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A teacher just assigned you a paper on genetic engineering. What do you do? Where do you go? You might consider jumping onto Google, but that would likely just lead you to a Wikipedia site. That information would not be the most reliable. With countless websites, articles, videos, and other media available, it can feel impossible to know which are the most reliable sites unless you're information savvy. Information literacy is one of the best skills you can develop for sorting through information and making it useful.

Start by asking yourself some basic questions. What do I need? How do I tackle the topic? Where can I find the information? And how should I read and evaluate the material?

Sometimes I tell students to just do a basic Google search if they don't know anything about the topic just to get some basic information about what it is they're researching. And then I tell them to gradually take that information and go to more scholarly sources.

What they want are databases of journals, or they want databases connected with books, or they want critically acclaimed or peer-reviewed sources.

Information literacy starts with knowing where to go for information and what to ask when you get there. But not all sources are legitimate. The most effective research happens when you compare a variety of sources to fact check and come up with your own conclusions. This is how you turn information into knowledge.

They're going to have to look at multiple sources, multiple sites in order to gather the best information from all.

One of the things that will set off your paper apart, and your research apart is if you develop a conversation. Source one says x. Source y says this. And therefore build your argument or your research based upon that.

Information literacy isn't just for school work. It empowers you to find answers for all aspects of life, whether for school, workplace, or personal research. For example, if you were planning to buy a car, where would you go to find information you could trust about cost, reliability, fuel economy, or safety ratings? Would a dealership provide different information on pricing used cars than the *Kelley Blue Book* site? Or if a loved one has been diagnosed with a particular disease, where would you go to find credible information on appropriate care and treatment options? Are there alternative treatments you can also research?

Information literacy is important in all areas of life. Once a student learns how to dig deep, learns how to get information, get a well-rounded supply of that information, and they're able to think critically about it, then they can take that skill and use it for anything.

When it comes to academic research, the Association of College and Research Libraries, or ACRL, identifies five core aspects of information literacy-- need, access, evaluate, use, and ethics. First, you have to figure out the information you need as well as the best resources. Then you have to access the information effectively and efficiently. But this doesn't mean doing what's fastest. It means using effective search strategies to find the best information to support your thesis or topic. Don't just rely on search engines. The more you vary your sources, the more robust your research will be.

You have to look at dates, for instance. If something is published in 2001 in health sciences, you're going to want to question it possibly depending what it, of course, is. So author, dates, those are really triggers in terms of any information that you're looking at to see whether it's valid just to begin with.

Next, you need to evaluate the sources of information. Are they legitimate? Be sure to corroborate facts elsewhere and check the author's credentials. Evaluating what you've found allows you to extract the main ideas and come up with new concepts of your own. It's also important to look at different points of view.

You also have to understand what any given piece of research that you're looking at, what bias it may have. And so if you gather all different points of view, it's going to give you a better understanding, perhaps, of your own view, perhaps of the worldview.

If it's a journal with peer review-- and I'd say peer view is the key here-- someone basically had to assess whether that article, or rather that form of assessment, could be placed in there. That is the key indicator that it is a quality article, a quality piece of research.

Once you've sorted through the information and come up with your own conclusions, you're ready to use what you've learned for a particular project, such as a thesis paper. Finally, make sure you're using information ethically and legally. You need to understand things like copyright issues and what constitutes plagiarism, plus cite resources appropriately.

Even if you're not meaning to, if you imply, if you fail to use citations, if you fail to paraphrase and then note where the paraphrase came from, if you're summarizing information and fail to say this is where this piece of information came from, then you are plagiarizing. And that is probably the primary academic sin.

Developing information literacy may seem like a lot of work. But once you've gained the skills, they will serve you well for a lifetime.

As technology has grown, so have the different types of information sources. Not all research is based on text. Other sources might include computer-generated graphics, photos, or videos. Because of this, there are different types of computer and information literacies.

Most of you probably excel in computer literacy. This simply refers to having the technical know-how to use a computer and different software programs such as Microsoft Office.

Textual literacy is taught at a very early age. It's the understanding of digits and letters, for example, learning how to add or subtract numbers, or understanding the moral of a story.

Visual literacy is more complex. It's the ability to critically read images. Visuals are a form of communication. A painting might convey an emotion, a story, or a historic event. Symbols have all sorts of universal meanings. Some images might be more vague and open to interpretation. Visual literacy is the ability to read and write about such images in a visual language.

One exercise that I can do in class is to have them to look at an image and then write down what they think it means. And then we put it in context. And then we talk about what the person who put the image up is trying to achieve, what they might be trying to achieve, and how it's interpreted to see if that's different or the same.

So visual literacy means knowing the history behind an idea, the framework behind it, the persuasiveness of it, but put it into a visual medium.

Specifically, visual literacy is a process of sending and receiving messages using images. Then you construct meaning from them. What might photos by documentary photographer Dorothea Lange tell us about living conditions during the Great Depression? What does the famous *Mona Lisa* smile suggest? What does this image tell us? What about this one? Is it simply soldiers holding a flag? Or is there a bigger meaning to be had?

In his famous painting *The Scream*, Edvard Munch created an image that symbolizes the anguish and pain of modern life. How would we interpret that message from what we can read in this image?

The curves and oblong lines in the foreground that lead to the figure are suggestive of movement and fluidity. I know that this is part of a larger context. And that's what I'm doing with visual literacy, trying to establish context. And in that sense, it's post-1800, post-romantic visual art. And I'd want to just look at the message like I would a piece of literature, a piece of an essay. And the message seemingly is, as we lead to the figure, that modernity is somewhat stressful. Modernity is one where we're isolated. And the figure feels isolated in a vast landscape of differentiated colors.

Since information is so all-encompassing, you'll sometimes hear the term media and information literacy, or MIL, to embrace all forms of information, from text to images or video.

There are times when, if you're working on a particular topic, there will not be peer-reviewed literature available on that particular topic. If something happens today, it will first be tweeted. Then it might end up on the radio or the television news. After that, the next day, it might make it into the newspaper. Within a couple months, it might make it into magazines. It may be six months before there's a journal article published. And a book may take two to three years to be published.

In general, the purpose of information literacy remains the same regardless of the type of source-- to evaluate, locate, identify, and use information effectively and ethically.

The goal of informational literacy is to help people make better choices, more informed choices. I think that the more that they are aware of what's out there and the more that they can critically analyze what's out there, then they'll make better decisions in every aspect of life.

It's easy to rely on Google or Wikipedia for all of your information needs, but those aren't necessarily the best choices, especially for school papers.

Getting a basic start on Wikipedia is OK as long as one realizes that it is one of the lowest denominators of research available out there. So a Google search and Wikipedia tells me as a teacher that the student has not really engaged with the information at hand and doesn't know how to do research as well.

Google has access to a very small section of the world of information, sometimes called the gray net or the dark net. But very much of the important information available to the world is held in password-protected places that Google doesn't search.

Academic library sites have vetted their information to be from reliable and trusted sources. You won't find false or inaccurate information here.

Lots of people have looked at these sources. They have analyzed these sources, made decisions about the sources and judgments, and that they put them out there saying, you can rely on this. They've been thoroughly researched.

So in the academic site, you know there's work behind it, that people have already looked at who the author is, looked at the organization or the origination of the site or the information. And we know that it's solid. We know that the foundation there is something that can be built upon.

Good library skills can save you a lot of time. To start, make sure the material you're researching is current and relevant. Being current means that the information hasn't become dated, changed, or obsolete. Also, check the source of the material, understand the purpose of the information, and look for evidence that it's reliable and accurate. When was the information created and published and updated or revised? Is it still relevant? Some topics, such as geology or art history, are more timeless, so older material may be OK. However, topics such as health sciences, technology, and current events need more up-to-date research. Consider the timeliness of your topic.

Topics such as technology and health sciences, it's very important to get up-to-date information because those areas seem to change a lot. Sometimes it seems overnight. And I think that relying on data or on information that is outdated can lead you to make wrong decisions and can give you a lot of bad information.

Where does the source originate? It's important to check whether it's from a reputable author, institution, or publication. Avoid biased or commercial sites that only provide enough information to entice consumers to purchase a particular product or service.

One of the things that one should do is search the website. If it's a journal, if it's a blog, what date were these journals published? What date did the blog entry, if it's reputable, was it published? What date did the print version originally come out first the second or third edition that you're now reading online?

In that sense, sometimes it's sleuth work. Sometimes it's detective work. Sometimes it's not there, and one has to estimate a date or not give a date at all. But generally speaking, most journals provide an issue number and a journal number if it's online.

What's the purpose of this source? Is it clearly stated and approached from an objective point of view? Make sure the purpose of the material is unbiased and relevant to your topic.

Look at the funding mechanisms for research. You always want to know who funded this research. Was this research funded from the tobacco industry? And if so, if they say that cigarettes are good for you, or they're not as bad as what people are thinking, then that's a bias that you can locate. And you can then take into account whether their information has been slanted in some way.

What facts or arguments are made in the source material? It's always important to cross-reference them with other sources. Also, look for a bibliography or citations, and make sure they're relevant to the topic.

If you're looking at cross-referencing facts, you're going to be getting information from multiple sources to make sure that what you have is valid.

Basic facts, such as dates, events, are not arguable in the academic world. In that sense, there are, for example, websites out there that deny the Holocaust or something like that. If that's the case, one would then realize by doing other searches, by consulting academic sources-- not someone's website-- that they'd realize that is factually inaccurate, by doing multiple-source searches.

Beyond these research methods, there are useful ways to narrow down your search. Keywords help reduce the number of options that appear. Computers index significant words in titles, summaries, and subjects. So items matching your keywords will appear at the top of the list. You can use key phrases in a similar way by putting quotation marks around the phrase.

Another tip for narrowing your search is to use the Boolean approach. This search style was named after British mathematician George Bool. It involves stringing keywords together with and, or, and not to limit the results. Use and between keywords that you want present in the materials, such as nutrition and exercise. If you want the search to include at least one of the keywords but not necessarily all of them, string them together with or, such as college or university. If there are words you want to exclude because they're not relevant to your topic, use not between the words, for example, fruit not apples.

Another thing you can do is to use Google Scholar for your searches as opposed to just regular Google. And Google Scholar goes ahead and tries to limit to .edu and .gov .org sites which have a higher likelihood of containing vetted information.

Using sound research methods and search tools can really help narrow your options and improve the quality of the results of your search.

Unfortunately, many sources on the internet are not reliable. Some are focused on selling products or services while others are slanted toward a particular agenda. Authors may be novices on a topic, or a site may be a parody or intentionally false or biased.

There's a little bit of everything on the internet. And there are people who have conspiracy theories, who think here various people were responsible for 9/11, and have very little basis for this. But if you simply use internet sources without evaluating, then you open yourself up to any number of crazy ideas that have no scientific or academic basis for them.

At least there are ways to check for credibility. The most important thing to do is choose sources from known, credible sites. Academic online libraries are the most reliable and are usually available to the general public. Your own school or college online library is a great place to start.

You can tell if a site is educationally based by the URL. The website address will end in .edu. Government sites can also be useful for research. And these are identified on a federal level with .gov on a state level by the state name or initials followed by .gov. Any site ending in .com or .net will take a little more digging to determine its origin and credibility.

Students, in particular, need to look at authors, not the addresses, because you could be getting information from a .edu that was produced by a student who has no more knowledge base than anyone else.

Once you start researching and find an article on a website, it's important to verify the author. Who are the authors or editors? And what are their credentials related to the topic? Is the author unbiased? Or is this site pushing a product or agenda?

Many articles that seem reliable are actually used for promotional purposes. If available, the About page is useful for finding information about the author or organization that is hosting the material. It also helps to search the author's name to see what other types of material they've written. Also look for their professional associations or experiences. Another thing to look for is contact information, such as an email address. You can use this to follow up with questions or to ask for additional support on the topic.

I'd first research the person. And if they're associated with a school or associated with a foundation or associated with a research unit or associated, maybe, with a think tank-- the ladder with a certain degree of skepticism-- one knows that they're looking at a scholarly material or scholarly source that could be used and it is agreed upon for an essay.

Non-credible sites are blogs, social media posts, or any content that's self-authored. Sites without citations or with minimal content should also make you skeptical. And definitely avoid those that have other motivations, such as to sell products or services. These sites often have ads and pop-ups.

One thing I've kind of noticed about non-credible sources is sometimes they use a lot of strange fonts or colors on their web page and kind of try to jazz it up a little bit. Whereas I think if something is more credible, then they try to make it look professional. I think I would look for a professional-looking website, first of all. And then beyond that, I would look to see if they, themselves, cite sources.

Again, it's always important to cross reference facts across multiple sources to be sure that they are reliable and always cite sources properly in your papers to back up your claims.

Plagiarism is a major problem in the 21st century. That means that even if a student may not mean to use source material that's not their own, if they don't cite it, it is technically a form of academic dishonesty.

When you cite sources that you've used, and cite them properly, that gives me the opportunity to go back and sort of peer review your work, see that it's valid, and then perhaps use it for my own to then extend that scope of knowledge. I mean, we are building a pyramid of knowledge when we cite.

To summarize, a few basic ways to find out if an internet source is valid is to look at the author's background and the date when the information was created. And always cross check your facts.

Researching and finding credible sources leads to lots of useful information. So how do you pick and choose the right content for your topic? This is where critical reading and critical thinking come into play. Critical reading doesn't mean being critical of what you've read. It's about discovering and understanding information and ideas.

For critical reading, I like to tell students that when they first read something, to go through it very quickly and to get basic information. And then I ask them to go back through it again and maybe stop at different junctures, for example, at the end of a paragraph, and to sort of summarize what they've read to themselves to make sure that they understand what that information is saying, and to do that throughout the piece, and then to stop and think about it critically.

Non-critical reading is passive. You might enjoy what you're reading, but you're not really engaged or doing anything in response. Critical reading is active. You're asking questions, comparing what you already know. And you might be underlining important points.

Non-critical reading also takes facts at face value, which is a gullible approach. Critical reading involves being skeptical and asking questions-- the what, how, and why of the information-- to come to an understanding of what it means. Non-critical reading is also reactive. You might laugh or be emotionally moved by what you're reading, but you're not doing anything beyond reacting.

Critical reading is purposeful. You're looking at what the text says, does, and means. Your goal is to find answers to specific questions.

A critical readership means being aware of one's reading practices, number one. Being aware of the reading audience that's being perpetuated through a given piece, number two. And in that sense, using those skills with information literacy suggests that one can then step back and look, how am I researching a topic? Am I using the right way of researching it? It means stepping back and critically analyzing what one does. It's something we do every day in our own lives, but now we're applying it to reading.

Critical thinking takes a step beyond critical reading. It's about being open-minded and not letting personal opinions get in the way of an argument. Critical thinking involves analyzing what you've read to determine whether a claim is true. You have to be rational and aware of your own bias toward a subject so that you can present a balanced argument that encompasses varying points of view.

For example, if you're writing a paper on the death penalty, you may have extreme personal views one way or another. But to present a balanced and objective paper, you need to be open and draw from all arguments surrounding a topic.

Being able to think critically about any given aspect of the information in front of you allows you to take the best from it, understand it, and then deliver it.

Critical thinking isn't fast or easy. Unlike reading a book or watching a movie for pleasure, it takes time and deliberation. Critical thinking goes beyond voting yes or no on a concept or fact.

You need to be purposeful and thorough in your evaluation. What's the issue at hand? What are the complexities surrounding it?

Some of the challenges to critical thinking would be just having the time to sift through all the information. Especially when the topic is very broad and it has a lot of different facets, I think that students maybe pull back from going in-depth into the topic because it is vast or it is so complicated. And in that case, I like to tell students to narrow down the topic. Maybe instead of trying to look at the whole thing, just think critically about a small part of it. And that helps them, then, to focus.

Critical thinking is, essentially, an exercise in problem solving. It allows you to form your own opinion on whether or not you agree with a claim based on your research. Once you've written your paper, you may have to defend your opinions to others.

To become a better active reader, you need to do more active reading. You need to become accustomed to reading things in different manners. To become a better critical thinker, you need to stop yourself from your first reaction to a new concept and to consider it deliberately.

Critical reading and thinking can help you in all walks of life. You probably wouldn't buy a used car without doing some thorough research on the make, model, and value. Critical reading and thinking will help me figure these things out. In school, critical reading and thinking are important for writing a well thought out paper. Being active, skeptical, purposeful, and objective will help you come up with your own conclusions on any given topic.

One class I taught, I had a student turn in a book review that was straight from the publisher's website. It was obvious to me that this was not the student's work because they were an OK student, but this was a graduate level evaluation of a text.

There are ethical considerations when you research a topic, such as plagiarism and copyright infringement. Plagiarism is using other people's words or ideas as your own, or not crediting them. It can be tempting to copy and paste text, especially if the text eloquently describes what you are struggling to say. Plagiarism isn't just copying text. It's also paraphrasing other people's ideas.

So you have a lot of accidental plagiarism where it's not intentional. They're not intending to misrepresent the information in their paper. But they're sloppy. They didn't record it at the time. They forgot that this was a quote. They didn't put the quotation marks in. A lot of times they do it at the last minute, so they don't have time to fix these things.

Teachers know their student's writing habits. If a paper looks suspiciously different in style, it's a strong indication that plagiarism might be the cause. Changes in font are an obvious clue that something was simply copied and pasted in. There are more sophisticated tools that teachers can use if they suspect plagiarism. These include a host of online plagiarism detection sites. A teacher can simply copy and paste a paragraph from your paper, and the site will detect its originality. If you worry you may have paraphrased too much, you can use these tools to check your own work.

The best thing a student can do is provide parenthetical citation, whether they're paraphrasing or whether they're actually directly quoting. And that way, the teacher knows, oh, here's where the source came from. If they've done that, they have nothing to worry about.

Let's put this student essay on the movie*Gone With the Wind* to the test. This is an actual essay that was submitted for a college film class assignment. The teacher immediately suspected plagiarism. The writing was far too eloquent and grammatically correct compared to the student's previous work. A simple search of the very first sentence shows the same content literally word for word on a film review site. Key matching words are bold.

Some students tried to shuffle words around or shorten sentences to make it harder to detect. Let's try a different section of this paper on a plagiarism detection site. Some grammar and words were changed from the original source. But as you can see, this site has identified that 0% of these sentences are actually unique based on paraphrasing. Busted.

I find that students usually don't try to plagiarize a whole paper. What I've noticed is they try to write the introduction and conclusion on their own. And then they might take the middle part of the paper and use other sources for it. And so I've noted differences that way. I've seen where the introduction, for example, just doesn't match the body in terms of tone, language, thought process, and that sort of thing. So I look for those the most.

If you want to quote another author, you can do this without plagiarizing the material. Put quotation marks around the quote and credit the author and source it came from. If it's more than a few sentences, you can create a block quote. If you're providing facts or statistics, you also need to provide the source. If you're giving your own claim or conclusions based on a body of research, you don't need to cite all of the sources. You become the source as it's your idea. If you're including a combination of sources and your own ideas, that's fine. Just make sure to include the other sources in your reference section.

There's also a term called common knowledge. This refers to things that most people know, so the information doesn't have to be cited. For example, imagine you're writing a paper about NASA's Mars Exploration Rover mission. You wouldn't need to cite a source for identifying the *Spirit* and *Opportunity* rovers that explored Mars. It was all over the news, so it's common knowledge.

I would say that dates are common knowledge, and one doesn't need to cite that information. I would say that names of books, where a person lived-- New York, West Virginia, somewhere else-- that's common information. One doesn't necessarily need to cite them. However, if it says that an author did something at this point of time in New York and was basically building off of those factual data and information, one should cite the information. When in doubt, cite.

Intentional plagiarism is cheating. There are serious consequences if you're caught, whether at school or work.

People who plagiarize can fail assignments. They can fail classes. They can also be expelled from universities.

It can also result in lawsuits, loss of a job or career, and, perhaps most importantly, serious damage to your reputation.

So the penalties can be quite severe. And it could be life-altering.

Copyright infringement is another serious ethical and legal concern. This means using someone else's work without permission. Maybe a student wants to use a YouTube video clip as part of a documentary project. This would be a copyright violation if they didn't have permission from the original filmmaker to include it. Under the law, you can't do any of the following without permission from the copyright creator or owner-- reproduce copies of work, create derivative works, distribute copies, or perform or display work publicly.

Copyright laws give us a set of legal framework or boundaries that must be followed for a particular piece, usually a peer-reviewed piece that is not owned, but within a journal or particular database or particular book that's done the homework to get it published.

There are times when it's OK to use another person's work. Anything in public domain, for example, is not copyright-protected. There's also a term called fair use. This refers to exceptions to copyright rules, such as taking a quote from an article for your research paper. Commenting or criticizing a piece of work is also OK. For example, you can write a critique of a movie you recently saw without the filmmaker's permission. Parodies are also an exception, and many late night comedy shows and cartoons take advantage of this.

If you are in doubt, always check the copyright information. Ensuring you're not plagiarizing or breaking copyright rules is critical both legally and ethically.

Information literacy is a skill that anyone can develop. It helps you find the information you need and gives you tools to efficiently tackle any topic at hand. Being information literate is also about questioning, comparing, and validating information so that you can come up with your own conclusions. And it's also about being ethical with the information you use.

As technology changes, so do the different types of information literacy. Today, most students are computer literate, which simply means having the technical know-how for using a computer and software programs. At an early age, we're taught textual literacy. This is knowledge about how to interpret and use digits and letters. Visual literacy is about critically interpreting images. What does a painting, photo, symbol, or other visual convey? Media information literacy or MIL is an all-encompassing term that includes text and media. At the end of the day the purpose of information literacy remains the same despite this source-- to evaluate, locate, identify, and use information effectively and ethically.

Good library skills can save you a lot of time. To start, make sure the material you're researching is current and relevant. Being current means that the information hasn't become dated, changed, or obsolete. Also check the source of the material, understand the purpose of the information, and look for evidence that it's reliable and accurate.

Search methods, like using keywords, key phrases and Boolean operators, also help you find information that's highly specific to your topic. There's plenty of information on the internet, but how do you know it's credible? It helps to use valid sites like online libraries. Verifying the author's credentials is also important. And check when the material was created. Is it still relevant? It's also very important to cross check facts across multiple sources to make sure they support your claims.

Critical reading and critical thinking are part of information literacy. Critical reading means being active, questioning, and purposeful. What do you think about this information? And how does it support your claims? Critical thinking is about having an understanding of the issues related to a topic and all of the complexities that surround it. It involves being open-minded and objective about the information so personal opinions don't interfere.

You also need to be aware of ethical and legal issues when you use information that's not your own. This includes plagiarism and copyright infringements. There are many tools available to check for plagiarism. And it's really not worth the risk. It's also important to respect authorship of material. Always cite sources and get permission, if required.

Information literacy is a skill that takes time and practice to acquire. But as you develop the skills, you'll soon realize their long-lasting, lifetime value.

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