my key words would be "Obama private-sector economy," but in the Advanced Search field called "site or domain" I would specify wsj.com, the domain for *The Wall Street Journal*.

The Advanced Search options also let you search according to when a site was updated, which can help you avoid stories that might be out of date. Another way to look for the most recent information on a topic is to not do a general search but instead do a search of news stories or blog entries that lets you organize results chronologically from when the news story or blog post was first published. You can also specify a date range to look only at stories published during a specific time window.

[4] Best found by searching for "Google Advanced Search" with Google (or some other search engine).

When might that be helpful? Well, let's say you're looking into that Romney, Bain, CST story I was just talking about. When I did a search using these key words during the 2012 presidential campaign, most results linked to stories covering the controversy generated by the negative ad I was researching. But when I limited my search to just 2001 (the year CST filed for bankruptcy), I was able to find links to documents, such as articles in financial publications, that talked about the story from a perspective not influenced by politics.

Now I've mostly been talking about the most well-known general search engines (Yahoo, Bing, and Google). But keep in mind that there are also search engines dedicated to specific topics such as medicine, history, or astronomy. Many of these have their own algorithms and sources for locating information that may differ from those used by the "Big Three," meaning you may get better (or at least different) results based on the type of search engine you use. In addition, you can use meta-search engines such as Dogpile or WebCrawler. These will run your search terms through many search engines at once, saving you from having to perform multiple separate searches.

We've spent a bit of time talking about how to best craft your initial search, but keep in mind that no matter what search engines you use and how well defined your search term is, the results of a search should just be treated as Step One in your quest for sufficient information to answer your question.

Step Two might include looking through those Web sites you found in your initial search for links to lists of additional relevant information. Many Web sites, for example, have resource pages, blog rolls, or other lists of links that point to material the creator of the site thinks is important or relevant. Unlike the results of a Google search, these links were not generated automatically but were selected by a person informed and interested enough in a subject to create a Web site on the topic you are researching. Scholarly articles may also include "live" footnotes, that is,

footnotes that link directly to the source they came from, giving you immediate access to sources the author used to perform his or her research.

But what do you do if that footnote link is not "live," that is, it refers to a journal or other resource that is not online? Or what if someone's resource page points you to a book or newspaper that isn't available on the Internet? Well this is when you've got to push yourself away from the computer, get out of your chair, and head off to the library where they still maintain (or can obtain) information that has not yet been digitized.

And even on the digital front, as mentioned earlier, many libraries provide access to databases of articles, journals, and other information you can't find on the Open Web, all of which go through far more quality control than does the popular online source Wikipedia. So repeating your searches on specialized databases available to you via your library or library Web site is time well spent.

Finally, don't forget that the Internet is as much about communication and collaboration as it is about searching and consuming information created by others. Somewhere out there, there is likely to be a person doing research similar to the work you are doing. It's also likely that the human beings who created the Web sites you discover, especially those with contact information, are eager to hear from you.

As someone who maintains such sites, I can't tell you how exciting it is when someone clicks on that "Contact" link and sends me a request for information. So not only are experts out there who know what you are trying to discover, they are often dying to communicate with you and help answer your questions.

So far, we've spent a fair amount of time on locating information and rightly so, since honing your search skills can mean the difference between obtaining sufficient background knowledge to think critically and becoming a victim of information overload.

But the next step in the information-literacy chain is just as important: evaluating the information you find for quality.

So what does quality mean in the context of information literacy?

Well, for each source you discover, you need to know whether you can trust the information it provides to help answer your original question. Before you decide to trust or distrust a source, however, you need to be aware of the many ways in which information from any source can be problematical.

For example, an information source may be biased in that it only provides information on one side of an issue or treats information on one side differently than it does the other.

As you read about in the discussion of media literacy, some sources are easy to identify as biased. For example, you wouldn't check out the Republican National Committee site for an unbiased perspective on a Democratic president's time in office or vice versa.

As for traditional news sources, some of these wear their biases on their sleeves, while others claim to offer impartial coverage with a wink to their real audience: partisans on one side or the other. But the bulk of traditional news sources claim, and probably believe themselves to be, 100-percent fair and balanced. And I'm afraid it's up to you to decide where the news sources you like to read, listen to, or watch fall into this spectrum.

But you should also note that there are some information sources that define their product offering specifically around political impartiality, which makes them worth adding to the mix.

For instance, the Web site FactCheck.org uses the tools of journalism to examine claims each candidate makes in a speech, TV ad, or debate performance, as well as checking facts on other news stories during non-presidential election years. Another site I like, called ProCon.org, provides extensive documentation on both sides of various controversial issues.

As for your average everyday blog or other site unaffiliated with a news service or organization you can identify, are there ways to identify their potential bias?

Well there are some tricks of the information-literacy trade that can help inform your judgment. For example, does a site go out of its way to acknowledge alternative opinions or are opposing views ignored or ridiculed? Does the site link to external sources, including external sources with varying views on an issue, or do links on the site only point to other pages on the same site (or only to sites of the like-minded). Does the author of the site use intemperate language, either in his or her own postings or in their response to comments criticizing their opinions? All of these are telltale signs of potential bias.

Keep in mind that you should not ditch all information from a source just because that source is biased. But you do need to understand the types and levels of bias sources might be bringing to their presentation and analysis and at least assume that such sources may not be providing balance and could potentially be providing you with inaccurate information.

But poor quality does not just originate from bias. In fact, it can come from a number of other places, such as tight deadlines, carelessness, or simple human error. This is why a test for *accuracy* is another important component of evaluating information.

Ironically, bias can actually help us gauge accuracy since if biased sources on two sides of a debate both agree on certain facts, that's a good sign those facts might be true, or at least that two disagreeing parties accept them as a reasonable starting point for argumentation. For the most part, however, the test for accuracy simply involves the shoe-leather work of double- or preferably triple-checking your facts using multiple independent sources, much like a journalist is supposed to do.

Another test for information quality is *timeliness* (is the information up to date). As a simple example, if you're researching

why Pluto is no longer considered a planet, material published before 2006 (the year Pluto was kicked out of the planet club) may not be timely. Some of the methods we mentioned earlier for searching for information within a date range can help you weed out sources that might be time-sensitive or out of date. And if you are researching a fast-changing story like breaking news or in a rapidly changing field like technology, you should always check for the latest stories on these subjects to make sure information you've found has not been superseded by more recent events.

Another test is for *relevance* (does the information relate to the question you're trying to answer?). For instance, if you're trying to find out which presidents were unmarried, stories of their childhoods and campaigns might be interesting but are not relevant. Similarly, if you want to determine what the current president has done to help small businesses, information on his bailouts of the major corporations may or may not be relevant depending on the specifics of the question you are trying to answer.

As mentioned earlier, search engines do their best to try to rank results based on relevance to the key words you specified. This makes it doubly important for you to get your search terms right. And as with all the tests we've described for evaluating information, you need to use your own judgment to determine whether or not the information you have found moves you forward to your ultimate goal of answering the question you posed at the beginning of this entire process.

Sufficiency, having enough information, is also one of the tests we use to evaluate information. And as you have already read, our ultimate goal for the entire evaluation process is to ensure that we have located enough information that passes our various quality tests to allow us to move ahead with the information-literacy process.

I'm going to give the last three steps in that process (organizing, synthesizing, and communicating information) a little less time

since they can vary widely depending on what the goal of your research might be.

Regarding *organization*, once you have located and evaluated the information you need, you must now organize this high-quality set of resources in a particular way. For example, if you are creating a bibliography to go at the end of an academic paper, this organizational structure would be alphabetical. But if you're trying to create a timeline of who-did-what-when on your Web site, then information needs to be organized chronologically.

You can also organize information thematically (by subtopics of your original topic, for example) or in a hierarchy, such as information organized based on what you believe to be the most vs. least-biased sources.

The purpose of this organizational effort is usually to help you create something new from this information (which educators often call a "work product"). Examples of work products can include a term paper, newspaper article, blog post, or video. The process used to create this work product involves *synthesis*, or using the information you have located, evaluated, and organized as building blocks to create something that previously did not exist.

Finally, we get to *communication* and in our hyper-communicative age, we usually don't keep our work products to ourselves but instead share them with others, either one to one (by e-mailing a term paper to a teacher, for example) or one to many (by publishing a story on a Web site where it can potentially be read by anyone on the planet)

And this is where the five canons of information literacy come full circle. For once you have communicated the work product that is the result of all that locating, evaluating, organizing, and synthesizing you've just been reading about, you need to assume that others will go through this same process to evaluate the quality of what you have created. This means that at every step of the information-literacy process, you should remain cognizant of the fact that the same standards you have applied to others (accuracy,

relevance, timeliness, lack of bias, etc.) are going to be applied to you.

Like most concepts you've been introduced to in this book, a detailed example included in the "Case Study" section will help make opportunities and challenges related to information literacy more concrete. But before I sign off on the topic, I'd like to spend a few moments on why we should be talking about *canons* of information literacy rather than use a more contemporary term like elements or components.

The use of the term "canons" is obviously meant to refer back to the five canons of rhetoric I mentioned a couple of chapters ago that specify the way arguments are organized through invention (also called discovery), arrangement, memory, style, and delivery.

The reason I think these key information-literacy principles should be thought of as canons is not just because there are also five of them (location, evaluation, organization, synthesis, and communication), but because there is almost a perfect fit between the two sets of canons I just listed.

For what is invention/discovery if not another way of saying locating and evaluating information? And is there any difference between the notion of arrangement and the information-literacy concept of organizing information? Style, memory, and delivery are not quite as perfect a fit but certainly everything contained in those ideas can be described as a form of synthesis and communication. In other words, we seem to be looking at a surprising parallel between information literacy (a field just a few decades old), and a cornerstone of classical thinking that goes back more than two millennia.

Now this might just be some sort of historic or intellectual coincidence, but I suspect it's more than that. For there is one other thing we today have in common with those who lived thousands of years ago, which is the notion of the library, an institution that's been mentioned several times in this discussion of information literacy.

It was in the classical age, after all, that the world's knowledge was held in the great libraries of cities like Rome and Alexandria. During this era, it was not a stretch to say that a large percentage of what constituted human knowledge was stored in one of these facilities. Not all of it, of course, but a higher concentration than had ever been known before, which meant that a quest for answers to important questions during this era required an understanding of how to find and use information located in just a few places.

During the centuries that followed the end of this classical age, knowledge didn't disappear, but it was no longer so concentrated. Libraries, universities, monasteries, and even people's homes in cities and towns across the world became places where smaller bits of knowledge were collected, stored, added to, and used. As the amount of knowledge in the world dramatically increased, more storehouses of information appeared in more locations, meaning the world's growing body of knowledge was being distributed over an even wider area.

Now people could still share information they had stored in their own warehouses (or in their own heads), but this communication involved hauling paper by horse-drawn carriage, then ships, and finally the automobile and airplane. Even when the computer disk replaced the paper manuscript and overnight delivery meant the movement of physical manifestations of knowledge could be done in one or two days vs. one or two weeks or months, intellectual activity was still about bridging islands of knowledge separated by time and space.

Today, however, we've eliminated these barriers as well as begun the greatest project in the concentration of human knowledge ever attempted, with both the elimination of barriers and concentration of information facilitated by the same technological breakthrough: the Internet.

Today's Internet may contain thousands, even millions of times more information than was ever stored in the great libraries of the past, but the world we inhabit today (at least in terms of where

information can be found) is more similar to when those libraries stood than it is to any era in between.

That's because for the first time in fifteen to twenty centuries, we have returned to a world where information is concentrated, not disbursed, and accessible (both to take from and add to) through the new Library of Alexandria of the Web. Given this transformation, is it any wonder that principles codified thousands of years ago to help people find and use information have returned to prominence?

So with respect to information literacy, I think it's worth asking if we have created something new or rediscovered something very old. And if a mix of wisdom and tools from today and from past millennia can help turn us into skilled, empowered users of a modern invention like the Internet, what else might they do for us?

Might a combination of cognitive science and information literacy, Aristotle and Cicero be able to help us use this great bounty of information to think critically and thus truly understand the world? Might it empower us to think on our own two feet and thus be truly free?

I'm betting on it. And if you've read up to this point, I'm hoping you now do as well.