

LIBRARY RESEARCH AND INFORMATION LITERACY 2E



Kari Wergeland
Sacramento City College

Libraries and Information Literacy (Wergeland)

2e

This text is disseminated via the Open Education Resource (OER) LibreTexts Project (<https://LibreTexts.org>) and like the thousands of other texts available within this powerful platform, it is freely available for reading, printing, and "consuming."

The LibreTexts mission is to bring together students, faculty, and scholars in a collaborative effort to provide an accessible, and comprehensive platform that empowers our community to develop, curate, adapt, and adopt openly licensed resources and technologies; through these efforts we can reduce the financial burden borne from traditional educational resource costs, ensuring education is more accessible for students and communities worldwide.

Most, but not all, pages in the library have licenses that may allow individuals to make changes, save, and print this book. Carefully consult the applicable license(s) before pursuing such effects. Instructors can adopt existing LibreTexts texts or Remix them to quickly build course-specific resources to meet the needs of their students. Unlike traditional textbooks, LibreTexts' web based origins allow powerful integration of advanced features and new technologies to support learning.



LibreTexts is the adaptable, user-friendly non-profit open education resource platform that educators trust for creating, customizing, and sharing accessible, interactive textbooks, adaptive homework, and ancillary materials. We collaborate with individuals and organizations to champion open education initiatives, support institutional publishing programs, drive curriculum development projects, and more.

The LibreTexts libraries are Powered by [NICE CXone Expert](#) and were supported by the Department of Education Open Textbook Pilot Project, the California Education Learning Lab, the UC Davis Office of the Provost, the UC Davis Library, the California State University Affordable Learning Solutions Program, and Merlot. This material is based upon work supported by the National Science Foundation under Grant No. 1246120, 1525057, and 1413739.

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation nor the US Department of Education.

Have questions or comments? For information about adoptions or adaptations contact info@LibreTexts.org or visit our main website at <https://LibreTexts.org>.

The LibreTexts name, logo, and book covers are trademarked by LibreTexts, Inc. (a 501(c)(3) not-for-profit organization) and protected against unauthorized use.

This text was compiled on 10/13/2026

TABLE OF CONTENTS

Licensing

1: Introduction to Information Literacy

- 1.1: What is Information Literacy?
- 1.2: How Will Information Literacy Benefit Me?
- 1.3: Generative AI Literacy
- 1.4: Parting Thoughts

2: Libraries and the Research Process

- 2.1: How Libraries Work
- 2.2: Library Collections
- 2.3: The Research Process
- 2.4: Research is Iterative
- 2.5: Parting Thoughts

3: Information Comes in Many Formats

- 3.1: Information Formats
- 3.2: Primary and Secondary Sources
- 3.3: Library Databases
- 3.4: Parting Thoughts

4: Search Strategy

- 4.1: How Can I Develop a Research Question?
- 4.2: Keywords
- 4.3: Choosing a database
- 4.4: Parting Thoughts

5: Advanced Search Strategies

- 5.1: What Is Precision Searching?
- 5.2: Searching with Google
- 5.3: Google Scholar
- 5.4: Find Better Coverage
- 5.5: Parting Thoughts

6: Evaluating Sources

- 6.1: What's Credible Anymore? Fake News and Evaluating the Information You Encounter During Your Research
- 6.2: Thinking About Your Sources
- 6.3: What is Timeliness?
- 6.4: What is Relevance?
- 6.5: What is Authority?
- 6.6: What is Accuracy?
- 6.7: What is Purpose?

6.8: Identifying Bias

6.9: Determining Quality

6.10: Building a Fact-Checking Habit by Checking Your Emotions

6.11: Fact-Checking Sites

6.12: Parting Thoughts

7: Citation and Ethical Use of Information

7.1: Using Information Ethically

7.2: Plagiarism and Academic Integrity

7.3: Citation Styles

7.4: The Basics of MLA Citation Style

7.5: Examples of Common MLA Source Citations

7.6: Citation Tools

7.7: How Do I Acknowledge and Cite Generative AI in Academic Work?

7.8: Parting Thoughts

8: What about AI?

8.1: How Generative AI Differs from Search Tools

8.2: Accuracy and Fabricated Information

8.3: Verifying AI-Generated Claims

8.4: Citation and Documentation

8.5: Ethical and Effective Uses of AI

8.6: Parting Thoughts

Index

Glossary

Detailed Licensing

Licensing

A detailed breakdown of this resource's licensing can be found in **Back Matter/Detailed Licensing**.

1: INTRODUCTION TO INFORMATION LITERACY

1.1: What is Information Literacy?

1.2: How Will Information Literacy Benefit Me?

1.3: Generative AI Literacy

1.4: Parting Thoughts

This page titled [1: Introduction to Information Literacy](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

1.1: What is Information Literacy?



Figure 1.1.1 Digital Silhouette (Su San Lee via [Unsplash](#))

Why This Book?

The key to success in college research is to develop and hone your information literacy skills. These skills will prepare you to find and use information not only for college, but also in the workplace and your personal life. Having strong information literacy skills will make you a more thoughtful and effective consumer and creator of information, and will increase your awareness of and resilience toward the psychological, physiological, and sociological effects of living in a society overloaded with information.

“Recent events underscore the threat that digital illiteracy poses to public health and democracy” (Breakstone et al.).

What is Information Literacy?

Some of the skills and abilities that fall under the umbrella of information literacy include:



Figure 1.1.2 Umbrella (Vectors Market via [The Noun Project](#))

- research skills
- critical thinking
- media literacy
- digital literacy
- news literacy
- algorithmic literacy
- ethical reasoning
- civic engagement
- AI Literacy

Information literacy acknowledges that students are not just **passive consumers** of knowledge, but that you are **active creators** and participants in the information environment. It is a set of skills that aims to help students navigate this landscape, “not just for college courses but **beyond**—in the workplace, in their personal lives, as lifelong learners, and as news consumers, creators, and voters” (Head et al. 12; emphasis added).

You might also hear this idea referred to as “information competency,” which is an equivalent term.

“Information literacy is an integrated set of skills, knowledge, practices, and dispositions that prepares students to discover, interpret, and create information ethically while gaining a critical understanding of how information systems interact to produce and circulate news, information, and knowledge” (Head et al. 8).

National & International Perspectives

In the U.S., the Obama administration made information literacy a priority. The 2009 “Presidential Proclamation on National Information Literacy Awareness Month” stated that:

Over the past decade, we have seen a crisis of authenticity emerge. We now live in a world where anyone can publish an opinion or perspective, whether true or not, and have that opinion amplified within the information marketplace. At the same time, Americans have unprecedented access to the diverse and independent sources of information, as well as institutions such as libraries and universities, that can help separate truth from fiction and signal from noise....The ability to seek, find, and decipher information can be applied to countless life decisions, whether financial, medical, educational, or technical.

Internationally, the Alexandria Proclamation of 2005 defined the term as a human rights issue: “Information Literacy lies at the core of lifelong learning. It empowers people in all walks of life to seek, evaluate, use and create information effectively to achieve their personal, social, occupational and educational goals. It is a basic human right in a digital world and promotes social

inclusion in all nations.”



Figure 1.1.3 Earth from Space (NASA via Unsplash)

“Information literacy is the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning” (“Framework for Information Literacy for Higher Education”).

References

Breakstone, Joel, et al. “Lateral Reading: College Students Learn to Critically Evaluate Internet Sources in an Online Course.” *Misinformation Review*, Harvard Kennedy School, 10 July 2023.

“Framework for Information Literacy for Higher Education.” *Association of College & Research Libraries*, American Library Association, 11 Jan. 2016.

Head, Alison J., et al. “Information Literacy in the Age of Algorithms: Student Experiences with News and Information, and the Need for Change.” *The Project Information Literacy Archive*, The Project Information Literacy Archive, 15 Jan. 2020.

UNESCO, et al. “Beacons of the Information Society: The Alexandria Proclamation on Information Literacy and Lifelong Learning.” *IFLA*, International Federation of Library Associations and Institutions, 9 Nov. 2005.

This page titled [1.1: What is Information Literacy?](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by Walter D. Butler; Aloha Sargent; and Kelsey Smith.

- [1.1: College Research and Information Literacy](#) by Walter D. Butler; Aloha Sargent; and Kelsey Smith is licensed [CC BY 4.0](#). Original source: <https://introcollegeresearch.pressbooks.com/>.

1.3: Generative AI Literacy

While the focus of this textbook is on library research and information literacy at the community college level, we will also touch upon AI Literacy where it is relevant to this course.

Liza Long of the College of Western Idaho has a lot to say about using generative AI during the research process. The content below is an excerpt from her OER textbook, *Cyborgs and Centaurs: Academic Writing in the Age of Generative Artificial Intelligence*.

Liza Long

When I asked ChatGPT about the main ethical concerns for generative artificial intelligence, it reported the following:

Generative AI technologies, like ChatGPT, raise significant ethical concerns. Firstly, they can spread misinformation and fake content, eroding trust in online information sources. Secondly, biased training data may lead to AI systems inadvertently perpetuating societal biases and discrimination. Privacy and data security are also at risk, as these systems process vast amounts of user data. The lack of accountability for harmful AI-generated content is a pressing issue. Malicious actors can use these technologies for manipulation and social engineering, endangering individuals' well-being and trust. Consent and user awareness problems arise when users are unaware they are interacting with AI. Economically, job displacement could occur due to AI automating content creation. Additionally, the weaponization of generative AI raises concerns about its misuse for harmful purposes. Mental health and well-being could be negatively affected by prolonged interactions with AI chatbots. Overreliance on AI may reduce human skills and agency over time. Addressing these concerns requires collaboration between developers, policymakers, researchers, and the public to implement transparency, fairness, accountability measures, and ethical guidelines and regulations for AI development and deployment ("How will generative AI impact climate change?").

I'll leave my ethical quibbles with the use of "firstly" as a transitional expression aside. But based on this response, ChatGPT doesn't seem to "think" (or algorithmically predict) that generative artificial intelligence is an existential threat to humanity. According to ChatGPT, the eight main issues are:

1. Misinformation and fake content.
2. Biased training data.
3. Privacy and data security.
4. Lack of accountability for harm caused by generative AI.
5. Consent and user awareness.
6. Job displacement (especially for formerly "safe" knowledge workers).
7. Mental health concerns from prolonged chats.
8. Reduction of human skills (I imagine writing will be one of them).

What else do you think is missing from this list? What concerns do you personally have about using generative AI tools in your life?

I'll tell you one thing that stands out to me as I write this chapter in the hottest summer of recorded memory: climate change. When I followed up with ChatGPT to ask about the effects of generative artificial intelligence on Earth's rapidly warming climate, it led with the positives, hopefully suggesting that energy efficiency and climate modeling would improve with this new technology.

But according to one study, generative artificial intelligence will consume 8-21% of the world's total energy output by 2030 (Magubane).

And contrast ChatGPT's response with this statement from the United Nation's Education, Scientific, and Cultural Organization's statement on artificial intelligence:

The world is set to change at a pace not seen since the deployment of the printing press six centuries ago. AI technology brings major benefits in many areas, but without the ethical guardrails, it risks reproducing real world biases and discrimination, fueling divisions and threatening fundamental human rights and freedoms. AI business models are highly concentrated in just a few countries and a handful of firms — usually developed in male-dominated teams, without the cultural diversity that characterizes our world. Contrast this with the fact that half of the world's population still can't count on a stable internet connection. ("Artificial Intelligence and Emerging Technologies")

What do you think? Do the benefits of this new technology outweigh the potential costs? How can we mitigate the potential harm that generative AI may cause?

As an ethical starting point in my own use of generative artificial intelligence, I am now including this acknowledgment inspired by the work of Laurie Phipps and Donna Lanclos whenever I use generative AI in my work.

I acknowledge that ChatGPT does not respect the individual rights of authors and artists and ignores concerns over copyright and intellectual property in its training; additionally, I acknowledge that the system was trained in part through the exploitation of precarious workers in the global south. In this work I specifically used ChatGPT to explore ethical concerns with generative artificial intelligence.

However you use (or don't use) generative AI, I encourage you to be thoughtful in your approach. These are interesting times. We need to remember now more than ever what makes us human.

References

"Artificial Intelligence and Emerging Technologies." *UNESCO*, 28 Sept. 2026.

"How will generative AI impact climate change?" prompt. *ChatGPT*, OpenAI, 20 Jul. 2023, chatgpt.com.

Long, Liza. "Cyborgs and Centaurs: Academic Writing in the Age of Generative Artificial Intelligence." *Idaho Pressbooks Consortium*, 20 Jul. 2023.

Magubane, Nathi. "The Hidden Costs of AI: Impending Energy and Resource Strain." *Penn Today*, Penn Today, 08 Mar. 2023.

Perrigo, Billy. "OpenAI Used Kenyan Workers on Less Than \$2 Per Hour." *Time*, Time, 4 Aug. 2026.

Phipps, Lawrie, and Donna Lanclos. "An Offering." *Digital Is People*, 22 Jan. 2023.

Roose, Kevin. "A.I. Poses 'Risk of Extinction,' Industry Leaders Warn." *The New York Times*, May 30, 2023.

This page titled 1.3: Generative AI Literacy is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Liza Long](#).

- 1.10: What Ethical Concerns Exist for Generative AI Tools? by [Liza Long](#) is licensed [CC BY-NC-SA 4.0](#). Original source: <https://cwi.pressbooks.pub/longenglish102/>.

1.4: Parting Thoughts

The term information literacy comes off a bit murky, if not confusing. What it boils down to is this: The information you encounter as you go through your daily life can be useful or misleading. It can be downright dangerous. It can also help you become successful and competent in the world. In the end, we all need to learn how to process this ever changing sea effectively, because getting closer to the truth of the matter will help us make wiser choices. In the community college arena this can mean selecting reliable sources when it comes time to work on a college assignment. In your personal life this might mean learning how to assess a political candidate astutely or figuring out how to reduce your carbon footprint. It might mean pinpointing reliable information focused on selecting the right car. It could mean accurately assessing your own medical situation. The better you become at analyzing the information coming at you, the more effective you will be as you take on the challenges you were meant to work through.

This page titled [1.4: Parting Thoughts](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

2: LIBRARIES AND THE RESEARCH PROCESS

2.1: How Libraries Work

2.2: Library Collections

2.3: The Research Process

2.4: Research is Iterative

2.5: Parting Thoughts

This page titled [2: Libraries and the Research Process](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

2.1: How Libraries Work

Understanding the different roles the library and librarians play on your campus can help you ask better informed questions and go deeper in your search for relevant and quality information. While campus libraries are always changing to accommodate new technologies and the evolving needs of the students and faculty who use them, the core functions of libraries remain mostly unchanged.

Circulation

Circulation is a major department in any library, though it will sometimes be called Access Services. Circulation provides students with the means to access a library's collections, meaning that they check books in and out and maintain borrower records. These borrower records, or library accounts, are usually only available to circulation staff. In other words, if you have any questions about our library account, or want to check books in or out, or want to pay or contest a fine, Circulation can help.

Laptops and Other Technology

Students can often find technology, such as laptops or calculators for checkout at Circulation. For example, the SCC Library offers a limited number of Chromebooks, Windows laptops, and MacBooks for semester-long or in some cases short-term loan.

Textbooks

Textbooks can be kept at Circulation. Textbooks housed in the SCC Library, for example, check out for varying loan periods, ranging from two hours at a time to the entire semester.

Reference

Reference librarians assist students with locating relevant information for their projects. They can also track down answers to especially challenging questions. Your library's reference librarians will probably have a service desk where you can ask question and talk to librarians. At some libraries, the reference desk is combined with Circulation.

Besides offering one-on-one assistance with research, reference librarians may also teach library instruction classes on your campus, as well as information literacy courses for credit. If you are uncertain about the best places to look for information on a given topic, ask a reference librarian. Typically academic libraries will have librarians with specialized areas of expertise.

Technical Services

Technical services largely refers to acquisitions and cataloging, with the former purchasing books and journals for the library and the latter integrating them into the collection. You will rarely see technical services librarians, as they typically have no public service role. Instead, they work on behind-the-scenes projects to ensure the library is operating effectively. For example, library databases, require time and staff to develop and maintain. Your library will most likely have librarians and other staff devoted to operating and improving the library catalog interface and whatever other electronic resources are available for research.

Access to Information

Your library may have a print collection with thousands or even millions of volumes. It may provide you with instant access to millions of electronic articles and books. But no library owns every title. If you need a source that is not part of your local library's collection, your library is likely to have an interlibrary loan service to help fill in the inevitable gaps in its collections.

Interlibrary Loan

Interlibrary loan services borrow the materials from other libraries and make them available to local library users. Some requests

can be filled quickly. For example, if you need an article, it may take only a day or two for the library to fill the request. A book may take a week. Rare titles may take longer. Some interlibrary loan programs are free of charge. Others may require a small fee. Some will request media on your behalf, while others may not. Your library's interlibrary loan program should have their policies clearly stated on their website.

Special Collections

Most large libraries will maintain special collections. These collections may be based on particular themes, often with a focus on local history. Special collections tend to house primary documents. These primary sources may be letters or old photographs, drafts of a poet's works, or the correspondence of a notable scholar or politician.

Library Programs

You can expect your library to offer special programming throughout the year. This might include exhibits and displays, guest speakers and lecture series, workshops, or even exam time stress relievers. For example, game nights are popular at some libraries during exam periods. Other libraries may offer yoga, pet therapy events, or snacks.

2.2: Library Collections

The library's "collections" include all of the various resources that a library offers for loan. There are services and resources that are commonplace across almost all libraries, and then specialized resources offered by only particular types. Most commonly, there are two types of libraries:

- **Public libraries:** Public libraries are state-funded institutions that offer free service to their community.
- **Academic libraries:** Academic libraries are associated with a specific college or university, and offer services to the members of their institution. However, many academic libraries also offer services to the public as well!

Library Collections

Libraries loan (or "check out") many different types of resources. The physical collection is often made up of print books, periodicals such as newspapers and magazines, and often simple devices such as headphones, web cams, dry erase markers, or fidget toys. However, these physical collections can include a lot more! Below, is a list of common resources and the types of libraries where you might find them.

Resource	Public Library	Academic Library
Print Books, Magazines, Journals, and Videos		
Audiobooks and music		
Electronic books, journals, videos, and music		

Computers and WiFi		
Workshops on doing research		
Meeting/study space (including private study rooms)		
Printing and scanning		
Headphones		

Tools, small kitchen appliances, umbrellas, power washers, etc.		
Specialized research sources such as substantial subject-specific databases		
Laptops and chromebooks		

Figure 2.2.1 Common Resources and the Types of Libraries Where You Might Find Them (CC BY-NC; Lyric Ripley)

There are other types of libraries as well. Specialized libraries include law libraries, medical libraries, science libraries, corporate libraries, and more.

This page was adapted from [Library Collections and Services](#) by Lyric Ripley, used under CC BY-NC 4.0.

2.3: The Research Process

To succeed in college, students need to develop solid research skills that will benefit them throughout and beyond their academic career. They must focus, in and out of class, on doing the following:

- Identifying an area of focus
- Identifying the audience
- Using campus library resources to find information
- Determining if information is scholarly and credible
- Citing sources accurately, avoiding plagiarism, and creating a final written composition using the appropriate style guide

Identifying an Area of Focus

Any student writer's initial task is to make sure he or she understands what the instructor is asking for. Precious time can be wasted if students begin their research without a clear picture of what their end product should look like and how it should read. Once an essay is assigned, and some initial contemplation and research on the student's part, it is a great time to make an appointment with an instructor.

Conscientious college writers begin thinking about and researching essay topics immediately after being given the assignment. As we all know, brainstorming can be a solid way to record important initial ideas. At the end of a brainstorming session, writers can begin to see patterns of interest, which will become perfect places to begin research. Avenues within writer's researching often need to remain fluid initially so student writers can determine what kind of resources are available regarding the respective the topic. This flexibility allows students to narrow or broaden topics into a thesis that might not be obvious at first.

Identifying the Audience

All writing is created for a specific audience. Writers must identify the type of reader they want to reach. If they are writing for a general audience, what is the best way to capture a wide range of readers' interests? Should they provide background information that general readers would not necessarily know? Are they writing for an audience already well versed in this topic, and, if so, does this mean writers can use more scholarly language and include less background information?

Using Campus Library Resources and the Internet to Find Information

Research-based writing is only as credible as the sources the writer uses. Therefore, students should start with the college library catalogs and databases. There, a writer can find reference materials (e.g., encyclopedias and dictionaries), books, multimedia resources, as well as the most valuable resource of all, the college librarian. Librarians are trained with the most up-to-date strategies to access scholarly and popular resources that are available to students and usable for college projects. These days, many of these resources can be accessed online from home, which makes learning to use the tools of the library even more important and valuable.

The internet is increasingly used to find sources for academic essays. However, much of what is found on the web is not appropriate for college work. Note, too, that a simple internet search may not allow students to access full articles of ideal credible and scholarly sources whereas going through one's college or university library main page will allow full and free access.

Some of information literacy skills include the following:

- Accessing the library search engines
- Determining the best search terms
- Narrowing or expanding search results
- Finding the best books, articles, and other sources through the library catalog

Determining if Information is Credible

Evaluating the quality of resources is also an essential information literacy skill, especially in today's world. People are inundated with media of various kinds, much of which tries to get us to buy something or to think in a certain way. The biggest challenge student researchers have is based in the fact that there is such a vast quantity of information available that could potentially be used for a research-based paper. However, there exists a significant range between highly credible, relevant information and that which is not. Materials found on the open web are usually less reliable than those curated and made available through library resources purchased through the college, including online databases housing materials that are behind the paywall.

Because “facts” can be accessed in just a few moments, it can be tempting to assume that they are just that—factual. More recently and more often, free online information is not fact, not verifiable through citations, and not credible. In addition, new kinds of sources are available, such as a live news feeds or any one of the array of social media options, thus necessitating a variety of ways of assessing information. Generative AI tools demand critical thinking if they are to be used effectively for research purposes. As such, understanding how to research is key, especially in this new era when content can be skewed in a number of ways.

Evaluating sources is detective work. The researcher needs to make decisions about what to search for, how to search, and what type of information is credible and academically appropriate. For example, a student who is writing about the Great Pacific Garbage Vortex will find many sources available through library-based searches, as well as through online resources that could be more current. However, information that comes from the website of a company that produces petrochemicals and plastics will not be as valuable as a source that comes from scholarly research found through a library database.

The following are some questions students need to ask of every source they are considering for an academic paper:

- Is this source relevant to the topic? Does it give background, explain concepts, and offer support for or an alternative viewpoint on the topic?
- Is it considered a credible source? What is the expertise of the person who wrote it? How current is it? Where was it published? What was the source of funding for this publication? Would that funding source add bias to the material? Are there references that indicate where the information has come from? Is it scholarly or written for a general audience? What does the language used in the source suggest about the purpose of the piece or the scholarliness of the writers?

Depending on the answers to these questions, writers can feel secure with sources that are relevant and credible. Papers that use high-quality sources get better results and better grades with the sharing of important information with professors and other readers.

2.4: Research is Iterative

The academic research process is a series of steps that help scholars and students investigate questions, solve problems, and create new knowledge. Whether you're writing a college research paper or conducting a scientific study, the research process is a structured approach that helps ensure your findings are accurate, reliable, and meaningful.

The research process involves several key stages, each building on the previous one to guide researchers from initial curiosity to clear conclusions. Here's a breakdown of the main steps in this process:



Figure 2.4.1 The Scientific Method (simple) (CC0; Thebiologyprimer)

1. Identify a Research Topic or Problem

The first step in the research process is to choose a topic or identify a problem to study. This could come from an area of interest, a gap in existing research, or a real-world issue that needs a solution. A good research question is specific, focused, and achievable within the scope of your project. For example, a broad topic like "climate change" can be narrowed down to "the impact of climate change on polar bear populations in the Arctic."

2. Conducting Background Research

Once you have a topic, it's essential to understand what has already been discovered about it. You can look up information that explains the background of a topic or issue. One formal method for this is the literature review. A **literature review** involves reading and analyzing existing research on your topic, such as journal articles, books, and credible websites. This step helps you avoid duplicating work that's already been done and provides context for your study. Reviewing the literature also reveals gaps in knowledge that your research could fill, guiding your approach and helping refine your research questions.

3. Formulate a Research Question or Hypothesis

Based on what you've learned, you can now develop a research question or hypothesis. A **research question** is a clear, focused question that your study will try to answer, while a **hypothesis** is a statement predicting an outcome that can be tested. For example, if your topic is "the effect of exercise on mental health," your research question might be, "How does daily exercise influence anxiety levels in teenagers?" If you're using a hypothesis, it might be, "Teenagers who exercise daily will report lower levels of anxiety than those who do not."

4. Choose a Research Method

The next step is to decide how you'll gather the data needed to answer your question. This choice depends on the nature of your question and whether your research will be **quantitative** (focusing on numbers and measurable data) or **qualitative** (focusing on words, meanings, and experiences). Common methods include surveys, experiments, interviews, observations, or analyzing existing data. For instance, if you want to measure the anxiety levels of teens before and after exercise, you might use surveys and interviews.

5. Gather Sources

With a method in place, it's time to gather your sources. Depending on your method, you could be analyzing documents, conducting interviews, or gathering responses from a survey.

6. Analyze What You Have Discovered

After gathering your sources, you'll need to examine them to draw conclusions. As a researcher, you will look for trends in your findings. Do multiple sources agree? Are there any particular findings that disagree with others?

7. Interpret Results and Draw Conclusions

Once your analysis is complete, you can interpret your findings and draw conclusions. Do the results support or contradict your hypothesis? What are the possible reasons for your findings? Are there any limitations to your study? For example, if your study shows that exercise reduces anxiety in teenagers, you might conclude that promoting exercise could help improve mental health in this age group.

8. Communicate Your Findings

The final step in the research process is sharing what you've learned. This can take the form of a research paper, presentation, or report. When communicating your findings, it's essential to explain your methods, present your data clearly, discuss your results, and acknowledge any limitations of your study. This way, others can understand your work and potentially build upon it in future research.

Scholarship as Conversation

Communities of scholars, researchers, professionals, and students engage in a continual discussion to build knowledge in a subject area. Through each work of research and scholarship (including journal articles, presentations, and teaching), knowledge is built up and further developed with new insights and findings. Sometimes, researchers will repeat other people's studies to confirm or refute their findings. This creates an ongoing "conversation" that continually builds on what we know (ACRL Board).

Summary

The academic research process is a powerful tool for answering questions, solving problems, and advancing knowledge. By following these steps—identifying a topic, conducting a literature review, forming a research question, choosing a method, collecting and analyzing sources, interpreting results, and sharing your findings—you ensure that your research is systematic, thorough, and credible. Each step is crucial to building a solid foundation for understanding and making discoveries that others can trust and learn from.

References

ACRL Board. "[Framework for Information Literacy for Higher Education](#)." *Association of College & Research Libraries*. 11 Jan. 2016.

This page was adapted from [The Research Process](#) by Lyric Ripley, used under CC BY-NC 4.0.

This page titled [2.4: Research is Iterative](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

2.5: Parting Thoughts

Your college library is the best place to begin most research assignments. Whether you access your library online or in person, you should discover myriad resources to back up your ideas. Library materials, such as expensive books and scholarly articles, are available for students to use for free. Libraries even provide access to some textbooks, helping students to cut costs.

Learning how to become a strong researcher is an essential college skill. This chapter has provided an overview on the research process, which can take time to master. Get started by brainstorming anything that comes to mind and jotting down your ideas. From there, spend time narrowing your thinking into a manageable topic. Once you are armed with your research question, you are ready to begin searching for useful sources.

Spoiler alert! Library discovery tools, such as OneSearch, make it easier to locate sources that are on target. If you find yourself getting stuck, a librarian can offer you some useful search strategies or even provide you with a list of resources that can serve as a starting point for your research assignment. Librarians in the SCC Library work with students in person, as well as online. You can find access to a 24/7 librarian chat service on the SCC Library website, perfect for those middle of the night questions. The SCC library also offers individual research appointments via Zoom. This is a great opportunity to share your initial ideas and gain some insights on how to dig deeper. In the end, checking in with a librarian to discuss your research needs can be terrific time-saver.

3: INFORMATION COMES IN MANY FORMATS

3.1: Information Formats

3.2: Primary and Secondary Sources

3.3: Library Databases

3.4: Parting Thoughts

This page titled [3: Information Comes in Many Formats](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

3.1: Information Formats

Distinguishing between Information Sources

Information is published in a variety of formats, each with its own special considerations when it comes to evaluation. Consider the following formats.

Social Media



Figure 3.1.1 (CC BY-NC 4.0; Andi Adkins Pogue)

Social media has been a rising star in the landscape of information gathering. Facebook updates, Tweets, wikis, and blogs have made information creators of us all and have a strong influence not just on how we communicate with each other but also on how we learn about current events or discover items of interest.

Anyone can create or contribute to social media and nothing that's said is checked for accuracy before it's posted for the world to see. So do people really use social media for research? Currently, the main use for social media like tweets and Facebook posts is as primary sources that are treated as the objects under study rather than sources of information on a topic. But the Modern Language Association has a [recommended way to cite a post on X](#), so social media may, in fact, be gaining credibility as a resource.

News Articles



Figure 3.1.2 (CC BY-NC 4.0; Andi Adkins Pogue)

These days, social media will generally be among the first to cover a big news story, with news media writing an article or report after more information has been gathered. News articles are written by journalists who either report on an event they have witnessed firsthand, or after making contact with those more directly involved.

The focus is on information that is of immediate interest to the public and these articles are written in a way that a general audience will be able to understand. Such articles go through a fact-checking process, but when a story is big and the goal is

to inform readers of urgent or timely information, inaccuracies may occur. In research, news articles are often best treated as primary sources, especially if they were published immediately after a current event.

Magazine Articles



Figure 3.1.3 (CC BY-NC 4.0; Andi Adkins Pogue)

While news articles and social media tend to concentrate on what happened, how it happened, who it happened to, and where it happened, magazine articles are more about understanding why something happened, usually with the benefit of at least a little hindsight.

Writers of magazine articles also fall into the journalist category and rely heavily on investigation and interviews for research. Fact-checking in magazine articles tends to be more accurate because magazines publish less frequently than news outlets and have more time to get facts right. Depending on the focus of the magazine, articles may cover current events or just items of general interest to the intended audience. The language may be more emotional or dramatic than the factual tone of news articles, but the articles are written at a similar reading level so as to appeal to the widest audience possible. A magazine article is considered a popular source rather than a scholarly one, which gives it less weight in an academic research context, but doesn't take away the value of these sources.

Scholarly Articles

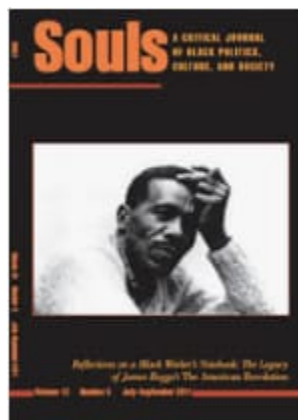


Figure 3.1.4 (CC BY-NC 4.0; Andi Adkins Pogue)

Scholarly articles are written by and for experts and scholars in a field and generally describe formal research studies or experiments conducted to provide new insight on a topic rather than reporting current events or items of general interest. You may have heard the term “peer review” in relation to scholarly articles. This means that before an article is published, it undergoes a review process in order to confirm that the information is accurate and the research it discusses is valid. This process adds a level of credibility to the article that you would not find in a magazine or news article.

Scholarly articles tend to be long and feature specialized language that is not easily understood by someone who does not already have some level of expertise on the topic. Though they may not be as easy to use, they carry a lot of weight in a research context (academic or otherwise), especially if you are working in a field related to science or technology. These sources will give you information to build on in your own original research.

Books

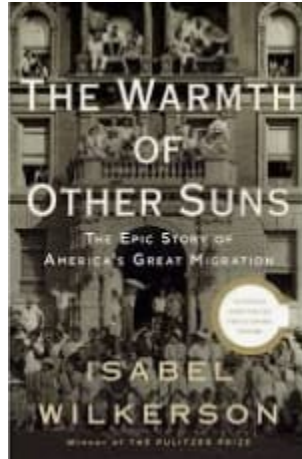


Figure 3.1.5 (CC BY-NC 4.0; Andi Adkins Pogue)

Books have been a staple of the research process since Gutenberg invented the printing press because a topic can be covered in more depth in a book than in most other types of sources. Also, the conventional wisdom for books is that anyone can write one, but only the best ones get published. This is becoming less true as books are published in a wider variety of formats and via a wider variety of venues than in previous eras, which is something to be aware of when using a book for research purposes. For now, the editing process for formally published books is still in place and research in the humanities, which includes topics such as literature and history, continues to be published primarily in this format.

This section was compiled, reworked, and/or written by Andi Adkins Pogue and is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](#), except where otherwise noted.

3.2: Primary and Secondary Sources

A factor you may not have considered when starting your research is time. It's important to know when something happened because that can help you determine both how much and what type of information might exist on your topic. The closer you are to the actual date something happened, the less information there is likely to be on that topic. By the same token, the further away you are from the event in time, the more likely it is that more information and publications may be available. This concept is called the flow of information.

In general, you can expect to find information on the internet, television, and newspapers in the first few days after a newsworthy event. As weeks go by, other information sources begin to emerge, adding new perspectives and information on the topic. Articles in magazines such as *Newsweek* or *People* appear next. Over time, other publications that take longer to produce may emerge like scholarly research articles and books.

Understanding when an event happened will help you figure out how much and what kinds of information are available on a given topic. It can also give you insight into whether primary or secondary sources are available on the topic. Depending on your research needs, using one or the other may strengthen your project. If you're researching a current event, you will likely rely heavily on primary sources such as newspapers. If your teacher requires you to use only peer-reviewed journal articles, you'll need to choose a topic that is not as recent so that there has been time for articles to undergo peer review and be published on your topic.

Primary sources

The first information available about a particular event usually attempts to describe or report it on the same day or very soon after it happens. These types of sources are often called primary sources because they are the first accounts and often provide eye-witness perspectives. Common types of primary sources include web and newspaper articles from the time of the event, diaries, news transcripts, photographs, and videos. These resources are particularly useful when your research could benefit from the perspectives of a given time period, not influenced by shifts in public thought over time.

Primary sources can also refer to publications describing scientific exploration when they are written by the people who did the research. In the sciences, "the purpose of reading the primary source is to get the original data, not someone else's interpretation of the data (a secondary source)" ("Articles").

Secondary sources

Secondary sources analyze an event or previous research after the fact, often putting an event into historical context or comparing it with other resources, issues, trends, or movements. Secondary sources analyze the original event in more depth and context. Common types of secondary sources include books, research articles, and encyclopedia articles. Some disciplines may define secondary sources mostly as books and encyclopedia articles.

Projects you work on may need to tap into many of these types of sources, and some sources may fall into more than one category. For example, a scholarly journal article may fall into the category of either a primary or secondary source, but a book with background information is likely to be a secondary source. Although each of these might be useful for your research, the sources you choose will have to conform to your instructor's expectations and the requirements for your project.

References

"Articles." *Chemistry and Biochemistry Subject Guide*, Mount Allison University. Accessed 2 June 2021.

This page was adapted from [Primary and Secondary Sources](#) by Library Instruction Services Iowa State University, used under a CC BY-SA 4.0 license.

This page titled [3.2: Primary and Secondary Sources](#) is shared under a [CC BY-SA 4.0](#) license and was authored, remixed, and/or curated by LibreTexts.

3.3: Library Databases

How do I find relevant sources in specific information formats?

Your instructor may ask you to include a variety of information formats on your Works Cited list. You should read your assignment carefully before beginning the search process, as you will want to make sure you discover all of the required source types for a particular project. For example, your instructor may ask you to track down a set of relevant sources, including one book, two peer-reviewed articles, one newspaper article, and one website. No doubt you have encountered this sort of instruction before! An efficient way to find various sources types useful for college research is through a library database.

What is a library database?

A library database is digital collection of organized information and resources, typically including academic journals, books, magazines, newspapers, and other content—the information formats useful for serious research.

Both academic and public libraries have electronic databases. These are digital collections that the library subscribes to. They are searchable collections that group content together to make it easier to find and access, often grouping it by subject area and/or format. Unlike internet search engines, library databases often focus on providing high-quality resources such as peer-reviewed journal articles, scholarly papers, and digital media that is not freely available on the internet.

While public libraries do subscribe to library databases, academic libraries usually have much larger collections of them. The exact databases they have will vary by the educational needs of their students; the library subscribes to different database collections based on the degree programs at their school. Within the college library, there are generally two ways to search their database collections:

- **Discovery Service (OneSearch):** Most libraries will have a discovery service, which operates kind of like an internet search engine. This tool is often located on the library's website homepage and allows you to search across most (if not all) of their database collections at one time. This can be a quick way to get a sense of what the library has. However, the discovery service can provide a ton of resources, too much information to easily sift through. Discovery Services go by many names and will not usually be called "discovery service" on the library homepage. Some common names include: OneSearch, Search, Find Books and Articles, Library Search, Discovery, and Summon.
- **Database Search:** Libraries will often have web pages or LibGuides (a special type of webpage) that offer lists of their databases. These usually provide information about each specific database including the topics and types of materials it includes. You can use these lists to find a specific database, so you can search it directly. There are also some tools that will search a small group of databases, rather than searching everything like a discovery service does. These are often broken up by the vendor that rents out the database, such as EBSCOhost or ProQuest.

Choosing a Database

OneSearch is a great option if you need to do a quick search, perhaps to test a new research topic and see how many resources you can find. It can also be useful if you're searching on a broad topic area.

If you have very specific type of information need or are conducting research in a specialized topic area, then choosing a specific database can be a much more efficient use of your time. For example, if you're doing research into business plans and/or looking up SWOT analyses, you can often find a business database that offers those specific resources. This type of database is often called **subject-specific database**.

Database Features

In addition to offering high-value resources, databases (and discovery services) often include a number of very helpful features. The image below displays the search results screen from OneSearch. On the left-hand side, you can see a list of filters. Filters are tools that allow you to get rid of undesired results. For instance, you can limit by publication date, availability online, resource

type (journal article, book, etc.), and more.

As shown here outlined in red, each resource also has tools allowing you to email it to yourself, get a permanent hyperlink to the source, and even to get citations for it. These citation generators can be very useful, but are not always 100% accurate.

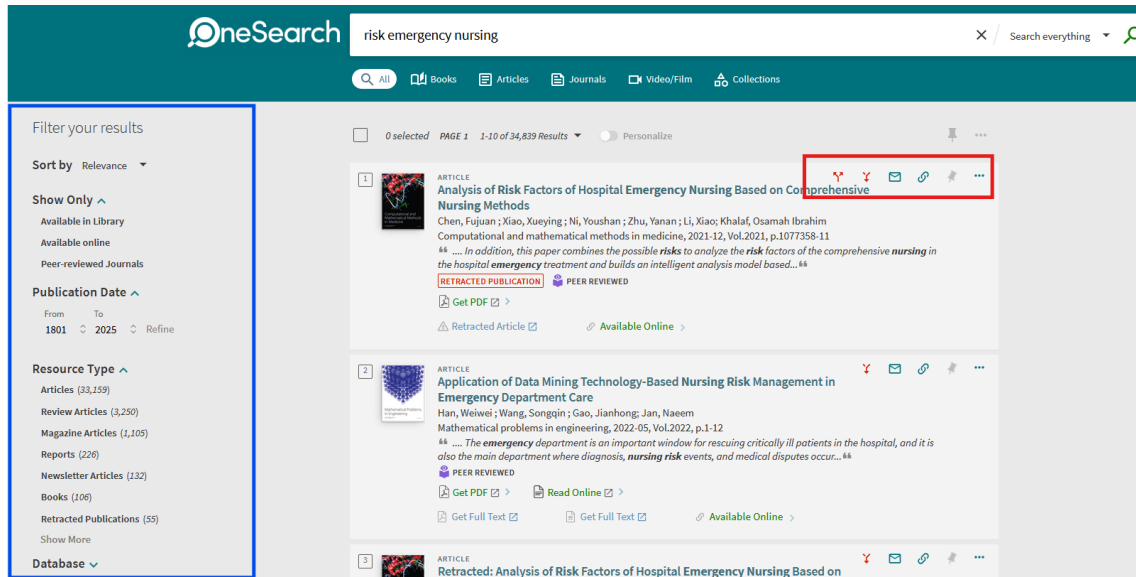


Figure 3.3.1 OneSearch Filters and Tools (CC BY NC 4.0; Daniel Wilson)

This page was adapted from [Using Library Databases](#) by Lyric Ripley, used under CC BY-NC 4.0.

This page titled [3.3: Library Databases](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

3.4: Parting Thoughts

You might be wondering why information formats are even relevant when there is so much information available through Google. Don't be too quick to judge traditional source types. You can use the source type as a starting point for evaluating the credibility and usefulness of a particular source (including websites). In other words, the various source types are not all equal. Each goes through a typical publication process. Newspaper articles, for example, are written quickly to get the news out ASAP. However, newspaper articles do go through a methodical editing process before they are published. This is not always true of the content you find on a website. Scholarly articles undergo intensive scrutiny by experts, not to mention an editing process, before they are released. If you understand how and why a particular source has been produced, you will begin the evaluation process with a number of clues that can help you ascertain the source's worthiness.

4: SEARCH STRATEGY

4.1: How Can I Develop a Research Question?

4.2: Keywords

4.3: Choosing a database

4.4: Parting Thoughts

4.1: How Can I Develop a Research Question?

This section by Liza Long remixes some material from “Developing a Research Question” from Clark College Libraries,

http://www.gavilan.edu/library/LIB99/unit3narrowingtopic_lesson09.html. Creative Commons BY-SA 3.0.

What is exploratory research?

Exploratory research starts with a question. But it’s not just any question. Exploratory research uses high quality sources to answer a narrow, focused research question. This type of writing is objective, meaning that the author does not take sides. These types of papers are common in college courses. You may write an exploratory research essay in a first-year composition course, but the skills you learn will transfer to much longer research papers in your major, then perhaps on to a master’s thesis and a doctoral dissertation.

The purpose of exploratory research writing is to inform the reader, and generally, your audience will be an academic one.

How Do I Choose a Topic?

In some courses, your instructor may assign you a topic or a range of topics that you can choose from. But in many other courses, including this one, you may have an open topic assignment. Choosing a narrowed, focused topic for your research question will be important to your success. Start by using exploring strategies (brainstorm, cluster, list, freewrite, question) about topics that interest you. The topic should be something that you care about because you will be spending quite a bit of time on it.

After you’ve generated several possible broader topics, you’ll need to narrow and focus one of your topics. One way to narrow your topic is to do a little background research on the Internet. What sorts of questions have others asked about your topic? Are there any new angles that you can explore? While you should not cite Wikipedia as a source in an academic paper, it can be a great place to do some background research to help you narrow and focus your topic.

You Try It!

How can you use generative artificial intelligence to help you narrow and focus your research question? Try this prompt with any generative AI tool such as Microsoft Copilot, ChatGPT, or Google Gemini:

I am writing a paper on _____. I need to come up with a narrow and focused research question appropriate for a 6-8 page college exploratory research paper. You are an expert in this field. Please suggest at least five possible research questions that I could explore for my paper. For each question, give me the following information: 1. Background information I will need in order to successfully write on this topic. 2. Suggestions for how to locate high-quality sources on this topic, including key terms I can use to search. 3. Any controversies associated with this topic.

Save the results of your chatbot interaction. Choose one or two questions that are most interesting to you. Remember that the paper should have a personal connection. For example, you can write about a topic in your community, or something in your major, or an issue that affects you personally in some way.

Note: All prompts in the “You Try It” sections are licensed CC0. You may use these prompts without attribution.

Once you have chosen the research question you would like to work with, review the material below, which goes over some best practices for starting your research.

Step One: Do Some Background Research

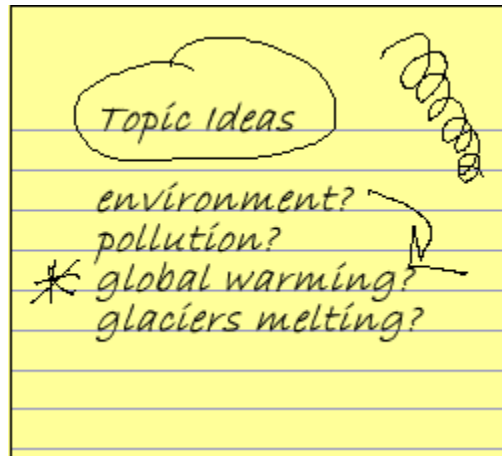


Figure 4.2.1 (CC BY-NC-SA 4.0; [Liza Long](#))

Collecting a little background information on your topic idea can help you define and focus your interest into an appropriate topic for an exploratory research essay. You can also find out if your topic is something you want to spend some time with, and if it's something you can research.

- Jot down a few keywords (terms) related to your topic, then perform some basic searches. Some excellent ideas for collecting background information include the following:
- Scan a few articles in a reliable subject-area or specialized encyclopedias, or online databases that provide REFERENCE overviews. (Like [Opposing Viewpoints](#), [CQ Researcher](#), and [Gale eBooks](#)). You will find these in your library's web site under Databases.
- Try out your keywords in a search engine, such as Google, but don't go too deep. Remember, you're just getting a feel for your topic, not doing the research.
- In doing your preliminary research, if you discover that this topic has possibilities, take the time to add additional words to your keyword list.

Collecting background information is not the same as conducting research. At this point you're just getting a general "feel" for your topic. An hour spent on this step may save you countless hours later.

Step Two: Focus Your Topic

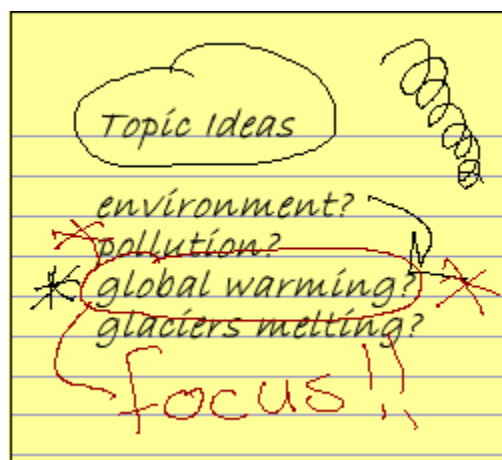


Figure 4.2.2 (CC BY-NC-SA 4.0; [Liza Long](#))

Once you have a topic that you like, you'll probably need to focus it or narrow it down. Most students start out with topics that are much too broad for their assignments. If your topic is too broad, your research will be much more difficult, and you'll waste time looking for information that you won't use.

For example, if you try searching for information on global warming, you will quickly be overwhelmed. Global warming is a large subject, covering a variety of disciplines, topics and issues. How can you narrow this topic?

Brainstorm again.

Jot down all the ideas and questions you might already have about the topic:

- What do you know about global warming? What don't you know?
- Is there a geographical area you want to focus on?
- Are there individuals or organizations involved in this issue?
- What are some areas impacted by global warming?
 - Environmental
 - Political
 - Economic
 - Human element.

It may help to set up a table or chart moving from the general topic to narrower topics:

Brainstorming a Topic

Topic	Narrower Topic	Even Narrower
Global Warming	» Environment	» rising sea levels » destruction of rain forests » air pollution
	» Political	» Kyoto Protocol » roles of government
	» Human Element	» impact on world health » reducing use of fossil fuel
	» Economic	» agriculture » role of corporations
	» Geographical	» developing countries
		» Antarctic region

Figure 4.2.3 Brainstorming a Topic (CC BY-NC-SA 4.0; [Liza Long](#))

If the chart is too formal for you, you might like making a **mindmap** or **concept map**. A whiteboard or a big piece of paper are all you need to make a mindmap. Here's the same information as above, but in a mindmap:



Figure 4.2.4 (CC BY-NC-SA 4.0; [Liza Long](#))

The secret to mindmapping is to free yourself from rules. Don't worry about grammar, spelling, or formatting. Just jot down ideas until you can't think of anymore, then go back and make connections between the ideas. If an idea appeals to you, make it the center idea on a new piece of paper and brainstorm more details.

Step Three: Turn Your Topic Into a Research Question

Dig into your topic to find the question

Once you've narrowed your topic to something workable, you need to restate it as a question. A question requires an answer, and research is all about the search for answers.

Here's an example:

Broad Topic: global warming

Focused Topic: global warming and world health

Possible Research Questions:

- How will changes in the world climate increase health risks for people worldwide?
- What should the U.S. government do to prepare for an increase in climate-related diseases?
- What is the role of the World Health Organization in response to increasing diseases?

Once you have a research question, break it into even smaller questions:

How will changes in the world climate increase health risks for people worldwide?

- What climate changes are expected?
- What diseases are most sensitive to climate change?
- What areas of the world are most at risk?
- What statistics are there to prove that health risks are increasing?
- ... etc.

You can see that research is basically a quest to find answers to the questions you are asking.

Research Question Checklist

These questions will help you to make sure you've developed an appropriate research question for your exploratory research essay.

1. Does the question deal with a topic that is personally connected to me in some way?
2. Can the research question be answered easily through research?
3. Is the scope of this question something that can be answered in a relatively short 1500-2500 word essay?
4. What kinds of information do I need to answer my question? For example, if I decide to research the effects of smartphone use on Millennial romantic relationships, I might need the following types of information:
 - - Statistics on Millennial smartphone use
 - Statistics on Millennial romantic relationships
 - Anecdotal evidence (stories about Millennial smartphone use)
5. What sources will have the type of information that I need to answer the research question (journals, books, Internet resources, government documents, people)?
6. How will I access the sources I need?

Once you know the answers to these questions, you probably have developed an appropriate research question for your essay.

This page titled [4.1: How Can I Develop a Research Question?](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Liza Long](#).

- [1.5: How Can I Develop a Research Question?](#) by [Liza Long](#) is licensed [CC BY-NC-SA 4.0](#). Original source: <https://cwi.pressbooks.pub/longenglish102/>.

4.2: Keywords

Keywords

Like a lot of other technology, search engines have their own rules. Knowing these rules will help you be more effective in your research. The first rule of search engines is that searching with full sentences is not as effective as searching with **keywords**. **Keywords** are usually nouns or short phrases (2 or 3 words that make up a single idea), and they are **the most important words in your topic**. If you did the mind map exercise suggested in the previous section, you should already have a good set of keywords to work with. But don't forget to be on the lookout for additional keywords as you proceed through the search process. For example, you might notice useful search terms in the citations you discover after you run a search.

Definition: Keyword

Keywords are usually nouns or short phrases (2 or 3 words that make up a single idea), and they are the most important words in your topic. These are the words and phrases you will put in the search box when doing research in the library catalog and databases.

Why should you search with keywords instead of full sentences? Because search engines search for every single word you put into the search bar. This means that your search results can quickly become cluttered with useless resources if you include words that aren't relevant to your topic (think *the, is, it, a, etc.*). Searching with full sentences makes the search engine look for extra, unnecessary words and impacts your search results.

Let's look at an example.

I've decided on the following research question: *What are the impacts of social media addiction on teenagers?* So, I go to Google and put the entire question in the search bar. Here's what I get:

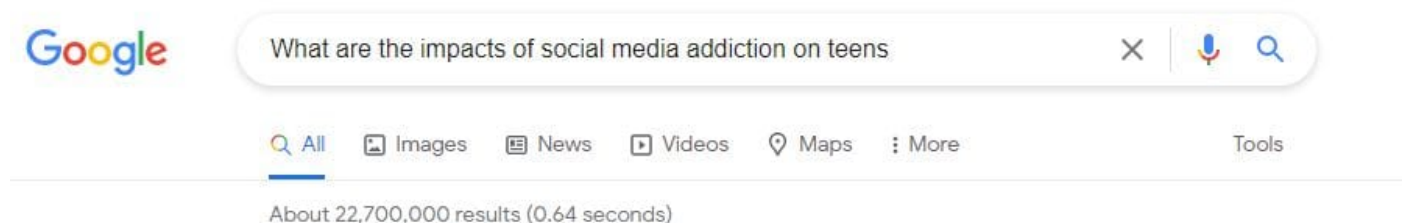


Figure 4.3.1 (CC BY-NC 4.0; Clackamas Community College Library)

Over 22 million results! That's way too many. Let's try cutting out the unimportant words in that sentence and only keeping the words that are really important for my topic:

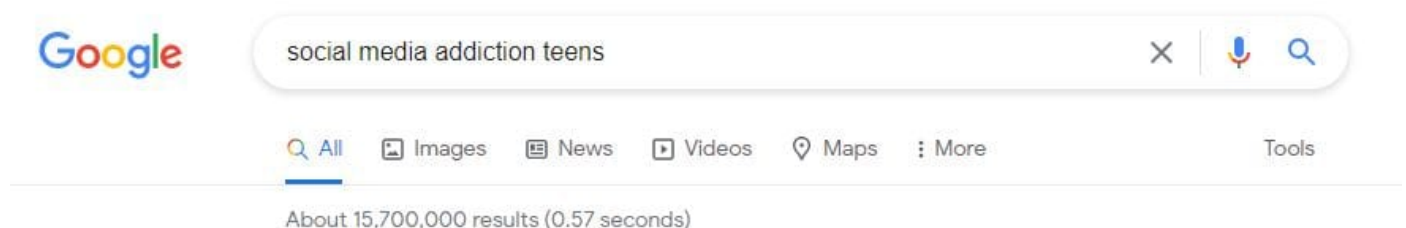


Figure 4.3.2 (CC BY-NC 4.0; Clackamas Community College Library)

Now I see 15.7 million results. That's still a lot, but much better than before! Those extra words (*what, are, the, impacts, of, on*) added 7 million extra results to my search.

Remember: **keywords** will be the most important words directly related to your topic. It's important to search with keywords so your results are as relevant to your topic as possible.

This page was adapted from [Keywords](#) by Clackamas Community College Library, used under CC BY-NC 4.0.

4.3: Choosing a database

You have thought through your topic, identified questions to explore, terms to use and how best they will be combined. Now it is time to pick a database (or two or three or...). For good research, you will find that you will often use multiple databases. Most of the information you will use for your academic papers and projects will come from books and articles that you will find via library databases. When first using a database, be sure and move the scroll bar all the way up and down to see what searching and limiting options you have. Click on the advanced search and scroll up and down again. In some databases you will see the options change a bit once you have done a search or when you are further along in the process. Read the pages that appear so you can take advantage of all your search options.

Every Database is Different

Some have books, others have articles and some have both or other kinds of information. Some specialize in one subject field and have information only on nursing or psychology, or botany and so on. Some have information on just about everything. Some have scholarly information, some have popular information and some have both. Some allow you to limit your search to scholarly information. Some allow you to limit your search to only items that are available in full-text. Some give you access to information on the internet, others only provide information they have purchased. Be aware of these possibilities and look for them.

Every Database is the Same

Every database is searchable. Every database uses Boolean logic. Every database has fields so always check the advanced search to see what fields you can search. (This is a different kind of field from a field of study to which we referred when we talked about experts in a field). Most databases will allow you to print and/or email what you find. Some will put your citations in a particular style such as APA or MLA as an option when you send via email. (Always check these automated citations for errors.) Most allow truncation and phrase searching. Note: if you are not familiar with Boolean logic, truncation, or phrase searching, don't fret. We will be going over these advanced search techniques in Chapter 5.

Databases offer Books, Article, Media and More

Choose a database that offers the kind of information you will need by reading the database descriptions provided or by asking a librarian. Library databases may contain lists of articles, full text articles, a list of books, periodicals, DVDs owned by the library, the full text of books or streaming video. A library's catalog (which is a database) will list what the library owns: e-books, print books, periodicals (magazines, newspapers and journals) and DVDs. A community college might have 80 databases while a large research institution will have hundreds. Most college libraries offer a search tool which is often called OneSearch and allows users to search most, if not all, of their library's databases at one time. Talk with the librarian about which to use for your topic so you can use your time efficiently.

Free Databases and Access from Home

Most vendors of scholarly databases charge for articles, but your institution and the public library pay for the ones they provide and offer them to you free of charge. It is important to go through your institution's website to reach the database so you can get to them freely. If you are enrolled in a college, chances are you can access many of the databases from home or any off campus spot with web access. If you go directly to the database provider's website, such as EBSCO or ProQuest, you will not have access, unless you pay. Your library should have a page of databases from which you may choose. Choose the one that offers both the topic and type of resource (books, articles, etc.) you need.

Google is a Database

Most of us have used the search engine Google. Google is another database so the same searching tips we have discussed also apply. Used in conjunction with library databases and applying solid evaluation criteria, Google can be a very useful tool to access information but does not replace the high quality information found in most academic library databases. Before using Google, ask

yourself such things as, “How am I going to use the information?” and “What kind of information do I need?” Is Google the best place to look for the information you need? As with other databases, look for Google’s advanced search which will provide more search options. Google can link us to a wealth of information on the web. Like any information, information found through Google needs to be evaluated. Google is great at finding organizations and associations that might have information on your topic.

Wise fool

Nasrudin Sufi stories have been used to learn about both the sacred and profane since the 13th century. Here is how Shah (1964) tells one of the most well-known stories about Nasrudin:

On one occasion a neighbor found him down on his knees looking for something.

“What have you lost, Mullah?”

“My key,” said Nasrudin. After a few minutes of searching, the other man said,

“Where did you drop it?”

“At home.”

“Then why, for heaven’s sake, are you looking here?”

“There is more light here.”



Figure 4.4.1 (via [Los Angeles County Museum of Art](#))

For our purposes, we can learn from the wise old fool that we should not look for the answers to our questions in the place that seems easiest, but rather where the information we need will be found. The goal is to answer your questions, not simply take the first few things that pop up on your screen and use only them. Choose a database that has the kind of information you want (book, articles...), covers the topics you need (general or subject specific information) and has information meeting any other criteria you need (peer reviewed, primary source...).

This page titled [4.3: Choosing a database](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by Carol M. Withers with Bruce Johnson and Nathan Martin.

- [6.3: Choosing a database](#) by Carol M. Withers with Bruce Johnson and Nathan Martin is licensed [CC BY-NC-SA 4.0](#).

4.4: Parting Thoughts

Basic search strategy includes:

- Determining the scope of your assignment.
- Doing some background reading on your subject.
- Developing a research question.
- Brainstorming a list of keywords.
- Choosing useful databases for your search.

Once you choose a database, begin your search by entering two to three relevant keywords into the search box. When you retrieve a useful set of results, develop a way to keep track of the specific sources you wish to investigate. For example, you can keep an ongoing list of permalinks to these sources. Or you can email citation information and/or articles to yourself.

There are a number of advanced search strategies that can help you refine this initial search even further. Many of these strategies will be covered in Chapter 5.

5: ADVANCED SEARCH STRATEGIES

5.1: What Is Precision Searching?

5.2: Searching with Google

5.3: Google Scholar

5.4: Find Better Coverage

5.5: Parting Thoughts

This page titled [5: Advanced Search Strategies](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

5.1: What Is Precision Searching?

Some of the information in this chapter was remixed from “[Sources and Information Needs](#)” by Teaching & Learning and University Libraries, licensed CC BY 4.0.

Effective searching takes precision. This section shows you how to perform several steps to make your searching more precise—you’ll turn up more sources that are useful to you and perhaps, sources that may be even crucial to your research question.

You’ve probably been searching in a more casual way for years and may wonder: Is going to the trouble of precision searching actually worth it?

Yes, definitely, for searches that are important to you! You’re in competition with many people who are working to be as skilled as they can be. So you should use of these steps for course assignments and for information tasks you do on the job. With other tasks and searches, precision searching may be less important.

Search Strategy

This information on precision searching is based on how search tools such as Google and specialized databases operate. If you’ve been more casual in your searching practices, some of these steps may be new to you.

Starting with a research question helps you figure out precisely what you’re looking for. Next, you’ll need the most effective set of search terms—starting from main concepts and then identifying and alternate between related and terms. Those search terms need to be arranged in the most effective way as search statements, which you actually type into a search box or chatbot prompt.

An important thing to remember is that searching is an iterative process: we try search statements, take a look at what we found and, if the results weren’t good enough, edit our search statements and search again—often multiple times. Most of the time, the first statements we try are not the best, even though Google or another search tool we’re using may give us many results.

It pays to search further for the sources that will help you the most. Be picky.

The image below shows the steos for a successful search.



Figure 5.1.1 The steps in a precise search (CC BY-NC-SA; [Liza Long](#))

Step One: Identify Main Concepts

Finding the main concepts in a research question is a lot like finding the main idea in an essay or story. Often the main idea is in the first paragraph, but not always. Sometimes it's in a later paragraph or even in the conclusion. The same is true with research questions—the main concepts can be at the beginning, middle, or end. Stick to the nouns and only what's necessary, not already implied. Don't read in concepts that are not really there. Be alert to words that may have connotations other than the concept you are interested in. For instance, if you identify depression as a main idea, be aware that the search engine won't automatically know whether you mean depression as a psychological state or as a condition of the economy or as a weather characteristic.

Example: How are birds affected by wind turbines?

The main concepts are birds and wind turbines. Avoid terms like affect and effect as search terms, even when you're looking for studies that report effects or effectiveness.

Example: What lesson plans are available for teaching fractions?

The main concepts are lesson plans and fractions. Stick to what's necessary. For instance, don't include: children—nothing in the research question suggests the lesson plans are for children; teaching—teaching isn't necessary because lesson plans imply teaching; available—available is not necessary.

Sometimes your research question itself can seem complicated. Make sure you've stated the question as precisely as possible. Then apply our advice for identifying main concepts as usual.

Example: Does the use of mobile technologies by teachers and students in the classroom distract or enhance the educational experience?

Acceptable main concepts are teaching methods and mobile technology. Another possibility is mobile technologies and education. Watch out for overly broad terms. For example, don't include:

- Educational experience (it misses mobile technology).
- Classroom distractions (too broad because there are distractions that have nothing to do with technology).
- Technology (too broad because the question is focused on mobile technology).

Step Two: List Related and Alternative Terms

For each main concept, list alternative terms, including synonyms and singular and plural forms of the words.

Sometimes synonyms, plurals, and singulars aren't enough. So also consider associations with other words and concepts. For instance, it might help, when looking for information on the common cold, to include the term virus—because a type of virus causes the common cold.

Check to make sure that your terms are not too broad or too narrow for what you want. Figuring out what's too broad or too narrow takes practice and may differ a bit with each search.

Try Working with Subject Headings

All the searches we have talked about so far have been keyword searches, usually used in search engines. But sometimes it pays to use tools—such as library catalogs and journal article databases—that have subject headings that you can search. Subject headings are standardized terms that are assigned by trained experts. They are similar to tags on the open web.

Most of the time, you won't know what words a specific finding tool uses for its subjects. To discover useful subject headings, begin with a simple keyword search. Once you've done your search, examine your results list. When you find an item that seems relevant to your topic, open the item record and skim through the abstract to make sure it is actually a good fit for your research. The item that best fits your needs might not be the first item on your list, or even on the first page of results.

Details	
Title	Hunting Dogs
Author/Creator	Ridgway, Marcella >
Subjects	Bird dogs > Gun dogs > Scent hounds > Sport dogs > Sporting breeds > Upland game > Zoonoses >
Is Part Of	The Veterinary clinics of North America. Small animal practice, 2021-07, Vol.51 (4), p.877-890
Description	Herding and hunting dogs are intense, high-drive dogs that work, and often live, outdoors and in constant or repeated close contact with domestic and wild animals. These dogs are at increased risk for injury and exposure to infectious diseases, toxic substances, and environmental threats. The common practice of feeding or allowing access to raw meat from farm or game animals enhances disease transmission risk. These dogs can be affected by infectious diseases and injurious agents that are rarely encountered in other groups of dogs. In addition, their extreme work ethic may lead to delays in diagnosis.
Publisher	Elsevier Inc
Language	English
Identifier	ISSN: 0195-5616 EISSN: 1878-1306 DOI: 10.1016/j.cvsm.2021.04.006
Source	ScienceDirect Journals (5 years ago - present)

Figure 5.1.2 Subjects field shows other subject terms associated with this item. (CC BY-SA 4.0; Iowa State University Library Instruction Services)

When you do find a source that appears to be on target, take a look at the list subject headings associated with it. You can use these subject terms to locate additional sources that might be useful for your research project. Start by clicking on a subject term in the item record. Doing this will generate a new Advanced Search and retrieve everything in the index on that topic. Or you can try modifying your original search to incorporate the subject terms you have discovered. To do this, go to Advanced Search and type out the relevant subject term. Don't forget to select the **subject field** for that line before running the search.

Keep in mind that different databases use different subject headings to refer to similar topics. For example, in a psychology index, there may be more psychology-specific subject headings than there would be in an engineering index. For this reason, when you get started with a new finding tool, you'll probably need to do some initial exploration to discover the subjects that best match your topic.

Remember, you can always go back and add more keywords, phrases, and subjects to build upon your initial search and explore

items that you might not have otherwise found. Experiment with different search techniques and explore how your results change.

This section on Subject Headings remixed with original content via the Iowa State University Library Instruction Services, used under a [CC BY-SA 4.0](#) license.

Step Three: Form Search Statements

At this point in your search process, you are moving from merely identifying main concepts and similar search *terms* to developing more complicated search *statements* that can do more precise searching.

Use Quotation Marks for Phrases

Put quotation marks around any phrases among your terms so that the phrase is what's searched for, rather than the separate words. "Common cold" instead of common cold is a good example. Without those quotation marks, just think how many sources Google or other search tools would waste their/your time on things that have nothing to do with our sniffles.

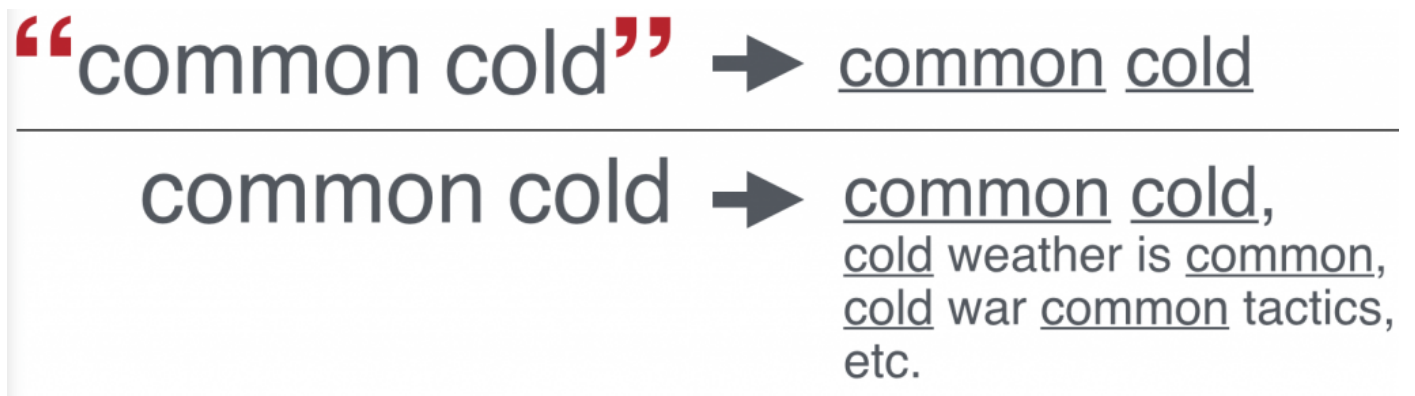


Figure 5.1.3 Putting a phrase in quotes returns results containing that phrase, and not the results for the individual words (CC BY-NC-SA; [Liza Long](#))

Use Wildcard and Truncation Symbols to Broaden

Consider whether using wild card or truncating symbols would help find variations of a word. For instance, the wildcard symbol in wom?n finds both woman and women, and the truncating symbol in mathematic* finds mathematics, mathematically, mathematician, etc.

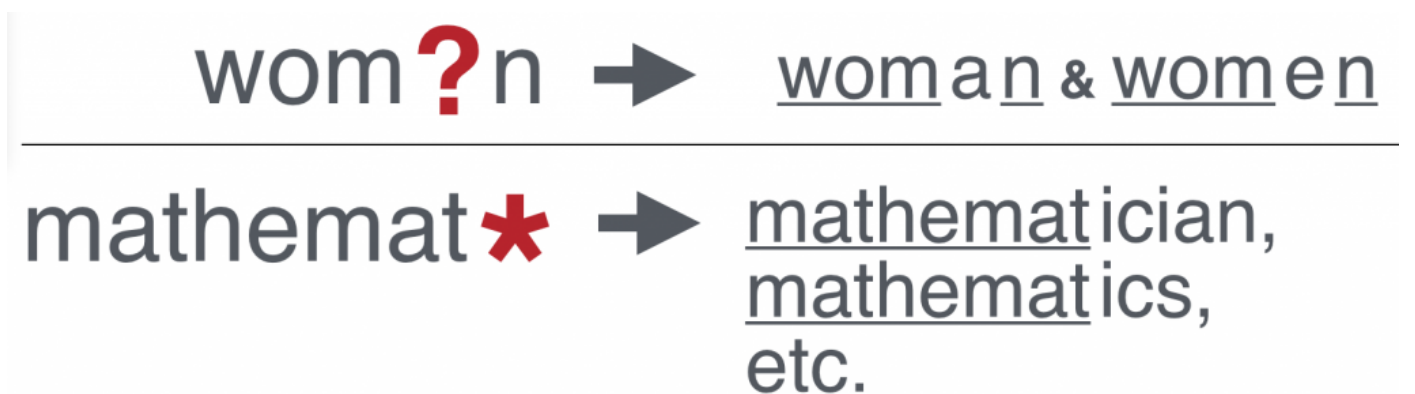


Figure 5.1.4 Using wildcard characters allows you to find variations of a word (CC BY-NC-SA; [Liza Long](#))

Consider AND, OR, NOT

You can often do more precise searching by combining search terms by using the words AND, OR, and NOT. These are known as Boolean Operators. Generally, using these operators narrows your search, making it more precise.

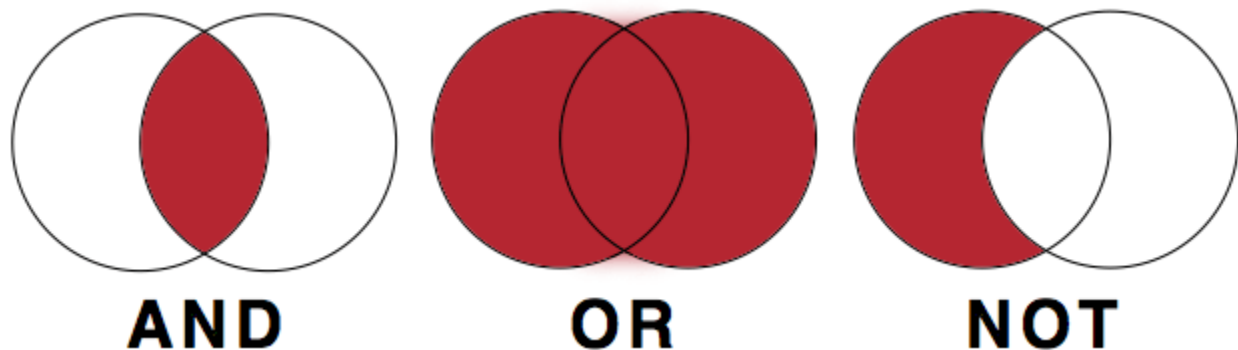


Figure 5.1.5 The Boolean operators AND, OR, and NOT exclude or include subsets of sources (CC BY-NC-SA; [Liza Long](#))

AND – If the main idea contains two or more ideas, you’ll want to use AND to combine those terms in your search statement. To look for information about spiders as signs of climate change, you’ll want to have both terms in the search and perform an AND search. That’s what automatically happens in search engines such as Google and Bing unless you tell them to do something different by using OR, NOT, or -.

OR – If the main idea has several synonyms, use OR to combine them. Most search tools search for all terms (AND) by default, so you need to use the operator OR between terms to let them know you want to find any of the terms not documents with all the terms. For instance, in the previous example of Latino small business growth, we would want to also use the term Hispanic.

NOT – If the main idea has a common use you want to exclude, use NOT to exclude that word. For example, if we were looking for information about illegal drug use we would want to exclude prescription drugs from the search results. This is commonly done with NOT or the use of the minus (-) sign. In Google, to exclude a word use word with no space between the - and the word you want to exclude. If you put a space in there, Google will not exclude the word. (When using some search tools, you have to use AND NOT before the word to exclude it.)

Using Parentheses with Multiple Operators

When a search requires multiple Boolean operators (AND, OR, NOT, or their symbols), you must use parentheses to group the appropriate terms and quotation marks with each Boolean operator. The resulting statements connect terms, remove terms, and organize search terms in ways that result in complex and precise searching.

The use of parentheses may remind you of the mathematical statements written in math courses. The reason parentheses are necessary in searching is that search tools, including Google, generally perform their operations from the left to right of a search statement. If you are using multiple Boolean operators, then the way to make sure that the search is done as a whole statement requires that you use parentheses to combine the sets in your statement.

Never use parentheses unless you are using multiple Boolean operators.

(cat or dog) and (“white house” and president)

Figure 5.1.6 Parenthesis are used with Boolean operators to combine terms for complex searches (CC BY-NC-SA; [Liza Long](#))

Being skillful at this task of envisioning the effects Boolean operators have on a search can help you troubleshoot your own search

statements when they aren't turning up what you expected.

Example: “United States” AND (immigration or emigration)

Can you tell that the searcher wants to find information about the United States' immigration or emigration?

The searcher will find more with this arrangement than would turn up if the statement had been “United States” immigration emigration. That's because the latter arrangement without parentheses would find only information that was about both United States immigration and emigration, instead of either.

Example: (cats OR dogs) AND (treatment OR therapy)

Can you tell that the searcher wants to find information about either treatment or therapy for either cats or dogs?

That's a different search from what the searcher would have gotten if this statement had been used: cats dogs treatment therapy. Anything found with the latter statement without parentheses would have had to be about both— not just either—therapy and treatment for both—not just either—cats and dogs. So the latter statement would have turned up fewer pieces of information.

Step Four: Search Iteratively

You may not get useful results the first time you search for something. Like any academic skill, searching for sources takes practice. Take some time to practice searching precisely. Start by identifying main concepts, then listing related and alternative terms (with the help of wildcard and truncation symbols), and finally constructing search statements. If at first you don't success, try again!

This page titled [5.1: What Is Precision Searching?](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Liza Long](#).

- [1.15: What Is Precision Searching?](#) by [Liza Long](#) is licensed [CC BY-NC-SA 4.0](#). Original source: <https://cwi.pressbooks.pub/longenglish102/>.

5.2: Searching with Google

Before you learn how to up your Google searching game, let's learn a little bit about what happens behind the scenes when you're searching, and how to "read" your Google search results page. Watch *The Internet: How Search Works* (5m12s).

Video produced by CodeAI, all rights reserved. It is not openly licensed but freely available to all.

Keywords

Just like with a catalog and database search, you should search with keywords in Google. The more keywords you put into Google, the more results you'll get. You don't want to add unnecessary keywords (*is, the, to, for, on...*) to your search, because they'll clog up your results and make it harder to find what you're looking for.

Google like a librarian

We all use it - now let's learn to use it better! Upping your Googling skills will save you time and make it easier to identify better sources of information. Tips and tricks are explained below.

1. Use **quotation marks** around your phrases to search for the words as a phrase, instead of separately.



"social media" addiction teenagers



Figure 5.2.1 (CC BY-NC 4.0; Clackamas Community College Library)

2. Use **intitle:** to see results that have your keywords in the title.



addiction teenagers intitle:"social media"



Figure 5.2.2 (CC BY-NC 4.0; Clackamas Community College Library)

3. Use **site:.** to only see results that end in the domain (.gov, .edu, .org) you specify. Universities (.edu) and the US government (.gov) are some of our biggest producers of research, and are great places to find good information. [Why do domains matter?](#)



"social media" addiction teenagers site:.gov



Figure 5.2.3 (CC BY-NC 4.0; Clackamas Community College Library)

4. Use **- (a hyphen or minus sign)** in front of words to exclude them from your search results.



"social media" addiction teenagers -smartphone



Figure 5.2.4 (CC BY-NC 4.0; Clackamas Community College Library)

5. Use **filetype**: to retrieve specific types of files (instead of websites). This works for finding most file types, but PDF is the most common choice for this trick.



"social media" addiction teenagers filetype:pdf



Figure 5.2.5 (CC BY-NC 4.0; Clackamas Community College Library)

6. Use **several strategies** at once for very specific results.



addiction teenagers intitle:"social media" site:.gov



Figure 5.2.6 (CC BY-NC 4.0; Clackamas Community College Library)

A word on website domains

Website domain suffixes can help you evaluate the purpose, audience, and initial credibility of a website.

- Some domains such as **.com**, **.org**, and **.net** can be purchased and used by any individual or organization.
- **.edu** is reserved for colleges and universities, meaning only folks who work at or attend the institution can publish to the website. .edu sites are usually more credible sources for information (though students can be assigned .edu addresses to for personal use, so use caution when citing).
- **.gov** denotes a government website. .gov sites are usually more credible sources for information.
- **.org** is often used by non-profit organizations (which may have an agenda of persuasion rather than education) but also can be purchased by for-profit corporations and individuals. Smart to check out the "About Us" pages when on a .org - or any - website.

This page was adapted from [Searching with Google](#) by Clackamas Community College Library, used under CC BY-NC 4.0.

5.3: Google Scholar

Google Scholar is a more targeted Google search engine designed to search scholarly literature - articles, books, abstracts, legal opinions, and dissertations and theses. Only resources published by academic publishers, professional associations, colleges and universities, and other online repositories are searched.

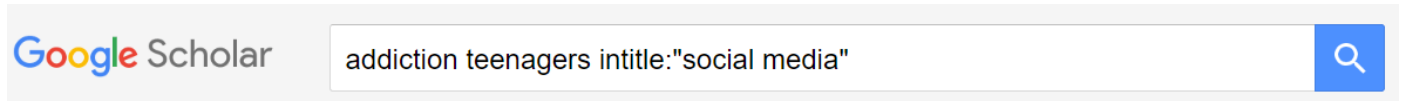


Figure 5.3.1 (CC BY-NC 4.0; Clackamas Community College Library)

- **Pro:** Easy searching of a huge amount of information – it's Google! All of the usual Google search features that you just learned about are available.
- **Con:** Free full text isn't always available immediately.

Get article full text

A word of caution: don't pay for articles from the Internet. Google Scholar will help you find interesting articles and to get the full text, Google Scholar will link you to the publishers' websites. Depending on the publisher's terms for sharing that article, you will hit a paywall and be asked to sign in to the publisher's website. **Your Los Rios username and password will not work here.** When logging in doesn't work, it will redirect you to a pay-per-view screen, charging anywhere from \$20 to \$3,000 (\$3,000 is my personal record for highest fee requested for one article view from a vendor) to read it. **Don't pay it.** Instead, copy and paste the article title into SCC Library's [OneSearch](#) and see if you can access it free from us. If the full text is not available through the SCC Library, you have the option to order it for free through [Interlibrary Loan](#).

Cite resources

Get premade MLA and APA citations from Google Scholar.

1. Select the " icon below an article or book title.
2. Copy and paste the MLA or APA citation.
3. Proofread and edit the citation as needed.

[PDF](#) Adolescent **social media addiction** (revisited)

[MD Griffiths, D Kuss - Education and Health, 2017 - irep.ntu.ac.uk](#)

... , 2016), suggesting that **social media** and social ... **addiction** because the context of excessive social networking is critical in defining someone as an **addict**, and habitual use by **teenagers** ...

☆ Save **Cite** Cited by 105 Related articles

Figure 5.3.2 (CC BY-NC 4.0; Clackamas Community College Library)

Evaluate source credibility

Use Google's *Cited by* function to find who has used this item in their own scholarly research. The higher the *Cited by* number, the more trusted and widely-known the resource (but newer items will have fewer cites, because they're new). Bonus: selecting this link will find related, recent resources on your topic.

[PDF] Adolescent **social media addiction** (revisited)

[MD Griffiths](#), [D Kuss](#) - Education and Health, 2017 - [irep.ntu.ac.uk](#)

... , 2016), suggesting that **social media** and social ... **addiction** because the context of excessive social networking is critical in defining someone as an **addict**, and habitual use by **teenagers** ...

☆ Save  Cite **Cited by 105** [Related articles](#) 

Figure 5.3.3 (CC BY-NC 4.0; Clackamas Community College Library)

This page was adapted from [Google Scholar](#) by Clackamas Community College Library, used under CC BY-NC 4.0.

5.4: Find Better Coverage

Most of the time, you won't be able to determine the reliability of a claim or statement based on how it is covered in a single source. To get a better understanding of your topic and ensure that the information you're using is reliable, try to find better coverage. This can take many forms: you might find better coverage through sources that are more detailed, varied, authoritative, or recent. Even if you think your original source is good, verifying what you've found with additional sources will strengthen your research.

Lateral reading

Rather than assuming the information presented within a single article provides a full picture of your topic, read multiple sources and examine how they support or contradict your original source. This is called **lateral reading**, going beyond your original source to explore how the same topic is discussed by others ("Expand Your View with Lateral Reading"). The primary purpose of reading laterally is to quickly determine whether the original information you found is true. It's more than just fact-checking, though; this process can also uncover better information if the source you started with is not as reliable as you had hoped.

Here is an example of reading laterally in action. You may find a news article that asserts "coffee reduces your risk of getting cancer." Seek out additional sources to determine whether there is any research that backs up that claim. Open up a new browser window and search for the phrase **coffee and "cancer risk"**. This may reveal if other news sites are reporting the same information, and how they have interpreted the results. Sometimes, multiple news sources will post or broadcast the same story word-for-word. Just because a story is shared widely doesn't mean that it is accurate, and it doesn't tell you where the data came from. Keep searching to find a better source. "After verifying, refuting, or otherwise contextualizing the data in question, you'd return to the original text and continue reading" (Heick). If you find that the information is being misrepresented or if you cannot find anything to back up the claim, don't use your original source. Instead, look for new sources on your topic that do a better job of supporting their claims.

Navigating around paywalls

Let's say you're looking to verify a news story; you find another article on the topic but the newspaper's website won't let you read the entire article without subscribing. In cases like this, check to see if the SCC Library subscribes to that newspaper through a database like Access World News, or if there is access directly, as for the *New York Times*. The best way to find this information for many local and major newspapers is to look through the library's [databases focused on News](#).

How algorithms affect what you find

Another reason library search tools may be useful for finding better coverage is to avoid the heavy bias built into the search algorithms used by Google and other web search engines. These tools change your search results based on your personal search history, online activity, and location and are affected by algorithmic bias. Unlike the other types of bias we mentioned in the last section, **algorithmic bias** can be difficult to detect: algorithms may appear to be objective because they are based on data, but the ways that data is gathered, used, or manipulated often reflects the biases of the algorithm's creators and users. "In search engines, for example, algorithmic bias can create search results that reflect racist, sexist, or other social biases, despite the presumed neutrality of the data" (Butler).

Your results are skewed by what Google thinks you want, based on what it "knows" about you. This may change what results are displayed but, more importantly, it determines the order they're listed in. If you and another person search for the same thing, what is displayed first for each of you may be different.

Don't let Google decide for you what is and isn't relevant for your needs. Use a tool that is less likely to use your browsing history to inform what it retrieves for you, such as [DuckDuckGo](#). Everyday tips like clearing your search history and cookies can also lessen these algorithms' effect on your search results. Alternatively, library databases don't base their recommendations on who they think you are, but on your actual search terms. Using these can work in your favor, especially for coursework.

References

Butler, Walter D., et al. "[Algorithmic Bias](#)." *Introduction to College Research*, Pressbooks.

"[Expand Your View with Lateral Reading](#)." *News Literacy Project*. Accessed 16 Aug. 2021.

Heick, Terry. "[The Difference Between Lateral Reading and Vertical Reading](#)." *TeachThought*, TeachThought, 14 Nov. 2025.

This page titled [5.4: Find Better Coverage](#) is shared under a [CC BY-SA 4.0](#) license and was authored, remixed, and/or curated by [Iowa State University Library Instruction Services](#).

- [4.7: Find better coverage](#) by [Iowa State University Library Instruction Services](#) is licensed [CC BY-SA 4.0](#). Original source: <https://iastate.pressbooks.pub/lib160>.

5.5: Parting Thoughts

If you want to dig deeper and truly uncover sources that will allow you to complete star quality college work, get in the habit of searching iteratively. Start with the basic search techniques outlined in Chapter 4. Take a look at your results. Then refine your search strategy (then refine it again). You are bound to go further by trying out a number of advanced search strategies.

- Try working with **Subject Headings**.
- Use quotation marks to search for phrases (**Phrase Searching**).
- Use **Wildcard** and **Truncation** symbols to pull in word variations.
- Try **Boolean Searching**, combining your keywords with operators - AND, OR, NOT.
- Become familiar with **Google Advanced Search**.
- Search **Google Scholar**, but don't pay for articles (your library should be able to offer you these articles through their databases or **Interlibrary Loan**).
- Find better coverage through **Lateral Reading**.

When you try finding better coverage through lateral reading you are actually beginning the evaluation process. We will work on fully evaluating sources in Chapter 6.

6: EVALUATING SOURCES

6.1: What's Credible Anymore? Fake News and Evaluating the Information You Encounter During Your Research

6.2: Thinking About Your Sources

6.3: What is Timeliness?

6.4: What is Relevance?

6.5: What is Authority?

6.6: What is Accuracy?

6.7: What is Purpose?

6.8: Identifying Bias

6.9: Determining Quality

6.10: Building a Fact-Checking Habit by Checking Your Emotions

6.11: Fact-Checking Sites

6.12: Parting Thoughts

6.1: What's Credible Anymore? Fake News and Evaluating the Information You Encounter During Your Research

Fake News, Information Bubbles, and Filter Bubbles

Whether the agenda is to sway public opinion, to affect the outcome of an election, or simply to make money, the proliferation of fake news creators and distributors has complicated our already complex information environment. Perhaps as bad, “fake news” has become an easy way to dismiss stories and information we don’t like without addressing the actual content of such stories.

When you get your news primarily from one source or from one partisan perspective, you are operating in an information bubble. You encounter stories that confirm your view of the world and avoid stories that challenge those views. Information bubbles have a natural appeal—they provide us with stories and perspectives that reinforce what we already believe about the world.

Information bubbles happen naturally when we seek out news and news sources that align with our world views. This isn’t limited to politics and current events either. They can happen within professions and within organizations too. Social media can also create information bubbles, as like-minded friends share articles they haven’t verified but that conform to some preconceived idea of the world. And once a story has been shared enough times, “fake news” can take on an unearned mantle of authority.

Worse, “filter bubbles” are making it more difficult to step outside of those information bubbles. Social media and search engines use algorithms to rank what appears in your feeds and search results. These algorithms look at your previous engagement with social media posts and search results in order to provide you with content that aligns with your interests. These sorts of tailored experiences online—whatever their virtues—limit our information gathering in ways we can’t anticipate. The algorithms are always changing and usually closely guarded by the companies that create and implement them.

Until we apply skepticism and critical thought to the information that aligns with our world views just as we would for information that challenges us, we set ourselves up to be fooled by fake news. Until we expand our information bubbles to include more perspectives and coverage from a more diverse community of scholars and reporters, we limit what we can know and learn about our world.

Evaluating Information

Being able to critically evaluate the information we encounter on the web is a hugely valuable research skill. Why?

Because so much information can be found online, and not everything we read is true. Sometimes information can be narrowly accurate, yet still be so biased, selective, or leading as to make the information essentially useless for research purposes. Some information may have once been accurate, but is now simply too out-of-date to be useful. Sometimes the authors of an article are not experts on what they are writing about. And sometimes the problem is not the accuracy of the information, it’s the lack of research-quality detail and substance.

Being a critical consumer of information is helpful not only in school, but also in our daily lives. Just as we need the information in our college papers to be based on reliable, quality sources, we also want the health advice, product reviews, and other kinds of information we personally use to be reliable.

This page titled [6.1: What's Credible Anymore? Fake News and Evaluating the Information You Encounter During Your Research](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [David Hisle and Katy Webb](#).

6.2: Thinking About Your Sources



Figure 6.2.1 Man in red and black plaid dress shirt (nvadingkingdom via Unsplash)

When conducting research it is important to think critically about the sources of information that you use. You not only want information that is accurate and reliable, but also want the right kind of information for your information need. Unfortunately, not all information sources are created equally. Some will provide poor information while others will actively try to mislead or influence you. Learning how to evaluate sources helps you to find the best information, avoid misinformation and fake news, and build strong arguments.

You can remember a simple acronym to help guide you through evaluating sources: TRAAP.

- **Timeliness:** When was the source published/last updated?
- **Relevance:** Is the source closely related to your topic and your information need?
- **Authority:** Is the author an authority on this topic?
- **Accuracy:** Is the information accurate?
- **Purpose:** Why was this source written/created? Can you trust it?

In this chapter we will review each of these elements and help you avoid falling into the TRAAP of poor quality information!

This page was adapted from [Thinking About Your Sources](#) by Lyric Ripley, used under CC BY-NC 4.0.

6.3: What is Timeliness?



Figure 6.3.1 Stonewall Inn Nightclub Raid Crowd Attempts to Impede Police, 1969, (Public Domain; New Daily News Archive via GettyImages)

Definition: Timeliness

A measure of how well the time of publication or creation of your information source is for meeting your information need.

Put simply, timeliness refers to how appropriate the publication/creation date of your source is for meeting your information need. Depending on your research task you may need information published at different times. For example, if you are conducting research into the historical Stonewall Riots (pictured above), then a photograph from 1969 can be a useful primary source document for you.

However, if you are researching something more current such as training requirements for nurses; using a source that is too old will only give you outdated information. It's important to ensure that the age of your information matches the need. Even for historical research you may want more updated sources that have had time to reflect on and provide context for the primary sources created in that time period. In some fields, such as medicine, you will want to rely on very current sources (usually published within the last 3-5 years).

When evaluating your source, ask yourself the following questions about timeliness:

- When was this information published and last updated?
- Is the information current enough for your topic?
- Have there been more recent discoveries or developments since this information was published?

Timeliness Clues

The following are clues you can look for to inform you about the source's timeliness:

- Publication date
 - On books, this is often on one of the first couple pages.
 - On articles, this is often on the first or second page.
 - On websites, this is often provided at the top or bottom of the page.

- Date of last update/revision
- Look for broken hyperlinks on web resources

This page was adapted from [What is timeliness?](#) by Lyric Ripley, used under CC BY-NC 4.0.

This page titled [6.3: What is Timeliness?](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

6.4: What is Relevance?

When you're doing research, it can sometimes be difficult to wade through the mountains of useless information. The internet is filled with information. Even in a library's carefully curated collection, there are millions of sources that you could review. Despite most of these being useful to someone, somewhere, most of them aren't going to be **relevant** to your current information need!

Definition: Relevance

The degree to which your information source is closely connect or appropriate for your information need.

It probably sounds obvious but when you're doing research you want to find sources that provide information directly related to your topic! This is a big part of why we've spent so much time learning how to form research questions and choose good search keywords, to help weed out the unrelated (or irrelevant) sources. However, it does get a little more complex than that. Sources can be relevant without being as relevant as needed. For example, you can find one source that discusses your topic without adding any new or useful information.

If you're researching video marketing on social media and your source discusses social media marketing but not using videos specifically, then while that source is possibly relevant it isn't nearly as relevant as one specifically discussing online video marketing.

To help you identify the source's relevance consider the:

- Title: The first glance at the source's intended content.
- Depth of the information provided: Does it provide useful, new information?
- Is the timeliness appropriate?

Relevance Clues

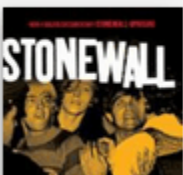
Look for these clues to help determine the relevance of the source.

- Title
- Abstract or Summary
- Conclusion or Findings section
- Prominent quotes or highlighted information
- Tables, charts, or other presentations of data
- Source citations and/or hyperlinks to other relevant sources

Consider This

If you were conducting research into the history of the gay rights movement and healthcare, which of these sources would be more relevant to you?

Book: Stonewall: The Riots that Sparked the Gay Revolution



BOOK

Stonewall : the riots that sparked the gay revolution

Carter, David, 1952-2020, author.

2010; Second St. Martin's Griffin edition.

Figure 6.4.1 (CC BY NC 4.0; Daniel Wilson)

Article: The Stonewall Riots, the AIDS Epidemic, and the Public's Health



ARTICLE

The Stonewall Riots, the AIDS Epidemic, and the Public's Health

Halkitis, Perry N

American journal of public health (1971), 2019-06, Vol.109 (6), p.851-852



PEER REVIEWED

Figure 6.4.2 (CC BY NC 4.0; Daniel Wilson)

This page was adapted from [What is relevance?](#) by Lyric Ripley, used under CC BY-NC 4.0.

This page titled [6.4: What is Relevance?](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

6.5: What is Authority?

Definition: Authority

The credibility and trustworthiness of a source as determined by the creator's expertise or status.

An authoritative source is one created by someone who expertise or status that establishes their trustworthiness in that topic area. In the Western world, there is significant emphasis on the importance of professional and educational experience. People with advanced graduate degrees (such as doctoral degrees) or significant professional experience are often considered the greatest sources of authority. However, there are cultures where other sources (such as elders) are considered to be authoritative.

When considering the source's authority, it can also be important to consider the company and/or website where the source is published to ensure the source is unbiased. If the creator provides citations and other evidence of their own information sources, it further helps to reinforce the authority of their arguments.

Why is Authority Important?

- Reliability of the information: If the creator is not an authoritative source, you cannot trust that the information is reliable.
- Academic requirements: In academic work, citing authoritative sources is often a requirement to demonstrate evidence of your scholarly work.
- Avoiding misinformation: By relying on authoritative sources, you can more easily avoid misinformation and bias.

Authority Clues

There are a number of clues that can help you identify the source's authority.

- Look for the author/creator's credentials. Does the source list their degree, place of employment, or other experience?
- Look for signs of bias or potential conflicts of interest for the author or the place of publication.
- Look for references or citations of the author's own information sources.

This page was adapted from [What is authority?](#) by Lyric Ripley, used under CC BY-NC 4.0.

6.6: What is Accuracy?

Definition: Accuracy

The correctness and reliability of the information.

One of the simplest and yet most critical evaluation criteria is accuracy. If your source is inaccurate then it is not useful to your research! Determining the accuracy of a source can be challenging. By relying on relevant and authoritative sources you can help to ensure accuracy, but that doesn't guarantee it. There are a number of types of inaccuracy that you should be wary of:

- Misinformation: Information that is unintentionally inaccurate.
- Disinformation: Information that is deliberately inaccurately.
- Biased information: Information that has been skewed by the author's internal bias. This may or may not be intentional.
- Scientific error (Also known as an experimental error): Inaccuracies that come from errors in how scientific variables are measured.

Scientific Error

One of the key reasons that authority is so important, is because researchers without professional or academic expertise may not know how to correctly conduct research. Inexpert researchers are more prone to bias as well as different types of scientific error. Even experienced academic researchers can fall victim to scientific errors.

- Environmental errors: Errors occurring when some factor in the environment leads to an error in the data.
- Human errors: Errors occurring due to carelessness or mistakes made by people.
- Instrumental errors: Errors occurring due to the use of a flawed instrument providing inaccurate readings.
- Observational errors: Errors occurring because an observer incorrectly reads a measurement.
- Procedural errors: Errors occurring when the procedures established for conducting the research are not followed consistently.
- Sampling errors: Errors occurring due to the research participants that were selected.

Accuracy Clues

The following can help you identify the accuracy of a source:

- Logical, well-organized writing.
- Evidence that supports their claims (cited sources/references/etc.).
- Evidence of the creator's authority.
- Articles that have been peer-reviewed.
- Avoid spelling and grammatical errors.
- Look for other sources to verify their claims.

Peer Review

Peer review is a key process in academic publishing. For many academic journals, peer reviewers are experts in that topic area who review other author's articles for quality. An academic author submits their paper to an editor who reviews it before submitting it to multiple peer reviewers. Those reviewers evaluate the paper and make recommendations for improvements. This process examines academic works looking to ensure they are new and innovative, accurate and reliable, clearly written, and significant to the field.

Lateral Reading

Lateral reading is a technique used to evaluate the accuracy and credibility of an information source. Lateral reading is particularly useful when considering information from online sources like websites and news blogs. Simply put, lateral reading involves checking a source's information by looking up other sources to compare it with. After reading information from one source, you go in search of other comparable sources; looking specifically for that same information.

This can sometimes be difficult to do with scholarly sources, as each article tries to be original. However, by reviewing multiple scholarly sources you can often identify and establish trends that help you understand the professional consensus (or agreement) about a topic.

This page was adapted from [What is accuracy?](#) by Lyric Ripley, used under CC BY-NC 4.0.

This page titled [6.6: What is Accuracy?](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

6.7: What is Purpose?

Definition: Purpose

The reason that a creator or author published a work.

Every type of information is created with a purpose in mind. From websites to books, each is created with a purpose and an audience. Understanding the purpose of a source is an important step in evaluating its usefulness to your research. Sources can be created with any of the following purposes:

- To inform you
- To persuade you
- To deceive you
- To sell something to you
- To profit off of you

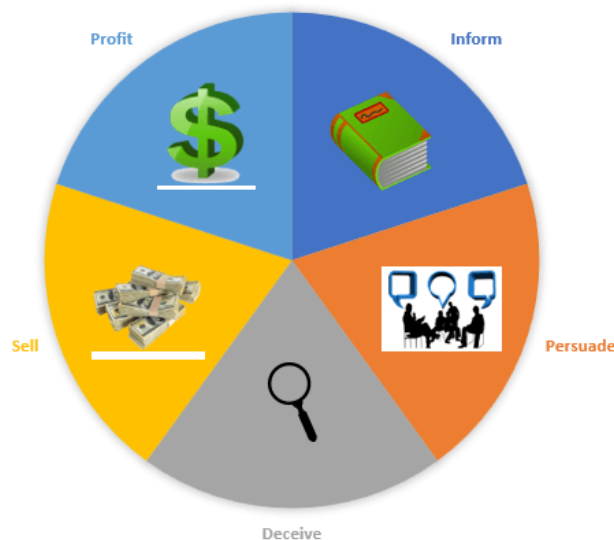


Figure 6.7.1 Purpose Chart (CC BY-NC 4.0; Daniel Wilson)

Consider for a moment how each of these purposes might shape a website differently. If someone wanted to inform you, their website might stick to facts and provide evidence supporting their information. If someone wanted to persuade you, perhaps on a politician topic, they might provide significant facts and evidence but they also might skew information in a way that is biased to their point of view. If the goal of a website were to make money, it might be focused on getting you in to view and click ads; with much less concern about the information that's provided.

Identifying the purpose of a source is important for three key reasons:

1. **Identifying Bias:** Knowing why a source was created will help you to identify any potential bias. For example, knowing that a blog reviewing insurance companies was sponsored by one of the insurance companies would certainly make you question its honesty.
2. **Understanding Context:** Understanding a source's purpose can help you understand the context in which it was created. If a newspaper article is an opinion piece intended to share personal views and persuade readers about a topic, you know that it is not necessarily well researched.
3. **Judging Relevance:** Identifying the purpose of a source can help you decide how relevant it is to your information need. If you are working on a project where you need good academic sources, you'll want to avoid sources created solely for profit.

Identifying bias, understanding context, and judging relevance help you to evaluate the credibility of the source. If you aren't sure that you can trust it, it isn't usually a good research source!

Identifying Purpose

Identifying the purpose of a source involves some detective work, but it doesn't have to be too complicated. Most often, you will have to read or at least skim through the source to identify any potential bias or conflicts of interest. However, there are a number of clues that you can look for as well.

Purpose Clues

- **Ads:** If a source has ads, its main purpose is likely to make a profit or to sell you something
- **Sponsorships:** If the source or its publishing website has any information about sponsors or owners then you should consider if they are related to the information you're reviewing.
- **Author affiliation:** If the author(s) is connected to a business or organization related to the topic, they may have a biased view on it.
- **Evidence:** If the source provides citations or references to show where their data or claims came from, that is a good sign that its purpose is to inform.
 - Bear in mind that not all evidence is of the same quality. Just as you have to use your critical thinking skills to select academic sources, so too should other authors.
- **About Us or Mission Statements:** If your source is a website, they may have an About Us or Mission Statement page that gives you important information about them and their goals.

In order to identify the source's purpose you can check for ads, look up information about the publisher (journal, website, etc.), and look up information about the author. You'll also need to consider the purpose as you read through the source. Look carefully at its writing and at the references provided for their own information sources. Is their writing supported by evidence or largely opinion-based? Does the writing sound objective and unbiased?

The format or medium of the information will give you clues as well. For instance, journal articles are almost always informational while websites can be many things!

Examine the Sources' Neighborhood

The "neighborhood" of an information source refers to its relationships with other sources and its location within the broader network of information. This can help give you insights into its credibility, relevance, and purpose. This often involves looking at the format/medium of the information source. For example, consider a source that is a book. A book could be part of a carefully selected academic library collection, a public library collection that includes many fiction works, or a bookstore collection intended for sale. Each of these neighborhoods have different purposes and so too do the works found within them!

The Center for News Literacy divides information neighborhoods into five specific categories: journalism, entertainment, publicity, propaganda, and raw information. This explains this concept more from the standpoint of news and journalism.

Journalism	Entertainment	Publicity	Propaganda	Raw information
• Informs • Empowers citizens	• Amuses • Increases sales	• Promotes • Raises awareness	• Builds mass support • Increases a groups' power	• Bypasses authorship • Outlet for self-expression

Figure 6.7.2 News Neighborhood (CC BY-NC 4.0; Daniel Wilson)

For a website things can be a little more complicated, as there aren't readily available groupings. But you can look at a few things to identify its neighborhood.

- Format: Is it a website article, a blog, a wiki, or a social media website?
- Author: Do you know anything about the author, their affiliations, or their credentials?
- Ad placements: The location of a lot of ads tells you about the type of website it is.

Ultimately, the "neighborhood" is about identifying the type of information source that it is and comparing it to what you know about similar types of sources.

This page was adapted from [What is purpose?](#) by Lyric Ripley, used under CC BY-NC 4.0.

6.8: Identifying Bias

Identifying bias is crucial for evaluating the source's reliability and objectivity. In western academia, research authors are supposed to present information in an unbiased and objective way that is purely intended to inform people. Bias can skew the presentation and interpretation of facts, leading to misinformation and a distorted understanding of a topic. It's important to note that everyone has some degree of bias and it can be very difficult to ensure that bias does not affect our writing and research at all. All sources are likely to be biased in some way. However, professional researchers and academics study to minimize the impact of bias on their research. When evaluating sources, you have to judge whether or not a source is too biased to be useful.

Types of Bias

There are six main types of bias to look out for:

- **Confirmation Bias:** The tendency to seek out information that agrees with or reaffirms your existing ideas and beliefs. For example, someone who believes in capital punishment performing searches like "benefits of capital punishment". The search itself is designed to produce confirming results.
- **Funding Bias:** When a scientific study is funded by a group that supports a specific outcome for the research. For example, if a study on the effects of drinking soda was paid for by the Coca-Cola Corporation.
- **Observer Bias:** The tendency of research participants to see what they expect or want to see. For example, if someone who is sexist is observing women's behavior, that might skew how they perceive it.
- **Publication Bias:** When certain types of studies are published over others. For example, when racial bias leads to publishers approving more white-authored papers than those from people of color.
- **Recall Bias:** When people are asked to recall events in the past and they fail to do so accurately.
- **Selection Bias:** When a researcher sets up an experiment and chooses samples or groups that aren't representative of the population they are studying. For example, if a researcher is investigating the effects of a drug on the general population but does not include many women in the study.

Some of these sources of bias might come up in the research process while others might come up during the writing of a paper or other information source. This is one reason why it is important to review the methods used in a research study. Unless you take a look at how they conducted their research, you sometimes cannot identify if there was a biased or flawed process involved.

Bias Clues

The following are clues that indicate potential bias.

- Opinions
- Data or evidence provided without a referenced source
- A non-neutral tone of voice in the writing
- Sources that only present a single point-of-view
- Lacking information about the author(s)
- Funding from a source related to the topic
- Publication by an organization with a particular bias on the topic

The Scholarly Conversation

Another way to help combat bias is to review multiple sources of information. When it comes to academic research, each researcher, student, and publication is a part of an ongoing scholarly conversation. People don't put out just one paper on a topic and have that become the source of all information on it. Instead, when one person publishes an article about the topic other scholars will review their findings. They may even attempt to replicate their findings and then publish their own work as well. The back and forth of these articles and presentations creates an ongoing conversation. As a student, you can participate in this conversation by reviewing their works and identifying common trends in the literature. These trends can form a sort of consensus where multiple authors agree with each other.

This page was adapted from [Identifying Bias](#) by Lyric Ripley, used under CC BY-NC 4.0.

This page titled [6.8: Identifying Bias](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

6.9: Determining Quality

Now that you know how to identify Timeliness, Relevance, Authority, Accuracy, and Purpose, it's time to determine the quality of your sources! To evaluate your sources you should read them critically, avoid overly simplistic and emotionally charged material, avoid bias, and use the TRAAP test. As you note these different elements in your source you can combine them to get a general idea of the source's overall quality.

Generally, there is no absolute right or wrong to whether or not a source is of good quality. It all depends on your information need. That being said, there are some sources that are generally very poor quality. Think of it like giving the information source a score. You can rate each TRAAP category from 1-5 with 1 being very poor and 5 being excellent. Any category with a 3 is probably questionable for use.

Timeliness

If you're researching a current topic, then an article from 10 years ago might be scored with a 1. However, an article from 3 years ago on a similar incident might still be a 3 or a 4.

Relevance

If you're researching an oil spill and you find a source talking about past oil spills, it could be a 4 or 5 if you want to include historical information. However, if you don't need historical information then it might be notably lower.

Authority

If you find an author with a Ph.D. in environmental science who is talking about oil spills, that might be rated as a 5 in authority. However, a journalist talking about oil spills might be rated lower.

Accuracy

If your source includes citations for their information and presents it in an unbiased way, that might score quite high in accuracy. However, tables or data with no sources at all could be scored very low.

Purpose

Lastly, an article on oil spills published by Shell might be notably biased and perhaps score low on purpose for an informative research assignment. However, you might find another source that has some great information, is written by an independent author, but on a page with a couple ads on it; and rate it at a 3.

As you mentally rate each of these categories you should be able to think about your source and create an average score. Do you feel like your source is a 3 overall? That isn't very good. If it averages to a 4 or a 5, that's probably a good scholarly source!

Validity and Reliability

There are two final elements that'll help you judge the quality of your information sources. Validity and Reliability are terms often used to discuss original research experiments. Reliability refers to the consistency of a method used in research. In other words, if repeated, would it get the same results? For example, if a group of researchers used a questionnaire to ask someone specific questions, but each researcher received different responses, then the questionnaire would have low reliability. Reliability issues can arise from problems related to the clarity of questions being asked in a study, as well as inconsistencies between researchers and how they use the method (such as how they ask questions).

Validity refers to the accuracy of a method used in research. For example, if a research study is using a thermometer to measure temperature but repeated uses shows different temperatures even though all other variables remain the same; then the thermometer has low validity. A study might have low validity if it uses inappropriate methods of measurement, fails to get an appropriate sample of participants, or fails to apply the research methods consistently.

By understanding the basics of validity and reliability you can begin to examine the research methodology used in research

studies in order to identify potential problems.

Definition: Research Methodology

The techniques and procedures used to identify and analyze information about a research topic.

This page was adapted from [Determining Quality](#) by Lyric Ripley, used under CC BY-NC 4.0.

This page titled [6.9: Determining Quality](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

6.10: Building a Fact-Checking Habit by Checking Your Emotions

In addition to our strategies we'll introduce one more word of advice: *Check your emotions*.

This isn't quite a strategy, like "go upstream," or a tactic, like using date filters to find the origin of a fact. For lack of a better word, we are calling it a habit.

The habit is simple. When you feel strong emotion—happiness, anger, pride, vindication—and that emotion pushes you to share a "fact" with others, STOP. Above all, it's these things that you must fact-check.

Why? Because you're already likely to check things you know are important to get right, and you're predisposed to analyze things that put you an intellectual frame of mind. But things that make you angry or overjoyed, well... our record as humans are not good with these things.

As an example, we might cite this tweet which recently crossed my Twitter feed:



Figure 6.10.1 (CC BY; Mike Caulfield)

You don't need to know that much of the background here to see the emotionally charged nature of this. President Trump had insulted Chuck Schumer, a Democratic Senator from New York, saying tears that Schumer shed during a statement about refugees were "fake tears". This tweet reminds us that that Senator Schumer's great grandmother died at the hands of the Nazis, which could explain Schumer's emotional connection to the issue of refugees.

Or does it? Do we actually know that Schumer's great-grandmother died at the hands of the Nazis? And if we are not sure this is true, should we really be retweeting it?

Our normal inclination is to ignore verification needs when we strongly react to content, and researchers have found that content that causes strong emotions (both positive and negative) spreads the fastest through our social networks. Savvy activists and advocates utilize this flaw of ours, getting past our filters by posting material that goes straight to our heart.

Building new habits requires that we identify "pegs" on which to hang those habits. So use your emotions as a reminder—as a trigger for your fact-checking habit. If every time content you want to share makes you feel rage, or laughter, or ridicule, or, sorry to say, a heartwarming buzz—spend 30 seconds fact-checking you'll do pretty well.

This page was adapted from [Building a Fact-Checking Habit by Checking Your Emotions](#) by Mike Caulfield, used under CC BY.

This page titled [6.10: Building a Fact-Checking Habit by Checking Your Emotions](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Mike Caulfield](#).

6.11: Fact-Checking Sites

Some Reputable Fact-Checking Organizations

The following organizations are generally regarded as reputable fact-checking organizations focused on U.S. national news:

- [Factcheck.org](#)
- [NPR Fact-Check](#)
- [PolitiFact](#)
- [Snopes](#)
- [Truth be Told](#)
- [Washington Post Fact Checker](#)

Respected specialty sites cover niche areas such as climate. Here are two examples:

- [Climate Feedback](#)
- [SciCheck](#)

There are many fact-checking sites outside the U.S. Here is a small sample.

- [BBC Reality Check](#)
- [Channel 4 Fact Check](#)
- [European Fact-Checking Standards Network \(EFCSN\)](#)
- [Full Fact](#)
- [International Fact-Checking Network](#)

This page was adapted from [Fact-Checking Sites](#) by Mike Caulfield, used under CC BY.

This page titled [6.11: Fact-Checking Sites](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Mike Caulfield](#).

6.12: Parting Thoughts

There are a number of systems focused on evaluating information sources being used in colleges and universities. This chapter has presented one of them. You may encounter different checklists as you work with other instructors. The larger point is this: If you understand how to assess information sources effectively, you will no doubt operate in the world as a functional citizen. The first question to ask is, "Who is responsible for this source?" If you can't answer that question, you will at least want to avoid using it for a college research project. I'm guessing you will also want to avoid this sort of information when you are making a personal decision. It is so easy to latch onto a source when it resonates with you. You have that Aha! moment. You really want the source to be true, so you assume it is. If you can develop the ability to step back and use your own remarkable intelligence to assess what you are reading and viewing, you can make sound decisions on the things you care about.

This page titled [6.12: Parting Thoughts](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

7: CITATION AND ETHICAL USE OF INFORMATION

7.1: Using Information Ethically

7.2: Plagiarism and Academic Integrity

7.3: Citation Styles

7.4: The Basics of MLA Citation Style

7.5: Examples of Common MLA Source Citations

7.6: Citation Tools

7.7: How Do I Acknowledge and Cite Generative AI in Academic Work?

7.8: Parting Thoughts

7.1: Using Information Ethically

Using information ethically means respecting the work of others and being honest about where ideas come from.

Definition: Plagiarism

A form of academic dishonesty that occurs when you use another person's work or ideas without giving them credit.

When Should You Give Credit to Another Source?

Anytime you use information that is not your own, that is not well-known factual information, you should credit the source. For example, telling someone that the boiling point of water is 100 degrees Celsius is a simple fact. You would not need to give credit to a source for that. However, very few pieces of information used in academic writing are based on simple, well-known facts. If you quote information from another source, you should provide information crediting them; whether it is a website, person, or video. If you paraphrase (or rewrite in your own words) that information, you should still give credit to the original source.

When in doubt, you should give credit to the source!

Why Should You Cite a Source?

Definition: Citation (or citing sources)

A formal process for giving credit to the original source of information, ideas, or words used in your work.

Citing sources is important for many reasons:

1. Citing sources adds credibility to your claims by backing them up with other people's voices.
2. Citing sources respects the work that another person did.
3. Citing sources allows your audience to find and review those sources to get more information.
4. Citing sources helps to avoid claims of plagiarism in classes. Committing plagiarism (or the theft of information) can cause grade penalties or other negative academic consequences.

Other Concepts in Information Ethics

There are a number of other concepts to consider with regard to ethically using information in your research and personal life.

1. **Plagiarism**
Plagiarism is when you use someone else's work or ideas without giving them credit, like copying and pasting without saying where it's from. Giving credit is important because it shows respect for the person who created it and shows honesty in your work. It also avoids accusations of academic misconduct in classes.
2. **Copyright**
Copyright protects the rights of creators. Using someone's work without permission breaks these rules. By respecting copyright, we support the creators who put effort into making things like music, images, and writing.
3. **Fair Use**
Fair use allows you to use small parts of copyrighted work, like a short quote in a report. But taking too much can cross the line. Knowing what fair use allows helps us use resources fairly in school and other projects.
4. **Privacy**
Respecting privacy means keeping personal details (like photos or phone numbers) private and not sharing them without

permission. This keeps people safe and builds trust.

5. **Checking Facts**

Sharing accurate information from trustworthy sources is important. If we pass along false information it can mislead others. We have an ethical obligation to try and share accurate information.

6. **Staying True to the Source**

Don't twist someone's words to make it sound like they said something else. Being honest about what information really says is part of being trustworthy and ethical.

Ethical Considerations for Generative Artificial Intelligence (AI)

Artificial intelligence tools can be remarkably helpful in many ways. They can help with planning projects, summarizing information, and even explaining topics. In particular, AI can be useful to some neurodivergent people; providing more personalized learning experiences or helping to manage tasks or adapt their communication to a more neurotypical style. However, there are many concerns related to using AI tools as well.

Generative AI tools are known to sometimes [make up or misrepresent information](#) ("What are AI Hallucinations?"). AI tools can also be created in a way that embeds bias and discrimination within the results they produce. The servers and technology used to power AI can also have a significantly [negative impact on the environment](#) (Zewe). In terms of information ethics, there are a couple key concerns to address:

- Academic honesty: Copying any other person or source's content and submitting it as your own is a form of academic dishonesty called Plagiarism. AI generated content should not be copied directly, but instead used to help inform and refine your own work. Additionally, when it is used to help write something, it should be cited.
- Intellectual property and copyright: Generative AI can create content that closely resembles existing copyrighted works. Additionally, AI tools are often developed by scanning thousands of other people's existing works. This brings up important legal questions about the use of those existing works and whether or not creations closely resembling them (especially when considering AI-generated Art) is infringing upon the original creator's copyright.

Generative AI tools have even been targeted by a number of lawsuits:

- In 2023, [an Australian mayor filed a defamation lawsuit against OpenAI](#) (owner of ChatGPT) over ChatGPT claims that he had served time in prison for bribery.
- In 2024, [five Canadian news outlets sued OpenAI](#) (the owner of ChatGPT) claiming that OpenAI violated copyright law by using their articles to train its language model.
- In 2025, a [man sued ChatGPT](#) accusing the company of knowingly allowing it to display false results after it accused the man of killing his children.

References

China, Chrystal R. "What Are AI Hallucinations?" *Think*, IBM, 1 Sept. 2023.

"Shedding Light on AI Bias with Real World Examples." *IBM*. Accessed April 1, 2025.

Zewe, Adam. "Explained: Generative AI's Environmental Impact." *MIT News*, 17 Jan. 2025.

This page was adapted from [Using Information Ethically](#) by Lyric Ripley, used under CC BY-NC 4.0.

This page titled [7.1: Using Information Ethically](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

7.2: Plagiarism and Academic Integrity

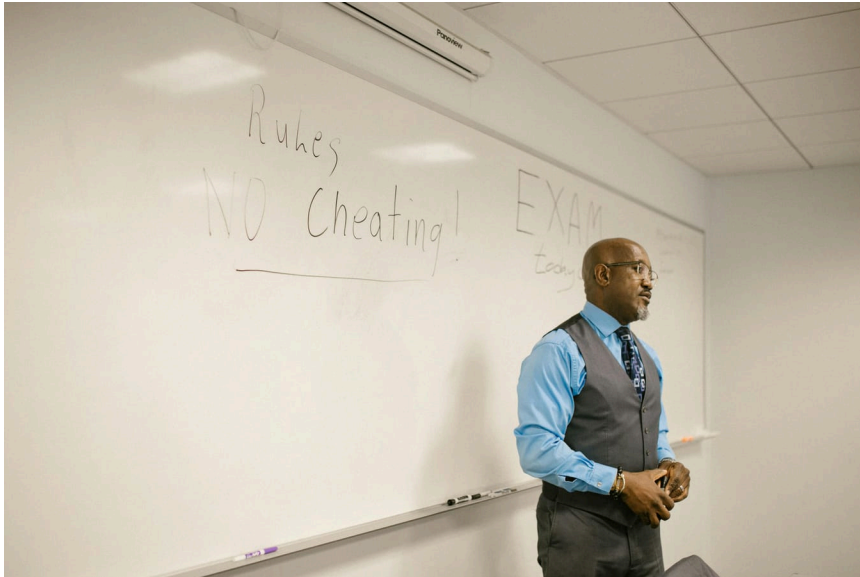


Figure 7.2.1 Instructor Giving Instructions Not to Cheat (RDNE Stock Project via Pexels)

Plagiarism is the act of using someone else's words, ideas, or work without giving them proper credit, and presenting it as if it were your own. This can happen in writing, music, art, and even scientific research. Plagiarism violates the trust between the creator and the user, and it's a serious issue in academics because it's seen as dishonest and disrespectful to the original creator's work. Avoiding plagiarism is an important part of **academic integrity**, which is the commitment to honesty, fairness, and responsibility in academic settings. In the classroom, assignments are given in order to enhance and test your learning. When someone commits plagiarism, they cheat by using another person's information inappropriately, which defeats the purpose of the assignment.

Common Examples of Plagiarism

1. Copying another person's work word-for-word without quotation marks or credit. For example, copying a paragraph from a website without giving credit.
2. Rewriting someone else's ideas or writing into your own words without giving credit. Even if you change the wording, the ideas still belong to the original author.
3. **Self-Plagiarism:** Self-plagiarism is when a student reuses their previous work without permission or acknowledgement. For example, submitting an essay to two different classes without letting the teachers know.
4. Accidentally committing plagiarism by unintentionally copying another person's content. This usually happens due to poor note-taking or a misunderstanding of citation rules.

Academic Integrity

Academic integrity is about upholding ethical values in all academic work. It means being respectful and trustworthy. Students who practice academic integrity demonstrate that they value learning and respect others' contributions.

Examples of Academic Integrity and Plagiarism in Real-Life Scenarios

- **Example of Academic Integrity:** When writing a research paper on climate change, a student carefully includes citations for each source they consulted, whether they quoted directly or paraphrased the ideas. This shows respect for the original authors, allows readers to check the sources themselves, and strengthens the paper's credibility.

- **Example of Plagiarism:** A student finds an article online that explains climate change in simple terms. They copy several sentences directly from the article and paste them into their paper without quotes or a citation. This is plagiarism because they did not give credit to the original source and are presenting the words as if they were their own.
- **Example of Plagiarism:** Another student needs to submit an essay quickly, so they copy an old paper of theirs from a previous semester and change a few sentences before turning it in. This is self-plagiarism, which goes against academic integrity because each submission is expected to be new work unless otherwise stated by the instructor.

Why Academic Integrity Matters

Practicing academic integrity builds a foundation of honesty and respect in all your work, which will serve you in school, your career, and beyond. By respecting other people's work, we create a fair and trustworthy academic environment where everyone can learn and grow. In addition, knowing how to correctly use, credit, and build on others' ideas helps you become a more independent, confident, and respected thinker. This isn't just important in the classroom, but also in your career. Many careers require you to be able to research and find reliable information, and you'll be expected to show where that information came from as well.

Furthermore, research is not just a solo activity. Finding, evaluating, and sharing information is a part of ongoing scholarly conversations. Even as a student, you have a place in learning about the movers and shakers in your intended career fields, reviewing and sharing their information, and even in contributing your own voice to those discussions as well. Academic information and research rarely ends with just a couple quick studies. They are often the product of years of ongoing 'conversation' through research and writing; which only works because of academic integrity and citation!

This page was adapted from [Plagiarism and Academic Integrity](#) by Lyric Ripley, used under CC BY-NC 4.0.

7.3: Citation Styles

Citation styles are formal systems for giving credit to the sources of information used in research or academic writing. Each style has its own rules for organizing this information, usually influenced by the academic discipline it's intended to be used by. These styles can often be really specific in their formatting rules because they are intended to give the reader all the information they need to locate the sources cited.

Here is a brief overview of three major citation styles:

1. MLA (Modern Language Association)

- **Purpose:** Commonly used in the humanities; especially in literature, language studies, and cultural studies.
- **Format:** Emphasizes the author and page number, allowing readers to locate sources in context. In-text citations include the author's last name and page number of the information used: (Smith 123).
- **Works Cited Page:** Includes a Works Cited page at the end of the work with all works cited. Arranged alphabetically by the author's last name, with each entry listing the author, title, container (publication the article or entry is published in), publisher, and publication date. Book example:
 - Smith, John. *Title of Book*. Publisher, Publication Year.

2. APA (American Psychological Association)

- **Purpose:** Primarily used in the social sciences; including psychology, sociology, and education.
- **Format:** Highlights the author and date, emphasizing the currency of the research. In-text citations include the author's last name, publication year, and page number of the information used: (Smith, 2023, p. 32).
- **References Page:** Includes a References page at the end of the work with all works cited. Entries are also alphabetically ordered and include the author(s), year, title, and source. For instance:
 - Smith, J. (2023). *Title of work*. Publisher Name. DOI (if available)

3. Chicago (Chicago Manual of Style)

- **Purpose:** Common in history, art history, and publishing; offering flexibility for different types of source material.
- **Format:** Offers two primary methods:
 - **Notes and Bibliography:** Uses numbered footnotes or endnotes for citations, with a bibliography at the end.
 - **Author-Date:** Sources are cited directly in the text, using in-text citations similar to APA style, rather than footnotes.
- **Bibliography Entry (Notes and Bibliography example):** Includes a Bibliography page at the end of the work with all works cited. The bibliography provides full citations, ordered alphabetically.

Different classes will use different citation styles. You should always review your assignments and class syllabus to identify the style used. Some classes may allow you to choose which style you want to use.

Citation: A (Very) Brief Introduction

YouTube Video

This interactive element is not available in this format. Visit the link or scan the QR code to access it online.

[View this YouTube Video online](#)



Video produced by libncsu, all rights reserved. It is not openly licensed but freely available to all.

This page was adapted from [Citation Styles](#) by Lyric Ripley, used under CC BY-NC 4.0.

This page titled [7.3: Citation Styles](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

7.4: The Basics of MLA Citation Style

The current edition of MLA Style is the 9th edition, which was published in 2021 with the 9th edition of the [MLA Handbook](#). This handbook governs the formatting requirements and citation methods for academic writing that uses the MLA Style.

When writing full citations in MLA Style, the elements (or necessary pieces of information) are usually listed in the following order:

1. Author
2. Title of the source
3. Title of the container
4. Other contributors (such as an editor)
5. Version of the container (if relevant)
6. Number of the container (if relevant)
7. Publisher
8. Publication date
9. Location (if relevant)

However, you will find that each type of source (website, journal article, video, interview, etc.), has different requirements for how to format their citations and what information needs to be included.

Most citations begin with the author's last name. The author (or authors) is the person/persons who created the source of information. The title of the source generally follows the author's name and is the title listed at the top of the source. This can sometimes get confusing with websites. When referencing an article on a website, you will normally use the title of that specific page as the source title, rather than the title of the website. The title of the website is the 'container title', because it contains the individual pages. This is just like an academic journal. An individual issue of an academic journal contains many individual articles!

"Other contributors" can include editors and translators. Publisher refers to whomever produces or distributes the information source. This is often an organization that produces (or puts together) the source and shares it.

Formatting a Paper in MLA 9th Edition

MLA has specific requirements for formatting a paper or essay. An MLA paper does not require a title page, but your course instructor might require one. If no other instructions are given, your first page should include a Header with your last name and a page number in the top-right. All text on the page should be double-spaced and left-aligned. It should begin with Your Name, Your Instructor's Name, Course Number or Name, and the Date you wrote the paper. You would then enter the Title of Your Paper with centered alignment. The actual writing of your paper should be left-aligned, with the first line of each paragraph indented over once.

Overview of Basic Formatting Requirements:

- Double-space your text and use a legible font such as Calibri, Aptos, or Times New Roman. The font size should be 12 pt.
- Leave only one space after periods or other punctuation marks.
- Set the margins of your document at 1 inch on all sides (the default on Microsoft Word and Google Docs).
- Create a header that numbers all pages in the upper right-hand corner.
- Use italics throughout your paper to indicate the titles of longer works.
- If your essay needs section headings, MLA recommends numbering them in the following fashion:
 1. First Section Title
 1. 1 First Section Sub-Title
 2. Second Section Title
 3. Third Section Title

Formatting a Works Cited Page

A Works Cited page comes at the end of your paper and lists every source you cited within your writing. It should begin on a separate page from the rest of your paper. The Works Cited page should include Works Cited centered at the top of the page. Only the title will be centered. You should follow these practices to format a Works Cited page:

- Double space all citations
- Organize the citations in alphabetical order
- Each citation should include a hanging indent that indents each line after the first.

In-Text Citations

To write a basic in-text citation, you include two pieces of information in parenthesis at the end of the information you referenced in your writing. For most sources, you will include the author's last name and the page number of the information you are citing.

Example 7.4.1

Basic In-Text Citation Example

Students have been shown to have improved success in courses that employ active learning techniques (Carter 21).

However, you can also use the author's name to introduce the source. If you do this, you only need to include the page number in parenthesis.

Example 7.4.1

Narrative In-Text Citation Example

According to Carter, students have been shown to have improved success in courses that employ active learning techniques (21).

If your source does not have a known author, you simply replace the author's name with the first several words of the source title. If it is a short work (such as an article) you place the title in quotation marks. If it is a longer work such as a book, you would italicize the title.

Example 7.4.1

No Known Author In-Text Citation Example

Students have been shown to have improved success in courses that employ active learning techniques ("Active Learning Techniques in the College Classroom" 21).

The last common consideration is what to do if you have a source with multiple authors. If there are two authors, you would list each of their last names. For example: (Thompson and Carter 21). For a work with three or more authors, list the last name of the first author then et al. For example: (Carter et al. 21). The 'et al' means "and others".

What if You're Referencing Information from Multiple Pages?

In the in-text citation, you just include the full page number range. For example: (Carter 16-21). If you are using information from more than one discontinuous pages (pages that are not next to each other), you include a comma between them. For example: (Carter 16, 21).

Creating Full Citations

In your Works Cited page, you will create full citations of sources used in your work. These will include far more information than the in-text citations. Here are some basic practices to keep in mind when writing citations:

- Capitalize each word in source titles but do not capitalize articles (a, and, the), prepositions (at, in, for, after, about, against, by, etc.), or conjunctions (for, or, yet, so, both, etc.).
- Use italics for titles of larger works (such as books) and quotation marks around titles of shorter works (such as articles).
- Authors' names are written last name first, then the first name, with a middle name or initial when needed.
 - Do not include titles or degrees with their names (Dr., PhD, etc.).

What if There is No Known Author?

If you do not know the author of a work, start the citation with the source's title. Alphabetize the citation in order using that title.

What if There is No Publication Date?

In MLA, if there is no publication date, then you just skip that information. Don't include anything for it and move to the next piece of information.

What if there are Multiple Authors?

If there are two authors, list both of them with and in-between their names. List the second author with their first name first and last name last. If there are three or more, list the first author's name followed by a comma and then et al.

Example 7.4.1

Two Author Example

Carter, Luiz, and Donald Trimm. "Active Learning Techniques in the College Classroom." *Journal of Education*, vol. 101, no. 2, pp. 5-24, JSTOR, <https://doi.org/10.1515/rep201.103.1.1>

Example 7.4.1

3+ Author Example

Carter, Luiz, et al. "Active Learning Techniques in the College Classroom." *Journal of Education*, vol. 101, no. 2, pp. 5-24, JSTOR, <https://doi.org/10.1515/rep201.103.1.1>

What About Annotated Bibliographies?

An annotated bibliography is basically a Works Cited page with a summary of each source after the citation. It should be titled Annotated Bibliography instead of Works Cited and each entry should include a one-paragraph summary. The entirety of that summary should be indented one inch from the left (from where the citation begins).

Identifying a Website Article vs a Journal Article vs a Newspaper Article

Because these works are all cited differently, it's important to be able to identify between a website article, journal article, and newspaper article.

Website Articles:

- Generally found on popular websites, blogs, and similar locations. This can include educational (.edu) and government (.gov)

websites.

- Often written for a broad audience.
- Often lack a formal author, academic credentials for any author that is listed, and a specific publication date.

Journal Articles:

- Published in academic journals often found through libraries, database collections, or through websites like Google Scholar. These are periodicals (publications put out at a regular schedule).
- Written by experts or researchers. Often include credentials about the authors such as their degrees or places of work.
- Written in a very formal, organized fashion. These often include sub-sections, abstracts, and references.
- Journals often have a volume and/or issue number and are not usually published more often than monthly. May only include the month and year for publication.
- Typically provide lengthy articles that can be over ten pages in length.

Newspaper Articles:

- Published in newspapers or on news websites. However, these can often also be found in library collections!
- Are normally published quite frequently, perhaps even daily. Newspapers usually have an exact date of publication including the month and day.
- Usually report on current events with articles written by journalists rather than subject experts.
- Typically provide short articles.

This page was adapted from [The Basics of MLA Style](#) by Lyric Ripley, used under CC BY-NC 4.0.

7.5: Examples of Common MLA Source Citations

Properly formatting citations requires a lot of very specific requirements. This includes very specific places to use italics, quotation marks, and punctuation. It can often be helpful to use a website or book that provides example citations, so that you can be sure to not miss some of the specific formatting requirements. On this page, we provide example MLA 9th edition citations for some of the most common source types. Most of these example citations will include generic descriptions to show what the information is, in order; then an example showing the type of information you would include.

Note

Many of the examples, web addresses, and DOI numbers included below are made up to serve as an example.



Figure 7.5.1 Example Citation with Information Labeled (CC BY NC 4.0; Daniel Wilson)

Books

An Ebook (or Electronic Book)

Author Last Name, First Name. *Title of the Book*. E-book, Publisher, Publication Date.

Williams, Costa. *In the Age of Wonder*. E-book, Penguin, 2002.

Print Book

Author Last Name, First Name. *Title of the Book*. Publisher, Publication Date.

Williams, Costa. *In the Age of Wonder*. Penguin, 2002.

Print Book with an Editor

You cite this as you would a normal print book, but add the editor after the title with "edited by" in front of their name.

Williams, Costa. *In the Age of Wonder*, edited by Jorge Collins, Penguin, 2002.

A Subsequent Edition of a Print Book

You cite this as you would a normal print book, but include the number of the edition after the title.

Williams, Costa. *In the Age of Wonder*. 4th ed., Penguin, 2002.

Journal Articles

For online journal articles, you should include the DOI (Digital Object Identifier) if one is available. Otherwise, you should include a URL or Permalink to the article. Permalinks are provided by most library database collections. If an online journal article has page numbers, include those in the citation. If it does not have page numbers, omit that section. For online journal articles, you may optionally include the date of access.

Journal Article from a Library Database

When citing an online journal article from a library database collection, you should include the database name in italics.

Author's Last Name, First Name. "Title of the Article." *Title of the Journal*, volume number, issue number, date of publication, page range, DOI or web URL.

Carter, Alice, and Simmons A. Pollato. "An Evaluation of Active Learning Models in K-12 Classrooms." *Journal of Education*, vol. 10, no. 3, 12 Feb. 2012, pp. 50-57.

Academic Source Premiere, <https://doi.org/10.1112/tor.20155>.

Journal Article from an Internet Website

Although not required, it can be advisable to add a date of access when the article comes from a public internet website; in case there are changes to the website.

Collins, Samantha, et al. "Marketing Strategies for Generation Z Consumers." *Marketing Issues*, vol. 13, no. 1, 1 Mar. 2015, pp. 2-13.

<https://www.marketingissuesjournal.org/2015/1>. Accessed 12 Jan. 2024.

Print Journal Article

Author's Last Name, First Name. "Title of the Article." *Title of the Journal*, Volume Number, Issue Number, Publication Year, page range.

Moorehouse, Gaston. "Trends in Extreme Nationalism: A Multi-National Review of Literature." *Journal of International Government*

Studies, vol. 10, no. 2, 2001, pp. 13-20.

Newspaper Articles

Newspaper Article from a Library Database

When citing a newspaper article from a library database collection, you should include the database name in italics.

Simpson, Charles. "New Initiatives in Housing Support." *Los Angeles Times*, 22 Apr. 2010, *International News Collections*, p. 6.

Newspaper Article from an Internet Website

Although not required, it can be advisable to add a date of access when the article comes from a public internet website; in case

there are changes to the website.

Simpson, Charles. "New Initiatives in Housing Support." *Los Angeles Times*, 22 Apr. 2010, p. 6. <https://www.latimes.com/2010/4/22>.

Accessed 22 Oct. 2024.

Print Newspaper Article

Author's Last Name, First Name. "Title of the Article." *Newspaper Title*, Publication Date, page number of the article.

Simpson, Charles. "New Initiatives in Housing Support." *Los Angeles Times*, 22 Apr. 2010, p. 6.

Websites and Web Documents

When citing content on a website, you will normally need to include a date of access. This is the date that you most recently opened and viewed the material to get the notes or content you used in your work. The access date should be listed in the format of day month year. Example: Accessed 6 July 2015.

Website Article

Article Author's Last Name, First Name. "Title of the Article." *Title of the Website*, Web Address URL. Accessed Date of Access.

Donaldson, Claire. "A Review of Social Media Trends from 2000-2010." *Social Truths*, <https://www.socialtruths.com/claire/2015>.

Accessed 6 July 2020.

Website Article with No Known Author

When information such as the author is not available, you skip that information in the citation.

"A review of Social Media Trends from 2000-2010." *Social Truths*, <https://www.socialtruths.com/claire/2015>. Accessed 6 July 2020.

Wikipedia Article

When citing Wikipedia, you'll want to include both the date of the last time the page was edited and the date you accessed the information. The date the page was last edited can be found towards the bottom of the page.

"Title of the Article." *Wikipedia: The Free Encyclopedia*, Wikimedia Foundation, Day Month Year the page was last edited.

Web Address URL. Accessed Date of Access.

"Environmental Justice." *Wikipedia: The Free Encyclopedia*, Wikimedia Foundation, 2 November 2024.

https://en.Wikipedia.org/wiki/Environmental_Justice. Accessed 3 November 2024.

Government Document from a Website

Many government documents will not provide a person as the author. If a person is not listed, use the government agency/department that created the document as the author.

Author Last Name, First Name. *Title of the Document: Subtitle if Given*. Edition if given and it is not the first edition.

Name of the Primary Government Agency, Publication Date, Web Address URL. Accessed Date of Access.

Bureau of Justice Statistics. *Human Trafficking Data Collection Activities, 2024*. 29 October 2024.

<https://bjs.ojp.gov/library/publicat...ctivities-2024>. PDF document.

Digital File (Word document, PowerPoint file, PDF document, etc.)

When citing a digital file such as a PDF document, you create a normal citation for that type of source and then add the file type at the end of the citation.

"A review of Social Media Trends from 2000-2010." *Social Truths*, <https://www.socialtruths.com/claire/2015>. Accessed 6 July 2020. PDF document.

Media

Image on a Website

Artist's Last Name, First Name. *Title of the Image. Title of the Website it is Hosted On*, Web Address URL. Accessed Date of Access.

Capatriman, Alice Ewelle. *My Dog Sitting in a Bird Bath*. Capatriman.com. <https://www.capatriman.com/photographs/June>.

Accessed 20 October 2022.

Video (YouTube, TikTok, etc.)

For videos from sites such as YouTube, you may need to include separate name entries for the author and for the uploader. If they are the same, you only need to include the name once and omit the 'uploaded by' section.

Triscol, Jessica. "How to Speak Confidently." *YouTube*, uploaded by PublicSpeak, 10 Sep. 2021, <https://www.youtube.com/watch?v=0sdf234WW34>.

Podcast

For a podcast, you should begin with the title of the episode in quotation marks. This is followed by the name of the series.

"Title of the Episode." *Name of the Podcast Series* from Name of the Podcast Site or Organization, Date of Publication, Web Address URL.

"Venturing into the U.S. West." *The Old Timey US* from NPR, 10 Jan. 2015, <https://www.npr.org/podcasts/30402521/west>

Other Sources

Twitter Post

Begin with the user's Twitter username as the author's name, then include the entire tweet in quotations. Include the date and time of posting.

@twitterUser02. "Twitter has gained a lot more bots, posting different types of content and misinformation." *Twitter*, 20 Mar. 2020, 12:01 p.m.,

<https://twitter.com/twitterUser02/st.../1002003040010>.

Facebook Post

Author Last Name, First Name or Account Username. Short Description of the Post. *Facebook*, Date of Post, Time of Post,
Web Address URL. Accessed Date of Access.

TimTim11013. Description of the Wagyu Riot. *Facebook*, 15 Apr. 2020, 6:01 a.m., <https://www.facebook.com/timtim11013/2130034>.

Accessed 3 Mar. 2024.

Blog Post, Listserv Post, or Discussion Group Post

Author Last Name, First Name (if available, possibly including the poster's username). "Post Title." *Name of the Web Site*, Version number (if available),

Name of the Organization Affiliated with the Web Site (such as a sponsor or publisher), Web Address URL. Date of access.

Creator91 [Daniel Timms]. "The Total Cost of Current Policies." *PoliticBlog*, 29 Sept. 2010, <https://www.politicblogusa.org>. Accessed 10 Apr. 2015.

Personal Interview

You use this format for citing an interview that you conduct personally. List the interview with the name of the interviewee at the beginning.

Interviewee Last Name, First Name. Personal interview. Date of interview.

Williams, Donald. Personal interview. 20 April 2020.

Class Notes or Handouts

Instructor's Last Name, First Name. "Title of the Handout/Notes/Page." Name of the Course, Course Code/Number, Name of the Institution, Date of Publication (if available) or the Date Accessed.

Wilson, Dani. "Using AI Effectively and Creatively." Introduction to Information Literacy, LIB-1-28317, Moreno Valley College, Accessed 4 Nov. 2024.

Class Presentation Slides (PowerPoint, etc.)

Instructor's Last Name, First Name. "Title of the Presentation." Presentation slides, Name of the Course, Course Code/Number,

Name of the Institution, Date of Presentation or Publication (if available) or the Date Accessed.

Wilson, Dani. "Week 1 Presentation." Presentation slides, Introduction to Information Literacy, LIB-1-28317, Moreno Valley College,

Accessed 4 Nov. 2024.

This page was adapted from [Examples of Common MLA Source Citations](#) by Lyric Ripley, used under CC BY-NC 4.0.

This page titled [7.5: Examples of Common MLA Source Citations](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

7.6: Citation Tools

Reference Websites

There are a number of websites that you can use to find formatting rules and guides for citing sources.

- [Online Writing Lab @ Purdue University](#): This website provides formatting rules and example citations for both MLA and APA styles.
- [Online Writing Lab @ Excelsior University](#): This website provides formatting rules and example citations for both MLA and APA styles.

Citation Generators

Citation generators are tools that can create or format citations for you. While these can be useful, they often contain minor errors that you will need to be careful to correct yourself. One of the perks of using library database collections, is that most of them have a built-in tool for providing pre-generated citations for the sources found within them.

- [Zotero.org](#): Zotero is a free tool for collecting and compiling citations for your research sources.
- [Easybib.com](#): Easybib is a free tool for creating citations or checking your papers for signs of plagiarism.
- [QuillBot.com](#): QuillBot is an AI-powered tool for creating citations.

Artificial Intelligence

Generative A.I. tools can suggest citations for your sources; however, you should be wary of their accuracy (just like with citation generators). Additionally, do not rely on these tools to find and cite sources for you. They are known to make up sources and provide non-working hyperlinks.

This page was adapted from Examples of [Citation Tools](#) by Lyric Ripley, used under CC BY-NC 4.0.

This page titled [7.6: Citation Tools](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Kari Wergeland](#).

7.7: How Do I Acknowledge and Cite Generative AI in Academic Work?

You've already learned the importance of citing your sources in academic work. But how do you acknowledge and cite generative artificial intelligence tools like ChatGPT?

Before we get started, it's important to remember that not all instructors allow students to use generative AI in their assignments. **You should check with your individual instructor for their policies.** When in doubt, ask!

Before You Use (and Cite), Reflect: Why and How Am I Using Generative AI?

As an instructor and a writer, I have found that generative artificial intelligence tools can be helpful to explore ideas, refine research questions, outline arguments, and break down difficult concepts for students. When my students use ChatGPT, I ask them to include a [citation](#) to the tool they used and also to provide a brief reflection about how they used ChatGPT and how they checked the information for accuracy. Here is an example of a reflection from [Luka Denney's essay](#) in *Beginnings and Endings*, a student-created open education resource.

For this essay, I used Chat GPT as a resource to give me a summary of the feminist and queer theory analysis lens, "Feminist queer theory is a critical analysis lens that combines feminist theory and queer theory to examine how gender and sexuality intersect and shape social power dynamics. This approach challenges the dominant cultural norms that promote heteronormativity, gender binary, and patriarchy, which result in marginalizing individuals who do not conform to these norms." With this, it helped me better understand the material so I could write better essays. This information was accessed on, May 6th, 2023.

Reflecting on how and why you are using generative AI can help you to ensure that you are not plagiarizing from this tool.

Luka's reflection is an example of an **acknowledgement statement**, which is separate from a citation. Increasingly, students should become familiar with AI acknowledgement statements and clarify with their instructors when these statements are needed.

Suggestions for Acknowledging Use of AI

Monash University provides helpful [recommendations](#) for how to acknowledge when and how you've used generated material as part of an assignment or project. If you decide to use generative artificial intelligence such as ChatGPT for an assignment, it's a best practice to include a statement that does the following:

- Provides a written acknowledgment of the use of generative artificial intelligence.
- Specifies which technology was used.
- Includes explicit descriptions of how the information was generated.
- Identifies the prompts used.
- Explains how the output was used in your work.

The format Monash University provides is also helpful. Students may include this information either in a cover letter or in an appendix to the submitted work.

I acknowledge the use of [insert AI system(s) and link] to [specific use of generative artificial intelligence]. The prompts used include [list of prompts]. The output from these prompts was used to [explain use].

Academic style guides such as APA already include guidelines for including appendices after essays and reports. Review Purdue

Owl's entry on [Footnotes and Appendices](#) for help.

Citing AI Chatbots

In some situations, students may want to cite information from a chatbot conversation, such as a definition or discussion of a concept they want to use in an essay. The American Psychological Association (APA) and the Modern Language Association (MLA), two of the most frequently used style guides for college writing, have both provided guidelines for how to do this.

ChatGPT includes the ability to [share links](#) to specific chats. It's a best practice to include those links in your reference. For other tools like Google Doc's Writing Assistant, links are not yet available, so it's important to be transparent with your reader about how and when you are using AI in your writing.

Here's an example of a [shared chat link](#) in ChatGPT 3.5. When you click on the link, you'll be able to see both the author's prompts and the chatbot's responses. Including links provides transparency for your writing process.

APA Style

According to the [American Psychological Association](#) (APA), ChatGPT should be cited like this:

When prompted with "Is the left brain right brain divide real or a metaphor?" the ChatGPT-generated text indicated that although the two brain hemispheres are somewhat specialized, "the notation that people can be characterized as 'left-brained' or 'right-brained' is considered to be an oversimplification and a popular myth" (OpenAI, 2023).

Reference

OpenAI. (2023). ChatGPT (Mar 14 version) [Large language model]. <https://chat.openai.com/chat>

MLA Style

The Modern Language Association (MLA) uses a template of core elements to create citations for a Works Cited page. [MLA](#) asks students to apply this approach when citing any type of generative AI in their work. They provide the following guidelines:

- Cite a generative AI tool whenever you paraphrase, quote, or incorporate into your own work any content (whether text, image, data, or other) that was created by it.
- Acknowledge all functional uses of the tool (like editing your prose or translating words) in a note, your text, or another suitable location.
- Take care to vet the secondary sources it cites. (MLA)

Here are some examples of how to use and cite generative AI with MLA style:

Example One: Paraphrasing Text

Let's say that I am trying to generate ideas for a paper on Charlotte Perkins Gilman's short story "The Yellow Wallpaper." I ask ChatGPT to provide me with a summary and identify the story's main themes. Here's a [link to the chat](#). I decide that I will explore the problem of identity and self-expression in my paper.

My Paraphrase of ChatGPT with In-Text Citation



Figure 7.7.1 The problem of identity and self expression, especially for nineteenth-century women, is a major theme in “The Yellow Wallpaper” by Charlotte Perkins Gilman--Summarize the short story (CC BY-NC-SA 4.0; [Liza Long](#))

Works Cited Entry

“Summarize the short story “The Yellow Wallpaper” by Charlotte Perkins Gilman. Include a breakdown of the main themes” prompt. *ChatGPT*. 24 May Version, OpenAI, 20 Jul. 2023, <https://chat.openai.com/share/d1526b95-920c-48fc-a9be-83cd7dfa4be5>

Example Two: Quoting Text

In the same chat, I continue to ask ChatGPT about the theme of identity and self expression. Here’s an example of how I could quote the response in the body of my paper:

When I asked *ChatGPT* to describe the theme of identity and self expression, it noted that the eponymous yellow wallpaper acts as a symbol of the narrator’s self-repression. However, when prompted to share the scholarly sources that formed the basis of this observation, *ChatGPT* responded, “As an AI language model, I don’t have access to my training data, but I was trained on a mixture of licensed data, data created by human trainers, and publicly available data. OpenAI, the organization behind my development, has not publicly disclosed the specifics of the individual datasets used, including whether scholarly sources were specifically used” (“Summarize the short story”).

It’s worth noting here that ChatGPT can “[hallucinate](#)” fake sources. As a Microsoft training manual notes, these chatbots are “built to be persuasive, not truthful” (Weiss and Metz). The May 24, 2023 version will no longer respond to direct requests for references; however, I was able to get around this restriction fairly easily by asking for “resources” instead.

When I ask for resources to learn more about “The Yellow Wallpaper,” here is one source it recommends:

“Charlotte Perkins Gilman’s The Yellow Wallpaper: A Symptomatic Reading” by Elaine R. Hedges: This scholarly article delves into the psychological and feminist themes of the story, analyzing the narrator’s experience and the implications of the yellow wallpaper on her mental state. It’s available in the journal “Studies in Short Fiction.” (“Summarize the short story”).

Using Google Scholar, I look up this source to see if it’s real. Unsurprisingly, this source is not a real one, but it does lead me to another (real) source: Kasmer, Lisa. “Charlotte Perkins Gilman’s ‘The Yellow Wallpaper’: A Symptomatic Reading.” *Literature and Psychology* 36.3 (1990): 1.

Note

ALWAYS check any sources that ChatGPT or other generative AI tools recommend.

A Checklist for Acknowledging and Citing Generative A.I. Tools

In conclusion, it's important to follow these five steps if you are considering whether or not to use and cite generative artificial intelligence in your academic work:

1. Check with your instructor to make sure you have **permission** to use these tools.
2. **Reflect** on how and why you want to use generative artificial intelligence in your work. If the answer is "to save time" or "so I don't have to do the work myself," think about why you are in college in the first place. What skills are you supposed to practice through this assignment? Will using generative artificial intelligence *really* save you time in the long run if you don't have the opportunity to learn and practice these skills?
3. If you decide to use generative artificial intelligence, **acknowledge** your use, either in an appendix or a cover letter.
4. **Cite** your use of generative artificial intelligence both in text and on a References/Works Cited page.
5. Always **check the information** provided by a generative artificial intelligence tool against a trusted source. Be especially careful of any sources that generative artificial intelligence provides.

These tools are rapidly evolving and have the potential to transform the way that we think and write. But just as you should not use a calculator to solve a math equation unless you understand the necessary steps to perform the calculation, you should also be careful about "outsourcing" your thinking and writing to ChatGPT.

References

"Acknowledging the Use of Generative Artificial Intelligence." *Learn HQ*, Monash University.

"Can you share any resources or articles that can help me learn more about 'The Yellow Wallpaper?'" prompt. *ChatGPT*, 24 May version, OpenAI, 19 Jul. 2023, chat.openai.com/share/70e86a32-6f04-47b4-8ea7-a5aac93c2c77.

Denney, L. "Your Body, Your Choice: At Least, That's How It Should Be." *Beginnings and Endings: A Critical Edition*, Pressbooks, 2023.

"How Do I Cite Generative AI in MLA Style?" *MLA Style Center*, Modern Language Association, 17 Mar. 2023.

McAdoo, Timothy. "How to Cite ChatGPT." *APA Style Blog*, American Psychological Association, 7 Apr. 2023.

Weise, Karen, and Cade Metz. "When A.I. Chatbots Hallucinate." *The New York Times*, 1 May 2023.

This page titled [7.7: How Do I Acknowledge and Cite Generative AI in Academic Work?](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Liza Long](#).

- 1.11: [How Do I Acknowledge and Cite Generative AI in Academic Work?](#) by [Liza Long](#) is licensed [CC BY-NC-SA 4.0](#). Original source: <https://cwi.pressbooks.pub/longenglish102/>.

7.8: Parting Thoughts

If you spend any time in college, you will need to understand how to cite the sources backing up the research you do for your academic assignments. There are a number of citations styles in use in academia and the publishing world. At the community college level, the most common citation styles are MLA and APA. Your instructor should indicate which citation style guide you need to use for a particular assignment. If you track down a source in a library database, you can usually use that database's citation tool to auto-generate a citation for this source. This is a great starting point! But don't forget to double-check auto-generated citations against the style guide, because computers can make mistakes. For example, if you see an element in a citation that is in all capital letters, this is a sign the citation needs to be edited before it is added to your Works Cited list.

The use of generative AI tools is making it necessary for students to go further with how they give credit for work they did not do. This is an evolving situation in the academic world, so the standards for this process are in flux. Your instructor should make it clear what they want to see with regard to the use of generative AI tools. Some instructors will not want you to use generative AI tools for specific assignments, while others may advise creative use of such tools. If you do make use of a generative AI tool to complete an assignment, it is a good idea to acknowledge how and why you used it. Heads up: Generative AI tools can generate citations, but proceed with caution. They often create inaccurate citations which could be graded down. They have been also known to generate citations for sources that don't exist. You will want to check this sort of citation against the actual source for accuracy.

8: WHAT ABOUT AI?

8.1: How Generative AI Differs from Search Tools

8.2: Accuracy and Fabricated Information

8.3: Verifying AI-Generated Claims

8.4: Citation and Documentation

8.5: Ethical and Effective Uses of AI

8.6: Parting Thoughts

8.1: How Generative AI Differs from Search Tools

How Generative AI Differs From Search Tools

The Mystery: Why Did Three Research Tools Give Maya Three Completely Different Answers?

Maya is researching whether social media affects college students' sleep. She enters nearly the same question into three tools.

Google displays thousands of links. A library database returns 47 scholarly articles with authors, journal titles, dates, abstracts, and subject terms. A generative AI tool produces one smooth paragraph explaining the topic.

The AI response is the easiest to read. It sounds confident, summarizes several possible effects, and even uses phrases such as "research consistently demonstrates." Maya assumes it must have searched the same information as Google and the library database, then summarized the best sources.

But when she asks which studies support the explanation, the answer changes. Some citations are difficult to locate. Others appear related to the topic but do not support the exact claims. Maya realizes that the three tools did not simply present the same information in different formats.

Why did Google give her links, the database give her publication records, and generative AI give her a newly written answer?

To solve the mystery, Maya must understand the difference between **retrieving information** and **generating language**.

Search Tools Retrieve; Generative AI Produces

A traditional search tool helps users locate information that already exists. It searches an organized collection called an **index** and returns records, webpages, articles, images, or other items that may answer the question.

Generative AI performs a different central task. A large language model produces a response by predicting a likely sequence of words or smaller language units called tokens. Its main purpose is not to retrieve one existing passage and display it exactly as written. It generates new language based on patterns learned during training and, in some systems, information retrieved at the time of the question.

Modern systems sometimes combine these functions. An AI search tool may search the web, retrieve several sources, and then use a language model to create a summary. That hybrid process can be useful, but the final answer remains generated text. The user still needs to inspect the cited sources rather than treating the summary as the source itself.

Definition: Term

An **index** is an organized, searchable record of information about documents, webpages, images, articles, or other items.

An **indexer** is a person or automated system that examines information and adds searchable descriptions, terms, or records to an index.

Crawling is the automated process of discovering and visiting webpages.

Scraping generally refers to using automated software to collect content or data from websites. The amount collected and the purpose of collection can vary greatly.

Aggregation means bringing content or records from multiple sources together in one location or service.

A **large language model**, or **LLM**, is a system trained to recognize and generate patterns in language.

Retrieval-augmented generation, often shortened to **RAG**, combines information retrieval with a language model that creates an answer using retrieved material.

An index points toward information. A language model produces a response. A hybrid AI search system attempts to do both.

How Google Search Works

Google searches a massive index of material found across the open web. Its results may include government pages, news reports, blogs, commercial sites, scholarly articles, social media pages, videos, and advertisements.

Google is excellent for locating public websites, current information, organizations, government documents, and sources that may not appear in a scholarly database. It also has broad coverage because its crawlers continually discover material from across the web.

However, Google does not limit its results to peer-reviewed scholarship. A highly ranked result may appear because it is relevant, popular, well linked, recent, or structured in a way the search system can understand. Ranking is not the same as scholarly evaluation.

Google usually returns links and short previews. The user chooses which sources to open, read, compare, and cite.

How Library Databases Work

A library research database searches a more deliberately selected collection. Depending on the database, that collection may include scholarly journals, magazines, newspapers, books, reports, conference papers, dissertations, images, or primary sources.

JSTOR, for example, describes itself as a digital library of academic journals, books, and primary sources. Its search system examines information such as titles, authors, and other metadata, as well as searchable document content. Matches in titles and author fields may receive greater weight than the same terms appearing elsewhere in a document.

Database records typically contain **metadata**, which is information describing another item. A record may list the article title, author, journal, date, volume, issue, page range, abstract, subject headings, and DOI.

This structure helps students search by author, subject, publication date, document type, or peer-review status. It also makes the source easier to identify and cite.

A database does not necessarily own everything it indexes. It may license content from publishers, include citation records without full text, or provide links to material hosted elsewhere.

Databases and Publishers Are Not the Same Thing

A publisher produces and distributes content. Examples include university presses, scholarly societies, commercial academic publishers, newspapers, and magazine companies.

A database organizes and provides search access to content. Some databases obtain full-text access through agreements with many publishers. Others provide citations and abstracts that direct users to the publisher's platform.

This distinction explains why a student may discover an article in a library database but read the full text on a publisher's website. It also explains why some articles appear in multiple databases.

Paid publishers commonly place content behind subscription paywalls. A college library purchases or licenses access so enrolled students can use that content without paying separately for every article. The material is not free merely because the library login opened it. The institution has arranged access under a license.

Students may usually read, download, quote, and cite licensed articles for academic work within the terms of that access. They

should not assume they can upload entire collections to public websites, distribute subscription copies widely, or feed large quantities of licensed content into outside systems.

How Generative AI Learns From Content

Large language models are trained using very large collections of text and other data. During training, a model learns statistical relationships among words and tokens. Modern LLMs are commonly trained through forms of next-token prediction: given a sequence of language, the system learns to predict what token is likely to follow.

The model is not best understood as a searchable filing cabinet containing one intact copy of every source. It uses learned numerical patterns to generate new sequences of language.

That distinction explains both its usefulness and its danger.

A generative AI system can explain a concept in simpler language, compare ideas, brainstorm keywords, reorganize notes, or draft examples. However, language that sounds reasonable may not be traceable to a particular source. The model's fluent response can blend accurate information, incomplete information, and unsupported connections into one polished paragraph.

The polished paragraph is an output—not proof.

AI Search Tools Are Hybrids

Some generative AI tools can search the web or another collection while answering. These systems combine retrieval with generation.

For example, a tool might search current webpages, select several sources, and provide their contents to a language model. The model then writes a direct answer and attaches citations or links. OpenAI describes ChatGPT search as combining a conversational interface with current web information and links to relevant sources.

A library platform can also add generative AI to its existing collection. JSTOR's AI research tool, for example, operates within JSTOR's scholarly corpus rather than searching the entire open web.

The quality of an AI search response therefore depends partly on what it retrieves. A system searching a selected scholarly collection begins with a different evidence pool than one searching the open web.

Retrieval helps ground an answer, but it does not eliminate the need for evaluation. The model may simplify a complicated source, overlook a limitation, combine claims incorrectly, or cite a source that discusses the topic without supporting the precise sentence.

The citation is an invitation to investigate—not a tiny certificate of truth.

Comparing the Major Research Tools

Tool	What it primarily does	What it searches or uses	What the student receives	Best use
Google Search	Retrieves and ranks indexed webpages	A broad index of the open web	Links, previews, images, videos, and other results	Finding public websites, organizations, government information, news, and current web content
Library database	Retrieves selected records and documents	A licensed or curated collection of publications and sources	Article records, abstracts, subject terms, filters, and sometimes full text	Finding scholarly, professional, historical, or specialized research

Tool	What it primarily does	What it searches or uses	What the student receives	Best use
Publisher platform	Provides access to works produced or distributed by the publisher	That publisher's journals, books, news, or other publications	Full articles, chapters, publication details, and related content	Reading and locating material from a known publisher
Generative AI without active search	Generates a response from learned language patterns and supplied context	Its trained model and information provided in the conversation	A newly written answer	Brainstorming, explanation, organization, and language support
AI search tool	Retrieves sources and generates an answer from them	The open web, a database, uploaded files, or another connected collection	A synthesized response with possible links or citations	Developing an overview and locating sources to verify

Figure 8.2.1 No one tool is automatically best. The correct choice depends on the information need. (CC BY-NC; Cheryl Bailey)

Copyright Does Not Disappear When Technology Collects Content

Copyright protects original works of authorship once they are fixed in a tangible form. Articles, books, photographs, illustrations, music, videos, computer programs, and many webpages may receive copyright protection.

Finding a work through Google does not make it free of copyright. Accessing an article through a college subscription does not make it openly licensed. Seeing text quoted by an AI tool does not automatically give a user permission to reproduce the original work.

The use of copyrighted material in AI training remains legally and ethically contested. The U.S. Copyright Office reported that generative AI systems may be trained on very large collections that include copyrighted works and explained that fair-use analysis depends on the specific circumstances. It did not declare all AI training automatically lawful or automatically infringing. Courts must evaluate particular uses and facts, and litigation remains ongoing.

For students, the practical lesson is simpler: do not assume that a tool's ability to access, summarize, or generate something gives you the right to copy and publish it.

Continue to quote sparingly, paraphrase responsibly, cite sources, follow license terms, and check whether media can legally be reused.

Open Access Is Different From Openly Licensed

Some scholarly articles are available online without a subscription. This is often called **open access**.

Open access means that readers can reach the work without paying. It does not necessarily mean that every kind of reuse is permitted.

An article released under a Creative Commons license may allow specific forms of reuse when users follow the license conditions. An article that is simply free to read may still retain ordinary copyright restrictions.

Similarly, a publicly accessible webpage is not automatically public domain. "I found it online" is a description of access, not a copyright analysis.

Choosing the Right Tool

Maya should use Google when she needs current public information, official organizations, government webpages, or broad web discovery.

She should use library databases when she needs scholarly articles, structured searching, publication details, subject terms, or access to licensed academic content.

She might use a publisher's platform when she already knows the journal, book, article, or publisher she wants.

She can use generative AI to develop keywords, clarify unfamiliar terminology, compare concepts, organize notes, or draft a preliminary explanation. She should not confuse that explanation with evidence.

An AI search tool may help her locate relevant sources more quickly, but she must still open those sources, confirm that they exist, read what they actually say, and cite the original materials.

The tools can cooperate. They do not become interchangeable.

Expert Thinking: Following the Information Path

Maya asks her generative AI tool for an explanation of social media and student sleep. Instead of copying the answer, she identifies the major concepts: social media use, sleep duration, sleep quality, nighttime phone use, and college students.

She searches those terms in a library database. The database provides author names, article titles, abstracts, subject headings, publication dates, and links to full text.

She then searches Google for a recent government or professional health source that explains sleep recommendations. Finally, she returns to the AI tool and asks it to help her compare the notes she has already verified.

Her process looks like this:

AI helps develop language and keywords → database locates scholarly research → Google locates public and current sources → Maya reads and evaluates the original materials → AI may help organize her verified notes

The AI participates in the research process. It does not become the entire process.

Course Connection: Selecting Tools by Purpose

College research requires students to choose search systems that match their information needs. A search engine, scholarly database, publisher platform, and generative AI system provide different forms of access and different kinds of output.

Understanding those differences helps researchers avoid two common mistakes: expecting a database to work exactly like Google and expecting generative AI to function like a transparent list of sources.

A strong researcher does not ask which tool is universally best.

A strong researcher asks what information the tool searches, how it produces its output, and what work remains for the researcher.

Solving the Mystery

Google, the library database, and generative AI gave Maya different answers because they performed different tasks.

Google searched a broad index of webpages and returned ranked links. The library database searched a selected collection and returned structured publication records and documents. The generative AI tool created a new explanation using learned language patterns. When search was available, it could also retrieve information and use it to produce a synthesized response.

The AI paragraph felt complete because it removed the visible searching, selecting, and connecting steps. That convenience also made the evidence harder to see.

Maya's corrected research note reads:

Google and library databases retrieve existing sources from different indexed collections. Generative AI primarily creates new language, although some AI tools also retrieve current sources before generating an answer. Because the generated response is not itself the original evidence, important claims must be traced to sources that can be located, read, evaluated, and cited.

The three tools were not disagreeing about how to display one identical answer.

They were doing three different jobs.

Check Your Understanding

How does a library database differ from a publisher platform? Why can several websites display the same aggregated article? What changes when an AI tool adds web retrieval to a language model? Why does access to copyrighted material not automatically grant permission to reproduce it? Which tool would you use to locate peer-reviewed studies, and what could generative AI contribute after you found them?

Key Takeaways

Search engines and library databases primarily retrieve existing information from indexes. Their indexes cover different collections and apply different forms of organization.

Publishers create or distribute works, while databases aggregate and organize records or full text from multiple sources.

Generative AI creates new language from learned patterns. Some AI search tools also retrieve current information before generating a response.

A generated answer can help a researcher understand or organize a topic, but it does not replace the original evidence.

Copyright and licensing rules still apply when content is discovered through search engines, databases, publisher websites, or AI tools.

The best research process often uses several tools, with the student—not the software—responsible for locating, reading, verifying, and citing the evidence.

References

Copyright and Artificial Intelligence, Part 3: Generative AI Training. Pre-publication version, U.S. Copyright Office, 6 May 2025.

Gloeckle, Fabian, et al. "Better and Faster Large Language Models via Multi-Token Prediction." *arXiv*, 2024, doi.org/10.48550/arXiv.2404.19737.

"In-Depth Guide to How Google Search Works." *Google Search Central*, Google.

"Introducing ChatGPT Search." *OpenAI*, 31 Oct. 2024.

"An Introduction to Searching on JSTOR." *JSTOR*, 26 Aug. 2025.

Attributions

No third-party screenshots, database records, search results, articles, or copyrighted AI outputs were reproduced or adapted. Maya's mystery, comparison table, research process, examples, and knowledge-check questions constitute original instructional content created for the LIB 15 OER.

The technical explanations of crawling and indexing draw on Google Search Central. The descriptions of JSTOR's collection and search system draw on JSTOR documentation. The discussion of AI-assisted web search draws on OpenAI's description of

ChatGPT search. The copyright discussion summarizes the U.S. Copyright Office's 2025 report without reproducing its text.

This page titled [8.1: How Generative AI Differs from Search Tools](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by Cheryl Bailey.

- [13.1: How Generative AI Differs from Search Tools](#) by Cheryl Bailey is licensed [CC BY-NC 4.0](#).

8.2: Accuracy and Fabricated Information

Accuracy and Fabricated Information

The Mystery: How Can a Citation Look Perfect and Still Not Exist?

Elena asks a generative AI tool to recommend scholarly sources about food insecurity among community college students. The tool returns a polished list containing authors, article titles, journal names, volume and issue numbers, page ranges, and DOIs.

One citation seems perfect. Its title matches Elena's topic exactly, and the journal sounds reputable. She copies it into her paper and searches the college library for the full article.

Nothing appears.

She searches Google Scholar. Still nothing. She enters the DOI into a DOI lookup service, but it leads nowhere. When she asks the AI whether the citation is real, the tool apologizes and produces a replacement.

The replacement also does not exist.

How can a system generate a citation containing all the parts of a scholarly article without describing any actual publication?

To solve the mystery, Elena must understand that fluent language and factual accuracy are related—but they are not the same thing.

Generative AI Can Be Useful and Wrong

Generative AI can produce accurate explanations, useful summaries, strong examples, and helpful starting points. It can also produce information that is partly wrong, completely invented, outdated, oversimplified, or unsupported by the cited source.

The difficulty is that accurate and inaccurate responses may sound equally confident.

A language model does not automatically pause, look worried, and announce, "I am about to invent a journal article." It may present false information using the same polished grammar, academic vocabulary, and organized formatting it uses for correct information.

This is why an AI response should not be treated as evidence merely because it sounds knowledgeable.

Accuracy must be checked outside the response.

Definition: Term

Accuracy refers to how closely information matches reliable evidence or established facts.

Fabricated information is content that appears factual but was invented rather than supported by a real source or event.

An **AI hallucination** is the common term for generated content that is unsupported, inconsistent with the available evidence, or factually incorrect.

A **fabricated citation** names a source that does not actually exist.

A **citation error** occurs when a real source is described incorrectly, such as through a wrong author, title, date, journal, page range, or DOI.

Grounding means connecting an AI response to identifiable evidence, such as a retrieved document, webpage, dataset, or source supplied by the user.

The term *hallucination* is widely used in AI research, but it is a metaphor. The system is not experiencing a human sensory hallucination. It is generating unsupported or incorrect content.

Why Fabrication Happens

A generative AI model produces language by estimating what text is likely to come next. That process can create a response that matches the usual form of an answer without matching the underlying facts.

For example, scholarly citations follow recognizable patterns. They usually contain author names, publication years, article titles, journal titles, volume numbers, pages, and DOIs. A model can reproduce that pattern even when it does not have reliable evidence for a specific article.

It may combine the name of one real researcher, the topic of another article, the title pattern of a familiar journal, and a DOI-shaped string into one convincing but fictional reference.

The result looks like scholarship because it imitates the structure of scholarship.

It is not necessarily scholarship.

Fabrication Is Not the Same as Deliberate Lying

A person lies when they know a statement is false and intentionally present it as true.

A language model does not possess human intentions or beliefs in the ordinary sense. It generates a response from learned patterns, instructions, retrieved information, and the conversation context.

Calling the model a liar can therefore hide the real problem. The system may produce false information without recognizing the conflict between the response and the evidence.

For the student, the practical result remains serious: incorrect information can enter an assignment, decision, or conversation.

The absence of human intent does not make the output accurate.

Common Accuracy Problems

AI errors do not all look the same. Some are easy to catch because they describe an obviously impossible event. Others change only one name, date, statistic, or qualification.

Type of problem	Example	Why it is risky
Completely fabricated information	The AI invents a court case, study, quotation, or historical event	The student may cite evidence that never existed
Fabricated citation	The authors, title, journal, and DOI form a realistic-looking but fictional reference	Detailed formatting can create false confidence
Misrepresented source	A real article exists, but it does not support the AI's claim	The citation appears to verify a statement that the source never made

Type of problem	Example	Why it is risky
Blended information	Details from several real people, studies, or events are combined into one account	Much of the response may sound familiar, making the invented combination difficult to notice
Wrong detail	The explanation contains an incorrect date, statistic, name, or location	A small error can change the meaning of an otherwise accurate account
Missing qualification	A correlation becomes causation, or a finding from one sample becomes a universal conclusion	The response exaggerates what the evidence supports
Outdated information	The answer reflects an earlier law, officeholder, product version, or policy	The information may once have been accurate but no longer applies

Figure 8.3.1 A response can contain more than one of these problems at the same time. (CC BY-NC; Cheryl Bailey)

Real Citations Can Still Be Used Incorrectly

Finding that a cited article exists does not finish the evaluation.

An AI tool may cite a real study but describe its findings inaccurately. It may claim that researchers proved causation when they reported only an association. It may apply findings from laboratory mice to humans, from adolescents to all adults, or from one country to the entire world.

It may also cite a source that mentions the general topic without supporting the exact sentence.

Suppose an AI response states:

A 2022 study proved that food pantries increase college graduation rates.

The cited article may actually be a survey showing that students valued a pantry. The article is real. The claim is still unsupported.

Verification therefore requires asking two questions:

Does the source exist?

Does the source actually support this claim?

Students need both answers.

Example 8.2.1

A Real Study of Fabricated Citations

Walters and Wilder (2023) tested citations generated by GPT-3.5 and GPT-4 in response to prompts requesting scholarly literature. In their sample, 55% of the GPT-3.5 citations and 18% of the GPT-4 citations were fabricated. Among the citations that referred to real sources, substantial portions still contained errors. The researchers concluded that improved models reduced—but did not eliminate—fabrication and bibliographic mistakes.

Those percentages should not be treated as permanent accuracy rates for every AI tool. The study examined particular model versions, prompts, subjects, and conditions in 2023. AI systems change rapidly, and performance varies by task.

The broader lesson remains useful: a citation can look complete and still require verification.

There Is No Single AI Accuracy Score

Students sometimes ask, “How accurate is AI?”

There is no one percentage that answers that question.

Accuracy depends on the model, version, prompt, topic, language, available context, retrieval system, and type of task. A tool may perform well when explaining a common concept and poorly when asked for an obscure citation. It may accurately summarize a supplied article but invent details when asked to answer from memory.

Performance can also change after an update.

A score from one benchmark does not guarantee that the same tool will be accurate for a different question. A model that performs well on a graduate examination may still produce a fabricated reference, inaccurate local policy, or incorrect current fact. Research has documented both strong performance on some academic tasks and serious failures in specialized applications.

The correct question is not simply, “Is this AI accurate?”

Ask:

Accurate at what task, under what conditions, and compared with what evidence?

Confidence Is a Writing Style, Not an Accuracy Measurement

AI-generated language often sounds certain because direct, confident sentences are common in explanatory writing.

A sentence such as “Researchers have conclusively demonstrated...” may reflect strong evidence. It may also be an unsupported phrase selected because it fits the expected style.

The tone does not reveal whether the system checked a source.

Likewise, cautious wording does not automatically make a response accurate. A fabricated statement can include *may*, *suggests*, and *possibly*.

Students should treat confidence as a feature of the writing, not proof of the information.

Asking the AI to Check Itself Is Not Independent Verification

When Elena cannot find the fictional article, she asks the same AI tool whether the citation is correct.

This is better than noticing nothing, but it is not independent verification.

The tool may repeat the original answer, change part of it, apologize without identifying the error, or replace one false citation with another. A second response is still produced by the same type of system.

The model may sometimes identify and repair its own mistakes. It may also sound highly reflective while remaining wrong.

A reliable check moves outside the generated answer. Elena should search the library database, publisher website, Google Scholar, or another appropriate source.

The AI can assist with verification. It should not be the only verifier of its own output.

Different Answers Do Not Automatically Reveal Which One Is Correct

Elena repeats the same prompt and receives a different response.

This variation is possible because generative systems may choose among several likely language sequences. Model settings,

system updates, conversation context, and retrieved sources can also change the output.

A changed answer does not prove that the first answer was false or that the second is correct.

Likewise, receiving the same answer twice does not independently confirm it. The system may repeat the same unsupported pattern.

Consistency can be useful, but it is not evidence by itself.

AI May Continue an Error Introduced by the User

Suppose a student asks:

Why did the Supreme Court decide *Garcia v. California* in 2024?

If no such decision exists, a model may correct the premise. It may also accept the fictional case and generate an explanation.

Research has shown that models can elaborate on fabricated information placed inside prompts, including in high-stakes clinical scenarios. This means a confident question can sometimes pull the model deeper into an error rather than prompting it to challenge the assumption.

Students should therefore verify the premise of a question, not only the answer.

A polished explanation of a nonexistent event remains a polished explanation of a nonexistent event.

Summaries Can Introduce New Claims

AI tools are often useful for summarizing long text, but the output should still be compared with the original.

A summary may omit an important exception, combine findings from separate sections, change tentative language into a definite conclusion, or add background information not found in the document.

Suppose an article states:

Within this sample, students who used the service reported somewhat higher confidence, although the study did not measure academic performance.

An inaccurate summary might become:

The service improves students' grades and confidence.

The sentence is shorter. It is also stronger than the evidence.

When accuracy matters, the student should check names, numbers, findings, limitations, and quotations against the original source.

Quotations Require Special Caution

A generated quotation should be considered unverified until it can be found in the original source.

AI may reproduce a real quotation accurately. It may paraphrase an idea and place quotation marks around it. It may blend several statements. It may invent a quotation that sounds appropriate for the person.

This can be especially difficult to detect with famous people because the invented line may resemble something they might have said.

Never cite a quotation merely because an AI tool attributed it to someone. Locate the speech, interview, book, court decision,

transcript, or other original record.

A quotation needs a source location, not just a famous name standing nearby.

Numbers Can Look Precise While Being Wrong

Specific numbers create credibility.

An AI response may state that “63.7% of students” experienced an outcome, even when no source supports that exact figure. It may also report a real statistic from the wrong year, population, or study.

Precision should increase scrutiny, not reduce it.

When an AI provides a statistic, ask where the number came from, what population it describes, when the data were collected, how the variable was measured, and whether the source can be opened.

A decimal point is not a tiny laboratory coat.

Retrieval Can Improve Accuracy but Does Not Guarantee It

AI search systems and retrieval-augmented tools may connect the model to current webpages, uploaded documents, or scholarly collections.

This can reduce some forms of fabrication because the response has evidence available during generation. It can also make sources easier to inspect.

However, retrieval does not automatically guarantee that the generated sentence matches the source. The system may select an irrelevant passage, overlook contradictory evidence, misunderstand a table, or combine several documents incorrectly.

A citation-enabled answer is generally easier to verify than an answer with no sources. It is not self-verifying.

The user still needs to open the cited material.

Accuracy Depends on the Stakes

Not every AI mistake creates the same harm.

An invented detail in a brainstorming exercise may be annoying. An invented medication instruction, legal deadline, financial requirement, or criminal accusation can cause serious harm.

The higher the stakes, the stronger the verification should be.

For college research, fabrication can lead to unsupported claims, false citations, inaccurate quotations, and academic-integrity problems. In health, law, finance, safety, or public policy, the same behavior can affect real decisions.

The proper response is not to panic whenever AI generates a sentence. It is to match the checking process to the consequences of being wrong.

Expert Thinking: Elena Verifies the “Perfect” Citation

Elena stops asking whether the citation looks scholarly.

She searches the exact article title in quotation marks. No results appear.

She searches the authors’ names and topic. The authors exist, but they did not write the article.

She searches the journal's archive for the stated year, volume, and issue. The page range belongs to a different article.

She checks the DOI. It is not registered.

Elena now has several independent reasons to conclude that the citation was fabricated.

She removes it from her paper and searches the library database using the useful keywords from the fictional title. The false citation was not evidence, but its wording helped her develop a better search.

Her research note becomes:

The AI-generated citation appeared complete but could not be verified through the journal, author records, databases, or DOI system. It should not be cited. Its keywords may still be used to search for real scholarship.

Elena salvages the useful part without preserving the false part.

Course Connection: Fluency Is Not Authority

College research requires evidence that readers can locate and evaluate.

Generative AI can help explain terminology, generate search language, compare verified notes, or suggest possible directions. It cannot make an unsupported claim reliable by expressing it clearly.

The researcher remains responsible for determining whether a source exists, whether a quotation is authentic, whether a statistic is accurate, and whether the cited evidence supports the conclusion.

This responsibility does not disappear because the error originated with software.

Solving the Mystery

The citation looked perfect because the AI system generated a highly recognizable citation pattern.

It combined realistic authors, a plausible article title, a scholarly-sounding journal, publication details, and a DOI-shaped string. The parts fit the expected format, but they did not point to a real publication.

The model had produced the appearance of bibliographic evidence without the evidence itself.

Elena revises her approach:

An AI-generated citation is a lead, not a verified source. Before using it, I must locate the publication through an independent research system, confirm its bibliographic details, read the source, and verify that it supports my claim.

The mystery was not how a fake citation could look so strange.

It was how a fake citation could look so normal.

That normal appearance is exactly why verification matters.

Check Your Understanding

Why can an AI-generated answer sound confident even when it is incorrect? What is the difference between a fabricated citation and an inaccurate citation to a real source? Why is asking the same AI tool to check itself not independent verification? How could a real article be cited in support of a claim it does not actually make? Why should a precise statistic receive more scrutiny rather than less? What steps would you take before including an AI-generated quotation in an assignment?

Key Takeaways

Generative AI can produce accurate information, inaccurate information, and mixtures of both within the same response.

The term *hallucination* commonly describes generated content that is false, unsupported, or inconsistent with the available evidence. The term does not mean that the system experiences human perception or intentionally lies.

Fluent wording, confident tone, detailed formatting, and specific numbers do not prove accuracy.

AI tools can fabricate sources, quotations, statistics, events, names, and supporting details. They can also misrepresent real sources.

No single accuracy rate applies to every AI system or task. Performance changes across models, versions, topics, prompts, and research conditions.

Retrieval and citations can improve grounding, but students must still open and evaluate the sources.

Researchers should independently verify important claims and remove information that cannot be supported.

References

Huang, Lei, et al. "A Survey on Hallucination in Large Language Models: Principles, Taxonomy, Challenges, and Open Questions." *ACM Transactions on Information Systems*, vol. 43, no. 2, 2025, article 42.

Omar, Mahmud, et al. "Multi-Model Assurance Analysis Showing Large Language Model Vulnerability to Adversarial Hallucination Attacks in Clinical Prompts." *Communications Medicine*, vol. 5, 2025.

Soroush, Ali, et al. "Large Language Models Are Poor Medical Coders—Benchmarking of Medical Code Querying." *NEJM AI*, vol. 1, no. 5, 2024.

Stribling, Daniel, et al. "The Model Student: GPT-4 Performance on Graduate Biomedical Science Exams." *Scientific Reports*, vol. 14, 2024, article 5670.

Walters, William H., and Esther Isabel Wilder. "Fabrication and Errors in the Bibliographic Citations Generated by ChatGPT." *Scientific Reports*, vol. 13, 2023, article 14045.

Attributions

No third-party AI responses, fabricated citations, screenshots, articles, or database records were reproduced or adapted. Elena's mystery, sample claims, verification process, comparison table, and knowledge-check questions constitute original instructional content created for the LIB 15 OER.

The real-world citation case draws on Walters and Wilder's study of fabricated and inaccurate references generated by GPT-3.5 and GPT-4. The broader explanation of hallucination draws on Huang et al. Examples involving strong performance in one context and poor reliability in another draw on Stribling et al. and Soroush et al.

This page titled [8.2: Accuracy and Fabricated Information](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by Cheryl Bailey.

- [13.2: Accuracy and Fabricated Information](#) by Cheryl Bailey is licensed [CC BY-NC 4.0](#).

8.3: Verifying AI-Generated Claims

Verifying AI-Generated Claims

The Mystery: The AI Said the Court Cases Were Real—So Why Could Nobody Find Them?

In 2023, attorneys submitted a legal document in a federal court case that cited judicial decisions provided by ChatGPT. When opposing counsel and the court could not locate several of the cases, one attorney returned to ChatGPT and asked whether the decisions were real.

The system confirmed that they were genuine and claimed they could be found in major legal databases. It even generated documents that looked like court opinions.

The cases did not exist.

In *Mata v. Avianca, Inc.*, the court concluded that the attorneys had relied on fabricated cases and quotations, failed to conduct reasonable verification, and continued presenting the false material after questions arose. The court imposed a \$5,000 penalty and required additional corrective actions.

The attorney had attempted to verify the answer—but asked the same system that created the error.

Why did that verification fail, and what should the attorney have done instead?

Verification Means Leaving the AI Response

Verification means checking a claim against evidence that exists independently of the AI-generated answer.

An AI system may be able to review its response, identify inconsistencies, search connected sources, or correct an error. Those features can help. They do not provide independent confirmation by themselves.

When an important claim appears in an AI response, the researcher should move outside the conversation and locate evidence through an appropriate system. Depending on the question, that evidence might include a scholarly database, government website, court record, statistical agency, original study, professional standard, or recognized subject expert.

The goal is not to find another webpage that repeats the same sentence. The goal is to find evidence capable of establishing whether the sentence is accurate.

Definition: Term

Verification is the process of checking whether a claim is supported by reliable, independent evidence.

Lateral reading means leaving the original page or response and opening other sources to investigate the claim, author, or organization.

An **authoritative source** has appropriate expertise, responsibility, access to evidence, or official standing for the particular question.

A **primary or original source** provides direct evidence, such as an original study, court ruling, law, dataset, speech, interview, or government record.

Corroboration occurs when independent evidence supports the same claim.

Source matching means selecting a source whose authority and evidence fit the specific type of claim being checked.

Verification is stronger when the source is not merely different from the AI tool, but appropriate for the question.

Begin by Separating the Claims

AI responses often contain several claims inside one polished paragraph. Checking the paragraph as a single unit makes verification difficult.

Suppose an AI tool says:

Community college students experience food insecurity at higher rates than university students, food insecurity causes lower grades, and campus food pantries significantly increase graduation rates.

That sentence contains at least three claims. Each requires different evidence.

The first is a comparative prevalence claim. It needs data collected from clearly defined college populations.

The second is a causal claim. It needs research capable of showing more than an association.

The third is an intervention-effectiveness claim. It needs studies that measured pantry participation and graduation outcomes, not simply reports showing how many students visited a pantry.

A researcher should break the response into checkable pieces before searching.

Do Not Search the Whole AI Sentence

Copying a complete AI-generated sentence into Google may return pages with similar wording. That can be useful for discovering where language may have originated, but it can also produce misleading reassurance.

Search for the central concept using neutral terms.

Instead of searching:

“Campus food pantries significantly increase graduation rates”

try:

campus food pantry graduation persistence evaluation

A neutral search does not assume that the claim is already true. It allows evidence supporting, qualifying, or contradicting the statement to appear.

Researchers should also try the language used by specialists. A study may discuss **degree completion**, **academic persistence**, or **retention** rather than “graduation success.”

Lateral Reading Is a Starting Point

Lateral reading asks researchers to leave a source and investigate what other sources say about it. Professional fact-checkers often open new tabs, search for the organization or author, and examine outside coverage before investing much time in the original page. Wineburg and McGrew (2019) found that professional fact-checkers used this strategy more successfully than other highly educated participants evaluating unfamiliar websites.

Lateral reading instruction can also improve students' online evaluation practices. In a study of college students, Brodsky et al. (2021) found that students improved their use of lateral-reading strategies after targeted instruction and practice.

However, lateral reading does not mean collecting random opinions from several websites.

A search result, discussion forum, encyclopedia entry, or fact-checking article may help you understand a claim's background. The final evidence should still come from sources with the authority, methods, and direct access needed to answer the question.

Lateral reading helps you find the neighborhood. Authoritative evidence helps you verify the address.

Authority Depends on the Question

No source is authoritative about everything.

A government health agency may be authoritative for its own official recommendations and datasets. A peer-reviewed medical study may provide stronger evidence for a treatment's measured effects. A court is authoritative for the text of its ruling. A legal scholar may provide expert interpretation of that ruling. A company is authoritative about what it officially announced, but it is not automatically an independent authority on whether its product works as advertised.

This is called **contextual authority**. The source's expertise and access must match the claim.

Consider the AI statement:

The Supreme Court ruled in 2025 that colleges may prohibit all student political demonstrations.

A university policy page is not enough to verify that claim. A news article might help locate the case, but the strongest evidence would include the official court decision or docket. Scholarly legal commentary could then help explain the ruling's meaning and boundaries.

For a scientific claim, the evidence path would look different. Researchers would seek the original peer-reviewed study, a systematic review, or guidance from an authoritative scientific or government organization.

Use Scholarly Sources for Scholarly Claims

When AI makes a claim about research findings, locate the research.

Search the library's scholarly databases, discipline-specific indexes, Google Scholar, or a verified publisher platform. Examine the original article rather than relying only on the AI summary.

A peer-reviewed source has undergone evaluation by other specialists before publication, but peer review does not guarantee perfection. Researchers should still examine the study's methods, sample, date, limitations, and relevance.

A single study also may not represent the broader evidence. When the question asks what research generally shows, a recent systematic review, meta-analysis, scholarly consensus statement, or professional guideline may provide a stronger overview than one isolated article.

The source hierarchy should match the claim's size. A universal claim such as "research proves" requires more than one convenient study.

Consult Legitimate Experts Carefully

Experts can help explain technical findings, identify authoritative sources, and clarify where a field has reached consensus or remains uncertain.

Expertise should be demonstrated rather than assumed. Look for relevant education, research experience, professional responsibilities, publication history, institutional affiliation, and recognition within the field.

A physician may have strong medical expertise but no specialized background in climate modeling. A professor may be highly knowledgeable in one subfield and unfamiliar with another. A social media following, confident tone, or television appearance

does not establish subject expertise.

Even legitimate experts should not replace evidence. When possible, follow the expert's explanation to the research, data, law, or professional standards supporting it.

The expert helps interpret the map. The evidence still shows the terrain.

Match Claims With the Best Available Evidence

AI-generated claim	Strong verification source
"A federal court ruled that..."	The official court opinion, docket, or authenticated legal database
"A new law requires..."	The enacted statute, regulation, or official government guidance
"A study found..."	The original peer-reviewed article
"Research generally shows..."	A systematic review, meta-analysis, consensus report, or several relevant studies
"The unemployment rate is..."	The responsible government statistical agency
"The organization's policy states..."	The organization's official current policy
"Experts recommend..."	A current professional guideline or consensus statement from the relevant field
"This quotation came from..."	The original speech, interview, transcript, book, or archival record

Figure 8.4.1 The table does not mean secondary sources are useless. High-quality secondary sources can provide essential interpretation and context. The point is to move toward evidence that can directly support the specific claim. (CC BY-NC; Cheryl Bailey)

Verify That the Source Exists

When AI provides a scholarly citation, start by confirming that the publication exists.

Search the exact title in the library database, Google Scholar, the journal archive, or Crossref. Crossref maintains metadata registered for scholarly materials, including publication titles, authors, journals, and DOIs.

Check that the title, authors, date, journal, volume, issue, pages, and DOI agree across sources.

A DOI that resolves is useful evidence that a registered item exists, but it does not prove that the article supports the AI's claim. Metadata can also contain errors. Verification must continue into the source itself.

Finding the citation is step one. Reading it is step two.

Verify What the Source Actually Says

Students sometimes stop after locating a real article.

Open the source and search for the claim, quotation, statistic, or finding. Read enough of the article to understand what the researchers measured and concluded.

Suppose an AI tool says:

A national study found that 80% of community college students experience food insecurity.

You locate the cited study, but its sample included students from three colleges who voluntarily completed a survey. The study may be legitimate, but "national study" is inaccurate, and the percentage should not be generalized to every community college student.

Verification should answer several questions. Who participated? What was measured? When and where was the study conducted? Was the result an association or a causal finding? Did the authors include qualifications that the AI omitted?

The claim must fit inside the source's actual boundaries.

Trace Quotations and Statistics to Their Origins

AI-generated quotations require direct confirmation.

Search a distinctive phrase in quotation marks, then locate the original speech, transcript, interview, article, court opinion, or book. Do not rely on quotation websites that repeat the line without documenting its origin.

Statistics require similar care. Find the original dataset, survey report, government release, or scholarly article. Confirm the year, population, wording, unit of measurement, and methodology.

An AI might accurately report the number but attach it to the wrong population. It might report a percentage from 2018 as though it were current. It might transform "students surveyed at participating colleges" into "all college students."

A number without context is not fully verified.

Corroborate Important Claims Independently

Some claims deserve confirmation from more than one source.

Independent corroboration does not mean finding five websites that copied the same press release. Determine whether the sources relied on separate evidence.

For example, a government agency may report a disease outbreak based on surveillance data. A peer-reviewed article may later analyze those data. A news article may repeat the agency's announcement. These sources provide different forms of support, but they are not three independent datasets.

Corroboration is especially important for surprising, controversial, harmful, or high-stakes claims.

The stranger and more consequential the claim, the less comfortable the researcher should be with one unexplained citation.

Use Fact-Checking Sites Appropriately

Professional fact-checking organizations can provide useful leads. They may identify altered images, locate original quotations, explain a rumor's history, or link to primary documents.

However, a fact-check article should not automatically become the final authority for every research question. Follow its links and examine the underlying evidence.

A fact-checker may help establish that a viral quotation is falsely attributed. The original transcript or archive provides direct confirmation of what the person actually said.

Fact-checking is an investigation trail, not a permission slip to stop investigating.

Watch for Source Laundering

Source laundering occurs when an unsupported claim gains credibility by being repeated through increasingly polished sources.

An AI response might cite a blog. The blog might cite a news article. The news article might summarize a company press release. The press release might make a claim based on an unpublished internal survey.

By the time the claim reaches the student, it appears to have several layers of support. In reality, every version depends on the

same weak original evidence.

Trace claims backward until you reach the source that collected the data, conducted the study, issued the decision, or made the original statement.

The citation chain may be long. Your patience may briefly leave the building. Follow it anyway.

What to Do When Verification Fails

Sometimes the researcher cannot confirm a claim.

Search using alternative keywords. Check spelling, dates, author names, and possible title variations. Ask a librarian or relevant subject expert. Look in specialized databases.

If the evidence still cannot be located, do not include the claim as fact.

You may write that the AI generated the statement but that it could not be independently verified if the unverified output itself is relevant to your analysis. For example, a paper about AI fabrication might discuss the false claim as an example of AI behavior.

For an ordinary research paper, remove it.

“I could not verify this” is a responsible research conclusion. “It sounded right, so I kept it” is not.

Expert Thinking: Verifying an AI Health Claim

Jordan asks an AI tool whether energy drinks improve college students’ academic performance. The response says:

A 2023 study found that daily energy-drink consumption improves concentration and raises college GPAs by 12%.

Jordan separates the statement into smaller claims. Was there a 2023 study? Did it examine college students? Did it measure daily energy-drink use, concentration, and GPA? Did it report a 12% increase? Did it establish causation?

Jordan searches the exact citation supplied by the AI. No article appears in the library databases, Crossref, or the named journal.

Next, Jordan searches neutral scholarly terms such as *energy drinks college students concentration academic performance*. Real studies appear, but they generally examine patterns of consumption, sleep, health behaviors, or associations with academic outcomes. None supports the exact claim.

Jordan also checks an authoritative health source to understand the broader evidence about caffeine and energy drinks. The legitimate sources discuss possible short-term alertness as well as sleep disruption and other risks. They do not establish that daily consumption raises GPA by 12%.

Jordan concludes:

The AI-generated claim could not be verified. No matching study was located, and the broader research does not support the specific causal statement or statistic. The claim should not be used.

Jordan does not replace it with the opposite claim unless the evidence supports that conclusion. Failed verification shows that one statement lacks support; it does not automatically prove its reverse.

Example 8.3.1

Real-World Case Study: *Mata v. Avianca*

The attorneys in *Mata v. Avianca* did not merely receive fabricated legal citations. The larger failure occurred when they did not verify them through legitimate legal research systems and official court records.

When questions arose, one attorney asked ChatGPT whether a case was real. The program reassured him that it was and supplied further fabricated information. The court found that the submitted materials contained nonexistent decisions, false quotations, and other features that should have prompted further investigation.

A proper legal verification process would have searched authoritative legal databases, court dockets, and official judicial records. It also would have required reading the decisions rather than relying on generated summaries.

The case demonstrates a principle that applies beyond law:

The system that produced a claim cannot serve as the only authority confirming that claim.

Course Connection: Verification Requires Judgment

Verifying AI output combines several information-literacy skills. Researchers must identify the claim, choose an appropriate search system, evaluate authority in context, trace information to its origin, compare sources, and represent uncertainty honestly.

The goal is not to distrust every AI-generated sentence automatically.

The goal is to decide how much verification each claim requires and which evidence can provide it.

An AI answer may point toward useful keywords, studies, people, laws, or debates. The researcher determines which of those leads survive contact with authoritative evidence.

Solving the Mystery

The attorney's verification failed because he asked ChatGPT to confirm information that ChatGPT had generated.

The system repeated its claim, invented additional support, and presented false cases in a form that resembled genuine legal documents. The response sounded reassuring, but it did not connect the citations to real court records.

The cases should have been checked through official judicial documents and established legal research databases. When those systems returned nothing, the attorneys should have stopped using the citations.

The court's sanctions order made the consequence clear: using an AI tool did not remove the attorneys' responsibility to verify the material submitted in their names.

A responsible verification note would have read:

The cases generated by the AI could not be located in authoritative legal databases or court records. They must be treated as fabricated and excluded from the filing.

The mystery was not why the AI failed to admit that it was wrong.

The mystery was why anyone expected the AI's reassurance to count as independent evidence.

Check Your Understanding

Why is asking an AI tool to verify its own answer not independent confirmation? How does lateral reading help a researcher investigate a claim? Why is finding several websites that repeat a statement different from corroborating it? What source would you use to verify a court ruling, a scientific result, and an unemployment statistic? Why must you read a real article after confirming that its citation exists? What should you do when a claim remains unverifiable?

Key Takeaways

Verification requires leaving the AI response and checking claims against independent evidence.

Lateral reading helps researchers investigate sources, authors, and claims, but the final verification should rely on evidence appropriate to the question.

Authority is contextual. Courts, government agencies, scholarly researchers, professional organizations, and subject experts hold different kinds of authority.

Scholarly claims should be checked against legitimate scholarly literature, especially original studies, systematic reviews, and expert consensus sources.

A real citation does not guarantee that the source supports the AI-generated statement.

Quotations, statistics, laws, studies, and current facts should be traced to their original or official sources whenever possible.

Repeated claims do not provide independent corroboration when every version comes from the same original source.

When a claim cannot be verified, remove it or clearly identify it as unverified rather than presenting it as fact.

References

Brodsky, Jessica. E., et al. "[Improving College Students' Fact-Checking Strategies through Lateral Reading Instruction in a General Education Civics Course](#)." *Cognitive Research: Principles and Implications*, vol. 6, 2021, article 23.

Mata v. Avianca, Inc. 678 F. Supp. 3d 443. United States District Court for the Southern District of New York, 22 June 2023.

Wineburg, Sam, and Sarah McGrew. "[Lateral Reading and the Nature of Expertise: Reading Less and Learning More When Evaluating Digital Information](#)." *Teachers College Record*, vol. 121, no. 11, 2019, pp. 1–40.

Attributions

No third-party AI outputs, court filings, scholarly articles, database records, or screenshots were reproduced or adapted. Jordan's example, the verification explanations, source-matching table, research notes, and knowledge-check questions constitute original instructional content created for the LIB 15 OER.

The opening mystery and real-world case study summarize the court's opinion and sanctions order in *Mata v. Avianca, Inc.* The explanation of lateral reading draws on Wineburg and McGrew (2019), while the discussion of college students' fact-checking instruction draws on Brodsky et al. (2021).

This page titled [8.3: Verifying AI-Generated Claims](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by Cheryl Bailey.

- [13.3: Verifying AI-Generated Claims](#) by Cheryl Bailey is licensed [CC BY-NC 4.0](#).

8.4: Citation and Documentation

Citation and Documentation

The Mystery: Why Was the Paper Still Incomplete After the Student Disclosed AI Use?

Luis uses a generative AI tool while writing a research paper about college food insecurity. The tool helps him brainstorm keywords, reorganize two paragraphs, and summarize several findings.

At the end of the paper, Luis adds this sentence:

I used ChatGPT to help with this assignment.

He assumes that this statement solves every citation and academic-integrity concern. He does not cite the scholarly articles behind the AI-generated summary because he disclosed that he used AI. He also deletes his prompts and chat history.

His instructor returns the paper with questions:

Which claims came from scholarly research? What exactly did the AI contribute? Which version of the tool did you use? Did you verify the summary? Which words are yours?

Luis is confused. He did not hide his AI use, so what information is missing?

To solve the mystery, he must distinguish among **citation**, **documentation**, and **disclosure**. These practices overlap, but they do different jobs.

Citation, Documentation, and Disclosure Are Not Interchangeable

A **citation** connects a claim, quotation, idea, image, or other contribution to its source. It allows readers to determine where the information came from and, when possible, locate it themselves.

Documentation preserves information about the research and writing process. For AI-assisted work, documentation may include the tool, model or version, date, prompts, uploaded materials, generated responses, revisions, and verification steps.

A **disclosure** explains how AI contributed to the completed work.

A citation answers:

Where did this information or language come from?

Documentation answers:

What happened during the research and writing process?

Disclosure answers:

How did AI contribute to what the reader is seeing?

One statement may not answer all three questions.

Definition: Term

Citation is a formal acknowledgment connecting information, language, media, or ideas to a source.

Documentation is a record of the tools, prompts, outputs, decisions, and verification steps used during a project.

Disclosure is a transparent explanation of how an AI tool contributed to the work.

An **AI-use statement** is a short disclosure naming the tool and describing its role in the project.

A **prompt record** preserves the instructions or questions supplied to an AI system.

Provenance is the history of where information came from and how it changed before reaching its current form.

Substantive use refers to AI assistance that meaningfully influences the ideas, language, analysis, evidence, design, or final product.

Citing an AI tool does not automatically disclose everything it did. Disclosing AI use does not replace citations to the real research sources.

Cite the Evidence, Not Merely the AI Summary

Suppose an AI tool tells Luis:

College food insecurity is associated with poorer health, greater academic difficulty, and lower graduation rates.

Even when the statement is accurate, the AI response is not the strongest evidence for it. Luis should locate and read the scholarly studies supporting those findings.

His paper should cite the research:

College food insecurity is repeatedly associated with poorer health and academic outcomes, although much of the evidence remains observational (Bruening et al.; Hagedorn-Hatfield et al.).

The AI may have helped Luis discover the idea or simplify the wording. The scholarly sources establish the evidence.

The Modern Language Association similarly distinguishes AI acknowledgment from ordinary source citation. Its current guidance explains that generative AI output may lack transparent provenance and recommends following generated claims to the original materials, reading them, and citing those sources directly.

A citation to ChatGPT does not turn ChatGPT into the author of the studies it summarized.

Disclosure Does Not Repair Missing Research

Luis's sentence—"I used ChatGPT"—provides some transparency, but it does not identify which claims he verified or where the evidence came from.

Imagine that he writes:

Researchers have proved that campus food pantries raise graduation rates by 20%.

He adds an AI disclosure but provides no supporting study.

The disclosure tells readers that software may have helped produce the sentence. It does not establish that the statistic is real.

Luis must either locate credible evidence supporting the claim, revise it to match the available evidence, or remove it.

An AI disclosure is not a magical citation blanket that can be gently placed over unsupported information.

Citation May Be Necessary When AI Output Becomes Part of the Work

Citation or attribution may be appropriate when a student quotes, closely paraphrases, analyzes, reproduces, or substantially relies on AI-generated output.

For example, a paper studying AI errors might include a short generated response as primary-source evidence:

When asked for studies about campus food pantries, the system generated two references that could not be located in the named journals (ChatGPT, personal communication, July 18, 2026).

The exact formatting will depend on the required citation style, whether the output has a stable shareable link, and the instructor's directions. APA, MLA, and Chicago continue to update their guidance as AI tools and their retrievability change. Current APA Style guidance provides specific reference formats for generative AI tools, while MLA advises writers to describe substantive AI use beyond the mechanics of a citation.

Students should therefore check the assignment, syllabus, institutional policy, and current style guide rather than copying an old citation example from an unrelated website.

A Citation Is Not Proof of Accuracy

Even a correctly formatted AI citation tells the reader only which tool produced the material.

It does not prove that the output was accurate, unbiased, or supported by evidence.

Consider:

ChatGPT reported that 62% of community college students experience food insecurity (ChatGPT, 2026).

The citation identifies the immediate source of the sentence. It does not identify where the percentage originated, which students were surveyed, or whether the number exists.

A stronger approach traces the statistic to the original study or report:

In the multicampus survey conducted by [verified authors], 62% of respondents at the participating institutions met the study's definition of food insecurity ([verified citation]).

Now the reader can evaluate the population, methodology, and limits of the statistic.

AI citation documents the output. Source citation supports the factual claim.

What a Useful Disclosure Should Explain

"I used AI" is usually too vague to help the reader understand the work.

A useful disclosure identifies the tool, the purpose of the use, the parts of the process affected, and the human verification or revision that followed.

Compare these statements.

Too vague: I used AI for this paper.

More useful: I used ChatGPT in July 2026 to brainstorm database keywords and suggest possible ways to organize

my verified research notes. I independently located and read all cited sources, checked the generated suggestions against those sources, and wrote the final analysis.

The second statement shows where the AI contribution begins and ends.

Scholars studying AI disclosure have argued that transparency supports appropriate credit, accountability, and evaluation of research practices. However, disclosure requirements differ across institutions, journals, disciplines, and types of AI use (Resnik & Hosseini).

One Disclosure Does Not Fit Every Project

The appropriate level of detail depends on how substantially the tool influenced the work.

A grammar checker that corrects a few typographical errors may require different documentation from a system that drafted paragraphs, analyzed data, generated code, translated interviews, created images, or reorganized an argument.

Kari Weaver's Artificial Intelligence Disclosure Framework recommends describing AI use according to the role it performed within the research or writing process. The framework aims to make disclosures clear enough to show both the AI contribution and the human contribution (Weaver).

The central question is not merely:

Did I open an AI tool?

A better question is:

Did the tool meaningfully influence the ideas, language, evidence, analysis, organization, or final product that another person will evaluate?

Example 8.4.1

Examples of AI-Use Disclosures

Type of AI assistance	Example disclosure
Brainstorming and keywords	I used ChatGPT in July 2026 to generate possible keywords related to college food insecurity. I tested the terms in library databases and independently selected and evaluated all sources.
Organization	I used Claude in July 2026 to suggest possible groupings for research notes I had already collected. I revised the organization and wrote the final outline and paper.
Editing	I used Grammarly's generative features to identify unclear sentences and suggest wording changes. I reviewed each suggestion and accepted, rejected, or revised it.
Drafted language	I used ChatGPT to produce an initial explanation of the difference between correlation and causation. I checked the explanation against assigned sources and substantially rewrote it before including it.
Image generation	I used an AI image generator to create the chapter illustration from an original prompt. No third-party image was supplied as a reference. The image is identified as AI generated in its caption and attribution.
No AI use	I did not use generative AI to develop, draft, revise, translate, or create media for this assignment.

Figure 8.5.1 These are models, not universal rules. Students should adapt them to the assignment and disclose what actually occurred. (CC BY-NC; Cheryl Bailey)

Document the Process While You Work

Trying to reconstruct AI use after finishing a project is difficult.

Luis initially deletes his chats because he assumes they no longer matter. Later, he cannot remember which prompts produced which suggestions or whether the tool supplied wording that remains in the paper.

A better approach is to keep a short working record.

For each meaningful AI interaction, Luis records the tool and model if available, the date, the purpose, the prompt, the useful output, the changes he made, and the sources used for verification.

His note might read:

Tool and date: ChatGPT, July 18, 2026

Purpose: Generate alternative database keywords

Prompt: “Suggest scholarly search terms for research about food insecurity and degree completion among community college students.”

Useful terms retained: basic needs insecurity, degree attainment, academic persistence

Verification: Tested all terms in Academic Search Complete and ERIC

Final use: Search development only; no generated prose copied into the paper

This record makes the final disclosure easier and provides evidence of Luis’s research process.

Save Important Prompts and Outputs

A prompt affects the generated response. Recording only the tool name may therefore leave out a major part of the context.

Compare:

Tell me about student hunger.

with:

Identify possible scholarly search terms for studying the relationship between food insecurity and academic persistence among California community college students. Do not invent citations.

The prompts ask for different work and will likely produce different outputs.

When an instructor requires documentation, students may save a transcript, export the conversation, capture the relevant prompt and response, or place selected exchanges in an appendix. The MLA notes that writers may need to provide information beyond formal citation, such as notes describing AI use, prompts, or linked or appended transcripts.

Do not submit private, confidential, copyrighted, or personally identifiable information merely to prove that you used AI. Documentation should remain proportionate and safe.

Explain Human Responsibility

AI cannot accept academic responsibility for a submitted assignment.

The student decides which claims to include, which sources to trust, what language to submit, and whether the work meets the assignment requirements.

A disclosure should not sound like this:

ChatGPT wrote the inaccurate section, so the error was not mine.

A more responsible statement would explain the AI contribution while preserving human accountability:

I used ChatGPT to draft a preliminary explanation. I reviewed and revised the language and accept responsibility for the accuracy and final content.

Current scholarly guidance on AI disclosure emphasizes that authors must independently verify AI-assisted content and remain responsible for the completed work.

Disclosure explains the process. It does not transfer responsibility to the tool.

AI Is Not an Academic Author

Authorship involves more than generating words. An author accepts responsibility for the work, responds to questions, discloses conflicts, and stands behind the accuracy and integrity of the final product.

An AI tool cannot perform those responsibilities.

Therefore, students should not list an AI system as a coauthor of an academic paper. They may cite, attribute, document, or disclose its contribution according to the assignment and style guide.

The human author remains accountable.

Documentation Helps Distinguish Assistance From Substitution

An instructor may permit AI for brainstorming but not for drafting. Another may permit editing but require disclosure. A third may prohibit generative AI because the assignment specifically assesses independent writing or problem solving.

A process record can show how the tool was used.

For example, Luis's saved prompts demonstrate that he requested keyword ideas and outline feedback. His document history shows that he drafted and revised the paper. His citations show that he located and read the scholarly sources.

Documentation does not automatically prove that every use complied with the assignment. It does make the process more transparent.

The safest approach is to read the policy before using the tool, not after submitting the assignment.

When AI Use Is Not Allowed

Citation and disclosure do not convert prohibited assistance into permitted assistance.

Suppose an instructor states:

Do not use generative AI to write or revise this reflection.

A student cannot submit AI-generated prose and avoid a violation by adding:

This reflection was generated by ChatGPT.

The disclosure makes the prohibited use visible. It does not make the use acceptable.

Citation addresses attribution. Compliance depends on the assignment rules.

When the policy is unclear, ask the instructor before using AI in a substantial way.

Copyright Attribution Is a Separate Question

An AI disclosure does not replace copyright attribution for third-party materials.

Suppose a student uploads a copyrighted illustration and asks an AI system to transform it into a different style. The final project may involve questions about the original image's copyright, the permission to create a derivative work, and how the source should

be attributed.

Likewise, asking AI to rewrite a copyrighted article does not remove the need to cite the article or create permission to reproduce protected expression.

Researchers must keep four questions separate:

What factual or scholarly source supports the claim?

What AI tool contributed to the work?

What disclosure does the assignment require?

What copyright or license applies to reused material?

One acknowledgment cannot perform all four jobs.

Example 8.4.1

Example: Revising Luis's Paper

Luis's original paragraph says:

College food insecurity causes depression, lowers grades, and makes students drop out. ChatGPT says colleges should provide food pantries and emergency aid.

His only documentation is:

I used ChatGPT.

Luis revises the paragraph after locating scholarly sources:

Research consistently associates college food insecurity with poorer health and academic outcomes, although much of the evidence does not establish that food insecurity alone caused those outcomes (Bruening et al., 2017; Hagedorn-Hatfield et al., 2022). Campus food pantries and emergency assistance may address immediate needs, but additional longitudinal evaluation is needed to determine which interventions produce lasting improvements.

He then adds a disclosure:

AI-use disclosure: I used ChatGPT in July 2026 to brainstorm search terms and suggest a preliminary organization for this section. I independently located, read, and cited the scholarly sources. I checked all factual claims against those sources and wrote and revised the final prose.

The revised version separates the evidence from the AI assistance.

The scholarly citations support the findings. The disclosure explains the process. Luis's notes document what happened.

Course Connection: Making the Research Process Visible

Citation helps readers follow ideas back to their sources. Disclosure helps readers understand where AI contributed. Documentation preserves enough of the process to explain and evaluate that contribution.

Together, these practices support transparency without pretending that AI output functions like an ordinary scholarly source.

The researcher must still locate credible evidence, verify claims, cite the original materials, and accept responsibility for the final work.

Solving the Mystery

Luis's paper remained incomplete because the sentence "I used ChatGPT" did not explain what the tool did or identify the evidence supporting his claims.

His disclosure was too vague. He had not preserved his prompts or outputs. Most importantly, he had treated the AI-generated summary as a replacement for scholarly citations.

Luis solves the problem by separating three responsibilities:

Citation: He cites the scholarly studies supporting his claims.

Documentation: He keeps a record of the tool, date, prompts, outputs, revisions, and verification.

Disclosure: He explains how AI contributed to the submitted work.

His final disclosure states:

I used ChatGPT in July 2026 to brainstorm search terms and test possible organizational structures. I independently located and evaluated all cited sources, verified the factual claims, and wrote the final analysis.

The mystery was not whether Luis admitted using AI.

The mystery was whether his reader could determine what the AI contributed, where the evidence came from, and who accepted responsibility for the final work.

Check Your Understanding

How does an AI disclosure differ from a citation? Why should a student cite the original study instead of an AI summary of that study? What information makes a disclosure useful rather than vague? Why might a student preserve prompts and generated outputs? Does citing AI make a prohibited use acceptable? Who remains responsible for inaccuracies in AI-assisted work?

Key Takeaways

Citation identifies the source of information, language, or media. Documentation records the research and writing process. Disclosure explains how AI contributed.

AI-generated summaries do not replace citations to original scholarly or authoritative sources.

A correctly formatted AI citation identifies the tool or output but does not prove that its claims are accurate.

Useful disclosures name the tool, describe the purpose and extent of its use, and explain the human verification or revision that followed.

Students should preserve important prompts, outputs, dates, model information, and verification notes when an assignment requires process documentation.

AI should not be listed as an academic author because it cannot accept responsibility for the work.

Citation and disclosure do not make prohibited AI assistance acceptable.

The student remains responsible for the evidence, accuracy, originality, and final submitted work.

References

"AI References." *APA Style*, American Psychological Association, 2026.

"Beyond Citation: Describing AI Use in Your Work." *MLA Style Center*, Modern Language Association, 13 Aug. 2025.

Resnik, David B., and Mohammad Hosseini. "Disclosing Artificial Intelligence Use in Scientific Research and Publication: When Should Disclosure Be Mandatory, Optional, or Unnecessary?" *Accountability in Research*, 2025.

Weaver, Kari D. "The Artificial Intelligence Disclosure (AID) Framework: An Introduction." *College & Research Libraries News*, vol. 85, no. 10, 2024, pp. 407–11.

Attributions

No third-party AI conversations, student work, prompts, screenshots, or disclosure statements were reproduced. Luis's mystery, research notes, sample paragraphs, disclosure models, and knowledge-check questions constitute original instructional content created for the LIB 15 OER.

The distinction between citation and broader acknowledgment draws on the Modern Language Association's current AI guidance. The discussion of disclosure, transparency, and responsibility draws on Resnik and Hosseini and Weaver's Artificial Intelligence Disclosure Framework.

This page titled [8.4: Citation and Documentation](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by Cheryl Bailey.

- [13.4: Citation and Documentation](#) by Cheryl Bailey is licensed [CC BY-NC 4.0](#).

8.5: Ethical and Effective Uses of AI

Ethical and Effective Uses of AI

The Mystery: How Can Writing One Paragraph Use Water?

Dani asks a generative AI tool to help reorganize a paragraph. The response appears almost instantly. Nothing on the screen looks environmentally intensive. Dani's laptop does not become especially hot, no water runs through the classroom, and the tool does not display a utility meter beside the answer.

Later, Dani hears that generative AI can consume water. The claim sounds impossible. Words are not wet, and the chatbot lives somewhere vaguely described as "the cloud."

Where would the water go?

The answer requires looking beyond the visible interface. Generative AI depends on physical data centers filled with computers that consume electricity and release heat. Those facilities must remove that heat, and some of the least expensive and most energy-efficient cooling methods use water.

The mystery raises a larger question. Using AI ethically requires more than avoiding plagiarism or checking facts. It also requires considering labor, privacy, copyright, corporate power, community resources, and whether the tool provides enough benefit to justify its costs.

Ethical Use Begins With Purpose

Generative AI is not automatically ethical or unethical. Its value depends partly on what the user asks it to do, what information the system uses, who may be affected, and what the user does with the result.

AI may help a student brainstorm search terms, translate technical language into a preliminary explanation, organize verified notes, test whether instructions are clear, or receive feedback on a draft. Those uses can reduce barriers and help students begin difficult tasks.

The same technology can also fabricate evidence, reproduce stereotypes, expose private information, weaken learning, imitate copyrighted expression, or allow a person to submit work they did not meaningfully create.

A useful first question is not simply, "Can AI do this?"

Ask:

What problem am I trying to solve, and is generative AI the most responsible tool for solving it?

Sometimes the answer will be yes. Sometimes a database, calculator, style guide, librarian, tutor, accessibility service, instructor, or ordinary search engine will provide stronger results with fewer risks.

Definition: Term

Ethical AI use means using AI with attention to accuracy, fairness, privacy, intellectual ownership, transparency, environmental effects, human responsibility, and the people or communities affected by the technology.

Effective AI use means selecting AI for a task it can perform usefully while recognizing its limitations and checking its output.

A **data center** is a physical facility containing computer servers, networking equipment, storage systems, electrical infrastructure, and cooling systems.

Direct water use occurs at the data center itself, primarily through cooling. **Indirect water use** can occur when power plants consume water to generate the electricity used by the facility.

Externalized cost is a cost created by an activity but carried partly by other people, communities, workers, or environments rather than by the buyer or company making the decision.

Late-stage capitalism is a critical term commonly used to describe a mature capitalist economy in which corporate concentration, profit seeking, inequality, commodification, and the transfer of social or environmental costs receive particular attention.

The phrase *late-stage capitalism* represents a political and economic interpretation, not a neutral technical measurement. It can help frame questions about who receives AI's benefits and who absorbs its costs, but researchers should identify it as a critical lens rather than treating it as an uncontested fact.

AI Exists in Physical Places

"The cloud" sounds light and almost magical. In reality, cloud computing happens inside buildings.

A generative AI request travels from a user's device to servers that perform large numbers of computations. Those servers consume electricity and generate heat. If the equipment becomes too hot, it slows down, fails, or becomes unsafe. Cooling is therefore a central part of data-center design.

The environmental effects do not come only from training a large model once. They also come from operating the model, storing data, manufacturing hardware, replacing equipment, maintaining networks, and generating the electricity that keeps the system available.

The size of the footprint varies greatly. It depends on the model, hardware, data center, cooling system, electricity source, local climate, time of day, and length and complexity of the request. For that reason, claims that "one prompt always uses exactly this much water" should be treated cautiously.

Why Data Centers Use Water

Many data centers use evaporative cooling or cooling towers. Water absorbs heat and some of it evaporates, carrying the heat away. This approach can use less electricity than relying entirely on compressor-based air conditioning, especially under suitable climate conditions.

The water may come from drinking-water systems, groundwater, surface water, reclaimed wastewater, or other sources. The local effect depends on where the facility operates and whether water is abundant or scarce at that time.

A gallon used in a cool, water-rich region does not create the same community risk as a gallon withdrawn during a drought in a water-stressed region. Annual totals can also hide peak demand on the hottest days, when communities and data centers may need the most water simultaneously.

Lawrence Berkeley National Laboratory's national data-center research emphasizes that water use varies substantially according to cooling technology, climate, energy source, equipment efficiency, and operating conditions. Its 2024 report also identified rapid growth in electricity and water demand associated with expanding data-center capacity, including AI workloads (Shehabi et al.).

Water Is Not the Only Cooling Option

Data centers do not have to use drinking water in open evaporative systems.

Facilities can use outside-air cooling in suitable climates, closed-loop liquid systems, direct-to-chip cooling, immersion cooling, reclaimed water, thermosyphon systems, or forms of dry cooling that reject heat through air rather than evaporation. Designers

can also improve airflow, raise operating temperatures within safe limits, locate facilities in cooler climates, and schedule flexible computing tasks when environmental conditions are favorable.

These options involve trade-offs. Dry cooling can sharply reduce on-site water use but may require more electricity, particularly during hot weather. Closed-loop systems still need a way to release the heat outside the building. Reclaimed water requires suitable treatment and pipeline infrastructure. Advanced liquid and immersion systems may require different equipment, technical expertise, and greater initial investment.

The U.S. Department of Energy has funded alternative and more efficient data-center cooling technologies because cooling can represent a substantial portion of facility energy demand. The existence of those projects demonstrates that water-intensive cooling is not the only technical possibility.

It would be too simple, however, to say that companies use water only because they do not care. Cooling decisions depend on climate, electrical demand, facility design, available infrastructure, reliability, and cost.

It is fair to say that water is often economically attractive because evaporation can remove heat efficiently. Systems that use less water may cost more to build, require more electricity, or involve unfamiliar infrastructure. A corporation operating under pressure to control costs may therefore have a financial incentive to choose the cheaper workable system unless law, community requirements, water pricing, or corporate commitments change that calculation.

That is where ethics, public policy, and political economy enter the server room.

The Late-Stage Capitalism Question

A critical analysis of AI asks who captures the economic value and who bears the costs.

Technology companies can earn revenue, increase market share, automate work, and attract investment through AI services. Users may receive convenience, productivity, creative tools, or improved access to information. Communities hosting data centers may receive construction activity, tax revenue, infrastructure investment, and some employment.

Those same communities may also face increased demand for electricity, water, land, transmission lines, backup generators, and public infrastructure. Utility customers may worry about rate increases. Residents may experience noise, construction, pollution, or competition for limited water. Workers whose writing, art, code, or other creative labor entered training datasets may receive no direct compensation.

From a late-stage-capitalism perspective, the ethical concern is that private companies may capture the profits while distributing some environmental, cultural, and infrastructure costs across the public.

This interpretation should lead to research questions rather than slogans. Who pays for new electrical generation and water infrastructure? What tax incentives did the facility receive? How many permanent jobs resulted? Are water withdrawals publicly reported? Can residents participate meaningfully in approval decisions? Does the company compensate creators whose work supports the system?

The answers may differ among facilities and jurisdictions.

AI Companies Are Not Completely Unregulated—but Regulation Is Incomplete

It would be inaccurate to say that AI corporations operate under no regulation at all.

Companies remain subject to laws involving contracts, consumer protection, employment, discrimination, privacy, copyright, environmental review, utilities, zoning, water withdrawal, and other areas. Some jurisdictions have also adopted AI-specific requirements. Data centers may need permits and agreements concerning construction, electricity, water, emissions, and land use.

The more accurate concern is that AI regulation remains fragmented, rapidly developing, and often less transparent than the technology's growth. Rules vary by country, state, and locality. Environmental reporting is not uniform, and companies do not always disclose enough information for researchers to calculate the water, energy, and carbon effects of a particular model or

prompt.

A 2025 scholarly assessment of data-center environmental footprints identified limited and inconsistent public disclosure as a major obstacle to accurate estimates and argued for stronger reporting requirements (de Vries-Gao).

The absence of one comprehensive law does not mean the absence of all law. It means that existing rules may leave gaps in disclosure, accountability, community participation, and enforcement while the industry expands quickly.

Individual Choice Matters, but Corporations Control the Largest Decisions

Students are sometimes told to reduce AI use as though every prompt carries equal responsibility for global infrastructure.

Individual choices matter, particularly when millions of users repeat resource-intensive tasks. A person can avoid generating dozens of unnecessary versions, use a smaller or non-generative tool when appropriate, and reserve AI for work that provides meaningful value.

However, individual users do not choose the data center's location, energy source, water supply, cooling system, model architecture, hardware, or disclosure practices. Companies and public authorities make those decisions.

Ethical discussion should therefore avoid placing the entire environmental burden on a student who requests help revising one paragraph while ignoring the institutions deciding to build gigawatt-scale computing systems.

Personal responsibility and structural responsibility can both exist. They do not exist at the same scale.

Copyrighted Works and AI Training

Generative AI systems are trained on large collections of text, images, music, code, video, and other materials. Some training collections have included copyrighted works.

The legal questions are not fully settled. In its 2025 report on generative AI training, the U.S. Copyright Office concluded that fair-use analysis depends on the specific facts, including the sources of training material, the purpose and character of the use, the nature and amount of the copied material, and effects on markets for the original works. The report did not declare all AI training categorically lawful or categorically infringing.

For students, the ethical concern extends beyond the final court rulings. Authors, artists, journalists, programmers, musicians, and other creators may object to having their work copied into commercial training systems without permission, compensation, meaningful notice, or a practical way to refuse.

A person can acknowledge this concern without claiming that an AI model stores and reproduces every training work intact. Models generally learn numerical patterns, but they can sometimes produce material that closely resembles training content, especially when prompted for recognizable works or when the content appeared repeatedly.

The responsible response is not to treat AI as a copyright laundering machine.

AI Does Not Erase the Original Source

A student should not paste a subscription article into an AI tool and assume that the generated paraphrase no longer needs citation. The ideas and evidence still came from the article.

Likewise, asking a model to rewrite a chapter, imitate a living author's recognizable voice, remove a watermark, or transform an illustration does not automatically create permission to use the result.

When copyrighted information contributes to a project, students should cite the source and follow applicable permission, license, fair-use, and assignment requirements. When using library-licensed material, they should also consider whether uploading the full text to an outside AI platform complies with the library's license and the platform's privacy terms.

Generative transformation changes the output. It does not erase provenance.

Privacy and Confidential Information

Prompts can contain more information than users realize.

A student might upload an unpublished research paper, interview transcript, medical record, workplace document, class roster, or email conversation to request a summary. That material may include private, confidential, copyrighted, or personally identifiable information.

Before uploading anything, ask whether you have permission to share it with the platform and whether the platform's terms permit the provider to store, review, or use the content. Institutional versions may provide different privacy protections from free public accounts, but the details must be checked rather than assumed.

Names can often be removed, but deleting a name does not always make a person unidentifiable. A combination of location, job title, unusual experience, age, and other details may still reveal who the person is.

When sensitive information is not essential to the task, do not upload it.

Bias and Unequal Representation

AI systems learn from human-created information. That information reflects historical inequality, cultural assumptions, stereotypes, gaps, and unequal representation.

A generated answer may treat one cultural experience as normal and others as exceptions. It may reproduce biased associations involving race, gender, disability, language, religion, nationality, income, or other identities. It may provide stronger information about heavily documented communities while offering shallow or stereotyped descriptions of groups less represented in the training data.

Bias does not always appear as an openly offensive sentence. It may appear through who receives the benefit of the doubt, which occupations the system associates with particular people, whose scholarship it recommends, or which perspectives it leaves out.

Students should examine the output for missing voices, unsupported generalizations, and assumptions about who the audience is. Verification should include scholarship and expertise from people directly connected to the issue rather than relying on the AI to represent every perspective fairly.

Example 8.5.1

Effective Use: Generating Search Language

AI can be useful near the beginning of research when a student does not yet know the vocabulary used by scholars.

A student researching students who cannot afford enough food might ask for related search language. The AI may suggest *food insecurity*, *basic-needs insecurity*, *academic persistence*, *degree attainment*, and *campus food assistance*.

The student can test those terms in a library database, examine subject headings in relevant records, and revise the search.

The AI has supported retrieval without becoming the source of evidence.

Effective Use: Explaining an Unfamiliar Concept

A student may ask AI to explain a difficult term at an introductory level.

For example:

Explain the difference between correlation and causation using a college-related example. Do not provide citations or claim that the example comes from a real study.

The resulting explanation can provide an entry point. The student should then compare it with the course materials or a verified scholarly source.

This approach works best when the AI explanation supplements—not replaces—the assigned reading.

Effective Use: Organizing Verified Notes

AI can help identify possible patterns in notes the student has already collected.

A useful prompt might state:

Group these verified notes according to patterns, disagreements, methods, and research gaps. Do not add facts, citations, or sources that are not present in the notes.

The student must review the groupings because the system may combine ideas incorrectly or overlook an important difference.

The tool can rearrange the puzzle pieces. The researcher decides whether the picture is accurate.

Effective Use: Testing Communication

Students can use AI as a practice audience.

A student might ask:

Identify terms in this paragraph that a first-year college student may not understand. Do not rewrite the paragraph.

Another prompt might ask:

What questions might a skeptical reader have after reading this explanation?

These uses can reveal unclear language, missing definitions, unsupported transitions, or assumptions about the audience. The student remains responsible for deciding which feedback to use.

Effective Use: Creating Practice Without Replacing Learning

AI can generate low-stakes practice questions, hypothetical scenarios, or examples.

A student might request three fictional claims and practice identifying which source would be best for verification. The student could also ask for an intentionally flawed citation and then practice checking it.

This use supports learning because the student still performs the evaluated skill.

By contrast, asking the AI to complete the graded analysis removes the practice the assignment was designed to provide.

The difference is not merely whether AI produced words. It is whether the student still did the thinking the course intended to assess.

Effective Use: Accessibility Support

AI may help users simplify complex wording, brainstorm descriptive alternative text, outline a transcript, reorganize a difficult passage, or identify potential barriers in instructions.

These uses may be especially valuable to multilingual learners and students with disabilities. However, generated captions, translations, summaries, and alternative text require human review.

An image description can omit important information. Automated captions can mistranscribe names or technical terms. Simplification can remove a necessary qualification.

Accessibility support should increase access without quietly reducing accuracy.

Less Effective Use: Asking AI to Perform Search Without Sources

A student who asks, “What does research say?” and copies the answer may receive an attractive summary with invisible evidence.

The student cannot tell which claims came from research, which came from general training patterns, or which were generated to make the paragraph sound complete.

A stronger approach uses an AI system connected to identifiable sources or provides verified materials directly. The student then opens, reads, and cites the original sources.

AI can help explain evidence. It should not make the evidence disappear.

Less Effective Use: Producing Endless Versions

Generative AI makes revision unusually cheap from the user’s perspective. A person can request 20 introductions, 50 images, or hundreds of slogans with little visible effort.

Those generations still require computation.

An ethical efficiency principle is to provide a focused prompt, review the first result, identify what specifically needs improvement, and revise deliberately. Requesting endless alternatives without reading them wastes both the user’s attention and computing resources.

This does not mean students should feel guilty for experimenting. It means the ease of generation should not replace purposeful decision-making.

A Practical Decision Before Using AI

Dani develops a brief mental check.

First, what is the task supposed to teach? If the assignment assesses independent synthesis, asking AI to write the synthesis may defeat the purpose.

Next, what information would have to enter the system? If the task requires confidential interviews or copyrighted subscription content, another method may be safer.

Then, what could go wrong? The output might be inaccurate, biased, fabricated, too similar to another work, or inconsistent with the assignment policy.

Finally, what will Dani do afterward? Effective use requires verification, revision, citation, documentation, or disclosure as appropriate.

This check is more useful than treating AI as either forbidden magic or mandatory progress.

Course Connection: The Researcher Remains Responsible

Generative AI can participate in research, but it cannot replace the researcher’s judgment.

Students must still select appropriate tools, find credible evidence, evaluate authority, verify claims, cite sources, preserve privacy, follow copyright and licensing requirements, disclose meaningful AI assistance, and communicate conclusions accurately.

Ethical use includes the effects that occur beyond the screen. It asks how the technology was built, which resources it consumes, whose work contributed to it, who controls it, and who experiences the risks.

Effective use asks whether the tool actually improved the research or merely produced more text.

Solving the Mystery

Dani's paragraph did not contain water, but generating it depended on physical infrastructure that may have used water.

The request traveled to servers in a data center. Those servers consumed electricity and released heat. Depending on the facility, water may have been consumed directly through evaporative cooling and indirectly through electricity generation.

Dani cannot determine the exact water footprint of the paragraph from the interface alone. Companies do not provide uniform prompt-level environmental data, and resource use varies across models, facilities, climates, cooling systems, and times.

The ethical conclusion is therefore not that every prompt consumes one fixed bottle of water or that students should never use AI. The evidence does not support such a simple rule.

The better conclusion is that AI has material costs that its smooth interface conceals. Dani can use it purposefully, avoid unnecessary generation, protect sensitive material, verify the output, and choose simpler tools when they can perform the task. Companies and governments carry the larger responsibility for transparent reporting, efficient systems, responsible facility locations, less water-intensive cooling, renewable electricity, and meaningful community oversight.

The cloud was never floating above the physical world.

It was a building connected to a power grid and, sometimes, a water pipe.

Chapter 8 Wrap-Up: What the Mysteries Revealed

The mysteries in this chapter followed an AI response backward—from polished words on a screen to the systems, sources, decisions, and physical infrastructure behind them.

In **8.2**, Maya received links from Google, publication records from a library database, and a newly written answer from generative AI. The tools produced different results because they performed different jobs. Search engines and databases retrieved indexed materials, publishers distributed content, aggregators brought records together, and generative AI created language from learned patterns. AI search tools combined retrieval with generation, but the generated summary still required inspection of the original sources.

In **8.3**, Elena received a citation that looked perfectly scholarly but described no real article. The model had reproduced the structure of a citation without establishing that the source existed. The mystery showed that fluency, confidence, precise formatting, and even a plausible DOI cannot prove accuracy.

In **8.4**, attorneys asked ChatGPT whether fabricated court cases generated by ChatGPT were real. The system reassured them and invented additional support. The failure demonstrated why verification must leave the AI response and move toward authoritative evidence such as official court records, original scholarship, government data, professional standards, and legitimate subject expertise.

In **8.5**, Luis disclosed that he had used AI but still failed to cite the scholarly evidence or explain what the tool contributed. The mystery separated citation, documentation, and disclosure. Citations connect claims to evidence. Documentation records the process. Disclosure tells readers how AI affected the work.

Finally, in **8.6**, Dani learned that an apparently weightless paragraph depended on servers, electricity, cooling systems, land, water, hardware, human labor, copyrighted materials, corporate decisions, and public infrastructure. Ethical use required looking beyond the answer to the system that made it possible.

Key Takeaways

Generative AI differs from a search engine or library database because its primary output is newly generated language rather than a transparent list of existing sources. Some systems retrieve information before answering, but retrieval does not guarantee that the generated response represents the sources accurately.

AI can produce useful and accurate information, but it can also fabricate citations, quotations, statistics, events, and explanations. The same confident tone can accompany both correct and incorrect content.

Verification requires authoritative evidence appropriate to the claim. Researchers should locate original studies, official records, government data, court decisions, professional guidelines, or legitimate expert analysis rather than accepting repetition as confirmation.

Citation, documentation, and disclosure perform different functions. Students should cite the evidence supporting their claims, preserve meaningful records of their AI use, and disclose how the tool affected the final work when required.

Copyright continues to apply when information passes through an AI system. A generated transformation does not automatically remove the rights, licenses, citations, or ethical interests connected to the original work.

AI systems also carry environmental and social costs. Data centers consume electricity and may consume substantial water, but their effects vary by facility, cooling system, energy source, climate, and local resource conditions. Companies and public authorities make the largest infrastructure decisions, while individual users can still choose purposeful rather than wasteful use.

The most effective uses of AI support human research and learning. AI can help develop keywords, clarify unfamiliar language, organize verified notes, test explanations, create low-stakes practice, and improve accessibility. It becomes less effective when it replaces evidence, conceals the research process, performs the thinking an assignment is meant to assess, or produces large quantities of material without a clear purpose.

The final responsibility remains with the person submitting or sharing the work. AI can generate an answer, but it cannot guarantee the evidence, accept accountability, follow an instructor's policy, protect someone's privacy, or decide whether the benefits justify the costs.

Final Takeaway

Generative AI is neither a magical source of knowledge nor a useless machine that must always be avoided.

It is a powerful, imperfect, resource-intensive, and commercially controlled technology.

The strongest researchers use it selectively. They know what task it is performing, what information it can access, what evidence supports its answer, what risks accompany the use, what must be disclosed, and when a different tool would be better.

The final question is not:

Did AI help create this?

It is:

Was AI used in a way that made the work more accurate, thoughtful, transparent, lawful, accessible, and responsible?

Check Your Understanding

How can generative AI use water even though no water appears on the user's device? Why might a data center select water-intensive cooling instead of a dry system? Why is it inaccurate to say that AI companies face no regulation at all? How does a late-stage-capitalism lens change the questions researchers ask about AI infrastructure? Why does passing copyrighted material through AI not erase its original source or copyright status? What is one AI use that supports learning and one use that might replace the learning an assignment intends to measure? How could a student reduce unnecessary AI use without assuming personal responsibility for every decision made by a technology corporation?

References

Copyright and Artificial Intelligence, Part 3: Generative AI Training. U.S. Copyright Office, May 2025.

de Vries-Gao, Alex. "The Carbon and Water Footprints of Data Centers and What This Could Mean for Artificial Intelligence." *Patterns*, 2025.

Shehabi, Arman, et al. *2024 United States Data Center Energy Usage Report*. Lawrence Berkeley National Laboratory, 2024.

Attributions

No third-party AI responses, copyrighted training materials, data-center photographs, diagrams, or corporate graphics were reproduced or adapted. Dani's mystery, examples, ethical analysis, practical applications, chapter review, and knowledge-check questions constitute original instructional content created for the LIB 15 OER.

The discussion of U.S. data-center energy and water demand draws on Lawrence Berkeley National Laboratory's national report and water-efficiency research. The explanation of cooling alternatives draws on U.S. Department of Energy data-center guidance and cooling initiatives. The copyright discussion summarizes the U.S. Copyright Office's 2025 report on generative AI training without reproducing its language.

This page titled [8.5: Ethical and Effective Uses of AI](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by Cheryl Bailey.

- [13.5: Ethical and Effective Uses of AI](#) by Cheryl Bailey is licensed [CC BY-NC 4.0](#).

8.6: Parting Thoughts

Generative AI tools can turn up sources that may work for college research. To be certain, though, you will need to do some of the legwork. First, you need to make sure each source actually exists! Start by tracking down the full-text of each source by entering citation information into OneSearch, a library database, Google Scholar, or Google. Remember, some content is behind the paywall, so you may need to rely on the library to locate essential sources in full-text. As an aside, generative AI output is likely to favor websites and other content easily accessible through the open web. If you need to include books or peer reviewed articles on your Works Cited list, you will generally go further with library databases, such as OneSearch.

If a Generative AI tool turns up a relevant source that actually exists, don't forget to evaluate it for credibility using the criteria we have been working on in this course. Who created the site? What is its purpose? And so forth. Finally, it is a good idea to run your own searches using OneSearch, a library database, or Google Scholar to get a better sense of what is truly available to you. If you solely rely on the choices made by a "robot," you could be missing valuable information and end up settling for a mediocre effort. Try seeing Generative AI tools as belonging to a larger research toolkit you are developing in order to become an expert researcher.

INDEX

No index terms found.

GLOSSARY

S

Sample Word 1 | Sample Definition 1

DETAILED LICENSING

Overview

Title: Library Research and Information Literacy (Wergeland) 2e

Webpages: 66

Applicable Restrictions: Noncommercial

All licenses found:

- [CC BY-NC-SA 4.0](#): 83.3% (55 pages)
- [Public Domain](#): 13.6% (9 pages)
- [CC BY-SA 4.0](#): 3% (2 pages)

By Page

- Library Research and Information Literacy (Wergeland) 2e - [CC BY-NC-SA 4.0](#)
 - Front Matter - [Public Domain](#)
 - [TitlePage](#) - [Public Domain](#)
 - [InfoPage](#) - [Public Domain](#)
 - [Table of Contents](#) - [Public Domain](#)
 - [Licensing](#) - [Public Domain](#)
 - 1: Introduction to Information Literacy - [CC BY-NC-SA 4.0](#)
 - [1.1: What is Information Literacy?](#) - [CC BY-NC-SA 4.0](#)
 - [1.2: How Will Information Literacy Benefit Me?](#) - [CC BY-NC-SA 4.0](#)
 - [1.3: Generative AI Literacy](#) - [CC BY-NC-SA 4.0](#)
 - [1.4: Parting Thoughts](#) - [CC BY-NC-SA 4.0](#)
 - 2: Libraries and the Research Process - [CC BY-NC-SA 4.0](#)
 - [2.1: How Libraries Work](#) - [CC BY-NC-SA 4.0](#)
 - [2.2: Library Collections](#) - [CC BY-NC-SA 4.0](#)
 - [2.3: The Research Process](#) - [CC BY-NC-SA 4.0](#)
 - [2.4: Research is Iterative](#) - [CC BY-NC-SA 4.0](#)
 - [2.5: Parting Thoughts](#) - [CC BY-NC-SA 4.0](#)
 - 3: Information Comes in Many Formats - [CC BY-NC-SA 4.0](#)
 - [3.1: Information Formats](#) - [CC BY-NC-SA 4.0](#)
 - [3.2: Primary and Secondary Sources](#) - [CC BY-SA 4.0](#)
 - [3.3: Library Databases](#) - [CC BY-NC-SA 4.0](#)
 - [3.4: Parting Thoughts](#) - [CC BY-NC-SA 4.0](#)
 - 4: Search Strategy - [CC BY-NC-SA 4.0](#)
 - [4.1: How Can I Develop a Research Question?](#) - [CC BY-NC-SA 4.0](#)
 - [4.2: Keywords](#) - [CC BY-NC-SA 4.0](#)
 - [4.3: Choosing a database](#) - [CC BY-NC-SA 4.0](#)
 - [4.4: Parting Thoughts](#) - [CC BY-NC-SA 4.0](#)
 - 5: Advanced Search Strategies - [CC BY-NC-SA 4.0](#)
 - [5.1: What Is Precision Searching?](#) - [CC BY-NC-SA 4.0](#)
 - 6: Evaluating Sources - [CC BY-NC-SA 4.0](#)
 - [6.1: What's Credible Anymore? Fake News and Evaluating the Information You Encounter During Your Research](#) - [CC BY-NC-SA 4.0](#)
 - [6.2: Thinking About Your Sources](#) - [CC BY-NC-SA 4.0](#)
 - [6.3: What is Timeliness?](#) - [CC BY-NC-SA 4.0](#)
 - [6.4: What is Relevance?](#) - [CC BY-NC-SA 4.0](#)
 - [6.5: What is Authority?](#) - [CC BY-NC-SA 4.0](#)
 - [6.6: What is Accuracy?](#) - [CC BY-NC-SA 4.0](#)
 - [6.7: What is Purpose?](#) - [CC BY-NC-SA 4.0](#)
 - [6.8: Identifying Bias](#) - [CC BY-NC-SA 4.0](#)
 - [6.9: Determining Quality](#) - [CC BY-NC-SA 4.0](#)
 - [6.10: Building a Fact-Checking Habit by Checking Your Emotions](#) - [CC BY-NC-SA 4.0](#)
 - [6.11: Fact-Checking Sites](#) - [CC BY-NC-SA 4.0](#)
 - [6.12: Parting Thoughts](#) - [CC BY-NC-SA 4.0](#)
 - 7: Citation and Ethical Use of Information - [CC BY-NC-SA 4.0](#)
 - [7.1: Using Information Ethically](#) - [CC BY-NC-SA 4.0](#)
 - [7.2: Plagiarism and Academic Integrity](#) - [CC BY-NC-SA 4.0](#)
 - [7.3: Citation Styles](#) - [CC BY-NC-SA 4.0](#)
 - [7.4: The Basics of MLA Citation Style](#) - [CC BY-NC-SA 4.0](#)
 - [7.5: Examples of Common MLA Source Citations](#) - [CC BY-NC-SA 4.0](#)
 - [7.6: Citation Tools](#) - [CC BY-NC-SA 4.0](#)
 - [7.7: How Do I Acknowledge and Cite Generative AI in Academic Work?](#) - [CC BY-NC-SA 4.0](#)
 - [7.8: Parting Thoughts](#) - [CC BY-NC-SA 4.0](#)

- 8: What about AI? - *CC BY-NC-SA 4.0*
 - 8.1: How Generative AI Differs from Search Tools - *CC BY-NC-SA 4.0*
 - 8.2: Accuracy and Fabricated Information - *CC BY-NC-SA 4.0*
 - 8.3: Verifying AI-Generated Claims - *CC BY-NC-SA 4.0*
 - 8.4: Citation and Documentation - *CC BY-NC-SA 4.0*
- 8.5: Ethical and Effective Uses of AI - *CC BY-NC-SA 4.0*
- 8.6: Parting Thoughts - *CC BY-NC-SA 4.0*
- Back Matter - *Public Domain*
 - Index - *Public Domain*
 - Glossary - *Public Domain*
 - Detailed Licensing - *Public Domain*