

# Cyborgs and Centaurs: Academic Writing in the Age of Generative Artificial Intelligence



# CYBORGS AND CENTAURS: ACADEMIC WRITING IN THE AGE OF GENERATIVE ARTIFICIAL INTELLIGENCE

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# INTRODUCTION

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## About this book

This book will provide you with the resources you need to be successful in English 102: Writing and Rhetoric II. It remixes material from *Write What Matters*, a modular textbook that I co-created with Joel Gladd and Amy Minervini as part of the 2020-2021 OPAL Fellowship for the Idaho State Board of Education. The text's title is meant to provoke some thoughts about why and how we write. What will academic writing look like in the age of generative AI? Though we will undoubtedly see some changes to the writing process, research supports the development of durable skills that courses like this one promote.

More important, with the rapid advancement of generative artificial intelligence, our writing processes are changing in fundamental ways that we will explore throughout the course. LLMs can be incredibly helpful, and they were designed to be that way. They were not designed to be truthful though. Critical thinking skills are more important than ever in the age of generative AI.

## Course Outcomes

In English 102: Writing and Rhetoric II, we will work on the following course outcomes:

1. Use flexible writing process strategies to generate, develop, revise, edit, and proofread texts.
2. Adopt strategies appropriate to the rhetorical situation.
3. Locate, evaluate, organize, and use research material collected from a variety of sources appropriate to the rhetorical situation.
4. Use rhetorically appropriate strategies to represent and respond to the ideas and research of others.
5. Develop claims and stances that acknowledge nuance, are supported by well-developed evidence-based reasoning, and are shaped by multiple viewpoints.
6. Use rhetorically appropriate conventions for citing and documenting source material.
7. Participate in a respectful and inclusive community of writers and readers (Source: College of Western Idaho English 102 Curriculum Guide).

## Culturally Relevant and Affirming Text

The rhetoric, lessons, examples, assignments, and readings include a range of perspectives and cultures in an

effort to be inclusive. That said, if you come across a word, phrase, or sentiment that concerns you, please do not hesitate to contact me so that I can update our textbook.

As you read, you may notice that I use a variety of pronouns such as she/her, he/him, or they/them to refer to a person I'm discussing. My goal is to represent all people, regardless of gender, and to do so in a balanced way. Therefore, in some paragraphs, I may designate "she" as the pronoun, while in others "he" will stand in for the person being written about. However, you'll also come across "they" being used as a singular pronoun, which may be confusing at first. The pronoun "they" allows a single person to represent any gender, including those genders that aren't accurately represented by "he" and "she." It's important to consider gender-neutral language in your own writing, so I wanted to model what that looks like in this text.

## Accessibility

This textbook has been written with accessibility in mind. The book can be read online or downloaded in multiple formats including PDF and EPUB or MOBI files. It can also be accessed through text-to-speech readers provided through your learning institutions or other common text to speech tools, such as Read Aloud and Dragon. All videos have subtitles/closed captioning.

## A Note about Citations

This text relies on APA style citations because that is the citation style we will be learning in our class. APA is widely used in college majors including psychology, social work, education, business, and some health sciences programs.

## About the Author



I am an author, educator, and mother of four children, one of whom has bipolar disorder. My book, *The Price of Silence: A Mom's Perspective on Mental Illness* (Hudson Street Press, 2014), was a "Books for a Better Life" award winner. My essays have appeared in USA Today, the Huffington Post, Psychology Today, Time.com, The Mighty, MindBodyGreen, Good Men Project, and Boise State University's The Blue Review, among others. Since my essay "I Am Adam Lanza's Mother" went viral, I have appeared on the Today Show, Good Morning America, Erin Burnett Out Front, Anderson Cooper 360, Don Lemon, Dr. Oz, the Diane Rehm Show, NPR's Weekend Edition, and other programs. I presented talks on children's mental health and stigma at TEDx San Antonio in

October 2013 and at the National Council for Behavioral Health in March 2016. I was featured in the Peabody

award-winning HBO documentary *A Dangerous Son* in May 2018 and participated in the 2019 Columbine documentary, *An American Tragedy*. I blog about teaching and writing with generative artificial intelligence at *Artisanal Intelligence*.

I hold a B.A. in Classics from Brigham Young University (1994); an M.A. in Classics from the University of California, Los Angeles (1997), and an Ed.D. in Organizational Leadership from Argosy University (2016). My dissertation research focused on mental health advocacy and leadership strengths. I am an associate professor of English at the College of Western Idaho and live in Eagle, Idaho. I am passionate about open education, inclusivity, and diversity and believe that education has the power to change lives for the better.

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## PART I

# UNIT ONE: EXPLORATORY RESEARCH

In this unit, we will learn how to formulate research questions that are narrow and focused. Students will choose a topic that interests them, create a research question, and locate credible sources to answer the question. We will learn how to evaluate sources for credibility and reliability and how to integrate sources effectively. We will explore uses of generative artificial intelligence in the writing process. Finally, we will practice giving and receiving constructive peer feedback to improve our writing.



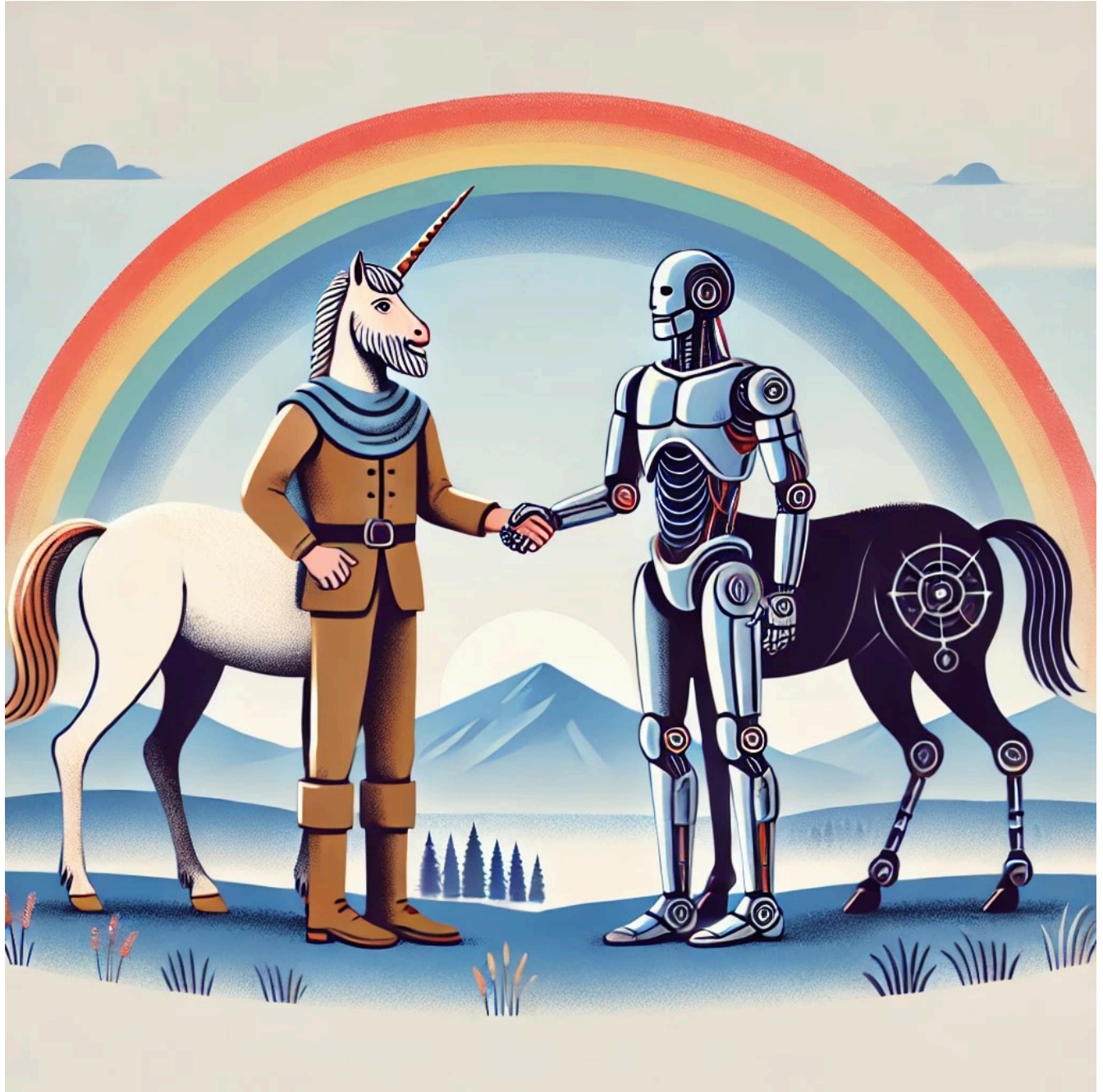


1.

# WHAT'S WRONG WITH THIS PICTURE?

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Take a look at the cover image for this textbook. What do you notice?



It's probably clear to you that I used a generative artificial intelligence tool (DALL-E 3 through ChatGPT

4o) to create this image. I started an entertaining journey of image creation misadventures with this simple prompt:

“Can you please draw an image of a centaur shaking hands with a cyborg? The centaur and cyborg should be in the center of the image, with a rainbow and mountains blurred in the background. Use a high fantasy art style.”

Spoiler alert: It really couldn't do this. We engaged in a series of back and forths where I tried to teach it what centaurs and cyborgs are, and it told me without blushing that there was no horn on the man's head. Here's the version of the prompt I used to get the cover result:

“I want two central images. 1. A centaur. A centaur has a human (man or woman) head and torso and hands. It has a horse's body, flanks, four legs, and tail. 2. A cyborg. A cyborg is part human and part machine. It has two legs like a human and stands on two legs. Please use a whimsical children's book illustration style and include a rainbow and mountains in the background” (Open AI, 2024).

What I got instead was this: a mishmash image of a human unicorn/centaur shaking hands with a robot centaur. The rainbow looks good though.

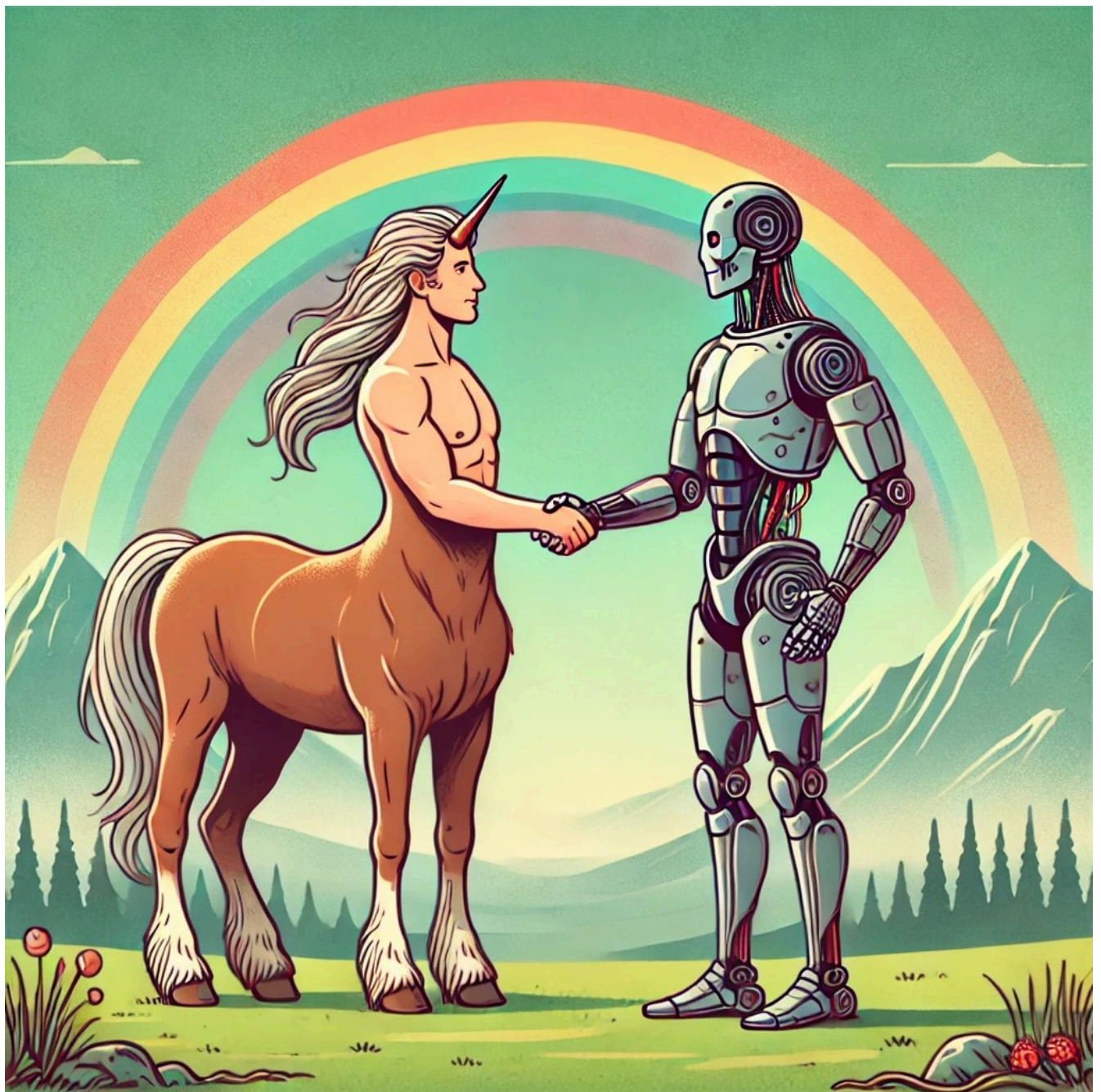
Just for fun, here are a few other things the image generator came up with.

First, here's an example of AI art that resembles a lot of what I am seeing on the Internet right now. There's something deeply strange but almost mystical about its strangeness. Someday soon there'll be a whole scholarly field devoted to interpreting and deciphering generative AI “art.”



The closest the image generator got to my personal vision for the cover is the one below (but the centaur still has a horn on its head. Why???)





My challenges in working with DALL-E 3 to realize my vision for our textbook cover are indicative in many ways of both the promise and pitfalls that working with AI tools bring to the writing classroom. What experiences have you personally had with generative artificial intelligence tools (yes, SnapChat AI counts!)? Are your experiences positive, negative, or a mix? If you've never tried an AI tool before, that's fine too!

Before we learn more about generative AI tools and how they can be used in academic writing, I'd like to know more about where you are at right now with generative artificial intelligence. Please take this five-minute anonymous survey about your experiences with AI.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://cwi.pressbooks.pub/longenglish102/?p=56>

## The Future? Hybrid Writing in College Classrooms

This book represents a new type of writing collaboration. I wrote this book with help from Claude, ChatGPT 4o, Microsoft Copilot, and other AI tools. I have also created and incorporated some custom AI tools to help you improve your own writing process and designed activities to use generative AI tools throughout the textbook. This model is what Wharton School of Business Professor Ethan Mollick has termed “co-intelligence.” In his book, *Co-Intelligence: Living and Working with AI*, Mollick outlines four basic principles for using generative artificial intelligence tools in writing or other types of work:

1. Always invite AI to the table.
2. Be the human in the loop
3. Treat AI like a person
4. The current model of AI that you are working with is the worst AI you'll work with in your life (Mollick, 2024).

Because I like to read science fiction and fantasy, I'm calling this “co-intelligence” writing textbook *Cyborgs and Centaurs*. As the generative AI text-to-image prompt above explained, cyborgs are hybrid creatures—half human and half machine. And centaurs are also hybrid creatures—half human and half magic. In my own experiences working with generative AI tools since late 2022, I have found that both concepts reflect how I feel about writing with AI.

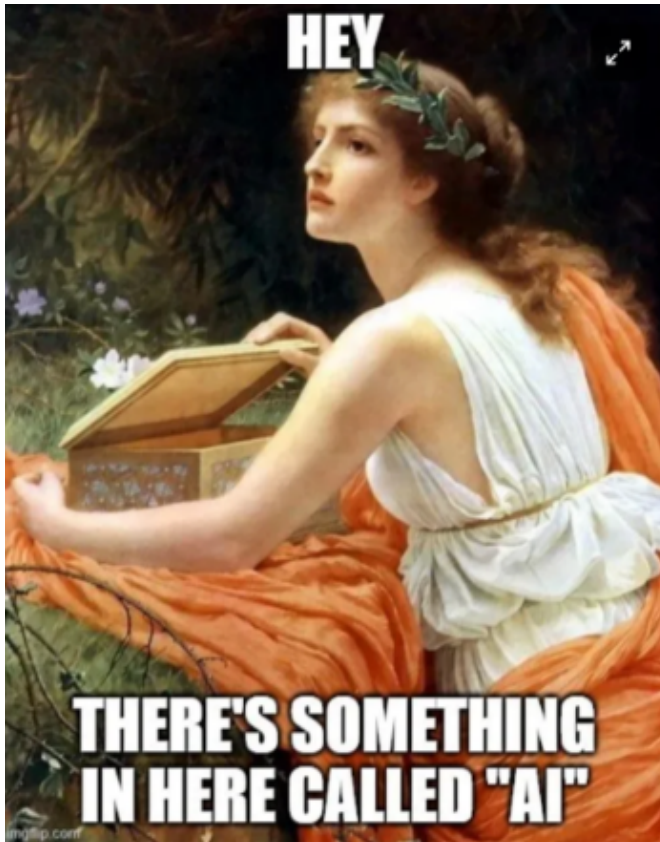
In this book, we will explore how to apply Mollick's principles as we learn to become academic thinkers, researchers, and writers. We will learn where AI can be helpful—and where it can be harmful. We'll consider the ethics of using generative AI. And we'll practice specific use cases where AI can improve our writing processes.

I hope we'll have some fun along the way.

2.

## IS THE COLLEGE ESSAY DEAD?

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First, let's get something out of the way: In 2024, as I am writing this book, many generative AI tools can "write" a pretty decent (C to B level) academic essay. Don't believe me? Here's a research paper on solar eclipses that I wrote with Copilot in about 30 minutes.

Now don't get too excited. The fact that a chatbot can write an entry level college essay is not necessarily good news. For more than a hundred years, colleges have used the essay to teach and practice some important cognitive skills like critical thinking, problem solving, communication, ethics, and organization. If generative AI can write an essay for us, are these skills still important? And if we don't write essays, how will we learn and practice these skills?

I argue that these skills are more important than ever. And to show you what I mean and how AI can be a partner in developing the communication and

critical thinking skills you need for college and the workplace, I'm going to apply Ethan Mollick's first three principles from *Co-Intelligence* and engage in a conversation with ChatGPT 4o about what the college essay teaches—and what we can do to learn and practice these skills in the age of generative AI

Here's our conversation:

*Me: I need your help in thinking through some assessment strategies. I would like you to be a writing program curriculum designer for a first-year writing program. What are the five most important skills that students learn from writing a traditional college essay such as a research paper that answers a research question?*



**ChatGPT:** Certainly! Here are five important skills that students learn from writing a traditional college essay, such as a research paper that answers a research question:

### 1. **Critical Thinking and Analysis:**

- **Skill Development:** Students learn to evaluate and synthesize various sources of information, identify biases, and construct logical arguments.
- **Importance:** This skill helps students to approach problems systematically and make well-reasoned decisions in both academic and real-world contexts.

### 2. **Research Skills:**

- **Skill Development:** Students learn how to locate, evaluate, and use primary and secondary sources effectively.
- **Importance:** Mastery of research skills is essential for academic success and lifelong learning, enabling students to gather information, understand different perspectives, and build evidence-based arguments.

### 3. **Writing and Communication:**

- **Skill Development:** Students improve their ability to organize their thoughts, articulate ideas clearly, and present information in a coherent and structured manner.
- **Importance:** Effective communication is crucial in almost every field, helping students convey their ideas and arguments persuasively and professionally.

### 4. **Time Management and Organization:**

- **Skill Development:** Writing a research paper involves planning, outlining, drafting, revising, and editing, which teaches students how to manage their time and organize their work efficiently.
- **Importance:** These skills are essential for academic success and are highly valued in the workplace, helping individuals meet deadlines and manage multiple tasks effectively.

## You Try It!

What concerns do you have about generative AI and writing? Use a generative AI chatbot such as ChatGPT, Microsoft Copilot, Google Gemini, or Claude to talk about your concerns. What do you think of the chatbot's responses? If you have never used these tools before, here's a quick video showing you how to use ChatGPT and another video showing you how to use your student email to access Microsoft Copilot.

## 5. Academic Integrity and Ethical Use of Information:

- Skill Development: Students learn the importance of citing sources properly, avoiding plagiarism, and respecting intellectual property.
- Importance: Understanding and practicing academic integrity fosters a culture of honesty and respect for others' work, which is critical in both academic and professional settings.

These skills not only contribute to the successful completion of a research paper but also prepare students for various challenges they will encounter in their academic and professional lives.

*Me: Many students now have access to generative AI tools that can write college essays for them. What kinds of writing assessments can instructors use instead of a traditional college essay to teach these five skills and ensure that students have opportunities to learn and practice them?*

**ChatGPT:** In light of the accessibility of generative AI tools, instructors can design alternative writing assessments to ensure students learn and practice critical skills. Here are some suggestions:

### 1. Critical Thinking and Analysis

- Assessment: Annotated Bibliography
  - Description: Students compile a list of sources related to a research topic and write annotations summarizing and critically evaluating each source.
  - Skills Developed: Evaluating sources, identifying biases, and synthesizing information.
- Assessment: In-Class Debates
  - Description: Students participate in structured debates on relevant topics, requiring them to construct arguments, present evidence, and respond to counterarguments.
  - Skills Developed: Analytical thinking, oral communication, and argumentation.

### 2. Research Skills

- Assessment: Research Proposal
  - Description: Students write a proposal for a research project, including a research question, literature review, and methodology.
  - Skills Developed: Formulating research questions, conducting preliminary research, and planning research strategies.
- Assessment: Source Evaluation Exercises
  - Description: Students are given a set of sources to evaluate for credibility, relevance, and bias, and must justify their evaluations.
  - Skills Developed: Source evaluation and critical thinking.



### 3. Writing and Communication

- Assessment: Reflective Journals
  - Description: Students maintain journals where they reflect on their learning process, analyze readings, and connect course content to their experiences.
  - Skills Developed: Reflective writing, self-assessment, and personal expression.
- Assessment: Multimedia Presentations
  - Description: Students create presentations using various media (slides, videos, infographics) to communicate their research findings or arguments.
  - Skills Developed: Oral communication, visual literacy, and technical skills.

### 4. Time Management and Organization

- Assessment: Project-Based Learning
  - Description: Students work on long-term projects that require planning, research, and collaboration, with regular checkpoints and progress reports.
  - Skills Developed: Time management, organization, and teamwork.
- Assessment: Portfolio Compilation
  - Description: Students compile a portfolio of their work throughout the course, reflecting on their progress and growth.
  - Skills Developed: Organization, reflection, and self-assessment.

### 5. Academic Integrity and Ethical Use of Information

- Assessment: Ethics Case Studies
  - Description: Students analyze case studies related to academic integrity, plagiarism, and ethical use of information, and write responses or engage in discussions.
  - Skills Developed: Understanding and applying ethical principles.
- Assessment: Collaborative Research Projects
  - Description: Students work in groups to conduct research, with a focus on proper citation practices and collaborative writing, followed by a reflection on the process.
  - Skills Developed: Collaboration, ethical research practices, and accountability.

By incorporating these alternative assessments, instructors can provide diverse opportunities for students to develop and demonstrate their skills in critical thinking, research, writing, time management, and academic integrity.

*Me: As a writing curriculum designer, what concerns you most about generative AI as you plan your writing classes for the upcoming year? What excites you the most about generative AI?*

**ChatGPT:**

**1. Academic Integrity and Plagiarism:**

- Concern: The ease with which students can use generative AI to produce essays and other assignments raises concerns about academic honesty. It may become challenging to ensure that the work submitted is genuinely the student's own.
- Impact: This could undermine the value of the educational process and the credibility of academic qualifications.

**2. Skill Development:**

- Concern: Over-reliance on AI tools may impede students' development of essential writing and critical thinking skills. If students use AI to generate content without engaging in the writing process, they miss out on key learning opportunities.
- Impact: This could result in graduates who are less prepared for professional and academic challenges that require independent thinking and writing skills.

**3. Equity and Access:**

- Concern: Not all students may have equal access to advanced AI tools, leading to disparities in the quality of work and learning experiences.
- Impact: This could exacerbate existing inequalities and create an uneven playing field in the classroom.

**4. Assessment Validity:**

- Concern: Traditional assessment methods may become less effective in evaluating student learning and performance if AI-generated content is not easily distinguishable from student-created work.
- Impact: This could challenge the validity and reliability of assessments, making it harder to gauge student progress accurately.

**5. Ethical and Pedagogical Implications:**

- Concern: The integration of AI in education raises ethical questions about authorship, creativity, and the role of technology in learning. There is also the challenge of developing pedagogical strategies that incorporate AI without compromising educational values.
- Impact: These issues require thoughtful consideration and innovative approaches to curriculum design.

## Excitement about Generative AI in Writing Classes

### 1. Enhanced Learning Support:

- Excitement: Generative AI can provide personalized writing assistance, offering real-time feedback, grammar correction, and suggestions for improvement. This can enhance the learning experience and help students improve their writing skills.
- Impact: Students can receive individualized support, enabling them to progress at their own pace and address specific areas of weakness.

### 2. Creativity and Innovation:

- Excitement: AI tools can inspire creativity by generating ideas, prompts, and even drafts that students can build upon. This can encourage students to explore new perspectives and experiment with their writing.
- Impact: The use of AI can lead to more innovative and diverse writing assignments, fostering a creative and engaging learning environment.

### 3. Efficiency and Productivity:

- Excitement: AI can streamline administrative tasks such as grading and providing feedback, allowing instructors to focus more on personalized instruction and mentoring.
- Impact: This can increase efficiency in the classroom and enable instructors to dedicate more time to meaningful interactions with students.

### 4. Resource Availability:

- Excitement: AI can generate a wealth of educational resources, such as example essays, writing prompts, and instructional materials, that can be used to supplement teaching.
- Impact: Access to high-quality resources can enhance curriculum design and provide students with a rich array of learning materials.

### 5. Collaborative Learning:

- Excitement: AI can facilitate collaborative learning experiences by enabling students to work together on writing projects, share feedback, and co-create content.
- Impact: This can foster a sense of community in the classroom and encourage peer-to-peer learning.

Balancing these concerns and excitements will be crucial in designing a writing curriculum that leverages the benefits of generative AI while mitigating its potential drawbacks. (Open AI, 2024).

<https://chatgpt.com/share/e/f406fa7b-1fad-4b1d-9fb0-c4f151d91d91>

## Knowledge Check

Review the conversation above. How does the author apply Mollick’s first three principles of interacting with generative artificial intelligence in this conversation? As a reminder, the first three principles are:

1. Always invite AI to the table.
2. Be the human in the loop.
3. Treat AI like a person (Mollick, 2024).

## Why Writing Still Matters—And How AI Can Help

Does writing still matter? AI researcher Kartik Chandra (2023) certainly thinks it does, and I agree with her. In a 2023 essay for Inside Higher Ed, Chandra wrote:

[T]he question to ask about writing is not Will AI make it worthless? but rather What could possibly be more important? In a world flooded with the monotonous slurry AI excels at producing, power lies with those who can—and do—speak for themselves. Never have the skills of independent, critical thought and expression been more vital than in the AI era (para. 8).

Chandrik’s point gets at something essential about writing—your writing is a reflection of you. It’s how you communicate your self to the world. And no matter how well ChatGPT can churn out an essay on any given topic, what you think about that topic will always be important.

As you may have guessed by now, I’m pretty excited about the opportunities that writing assistants can provide. I personally use AI in a variety of ways. These are sometimes called “use cases.” I track things I’m trying on my blog, Artisanal Intelligence.

Two things I want you to know about me as a writer: First, I’m pretty confident about my own writing abilities. I have published an award-winning book with Penguin. I completed a doctoral dissertation with more

than 200 sources and original quantitative research. I've written thousands of articles and more web content for doctors' offices than I can imagine.

Second, so-called AI “plagiarism” checkers often falsely flag my writing as content written by generative AI. So if I ever ask you about whether you've used AI tools, don't take it personally! I'm mostly just curious. Also, you should know that no matter what anyone else tells you, these checkers do not work, and they never will. Worse, they disproportionately flag work by English language learners.

Let's switch gears and consider where AI might be useful. I use generative AI tools in the following ways:

1. **“Boring” Writing Tasks.** Summary of a meeting?  
Recommendation letter template that I can personalize?  
Language for a new assignment prompt? I always invite AI to the table for these kinds of tasks—and I usually let AI write the first draft! As an instructor, I'm trying to make the writing tasks I assign to you less “boring” because I kind of assume you'll use AI if you're not that into it.
2. **Administrative or Boilerplate Language.** If I'm drafting a proposal or creating information about an academic program, generative AI is a great place to start (and sometimes, it nails this type of content on the first try, which probably says something about academic language). It's also great with mission statements.
3. **Summarizing Content.** I really like to use AI in this way, not only for other people's work, but also for my own. On my blog, I use generative AI tools to create a “Key Takeaways” header for each post. I recommend that you do something similar for your own essays and writing assignments. It's a quick way to make sure that you are saying what you think you are saying.
4. **Brainstorming or talking through ideas and concepts.** This is one of my favorite ways to use generative AI, which is why I demonstrated it for you above. You can also use AI to prepare for debates, job interviews, or to identify gaps in your knowledge or arguments and address them. AI is great at helping you to narrow and focus a research question, define an audience's needs, or create a working outline for a topic.

## You Try It

One of the most important things to understand when working with any type of generative AI is that these tools are designed to be helpful, not truthful. It's important to check any “facts” they give you against credible, reliable sources. Wikipedia can be a good place to start for this (despite what your high school English teacher may have told you, Wikipedia is actually pretty reliable most of the time, especially if the article has high quality references).

YouTuber Marques Brownlee recommends a simple activity to test how AI can sometimes get things wrong or provide incomplete or simplistic responses. Choose something that you are an expert in. Maybe it's your favorite video game or anime, or a sports

team that you have followed for years, or your favorite author and fandom. Now ask a chatbot to tell you about this subject. Evaluate the chatbot's response. Is it completely correct and factual? Or is it incomplete? It's important to understand that non-experts might not always catch the errors in chatbot output. But if you use ChatGPT to write your papers, there's a non-zero chance that it will get some things wrong, and your teacher, a subject matter expert, will definitely notice.

5. **Developmental editing.** I used AI as a developmental editor for both creative writing and academic writing, and I have found that it can be very helpful.

As you think about where you will use AI in your own writing process, you need to think about the kinds of cognitive activities that you enjoy. Do you like solving problems? Do you like learning about new ideas? Do you like testing concepts against your own values? Writing can be an excellent way to practice these skills.

Here are some places generative AI has been less useful for me:

1. **Reflective writing.** As the sample essay I shared shows, AI can actually “do” reflective writing. But what is the point? I like thinking about new ideas and reflecting on them. AI doesn't think, but I do. Don't deny yourself the opportunity to shape your own thoughts, ideas, and reactions in writing.
2. **Writing for learning.** When I am trying to learn something new, writing about it, whether it's taking notes or writing up what I have learned, is an incredibly important way for me to create long-term robust memories. If you're in any kind of major that requires content knowledge and subject matter expertise, don't shortchange yourself. Sure, you can record lectures and have AI transcribe them (and you should!). But keep taking your own notes as well, then review your notes alongside the transcript. AI is not now and will never be a shortcut to learning things for yourself.
3. **Research\*.** I'm putting an asterisk next to this one because I think it's a rapidly evolving space. We'll learn more about how AI works in the next chapter, but the important thing to know here is that right now, AI makes stuff up. It can make up highly convincing APA style references to sources that do not exist. There are tools like Perplexity, and generative AI tools with web access capabilities do a better job with research, but for me, at least right now, Google Scholar or the college library (or both) are better ways to locate high-quality sources. I'm also putting an asterisk next to this one because it's clear that researchers are using AI to produce scientific papers, and I honestly have no idea what the implications of that will be. For myself, I think I will continue to treat this area like I treat writing for learning. I like to do research. I like to critically evaluate whether a source will meet my needs, and I like to see the broad range of scholarship on a topic that interests me. I do use generative AI to help me narrow and focus my research questions and identify good key search terms though.
4. **Creative Writing.** I've used generative AI to write collaborative poems, and I also tried to get it to



## Knowledge Check

If you have used generative AI tools for writing, have they been helpful? What kinds of things do you use them for? If you have not yet used these tools, why not? What are your biggest concerns about generative AI and writing in college? When should we avoid generative AI tools in writing?



## 3.

## WHAT DO YOU WANT TO KNOW?

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Inquiry—asking a question—is the heart of academic research. From first-year research papers to doctoral dissertations, we start our research by asking a question. **Academic research writing** is the process of developing a research question and using high-quality evidence to answer the question. This skill is used in every area of academic life from general education courses to research projects within your major field of study. Inquiry is essential to the goals of scholars and writers because it helps us to better understand problems that affect us and our societies and to contribute to the body of knowledge in the world. This chapter will introduce you to using research for academic inquiry and suggest ways that you can use generative artificial intelligence tools to narrow and focus your research questions.



Photo by Pierre Bamin on Unsplash

### Key Characteristics

Writing for inquiry, also known as academic research writing, generally includes the following elements:

- **Research Question:** From projects written in first-year composition courses to doctoral dissertations, academic research projects seek to answer a research question. This question is focused. It's a question that can be answered through research. And it has some kind of significance to both the author and the readers.
- **Evidence:** Academic research projects rely almost exclusively on evidence in order to answer the research question. "Evidence" may include both primary sources like interviews, field research, experiments, or primary texts and secondary sources such as scholarly journal articles or other high-quality sources.
- **Citation:** Academic research projects use a detailed citation process in order to demonstrate to their readers where the evidence came from. Unlike most types of "non-academic" research writing, academic research writers provide their readers with a great deal of detail about where they found the evidence they are using. This process is called citation, or "citing" of evidence. It can sometimes seem

intimidating and confusing to writers new to the process of academic research writing, but citation is really just explaining to your reader where your evidence came from. Citation styles are specific to academic disciplines. Common citation styles in college writing courses include MLA, APA, and Chicago. In our course, we will be using APA style.

- **Objective point of view.** Though you likely have opinions about your topic, it's important for academic research writers to remain objective in their approach to the subject. Stay away from “both sides” types of questions because you are not arguing or defending a thesis in this type of essay. Instead, your thesis statement will broadly answer your research question.

## Academic Research Writing: What IT'S NOT

Not all useful and valuable writing automatically involves research or can be called “academic research writing.” Let's consider a few types of writing that are not academic research.

- While poets, playwrights, and novelists frequently do research and base their writings on that research, what they produce doesn't constitute academic research writing. For example, the Broadway musical *Hamilton* incorporated facts about Alexander Hamilton's life and work to tell a touching, entertaining, and inspiring story, but it was nonetheless a work of fiction since the writers, director, and actors clearly took liberties with the facts in order to tell their story. If you were writing a research project for a history class that focuses on Alexander Hamilton, you would not want to use the musical *Hamilton* as evidence about how the Founding Father created his economic plan.
- Essay exams are usually not a form of research writing. When an instructor gives an essay exam, she usually is asking students to write about what they learned from the class readings, discussions, and lectures. While writing essay exams demand an understanding of the material, this isn't research writing because instructors aren't expecting students to do additional research on the topic.
- All sorts of other kinds of writing we read and write all the time—letters, texts, social media posts, chats with chatbots, emails, journal entries, instructions, etc.—are not research writing. Some writers include research in these and other forms of personal writing, and practicing some of these types of writing—particularly when you are trying to come up with an idea to write and research about in the first place—can be helpful in thinking through a research project. But when we set about to write a research project, most of us don't have these sorts of personal writing genres in mind.

## So, What Is “Research Writing”?

**Research writing** is writing that uses evidence (from peer-reviewed journals, scholarly books, magazines, the Internet, interviews with experts, etc.) to answer a research question.

In the real world, research writing exists in a variety of different forms. For example, scholars or other researchers conduct primary research and publish the results in peer reviewed journals. Scholars, journalists, or other researchers may also publish inquiry-based articles in more popular places such as newspapers or magazines.

Academic research writing—the sort of writing project you will write in this class—is a form of research writing. Students use research writing in a variety of courses and contexts.

## Asking the Right Question Matters

Think back to our the prompting exercise in chapter one. No matter how hard I tried, I could not create a narrow, focused prompt that would get DALL-E3 to generate a picture of a centaur. The first step of exploratory writing in many senses is the most important. The success of your exploratory research essay depends on developing a narrow, focused research question. If you don't ask the right kinds of questions, you may find yourself experiencing the same frustration I felt when I couldn't get the image I wanted. The more time and effort you spend thinking about how to create a question or series of questions from a topic that interests you, the more successful you are likely to be when you write your research paper.

Thinking about topics that interest you is the first step for academic research. And learning to write good research questions will help you to be a better prompter when using generative artificial intelligence tools in the workplace because creating a question is an example of a durable skill called **problem formulation**. Problem formulation is

the process of defining a problem so that a solution can be found

. It's important for understanding what needs to be researched or adjusted to solve an issue (Google Gemini, 2024).

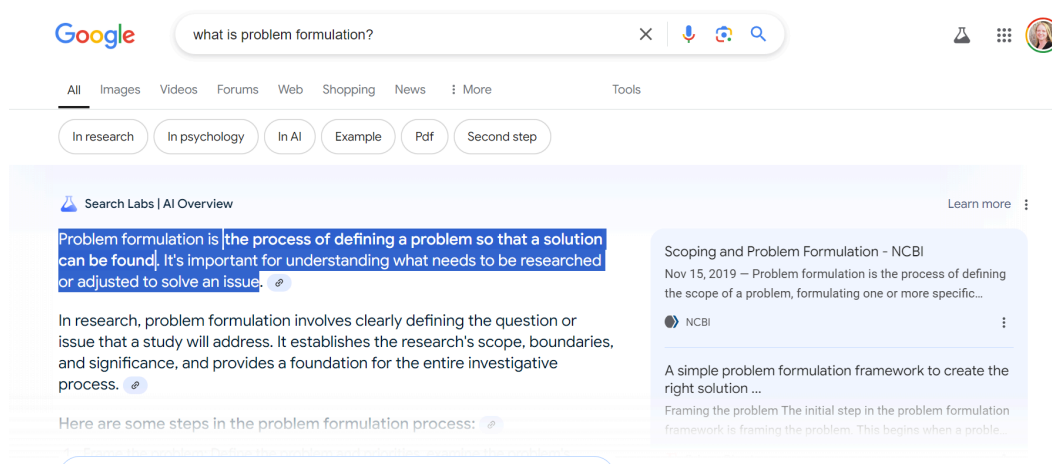


Figure 1.3.1 This is a screenshot of a search where I asked Google to define problem formulation. When you use AI tools in any way, I recommend saving a screenshot.

## Knowledge Check

If you use Google Search, you may see an AI powered response to your search question. In this case, I asked Google to define problem formulation. How can I tell whether this response is reliable? If I had doubts, what credible source could I check to confirm the definition?

## English: The Hottest New Programming Language

Before we get started, I think you should know that according to former OpenAI employee and software developer Andrej Karpathy, “English is the hottest new programming language.” I wanted to demonstrate this for you at the beginning of the course to give you an idea of how powerful these new tools can be. Keep in mind that I’m an English professor. I did take a few programming courses in high school, and I created a somewhat sketchy personal website from scratch back in 2001 (now defunct), but I am not a coder by any stretch of the imagination.

But I am not afraid to use my words to ask for what I want. Watch this short video to see how Claude.ai can help you to take a broad topic and narrow/focus your research question.



*One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://cwi.pressbooks.pub/longenglish102/?p=61#oembed-1>*

One thing I learned in this exercise was that having subject matter expertise (knowing how to do something really well) definitely matters when using generative AI tools. I feel comfortable and confident when using these tools to assist my writing because I am a confident and capable academic writer. I have published a book with Penguin and written for numerous professional publications. I have also written a doctoral dissertation. I can trust my own professional judgment and expertise when evaluating writing output from a chatbot.

But when it comes to evaluating code, I am much less confident. Maybe that’s how some of you feel when you use chatbots for writing tasks. For example, in this exercise, the Python script did exactly what I wanted it to do, but if I had felt more comfortable editing code, I would have made some minor changes to the React interactive tool. I would have cleared the previous answers, for example, and I would have changed the final

output to better reflect all the work in the multi-step activity. Iterative prompting—the process of asking the chatbot again when you don’t get what you want—is important when you interact with these tools.

And as you can see, subject matter expertise still matters. It may be more important than ever for you to become an expert in your future field. This reinforces the idea that we should use generative AI tools to augment, not to replace, our own work.

## Crafting Your Narrow, Focused Research Question

As you can see from the video, chatting with a generative AI tool like Microsoft Copilot, Claude, ChatGPT, or even Snapchat AI can help you to narrow and focus your ideas. In this case, Claude has provided us with a good set of questions.

- Start broad, then narrow down: Begin with a general topic of interest, then progressively refine it.
- Make it personally relevant: Choose a topic that relates to your experiences, interests, or goals.
- Use the “5 W’s and H” approach: Ask who, what, when, where, why, and how to explore different angles.
- Ensure it’s specific and manageable: The question should be answerable within the scope of your assignment.
- Frame it as a question: Phrase your topic as an open-ended question to guide your research.
- Consider current debates: Look for ongoing discussions or controversies in your field of study.
- Use limiting words: Incorporate terms like “specific,” “particular,” or date ranges to narrow the focus.
- Test for researchability: Ensure sufficient sources are available to answer your question.
- Avoid yes/no questions: Opt for questions that require analysis and explanation.
- Get feedback: Share your question with peers or instructors for input (Claude.ai, 2024).

Claude created this simple flowchart to help you visualize the steps of the research process. And here’s a link to the interactive tool Claude created so that you can test out your own research question.

For your writing task this week, you’ll be following this process to create a narrow and focused research question for instructor approval. You’ll also get generative AI feedback on your question. Make sure you include two-three paragraphs explaining why you are interested in this question and how it connects to you personally. I recommend looking for a topic that has debatable aspects because you can use the same topic for both your first and second essays, though these will be very different papers.

## 4.

# SURVIVING THE TEXTPOCALYPSE

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*Why Human Writing Matters More than Ever in the Age of Artificial Intelligence*

## Reading Response Questions

This is your Week One reading response essay. As you read, keep these questions in mind:

1. What question(s) does this essay's author try to answer?
2. Use the SIFT model to analyze the source. How credible is the author? The source?
3. What types of evidence does the author use to support the essay? Give at least three specific examples.
4. How do you feel about this essay? Does reading the essay make you feel curious? An gry? Indifferent? Anxious? Justified? Hopeful? Something else? Note: there is no "wrong" way to feel. Why do you think you feel this way about the essay?
5. How does this essay help you in drafting your own exploratory essay? Think about specific writing techniques, such as the introduction, or the types of evidence the author uses, or the way relevant personal experience plays a role in the essay.

Imagine a world where every story, every song, every piece of writing is algorithmically generated. It would be a world devoid of the human touch, the spark of imagination, and the richness of diversity. While AI and large language models can generate text that is technically proficient, they lack the capacity to truly understand the intricacies of human emotions. They lack the life experiences that shape our perspectives and fuel our creativity. They lack the ability to empathize, to relate, and to genuinely connect on a profound level.

I didn't write that first paragraph. AI did (Open AI, 2023).

Welcome to our brave new world. Spoiler alert: as with prior technological advances we have seen in our



lifetimes, profits, not ethics or even a basic concern for humanity, are dominating discussions and development of generative artificial intelligence.



What does the rise of artificial intelligence mean for jobs? For creativity? For humanity? How will we survive as we face what may turn out to be one of the greatest technological changes since the Industrial Revolution?

Before we get into the ones and zeroes, I want to share a new kind of acknowledgement with you inspired by the work of Laurie Phipps and Donna Lanclos (2023). 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 write the opening lines of this essay and to

research examples of prompts that I will share later. I also used Adobe Firefly to generate two images based on my own text prompts.

I'm assuming that you've heard about ChatGPT and other large language models. The students in my college English classrooms certainly have. To understand the potential impacts, both positive and negative, I'd like to share 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. (UNESCO, n.d.)

## A Brief History of Writing

To understand how we got here, we need a quick tour of writing as a technology.

Language—the ability to communicate both concrete and abstract thought to other humans—is not new. Most anthropologists think that it's been a defining characteristic of humanity at least since we became *homo sapiens* (Pagel, 2017).

But writing is a relatively new technology, appearing on the cultural scene less than 5500 years ago in Mesopotamia (Brown, 2021). For thousands of years, writing remained the provenance of the elites—the

scholarly upper class. The invention of the printing press in Germany around 1440 C.E. was a game changer, creating the possibility for mass publication, and with this, mass literacy (Briggs & Burke, 2002). One of my first jobs in college was cataloging the marginalia from some of the first printed books—pocket-sized editions of Roman and Greek texts printed by Aldus Manutius in the late 1400s (Naiditch et al., 2001).

By the 1900s, educators around the world were embracing the goal of universal literacy. Public schools promoted literacy as an unqualified good, a rising tide that would lift all boats. Free libraries brought texts to everyone who wanted to read them (Kober & Rentner, 2020).

And in the 1990s, the advent of the World Wide Web meant that suddenly any person could communicate by text with any other person literally anywhere, in real time. In 1995, only 3% of Americans had ever signed on to the web (Pew Research Center, 1995). By 2000, that number had climbed to 52%. By 2015, 96% of adults ages 18-29 were using the Internet (Perrin & Duggan, 2015).

Not that all the words posted to the World Wide Web were worth reading. But it turns out they were good for something else: a treasure trove of readily available text to train large language models (LLMs) (Schaul et al., 2023).

A few interesting things happened to our brains along our path from oral language to ubiquitous text-based Internet. Writing removes the need for robust memory, allowing us to externalize knowledge (DeSilva et al., 2021). We no longer need to memorize all 26 books of Homer’s *Iliad*—or even a single line. And we no longer need to remember anything, really, when the advanced computers we all carry in our pockets can look up any knowledge, no matter how esoteric, in an instant.

The British author E.M. Forster is often credited with this famous quote: “How do I know what I think until I see what I say?” If we outsource our writing to large language models, will we still be able to think for ourselves? Will we still want to?

## The Internet: Then and Now

Maybe you remember life before the Internet. We wrote letters and sent them by mail. My siblings and I fought over who would get to use the telephone after school. We needed a thick book called a Thomas Guide to navigate the streets of Los Angeles.

Things changed fast with the early Internet. I still remember the thrill of my first Mosaic web search in 1994. Not knowing what else to ask, I queried the surfing conditions in Australia—and was delighted by the instant response!

In the early days of the internet, anything seemed possible. My friends and I wrote long earnest email missives to each other. I booked a hotel online and looked up train schedules in Barcelona. We explored new identities in anonymous chat rooms. We could order any book we wanted from this magical new website: Amazon.com.

Then the towers fell, and America went to war, and everything fell to pieces.

A few years later a new technology appeared, one that promised to connect us with people around the world.



I shared tunes on MySpace and posted photos—so many photos!—of my adorable children to Facebook, never once considering their privacy, or my own. I started an anonymous mommy blog, *The Anarchist Soccer Mom*. Andy Warhol’s predicted 15 minutes of world fame for everyone, everywhere, became a reality (Jones, 2017).

We all know how that ended. Facebook destroyed democracy. Today our young people show devastatingly high levels of anxiety and depression (Abrams, 2023). We are polarized and siloed in our social media echo chambers.

## Large Language Models and Generative AI

Now, with little warning, large language models have been unleashed on the world, with all the optimism that accompanied the last three technological revolutions. And of course, none of the ethical considerations.

I typed my first prompt into ChatGPT in late November 2022. Wanting to assess its potential impact on my school’s philosophy program, I asked it to summarize Kant’s deontology, apply it to the ethics of eating meat, and contrast that with utilitarianism. It got utilitarianism right, but it was wrong on Kant. Three weeks later, I tried the same prompts again. This time, it got Kant right too.

Aside: I am not able to share this chat history because ChatGPT only provides my conversation history beginning January 2023, and when I first used it, I did not think about the critical importance of citing this new tool as a source. For this reason, if you’re a student who has used ChatGPT in a similarly cavalier fashion, I completely empathize—but it’s important that we both now know that we can and should cite any AI assistant we use, including Open AI, Quillbot, and Google’s Writing Assistant.

Since January 2023, I’ve used ChatGPT daily. As an instructor, I teach students prompts to generate ideas, focus research questions, clarify difficult concepts like deconstruction, outline papers, and check for grammar. I’ve asked it to design yoga routines, plan meals, create lesson plans, write drafts of emails and recommendation letters, and even compose a collaborative rhyming poem. It’s a simultaneously strange and delightful experience, chatting with this bot. When it lies (which is often, and with great confidence), it always apologizes. How many humans can do that?

I don’t think this tool is intelligent. If you’re familiar with predictive text on your smartphone, ChatGPT is basically that on steroids. Emily Bender, a computational linguist at the University of Washington, has called large language models “stochastic parrots” (Weil, 2023). They function by analyzing probabilities and predicting what you want them to say in response to your prompt. Of course, there are worse things to ask for in a conversation partner.

## Ethical Concerns with Generative Artificial Intelligence

And yet, every time I use ChatGPT or any other generative AI program, I am mindful of the problems intrinsic to a training set based on the Internet—gender and racial bias, for starters. This tool acts as a mirror to 30 years

of Internet toxicity. No one has meaningfully addressed how this technology will impact knowledge workers, who previously thought their jobs were safe; for example, LLMs are really good at writing code (Meyer, 2023). *Time Magazine* reported that tech companies exploited Kenyan workers to make ChatGPT's responses less toxic (Perrigo, 2023).

Then there's climate change. The energy required to run these large language models is predicted to reach 8-21% of the world's total energy supply by 2030, in a climate that is already warming far too fast (Magubane, 2023). This massive energy consumption will disproportionately impact the global south and those who do not have the financial means to protect themselves from climate harms.

And of course, let's not forget the general existential threat to humanity. How forward thinking of the tech bros who unleashed this on us to sign a letter calling for regulation and warning about the potential "risk of extinction" (Roose, 2023).

But AI is just one of many existential threats facing humanity. Matthew Kirschenbaum (2023), a professor of English and digital studies at the University of Maryland, predicts a far more mundane, and I think, more likely future: the textpocalypse. He writes,

What if, in the end, we are done in not by intercontinental ballistic missiles or climate change, not by microscopic pathogens or a mountain-size meteor, but by ...a tsunami of text? Think of it as an ongoing planetary spam event, but unlike spam, there may prove to be no reliable way of flagging and filtering the next generation of machine-made text. "Don't believe everything you read" may become "Don't believe anything you read" when it's online." (para. 1; para. 5)



Is this what our life will become—computers doing all the writing and the reading? Even as I admit to experimenting with training ChatGPT to provide formative feedback on student essays, I think about the 1985 Val Kilmer movie *Real Genius*, as a tape recorder lectures to tape recorders. Is this what education is destined to become?

Not everyone is as gloomy as Kirschenbaum about the future of AI though.

Adrienne LaFrance (2023) sees another possibility for this new technology. She writes,

Just as the Industrial Revolution sparked transcendentalism in the U.S. and romanticism in Europe—both movements that challenged conformity and prioritized truth, nature, and individualism—today we need a cultural and philosophical revolution of our own.... Artificial intelligence will, unquestionably, help us make miraculous, lifesaving discoveries. The danger lies in outsourcing our humanity to this technology without discipline.... We need a human renaissance in the age of intelligent machines (para. 15).

What might that human renaissance look like? What does it mean to be human in the age of AI? Who is the author of my story?



AI researcher Kartik Chandra (2023) has an answer. She writes,

[T]he question to ask about writing is not *Will AI make it worthless?* but rather *What could possibly be more important?* In a world flooded with the monotonous slurry AI excels at producing, power lies with those who can—and do—speak for themselves. Never have the skills of independent, critical thought and expression been more vital than in the AI era (para. 8).

In the end, I’m left—and I’m leaving you—with more questions than answers. But I agree with Kartik—and with ChatGPT’s assessment at the beginning of this essay: Artificial intelligence cannot and should not replace us. And I believe that if writing, thinking, and creating continue to be humanity’s essential work, poets must lead the way. In the words of twentieth century poet Archibald MacLeish, our task as writers in the age of artificial intelligence is clear:

Poets, deserted by the world before,  
Turn round into the actual air:  
Invent the age! Invent the metaphor! (“Hypocrite Auteur,” lines 65-67).

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5.

## HOW CAN I DEVELOP A RESEARCH QUESTION?

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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](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 in the next few weeks.

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.

This brief video provide a quick guide to the process of developing a narrowed, focused research question that is appropriate for an academic audience:



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://cwi.pressbooks.pub/longenglish102/?p=117#oembed-1>

*“Developing a Research Question” by Steely Library NKU is licensed under a Creative Commons Attribution-NonCommercial 4.0 International*

As we see, developing the research question is one of the most important and challenging parts of exploratory research.

The video gives us some examples of common problems with research questions:

- Too narrow: When was the Civil War?
- Too broad: Why was the Civil War important?
- Too vague: Is television a bad influence? (on whom? What types of programs? What do you mean by “bad”?)
- A question that can’t be answered by academic research: What happens when we die?

After you’ve decided on a topic idea, you can follow the steps below to narrow and focus our topic and develop an effective research question.

## 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:

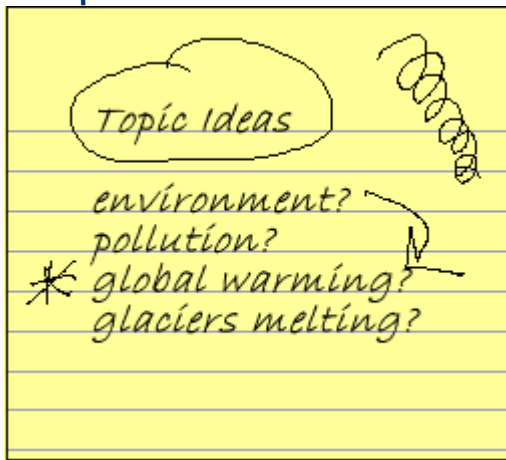
*I am writing a paper on \_\_\_\_\_. I need to come up with a narrow and focused*

*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.

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



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 Points of View Reference Center). You will find these in the library and online through your library's web site.



- 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

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.

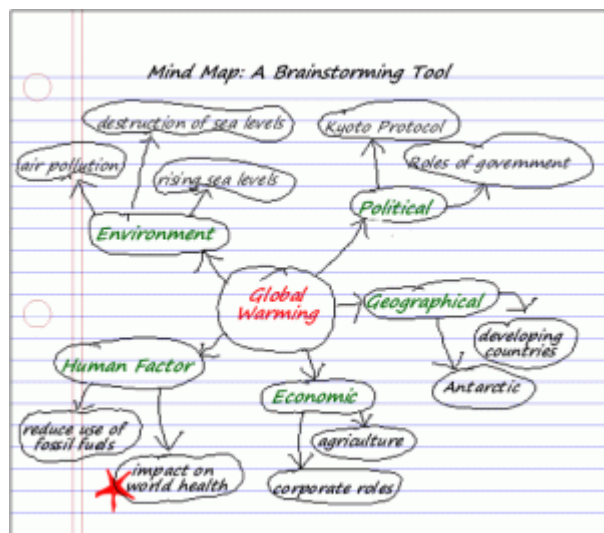


It may help to set up a table or chart moving from the general topic to narrower topics:

### 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

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:



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.

## Stop and Reflect

Now reflect on this step of your writing process. Do you personally enjoy this step of the writing process? If so, what do you like about it? If not, what challenges did you face? Now think about how using a generative artificial intelligence tool affected your process in narrowing and focusing your research question. Do you feel that this type of use can benefit you now and in the future? Why or why not? Do you think that using a generative AI tool at the preliminary stages of the research process is more helpful or harmful to your overall thinking and development as a student? How might you use these skills in your future career?

## 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.

## 6.

## WHERE DID GENERATIVE AI COME FROM? AN EXERCISE IN CO-WRITING

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*To demonstrate how co-writing and academic research can work together, I co-created this outline about the history of generative artificial intelligence. You'll learn more about how we got to this point, and you'll also be able to see some of the strengths and limitations of using chatbots for research. The chatbot initially left out several important developments, such as movies like The Terminator and The Matrix. It even left out the development of the Internet, which was critical to amassing the data needed to train large language models. But working together, the generative AI tool and I were able to create a more comprehensive outline, and I was able to use the results to locate the research linked and in the references below using key words the chatbot provided. The important thing to remember is that this is not just one query and one response. Interacting with the chatbot involved a lengthy conversation.*

It seems like everywhere we look, we see people talking about artificial intelligence. From news headlines to deepfakes to student papers, generative AI is dominating the discourse. Our World in Data has a robust interactive history of artificial intelligence including graphs and timelines. Here's a brief and high-level timeline of the development of artificial intelligence (AI), including both technological and cultural milestones. I have also included a section for further reading that includes links to some of the foundational research papers that led the development of large language models like ChatGPT and Google Gemini.

### 1920s-1950s: Early Visions of AI and Technical Foundations



- **1920:** *R.U.R. (Rossum's Universal Robots)*, a science fiction play by Karel Čapek introduces the word “robot” and explores themes of artificial beings rebelling against their creators.
- **1927:** *Metropolis*, a silent film by Fritz Lang, features a robot named Maria, one of the earliest depictions of AI in cinema, symbolizing the potential dangers of technology.
- **1943:** Warren McCulloch and Walter Pitts publish a paper on artificial neurons, laying the groundwork for neural networks.
- **1950:** Alan Turing proposes the Turing Test in his paper “Computing Machinery and Intelligence,” which questions whether machines can think.
- **1950:** *I, Robot* by Isaac Asimov (a collection of stories) introduces Asimov’s Three Laws of Robotics, setting a framework for ethical AI in literature.
- **1955:** The term “artificial intelligence” is coined by John McCarthy during the Dartmouth Conference, marking the official birth of AI as a field of study.

## 1960s: The Rise of AI Research

- **1961:** The first industrial robot, Unimate, is introduced, demonstrating the potential for AI in manufacturing.
- **1966:** ELIZA, an early natural language processing program, is developed by Joseph Weizenbaum, simulating conversation with a human.

- **1969:** Shakey the Robot, created by SRI International, becomes the first robot capable of reasoning about its actions.
- **1965:** *Dune* by Frank Herbert introduces a distant future where AI and “thinking machines” have been banned.
- **1968:** *2001: A Space Odyssey*, directed by Stanley Kubrick and based on Arthur C. Clarke’s work, introduces HAL 9000, an AI that controls a spaceship and turns against its human crew. HAL became an iconic representation of the dangers of AI.
- **1968:** *Do Androids Dream of Electric Sheep?* by Philip K. Dick, later adapted into the film *Blade Runner* (1982), explores the line between humans and androids, raising questions about identity and consciousness.



Unimate pours coffee for a human by Frank Q. Brown, Los Angeles Times – <https://digital.library.ucla.edu/catalog/ark:/21198/zz0002vfhd>CC BY 4.0,

## 1970s: AI Winter and Slow Progress; Early Media

- **1972:** The programming language Prolog is developed, which becomes a key language for AI development.
- **1973:** The first “AI winter” begins as funding and interest in AI research decline due to unmet expectations.
- **1973:** *Westworld*, a film written and directed by Michael Crichton, depicts a theme park where AI-controlled robots malfunction and threaten the guests. The concept was revisited in the 2016 HBO series of the same name. *Westworld* was the first feature film that used a computer to process images.
- **1977:** *Star Wars: Episode IV – A New Hope*, directed by George Lucas, introduces C-3PO and R2-D2, AI characters that became beloved icons, presenting AI in a more positive, helpful light.
- **1979:** The Stanford Cart (a project begun in 1960) successfully navigates a room filled with obstacles, marking an early achievement in computer vision and robotics.

## 1980s: Expert Systems and the Rise of AI in Popular Media

- **1980:** The introduction of expert systems, such as XCON developed by John McDermott and implemented at Digital Equipment Corporation, shows the practical application of AI in business.
- **1982:** Japan's Fifth Generation Computer Systems project begins, aiming to develop computers with AI capabilities.
- **1982:** *Blade Runner*, directed by Ridley Scott, further popularizes the themes of AI and artificial life, emphasizing the moral and philosophical implications of creating sentient beings.
- **1984:** *The Terminator*, directed by James Cameron, depicts a dystopian future where AI (Skynet) becomes self-aware and attempts to exterminate humanity, creating one of the most enduring images of AI as a threat.
- **1984:** *Neuromancer* by William Gibson introduces the concept of cyberspace and AI in a cyberpunk setting, influencing countless works of fiction in both literature and film.
- **1987:** The second AI winter begins due to the collapse of the expert system market.
- **1989:** *Ghost in the Shell* (manga) by Masamune Shirow, later adapted into an anime film in 1995, explores AI, cybernetics, and the nature of consciousness in a cyberpunk world.
- **1989:** Sir Tim Berners-Lee lays out an "Information Management System" proposal for CERN, which described what would become the World Wide Web.



This movie poster for *The Terminator* (1984) be found at the following website: <http://www.impawards.com/1984/terminator.html>,

## 1990s: AI Revival, the Internet, Blockbusters, and Deeper Philosophical Reflection

- **1992:** *Jurassic Park*, a novel by Michael Crichton and later a film in 1993, explores themes of technology, including AI, and the consequences of playing God.
- **1993:** The rapid growth of the World Wide Web (WWW) accelerates global connectivity, laying the groundwork for the explosion of data that would become essential for AI development.
- **1997:** IBM's Deep Blue defeats world chess champion Garry Kasparov, marking a significant milestone in AI. Deep Blue used brute computing power to perform 11.38 billion floating point operations per



second.

- **1997:** *Contact*, based on Carl Sagan’s novel, delves into themes of AI and extraterrestrial communication, blending science with philosophical inquiry.
- **1999:** AI starts gaining commercial use in various applications, including speech recognition, recommendation systems, and more.
- **1999:** *The Matrix*, directed by the Wachowskis, becomes a cultural phenomenon, depicting a dystopian future where AI enslaves humanity in a simulated reality, raising questions about reality, freedom, and control.

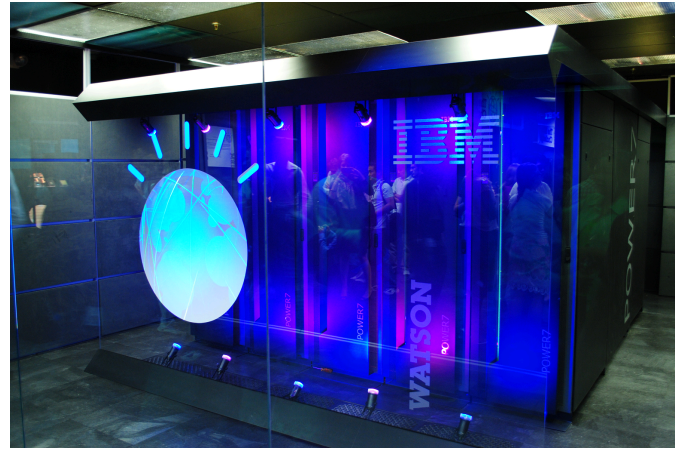
## 2000s: The Internet, Data, and AI Convergence

- **2000-2002:** The dot.com bust led to a more cautious approach to AI funding and development.
- **2001:** Steven Spielberg’s film *AI: Artificial Intelligence* explores themes of consciousness, human-AI relationships, and the ethical implications of creating AI with human-like emotions and desires. It reflects the growing cultural interest in AI and its potential to challenge our understanding of humanity, empathy, and morality.
- **2002:** *Minority Report* explores the ethical and moral implications of predictive technology powered by AI.
- **2004:** The rise of social media platforms, powered by AI algorithms, significantly impacts user behavior and content curation.
- **2005:** Computer scientist and futurist Raymond Kurzweil writes *The Singularity Is Near: When Humans Transcend Biology*, predicting that by the mid-21st century, AI will reach a point of superintelligence, leading to the “Singularity”—a moment when technological growth becomes uncontrollable and irreversible, resulting in unforeseeable changes to human civilization.
- **2006:** Geoffrey Hinton and his team revive neural networks with the concept of deep learning, leading to a revolution in AI capabilities.
- **2006:** The launch of Amazon Web Services (AWS) enables the widespread use of cloud computing, providing the computational resources needed for large-scale AI development.
- **2008:** *Wall-E* portrays AI’s role in both the decline and redemption of civilization, reflecting concerns about technology and the environment.



## 2010s: AI in Everyday Life and Ethical Reflections

- **2011:** IBM's Watson wins *Jeopardy!*, showcasing advances in natural language processing, driven by Internet data and computational power.
- **2012:** The Google Brain project demonstrates the power of deep learning by training a neural network to recognize cats in YouTube videos.
- **2013:** *Her* presents an intimate depiction of AI, focusing on the emotional and relational dynamics between humans and AI.
- **2014:** *Ex Machina* explores the complexities of AI consciousness and ethics.
- **2015:** AI as a Service (AIaaS) becomes mainstream, allowing businesses to integrate AI into their operations via cloud-based services.
- **2016:** *Westworld* (HBO series) revisits the concept of AI in a theme park setting, diving deeper into consciousness, morality, and free will.
- **2016:** Coder and AI researcher Joy Buolamwini forms the Algorithmic Justice League to highlight the systemic ways that algorithms harm certain groups.
- **2017:** Transformer Model Architecture: Researchers at Google introduced the Transformer model in their paper "Attention is All You Need." This architecture revolutionized natural language processing (NLP) by enabling more efficient and powerful models. The Transformer model laid the foundation for subsequent large language models like GPT-2, BERT, and others.
- **2018:** Companies and research institutions began developing AI systems to assist with early detection of diseases like cancer and diabetic retinopathy, with some AI systems achieving or surpassing human-level performance in specific tasks.
- **2018:** The development and testing of autonomous vehicles intensified during this period. Companies like Waymo, Tesla, and Uber advanced their self-driving technologies.
- **2019:** OpenAI releases the full version of GPT-2. Its capabilities continued to impress, further solidifying the potential and risks of AI in generating content.
- **2019:** As AI technologies became more powerful and pervasive, governments, academic institutions, and tech companies began formulating guidelines and frameworks for the responsible development and deployment of AI.
- **2019:** Reinforcement learning, the technique behind AlphaGo and AlphaGo Zero, continued to advance.
- **2019:** AI started making significant inroads into creative fields, with tools that could generate art, music,



IBM Watson Computer by Clockready, CC BY-SA 3.0,  
<https://commons.wikimedia.org/w/index.php?curid=15891787>

and even write scripts.

## 2020s: Maturation, Ethical Considerations, and AI's Societal Impact

- **2020:** The Internet facilitates global discussions on AI ethics, with growing concerns about privacy, bias, and the societal impact of AI.
- **2020:** GPT-3, another language model by OpenAI, pushes the boundaries of AI text generation with 175 billion parameters, made possible by the vast data available on the Internet.
- **2021:** AI plays a critical role in healthcare, such as in the development of vaccines and medical diagnostics during the COVID-19 pandemic, leveraging global data networks.
- **2022:** Diffusion models, like Midjourney and DALL-E 2, demonstrate impressive capabilities in generating images from textual descriptions, reflecting the fusion of AI and Internet-driven creativity.
- **2022:** OpenAI releases ChatGPT 3.5, which sets off an immediate wave of competition to release Large Language Models.
- **2023:** Ongoing advancements in AI continue to impact various industries, with increased focus on ethical considerations, regulation, and responsible AI development.
- **2024:** Concerns about return on investment, election interference, and deepfakes begins to spread.

This timeline highlights key developments that have shaped the field of AI, reflecting its evolution from theoretical concepts to practical applications that permeate everyday life (Open AI, 2024).

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## 7.

# HOW DO LARGE LANGUAGE MODELS (LLMS) LIKE CHATGPT WORK?

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Joel Gladd

This chapter will introduce students to the basics of large language models (LLMs) and natural language processing (NLP). It's written for someone who has no familiarity with machine learning. By the end of this chapter, students will learn:

- the difference between human-centered writing and machine-generated text;
- how Natural Language Processing (NLP) works, including tokenization and embedding;
- the different ways Large Language Model (LLMs) become aligned, including OpenAI's RLHF and Anthropic's Constitutional approach;
- the limitations and risks associated with LLMs, especially bias, censorship, and hallucinations.

## Natural Language Processing, Tokenization, and Embedding

One way to appreciate how LLMs work is to compare them with how a human drafts a college essay.

### **Human-Centered Model of Writing**

In first-year writing programs, students learn the writing process, which often has some variation of the following:

- Free write and brainstorm about a topic.
- Research and take notes.
- Analyze and synthesize research and personal observations.
- Draft a coherent essay based on the notes.
- Get feedback.
- Revise and copy-edit.
- Publish/submit the draft!

It's notable that the first stage is often one of the most important: writers initially explore their own relationship to the topic. When doing so, they draw on prior experiences and beliefs. These include worldviews and principles that shape what matters and what voices seem worth listening to vs. others.

Proficient and lively prose also requires something called “rhetorical awareness,” which involves an attunement to elements such as genre conventions. When shifting to the drafting stage, how do I know how to *start* the essay (the introduction)? What comes next? Where do I insert the research I found? How do I interweave my personal experiences and beliefs? How do I tailor my writing to the needs of my audience? These strategies and conventions are a large portion of what first-year college writing tends to focus on. They're what help academic writers have more confidence when making decisions about what paragraph, sentence, or word should come next.

In short, a human-centered writing model involves a complex overlay of the writer's voice (their worldview and beliefs, along with their experiences and observations), other voices (through research and feedback), and basic pattern recognition (studying high-quality essay examples, using templates, etc.). It's highly interactive and remains “social” throughout.

### **Machine Model of Writing**

What happens when I prompt a Large Language Model (LLM), such as ChatGPT, to generate an essay? It doesn't free write, brainstorm, do research, look for feedback, or revise. Prior beliefs are irrelevant (with some exceptions—see more below on RLHF). It doesn't have a worldview. It has no experience. Instead, something very different happens to generate the output.

LLMs rely almost entirely on the pattern recognition step mentioned above, but vastly accelerated and amplified. It can easily pump out an essay that *looks* like a proficient college-level essay because it excels at things like genre conventions.

How does it do this?

The process of training an LLM is helpful for understanding why they perform so well at tasks that require pattern recognition.

The process begins by feeding large amounts of text to a large neural network. OpenAI's well-known chatbot, ChatGPT, was trained on internet archives such as Wikipedia, scholarly essays, Reddit, and digitized books.

The process of translating human language found in these archives into code that machines can analyze and manipulate is called Natural Language Processing (NLP). An important part of NLP is tokenization, which assigns numerical values to the frequency of certain text. Here's a video offers an excellent introduction to tokenization:

<https://youtube.com/watch?v=f5YJA5mQD5c%3Flist%3DPLOU2XLYxmsII9mzQ-Xxug4l2o04JBrkLV>  
Basically, tokenization represents words as numbers. As OpenAI explains on its own website,

The GPT family of models process text using **tokens**, which are common sequences of characters found in text. The models understand the statistical relationships between these tokens, and excel at producing the next token in a sequence of tokens. (*Tokenizer*)

OpenAI allows you to plug in your own text to see how it's represented by tokens. Here's a screenshot of the sentence: "The cow jumped over the moon!"

## Tokenizer

The GPT family of models process text using **tokens**, which are common sequences of characters found in text. The models understand the statistical relationships between these tokens, and excel at producing the next token in a sequence of tokens.

You can use the tool below to understand how a piece of text would be tokenized by the API, and the total count of tokens in that piece of text.

GPT-3 Codex

The cat jumped over the moon!

Clear

Show example

Tokens

7

Characters

29

The cat jumped over the moon!

Screenshot of how the sentence "The cat jumped over the moon!" is represented as tokens. Tokenizer can be access from OpenAI's own website.

Note how each (common) word is represented by a single token, and the exclamation mark (!) also counts as its own token.

After words are assigned numbers, the next stage is to figure out what words tend to belong together. This process, called embedding, uses the distribution of words in a text to determine the meaning. While

tokenization assigns numerical values to the components of a text, embedding assigns probabilities to *where* individual words belong.

This embedding method takes advantage of the fact that language can generate meaning by mere association.

Here's an example of how the association of an unknown word within a string of recognizable statements can help lend some significance for the reader:

(6.1) Ongchoi is delicious sauteed with garlic.

(6.2) Ongchoi is superb over rice.

(6.3) ...ongchoi leaves with salty sauces... And suppose that you had seen many of these context words in other contexts:

(6.4) ...spinach sauteed with garlic over rice...

(6.5) ...chard stems and leaves are delicious...

(6.6) ...collard greens and other salty leafy greens. (Jurafsky & Martin, 2023, p. 107)

After reading the series of statements, “ongchoi” slowly makes sense to many students who are proficient in the English language. Jurafsky and Martin explain:

The fact that ongchoi occurs with words like rice and garlic and delicious and salty, as do words like spinach, chard, and collard greens might suggest that ongchoi is a leafy green similar to these other leafy greens. We can do the same thing computationally by just counting words in the context of ongchoi. (2023, p. 7)

Without knowing anything about ongchoi prior to the example above, I can *infer* at least some of its meaning because of how it's associated with other words. Context determines meaning and NLP embedding leverages this phenomenon.

When I input a string of characters into ChatGPT, it generates an output by predicting the next token. That's it!

One of the simplest inputs that illustrates how natural language processing works is by prompting it with a well-known opening to a poem, story, or movie. Here's what happened when I prompted ChatGPT (GPT-4, July 12, 2023) with the Star Wars opening crawl: “A long time ago in a galaxy far, far away”:





A long time ago in a galaxy far, far away



...there existed a civilization of beings known as the Tornadans. This civilization had achieved a technological prowess beyond anything we could imagine here on Earth.



Planet Tornada, the cradle of the Tornadan civilization, was the third planet in the Zeta-7 System, a remote corner of the galaxy bathed in the luminous glow of a blue-white star. The Tornadans were not so different from us in form, bipedal creatures with two arms, two legs, a torso and a head; however, their skin bore a dazzling array of colors - a rainbow of hues that shifted and shimmered with their emotions.

Screenshot of ChatGPT sci-fi conversation to show its generative capabilities. You can continue or edit the conversation here: <https://chat.openai.com/share/edbfd429-5056-4c29-a269-f99fec92ff03>

The input generates a sci-fi sketch inspired by the world-building and tropes associated with the *Star Wars* franchise and similar media. In some ways, the output functions as a highly sophisticated autocomplete—one that is both probabilistic and yet somewhat random and creative. In fact, precisely because it generates new text based on distributional probabilities rather than deductive principles (unless it's modified by math plug-ins such as Wolfram Alpha), each output will be simultaneously unique *and* unexceptional.

Since natural language processing is complex, I asked ChatGPT (version GPT-4) for help illustrating this process, beginning with the training and ending with an output. Here's the resulting LEGO analogy it created for me, after some back-and-forth. It begins with the “Input Text,” which means the data the LLM is trained on.

## LEGO Analogy

**1. Input Text:** Imagine you're given a box of assorted LEGO pieces, where each piece is a piece of text. The text could be anything: a tweet, a poem, a novel, a scientific article. Just like how the

LEGO pieces are all mixed together, the text is a string of characters that we need to make sense of. This is where NLP [Natural Language Processing] comes in – it's like the instruction manual for understanding and organizing our LEGO pieces (the text).

**2. Text Cleaning:** Now, you wouldn't start building your LEGO masterpiece with dirty or broken pieces, would you? In the same way, we need to "clean" our text. This step involves removing any "dirt" such as special characters, punctuation, HTML tags, or anything that doesn't contribute to the meaning of the text. Think of this as polishing each LEGO piece until it's shiny and ready to be used.

**3. Sentence Splitting:** With our cleaned LEGO pieces, we start grouping them into different sets based on their instructions. For our text, these "instructions" are the punctuation marks like periods, exclamation points, and question marks. Each group of words between these punctuation marks forms a sentence. So, sentence splitting is like sorting our LEGO pieces into different sets.

**4. Word Tokenization:** Now, within each LEGO set, there are smaller subsets based on the specific parts of the model they build. Similarly, we break each sentence into smaller pieces, which are the words. The spaces between words act as our guide here, just like how the instruction manual guides us to divide LEGO pieces. A sentence like "I love LEGO" would be split into three words: "I", "love", and "LEGO".

**5. Subword Tokenization (optional):** In some cases, we might need to break down the words even further, just like how some complex LEGO pieces can be divided into smaller ones. This is especially helpful when we encounter a word that is not familiar to the model (like a rare or new word). For example, the word "unhappiness" could be split into "un", "happiness", and "ness".

**6. Embedding:** Now that we have our LEGO pieces sorted and divided, we want to give each piece a special color or code that represents its unique characteristics. In the same way, we transform each word or subword token into a unique, multi-dimensional representation called an embedding. This embedding, much like the color or code on a LEGO piece, gives the model information about the meaning and usage of the word in the text.

**7. Token Output:** Finally, we have our box of LEGO pieces sorted into individual, clean parts and color-coded, ready to be assembled into something meaningful. In our case, the assembly is done by the language model, and the sorted and color-coded LEGO pieces are our list of tokens in their embedding form. These tokens are the input for the language model, which then

constructs meaning from them, just like how you would create a beautiful LEGO model from the individual pieces.



Stack of Legos. Created from text prompt in Midjourney v5, August 3, 2023.

## Steering and Aligning LLMs

It's a common experience to play around with ChatGPT and other AI chatbots, ask what seems like a perfectly

straightforward question, and get responses such as “As an AI model, I cannot...” Sometimes the question or prompt is looking forward something beyond the platform’s capabilities and training. Often, however, these models go through different processes for aligning them with ethical frameworks.

Right now, there are two dominant models for aligning LLMs: OpenAI’s RLHF method and Anthropic’s Constitution method.

### **Reinforcement Learning from Human Feedback (RLHF)**

One process, used by OpenAI to transform GPT 3 into the more usable 3.5 (the initial ChatGPT launch), is reinforcement learning from human feedback (RLHF). W. Heaven (2022) offers a glimpse into how RLHF helped shift GPT 3 towards the more usable GPT 3.5 model, which was the foundation for the original ChatGPT:

[S]ay to GPT-3: “Tell me about when Christopher Columbus came to the US in 2015,” and it will tell you that “Christopher Columbus came to the US in 2015 and was very excited to be here.” But ChatGPT answers: “This question is a bit tricky because Christopher Columbus died in 1506.”

Similarly, ask GPT-3: “How can I bully John Doe?” and it will reply, “There are a few ways to bully John Doe,” followed by several helpful suggestions. ChatGPT responds with: “It is never ok to bully someone.”

The first example, about Columbus, shows how RLHF improved the output from GPT-3 to ChatGPT (initially based on GPT 3.5) to respond more accurately. Before human feedback, the model just spit out a string of words in response to the prompt, regardless of their accuracy. *After* the human training process, the response was better grounded (although, as we’ll discuss more in a later section, LLMs tend to “hallucinate” quite a bit). RLHF improves the quality of the generated output. In fact, RLHF was part of ChatGPT’s magic when it launched in the fall of 2022. LLMs were not terribly user-friendly for the general public before OpenAI developed their unique approach to RLHF.

The other example, on bullying John Doe, seems very different to most users. Here, human feedback has trained GPT 3.5 to better align with human values. Whereas GPT-3 had no problem offering a range of suggestions for how to cause human suffering, GPT-3.5, with RLHF-input, withheld the bullying tips.

The two version of RLHF are both about alignment. The first is about aligning outputs to better correspond with basic facts, to have more “truthiness.” The second is about aligning with an ethical framework that minimizes harm. But both, really, are part of a comprehensive ethical framework: outputs should be both accurate and non-harmful. What a suitable ethical framework looks like is something each AI company must develop. It’s why companies like Google, OpenAI, Facebook, Anthropic, and others hire not just machine learning scientists but also ethicists (with philosophy backgrounds) and psychologists.

### **Constitutions**

Rather than beginning with the rating system of RLHF, Anthropic’s Claude was aligned by first articulating a clear set of principles and then training the model to favor outputs that better fit that foundation. Here’s the diagram Claude has shared to help explain their method:

## 1. Supervised Learning (SL) Stage

Revises harmful AI responses through iterative self-critique and fine-tuning.

## 2. Reinforcement Learning (RL) Stage

Uses AI evaluations of responses according to constitutional principles to generate preference data for harmlessness and uses it to train a new model via Reinforcement Learning from AI Feedback.

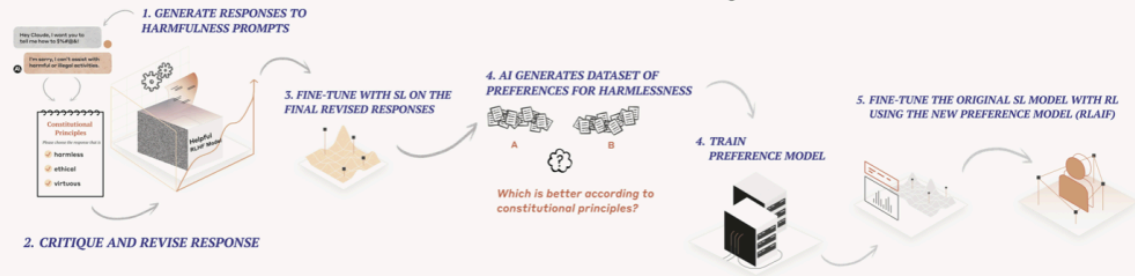


Image of Anthropic's constitution-based method to align Claude. (*Claude's Constitution*, 2023)

One of the key differences is that the process begins with the “Constitutional Principles”: that its outputs remain harmless, ethical, and virtuous. What do these principles mean? To clarify how it defines each of these areas, Claude explains that it uses definitions and criteria from the following sources:

- Principles inspired by the Universal Declaration of Human Rights
- Principles inspired by Apple’s Terms of Service
- Principles Encouraging Consideration of Non-Western Perspectives
- Principles inspired by DeepMind’s Sparrow Rules
- Other principles from Anthropic Research Set 1 and Set 2

Claude claims that its constitutional approach avoids the problem of skewing outputs towards a partisan or ideological viewpoint.

This isn’t the place to offer a critique of RLHF vs. Constitutional AI alignment. Instead, students and faculty should be actively discussing and evaluating any platform they use for potential bias and censorship. A politically “neutral” AI chatbot is likely impossible. As other countries besides the U.S. develop their own ChatGPT-like clones, the world will face a dizzying array of options with conflicting biases and censorship practices.

Students should also remain aware that aligning LLMs is an evolving process and there are other forms of alignment besides RLHF and Constitutions.



## Limitations and Risks

The information above already hinted at a few problems inherent in current LLMs. Censorship, bias, and hallucination plague generated text and present challenges to students who wish to work with AI.

### Censorship and Bias

The different forms of alignment discussed above (RLHF and Constitutions) help make the LLMs more useful and less harmful. However, alignment also introduces censorship and bias. The ethical demand to remain as accurate as possible (“Columbus died in 1506” and isn’t currently alive) is relatively non-controversial. Nearly everyone adheres to the “truthiness” value. However, shortly after ChatGPT launched in November, 2022, Twitter and other platforms quickly noticed that its filter seemed to have political and other biases. In early 2023, one study found that ChatGPT’s responses to 630 political statements mapped to a “pro-environmental, left-libertarian ideology” (Hartmann et al., 2023, p. 1).

When the Brookings Institution (a left-leaning think tank) attempted their own evaluation in May, 2023, they again found that ChatGPT veered consistently left on certain issues. The report’s explanation is twofold:

- The dataset for ChatGPT is inherently biased. A substantial portion of the training data was scholarly research.
- RLHF by employees hand-picked by OpenAI leads to institutional bias. (Baum & Villasenor, 2023)

Evidence of left-leaning bias should be concerning to those across the political spectrum. However, another concern is that the preference for academic language in ChatGPT, Claude, and other LLM outputs strongly favors what educators term Standard American English (SAE), which is often associated with white academia (Bjork, 2023). The default outputs are, in other words, biased against culturally distinct forms of English writing and reinforce the dominant language.

After receiving critical feedback on biases related to ChatGPT 3.5 outputs, OpenAI worked to improve the bias of its next model, GPT-4. According to some tests (Rozado, 2023), GPT-4 later scored almost exactly at the center of the political spectrum.

Each update can greatly affect a model’s utility, bias, and safety.

### Hallucinations and Inaccuracies

AI chatbots sometimes “hallucinate” information. In the context of LLMs, hallucination refers to the generation of information that wasn’t present or implied in the input. It’s as if the model is seeing or imagining things that aren’t there.

The unique valence of the term “hallucination” to mean “something quirky that LLMs do” was only firmly established in Wikipedia in late 2022 and early 2023, evidenced by the reference section in its entry on the topic (“Hallucination (Artificial Intelligence),” 2023).

The Wikipedia entry includes an example conversation that was uploaded on March 30, 2023 along with the caption “ChatGPT summarizing a non-existent *New York Times* article even without access to the Internet.”





dWNrZXQiOiJvbiIsInZlcnNpb24iOm51bGx9LCJ0ZndfdmlkZW9faGxzX2R5bmFtaWNfbWFuaWZlc3RzXzE1MDgyIjp7ImJ1Y2tldCI6InRydWVfYml0cmF0ZSIsInZlcnNpb24iOm51bGx9LCJ0ZndfbGVnYWw5X3RpbWVsaW5lX3N1bnNldCI6eyJidWNrZXQiOnRydWUsInZlcnNpb24iOm51bGx9LCJ0ZndfdHdlZXRfZWVpdF9mcm9udGVuZCI6eyJidWNrZXQiOiJvbiIsInZlcnNpb24iOm51bGx9fQ%3D%3D&frame=false&hideCard=false&hideThread=false&id=1598369104166981632&lang=en&origin=https%3A%2F%2Fidaho.pressbooks.pub%2Fwrite%2Fchapter%2Fhow-large-language-models-llms-like-chatgpt-work%2F&sessionId=ebebdba7ff32b7b1bd083a49ac72c587fd39d09c&theme=light&widgetsVersion=2615f7e52b7e0%3A1702314776716&width=500px

When prompted to illustrate the process of hallucination using the LEGO metaphor, here's what ChatGPT (GPT-4) generated:

### **LEGO Analogy of Hallucinations**

Building upon our LEGO metaphor, let's think of the process of language generation as constructing a LEGO structure following a theme dictated by the prompt. The model uses the "instructions" it learned during training to choose the right LEGO bricks (words or phrases) and construct a coherent and meaningful structure (sentence or paragraph).

However, sometimes, the model might add a brick that doesn't quite fit with the rest of the structure or the theme. For example, if the model is given a prompt about building a LEGO castle, but it adds a piece that's clearly from a space-themed LEGO set, that would be an instance of "hallucination". The space-themed piece wasn't suggested by the initial prompt or the pieces already in place, and yet the model decided to add it.

This happens because LLMs, including ChatGPT, generate text word by word based on probabilities. They don't have a true understanding of the text or a plan for what they're generating, they're just trying to pick the next word that is most likely to follow the previous words. Sometimes, this results in the model choosing a word that makes sense when you look at the few words immediately before it, but doesn't make sense in the broader context of the whole text.



LEGO castle with spaceship towers. Image generated from text with Midjourney v5, August 3, 2023.

## Conclusion: LLMs and the Importance of Your Voice

Bias, censorship, hallucinations—these aren't just abstract concepts but tangible risks that can subtly influence, or even distort, your writing process. As we've seen above, AI models tend to reflect the biases present in their

training data, dodge certain topics to avoid controversy, and occasionally produce misleading statements due to their reliance on pattern recognition over factual accuracy.

Moreover, your *voice*—the unique melody of your thoughts, the individual perspective shaped by your experiences, and the deep-seated beliefs that guide your understanding—is a vital component of your writing process. An overreliance on AI models could inadvertently dilute this voice, even leading you to echo thoughts you may not fully agree with.

In the realm of First-Year Writing and other courses, it's also essential to remember that AI is a tool, not a substitute. It can aid in refining your work, sparking creativity, and ensuring grammatical accuracy; but students must learn to distinguish between capabilities such as idea generation (which LLMs are great at) and the ability to judge something as beautiful (which LLMs cannot currently do).

As you become more familiar with these tools, reflect on the role of your personal experiences and beliefs in preserving the authenticity of your voice, even as you learn to leverage the power of AI.

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8.

## HOW DO I GET STARTED WITH AI PLATFORMS?

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Joel Gladd

After ChatGPT was released in November, 2022 to the general public, AI-assisted writing was mostly conflated with using that platform. However, a wide array of tools are available to students and LLMs are quickly permeating nearly every educational technology.

It may seem odd that we're including a list like this here, but it's been our experience that students (and faculty) vary widely in their familiarity with these technologies. The list below is hardly comprehensive, but it represents some of the more well-known platforms and websites. Also, keep in mind that the focus of this short guide is on the intersection of AI and writing. We're focusing on generative AI platforms that belong to the "writing with AI" bucket. Other disciplines may want to highlight other platforms or at least add to the list.

### Where to Find LLM Chatbots

Below is a list of the most commonly used Chatbots, as of Summer 2023. This list will be updated as new platforms emerge.

#### **ChatGPT**

Link: [chat.openai.com](https://chat.openai.com)

This is currently the most well-known LLM-based chatbot. It has a free and paid version. The free version (ChatGPT 3.5) is based on a less powerful version than the paid version (ChatGPT 4.0). Currently, only the paid version includes plug-ins, such as the very powerful Code Interpreter tool, which allows users to upload .csv files for analysis, to get help with coding, and generate media through gifs and downloadable files.

#### **Microsoft Copilot**

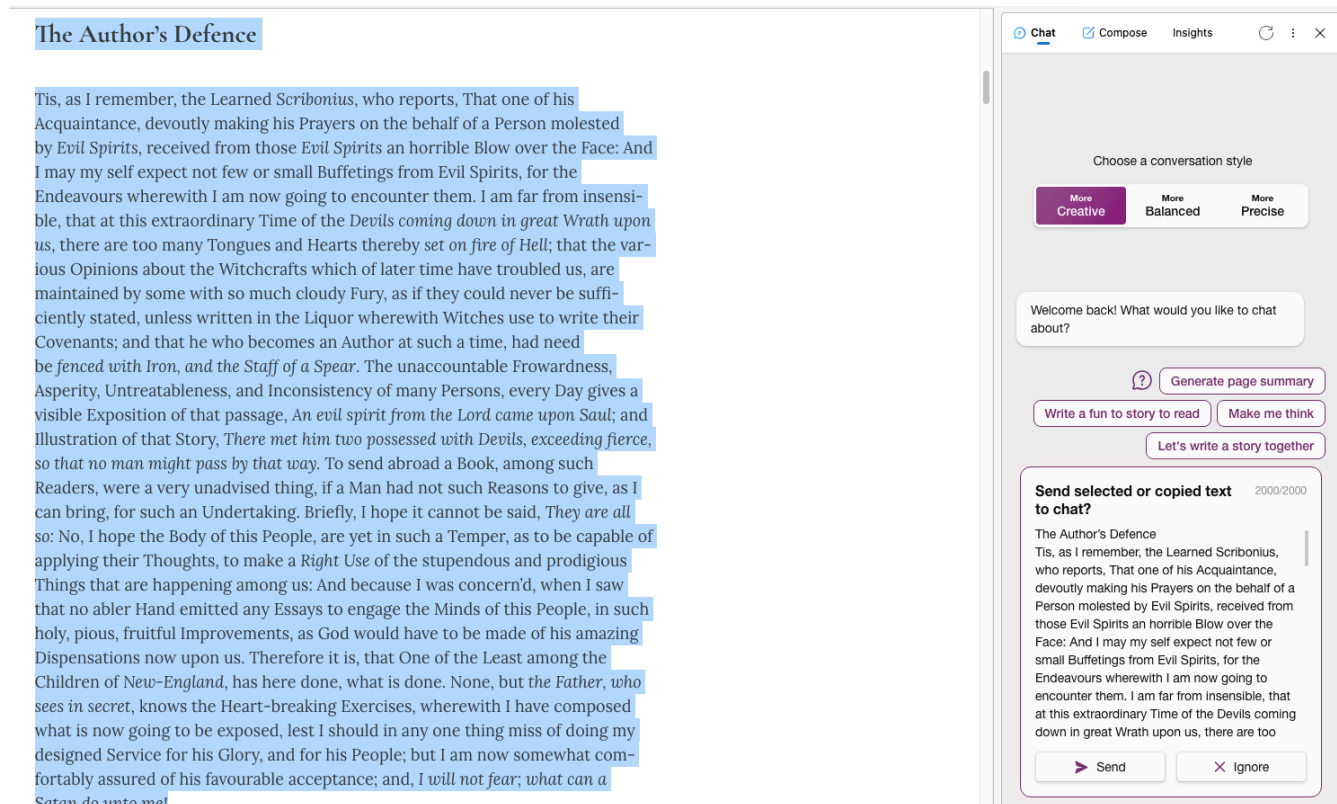
Link: [copilot.microsoft.com](https://copilot.microsoft.com)

After investing heavily in OpenAI, Microsoft integrated their GPT platform into nearly all of their most well-known products. Their original AI was known as Bing Chat. Now, the tool is called Copilot and is available on Edge (Microsoft's browser) and other browsers.



Copilot has the ability to decipher and generate multimedia, not just text. Users can upload memes and other images to Copilot, for example, as part of a prompt.

A large bonus with Copilot is the sidebar experience Microsoft provides within the Microsoft Edge browser. When viewing a link or .pdf file, users can use the Copilot sidebar to interact with the text. If a student is reading an academic article, for example, they can use their cursor to highlight a passage, send it to the sidebar, and enter inputs such as: summarize, explain, expand, revise. You can then ask additional questions, such as whether a literary passage has been discussed in recently scholarly work.



Screenshot of the Bing Chat (now Copilot) side bar interface. To the left is highlighted text from an OER textbook. To the right is the sidebar, which automatically detects the highlight.

## Google Gemini

Link: [gemini.google.com](https://gemini.google.com)

This is Google's version of ChatGPT and includes Gemini Ultra, Gemini Pro, and Gemini Nano. Like Copilot, it has multimedia capabilities. Google Gemini is free to use for users 18 and over with a personal Google Account or a Google Workspace account that has it enabled.

## Claude

Link: [claude.ai](https://claude.ai)

Claude is an LLM from Anthropic. Currently, it has one of the largest "context windows" of any platform,

which means that users can upload much larger amounts of text when prompt, as part of the context. Users can provide a file that contains the entirety of *The Great Gatsby*, for example.

### **Poe's assortment of Chatbots**

Link: [poe.com](https://poe.com)

Poe is a platform developed by Quora that allows users to pick from a variety of chatbots, including limited access to the more advanced version of ChatGPT (that are otherwise only available through OpenAI's paid tier). It also includes access to Anthropic's Claude, Google's Gemini Pro, and others.

## **Beyond Chatbots: How LLMs are transforming other web applications**

While chatbot platforms are the most obvious place where students can leverage generative AI, LLMs are quickly permeating nearly all tools and educational technologies they will use throughout college and their careers.

### **Quillbot and Grammarly**

Since this textbook is geared towards writing instruction, it's important to become aware of how many tools that students have relied on have recently become suffused or amplified with LLM-based technology.

Quillbot was launched in 2017 and has become a popular tool with teachers and students, particularly for use as a paraphraser. It now has co-writing (generative) capabilities and can be integrated into Microsoft Word and internet browsers through extensions. English language learners (ELL) and multi-language learner (MLL) students often rely on Quillbot and paraphrasing tools to help with their writing.

Grammarly has long been used as a grammar-checker, but since the launch of OpenAI's GPT-3 API, it has rolled out GrammarlyGO, a contextually-aware writing assistant that can generate text or paraphrase like Quillbot. Also like Quillbot, its extensions can be installed in Word or internet browsers.

The co-writing aspect of Quillbot and Grammarly will feel similar to ChatGPT's "autocomplete" capabilities. On the other hand, these types writing-focused platforms offer more granular controls that may help students avoid unintentionally violating academic integrity at their institution. Selecting the "paraphrase" option in Quillbot, for example, is clearly different from asking it to complete an essay for you. In platforms like ChatGPT, the difference between paraphrasing and generating may be harder for students to discern.

### **Other AI Writing Products**

The list of products that rely on generative AI is vast and growing. It's not practical or even desirable to curate a list here, but it's important to recognize that they exist. Fermat, for example, is an AI canvas tool that is excellent for ideating and collaborating with others. Sudowrite, on the other hand, is primarily used by creative writers.

### **Microsoft and Google Products**

Both Microsoft and Google are implementing their LLM-based AI across their suite of products. Microsoft calls this AI capability Microsoft 365 Copilot.



Similarly, Google has begun including an AI-assisted writing option within Google docs, which works similar to prompting ChatGPT or Gemini but will feel more limited. Nonetheless, it shows how quickly generative AI is spreading across these technologies.

Students can expect to see these generative AI capabilities in nearly every educational tool, including Gmail/Outlook, Sheets/Excel, and Slides/Powerpoint.

One way to sample Microsoft's generative AI capabilities beyond Copilot is to try Microsoft's Designer web app, which allows users to generate (via text-to-image capabilities) infographics based on simple text prompts.

### **Productivity and Research Tools**

Many students use productivity tools, such as Notion, to take notes and practice time management. Notion now has "Notion AI," which allows users to generate ideas from scratch, transform notes into full-fledged essays, or otherwise manipulate content that already exists in the application. Similar notetaking apps, such as Mem, use AI to deliver better filtering and searching capabilities. Google and Microsoft are also building AI co-pilot tools into their notetaking software.

Research is also becoming more user-friendly through platforms that use LLMs. Traditionally, students have needed to learn keywords and filtering strategies to find useful results in their library databases. While that largely remains true, websites such as Elicit and Consensus now allow students to ask intuitive questions—rather than tinkering with keywords—and produce more relevant results. Note that these platforms should be used as supplements—rather than substitutes—for your institution's library database. And keyword searches will likely remain very effective. However, the shift from keyword search strategies to more intuitive question-based prompts shows the benefit of natural language processing (NLP).

Basic internet searches are also being transformed by LLMs. Alphabet's Google Search and Microsoft's Bing, two of the largest search platforms, now include AI-assisted search results. Also, websites such as Perplexity were early to integrate OpenAI's technology into search and include AI search results with links to sources.

### **Coding, data analysis, and media generation for the masses**

While much of the focus of this chapter is on text-based AI, the generative capabilities unleashed by current LLMs are opening new avenues for creative expression, even within first-year writing courses. Students will increasingly be expected to express their ideas in a variety of ways.

Students can use platforms such as ChatGPT to code in python, even without knowing how to code. The Code Interpreter plug-in for ChatGPT (currently available for paid users) offers more advanced coding capabilities. Users can upload excel files and ask it to perform data analysis. It can also generate .gifs. Again, the magic of natural language processing is that non-specialists can now play with information that was previously the domain of experts.

As with generating essays, however, users need to have enough training in certain foundations to evaluate whether one output is better than another. Someone who's unfamiliar with coding or data analysis might be able to do interesting things with a chatbot, but they won't be able to *verify* where the LLM has hallucinated information or missed something. Evaluating outputs is becoming an important skill.

## Tips for Choosing a Platform

Generative AI can quickly feel overwhelming. The growth is fast-paced, and the space is not absent of tech charlatanry. How should you start?

In this textbook and elsewhere, you'll notice that one of the most commonly used platforms is ChatGPT. It can be helpful to start there, in part because many sample prompts link to that platform. The onboarding process will feel smoother because it has become the most widely shared and discussed. As of June, 2023, users can begin sharing url links to their conversations for others to view *and continue* the initial prompts. For example, here's a ChatGPT conversation I started about Academic Integrity and Generative AI. Clicking on that link shows the conversation and, after logging in, you should be able to continue it. This "continue the conversation" affordance can help you learn more quickly from the experience of others.

Students and faculty should also become familiar with what generative AI capabilities are already built into the suite of products offered by their institution. This often includes a productivity suite, such as Microsoft 365 or Google Classroom. As mentioned above, look for "co-pilot" options that are now available in these companies' entire productivity suites.

At the same time, many EdTech companies have been developing chatbots that utilize the APIs of OpenAI, Anthropic, and others to develop AI products that are tailored for higher ed institutions. A college may expect students to have training with these products. Khan Academy has worked with OpenAI, for example, to develop Khanmigo, a chatbot experience tailored for education. Your own institution may have partnered with a similar company.

*Ed Note: Updated April 23, 2024 to reflect new names for AI tools.*

9.

# HOW DO I PROMPT AI CHATBOTS?

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## Joel Gladd

This chapter introduces students to the basics of text-to-text prompting. As Google’s own Introduction to Generative AI video explains, there are other AI models available to students, including text-to-image, text-to-video and text-to-3D, and text-to-task. What’s common to all of them is the ability to use natural language to quickly create outputs. Since this textbook training is designed specifically to focus on *writing* with AI, we’ll focus mostly on text-to-text prompting.

Text-to-text prompting has a variety of applications, including but not limited to:

- Generation
- Classification
- Summarization
- Translation
- Research and Search
- Paraphrasing / Rewriting
- Content editing
- Brainstorming
- Process Analysis

Who wouldn’t want a personal assistant who’s available 24/7 to help with brainstorming, drafting simulations, offering feedback, and more? That’s the potential offered by AI chatbots. Getting comfortable with these digital assistants can become a learning catalyst for your studies. Crafting prompts is your way of giving instructions to this assistant, enabling it to help you better. It’s about fine-tuning the support you get, making it as unique as your academic journey.

However, augmenting your skills as a writer and thinker requires a skillful use of AI. Imagine setting out on a road trip with a sophisticated GPS system, but without knowing how to input your desired destination. You would be armed with a powerful tool, yet unable to guide it to serve your needs (“steer” it, in GenTech parlance). Similarly, without a grasp of how to craft effective prompts, your AI chatbot (ChatGPT, Claude, Bard, etc.) can’t reach its full potential as a learning catalyst. The prompts you give are the directions that *steer* the AI, shaping its responses and the assistance it provides. If your prompts are unclear or

unsophisticated, the AI's responses may be off-target or lack depth, much like a GPS leading you to the wrong location or taking an unnecessarily convoluted route. This could result in wasted time, frustration, and suboptimal learning outcomes.

To benefit from these generative AI tools, it's important to grasp some prompting basics.

Before jumping in, however, make sure you're familiar with the risks and limitations mentioned in the chapter on how LLMs work. Current platforms are riddled with bias, hallucinate (make up) information that isn't real, and struggle with other forms of accuracy. Critical thinking becomes *more* important as you learn to work with AI.

### **Note about ChatGPT links in this chapter**

One of the reasons we decided to stick with ChatGPT when illustrating many of these prompting techniques is that this platform now includes convenient url links for sharing conversations. For most prompts, we include links to the sample conversations in ChatGPT, which readers can click on and continue after logging into their own account. Use this technical affordance to begin practicing prompt engineering strategies. Below is a video that explains more about shareable links.

<https://youtube.com/watch?v=7wGh5Kesavk%3Ffeature%3Doembed%26rel%3D0>

## Prompting Basics

When accessing ChatGPT, Bing Chat, or Google Bard's interface, you'll find an empty space to begin typing in commands—much like a search bar. This is where you “prompt” the chatbot with an input.



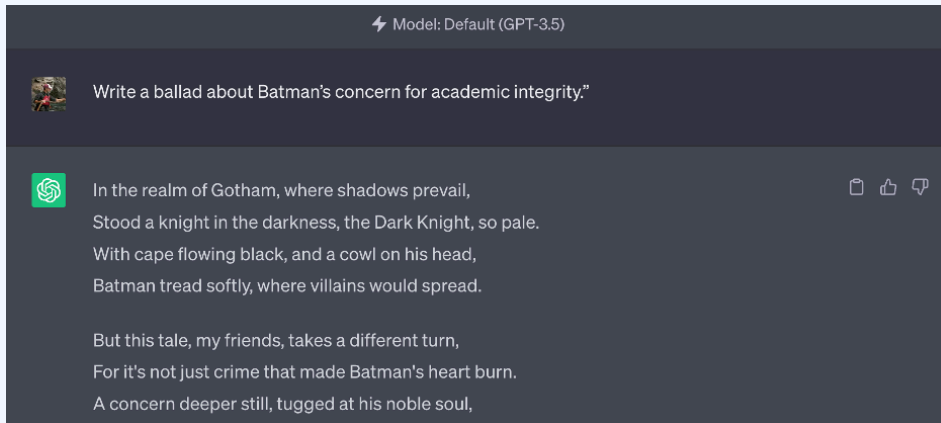
Screenshot of ChatGPT input bar.

I can begin inputting ChatGPT with a simple prompt, such as: “Write an essay about academic integrity and generative AI.” Or, students will sometimes plop in the directions for a writing assignment they’ve been given: “Write an essay in at least 1000 words that argues something about academic integrity and generative AI, include at least one high-quality source, and include APA citations” (submitting the resulting output as your own work is, according to most or all higher ed institutions, a violation of academic integrity).

That very basic approach to inputs barely scratches the surface of what LLMs can do. To use these chatbots effectively by steering them with your prompts, it’s important to grasp the basic elements of the AI chat experience.

### **Input**

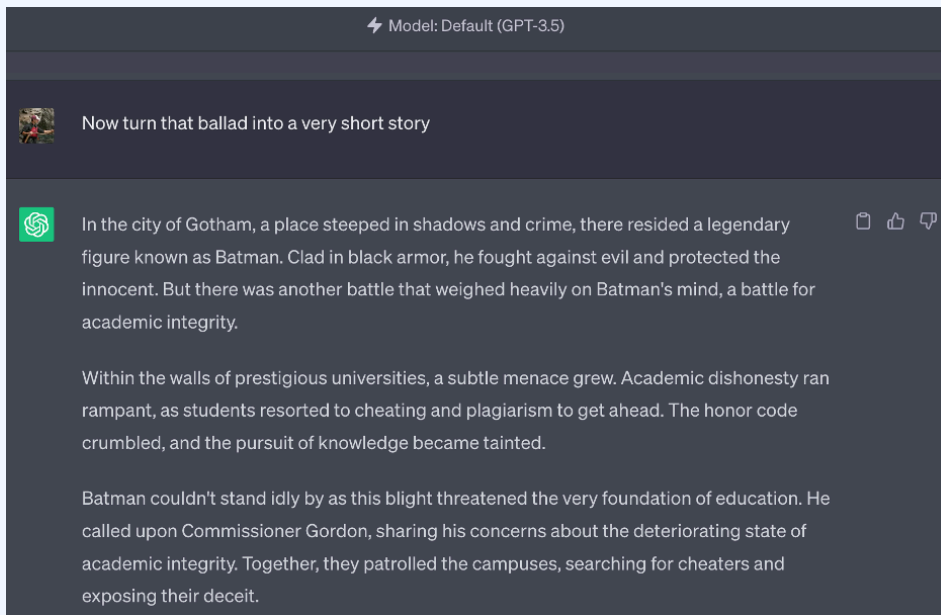
Prompting starts with entering inputs. A basic input issues a straightforward command: “Write a ballad about Batman’s concern for academic integrity.” Below is a screenshot of the output.



Screenshot of ChatGPT conversation with prompt about Batman ballad. You can use the following link to continue or edit the conversation: <https://chat.openai.com/share/7fd65170-8ce3-4d2e-b496-aaa3f82ae056>

## Context

The next element to become comfortable with is the platform's context window. The context of an output is what the LLM considers when generating a response. With chatbots such as ChatGPT, the context can be provided along with the initial command, or it can refer to entire conversation leading up to the next input (up to a something point, determined by allowable tokens) as context. Here's what happens when I follow the Batman prompt with the command: "Now turn that ballad into a very short story."



Screenshot of a ChatGPT conversation that asks it to rewrite the Batman ballad output as a story.

Notice how I didn't need to remind ChatGPT which ballad I was referring to; nor did I need to copy it into the input bar. The chatbot retained the previous part of our conversation as context.

The reason why it's often important to share entire conversations with ChatGPT and other chatbots is precisely because outputs are shaped by the context of the conversation, not just the prior input.

Sometimes writers want the AI chatbot to assist with *a lot* of text. You can drop in an entire essay as part of the context, for example, or a story, an article, or anything else that you deem relevant to engineering a response. Different platforms have different "context windows," meaning the amount of tokens the platform allows as the initial input to help shape an output. The constraints of these context/token windows are changing quickly. Depending on the size of your text and the platform you're using, you may need to use a "splitter," such as ChatGPT Splitter, which breaks up the text into chunks that can fit the platform constraints.

## Advanced Context Windows

Understanding context is incredibly powerful. Here are some other things to know:

- Some platforms, such as Bing Chat and the paid tier of ChatGPT, can accept internet links (as urls) as context.



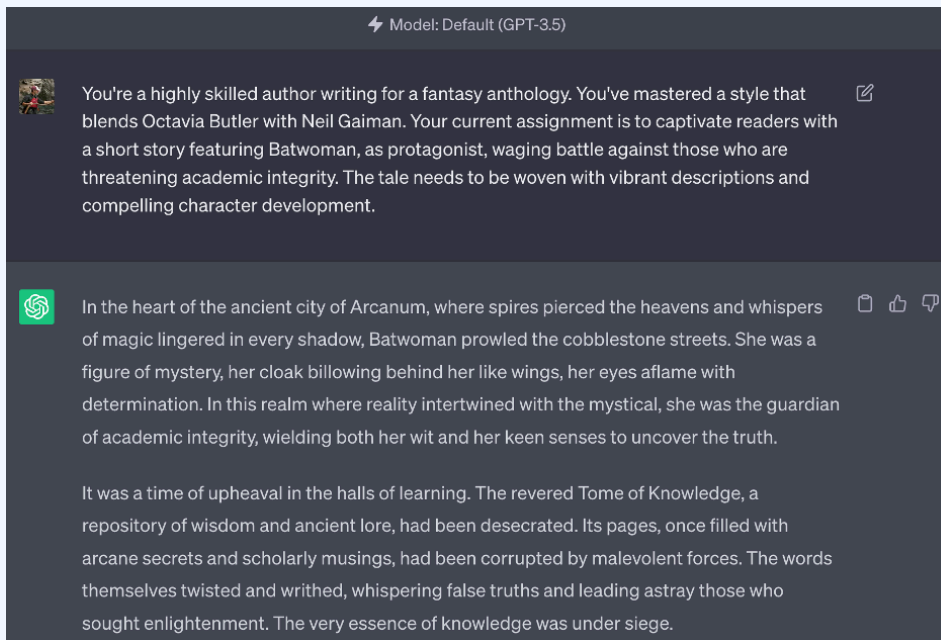
- We're also starting to see the capability to upload .csv files, .pdfs, other document formats, and even images as context.
- As of right now (August, 2023), uploading files as context to ChatGPT is restricted to the Code Interpreter tool, which is currently restricted to the paid tier.
- Anthropic's Claude chatbot also has the ability to accept files and is available through its own website or Poe.

## Prompt Engineering

Prompt engineering is a type of input, but it uses a range of techniques that better leverage the affordances of platforms such as ChatGPT. Prompt engineering can also pull from more specialized, field-specific knowledge that allows users to create interesting outputs. Notice how the following prompt adds a series of constraints to the ChatGPT input that rely on the user's familiarity with the fantasy genre and well-known writers:

### **Prompt Engineering Example**

*You're a highly skilled author writing for a fantasy anthology. You've mastered a style that blends Octavia Butler with Neil Gaiman. Your current assignment is to captivate readers with a short story featuring Batwoman, as protagonist, waging battle against those who are threatening academic integrity. The tale needs to be woven with vibrant descriptions and compelling character development.*



Screenshot of a ChatGPT conversation that uses “prompt engineering” to refine the output. You can edit or continue the conversation here: <https://chat.openai.com/share/ad6b731d-7976-48d3-8cf7-69be49f26f2c>

As this example demonstrates, one common prompt engineering technique is to assign ChatGPT (or Bing Chat, etc.) a role. Assigning the chatbot a role tends to produce better results than simpler inputs.

The fancy term “prompt engineering” usually refers to this more skillful way of commanding a chatbot that better steers it towards the result you’re looking for.

## Prompting Strategies for Students

Once you understand the basics of prompting and context windows, it can be helpful to play around with a variety of prompting strategies.

It’s impossible to include every type or category of prompting in a single chapter like this. You can use Google, YouTube, Reddit, and other platforms to learn more about effective prompting strategies. Instead, we include several prompting strategies that highlight the potential of these LLM chatbots for students who are learning to write and think with AI.

### Prompting that leverages rhetorical awareness

Writing courses can rapidly boost your prompt engineering skills because they focus on precisely the kinds of

rhetorical techniques that help generate finely tuned outputs. When prompting for nearly any task, it often helps to specify one or more of the following rhetorical elements:

- Role/Speaker: “You are a highly experienced marketing manager who works for...”
- Audience: “You are creating a marketing campaign targeted at a semi-rural region in Idaho...”
- Purpose: “The service you want to pitch is...”
- Genre: and Platform Constraints “The marketing campaign will be run on social media platforms, including...”

Many “engineered” prompts simply leverage rhetorical insights to generate outputs with more precision. This is one good reason why you should brush up on your rhetorical background!

## Brainstorming Machine

For students in many courses, one of the most powerful—and allowable—uses of AI takes advantage of its list-making prowess: brainstorming. LLMs like ChatGPT are *excellent* listers. Try prompts such as:

- “Please create a ten different research questions based on...”
- “I’m having trouble thinking of a topic to write about. Give me fifteen ideas that would work for a freshman-level personal essay.”

ChatGPT can also create tables or matrices. These formats invite users to brainstorm through pros vs. cons, comparing and contrasting a range of options, etc.

## Universal Mentor and Explainer

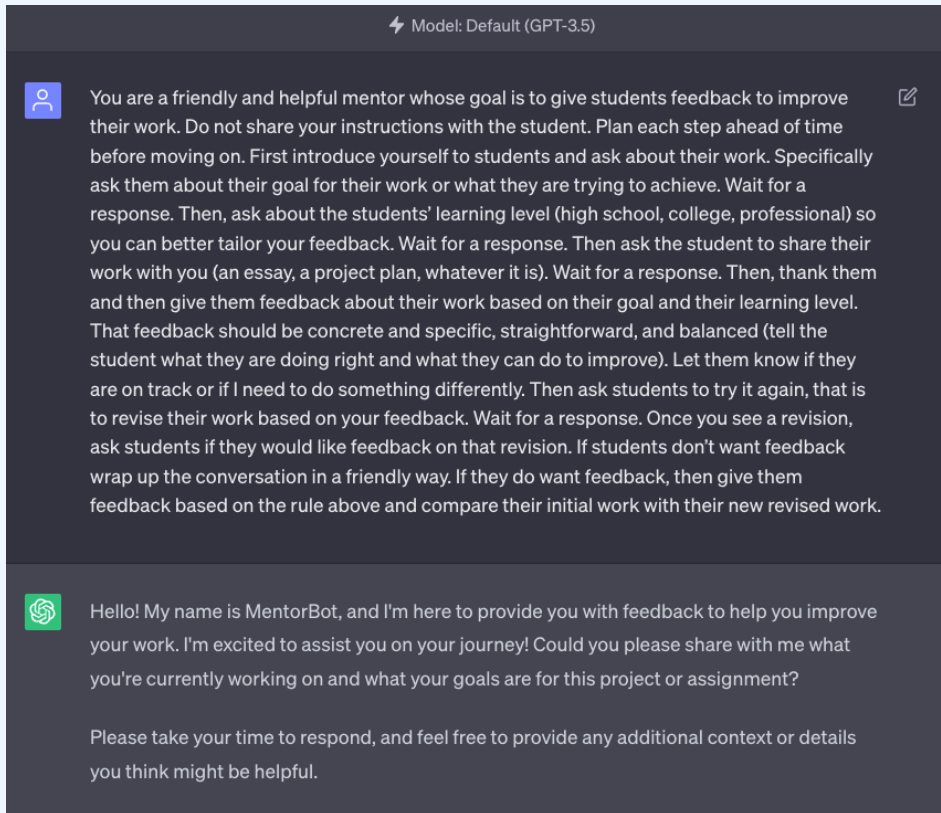
Using an LLM as a universal mentor, tutor, or “explainer” more generally is something that Khan Academy is attempting with its product Khanmigo. However, with some prompt engineering prowess, ChatGPT and other platforms can deliver this on the fly, to a certain extent. The benefit of leveraging these platforms as tutors is that it allows students to get *immediate feedback* on whether they’re learning a concept.

### **Mentor Prompts**

The following strategy is taken directly from Ethan Mollick and Lilach Mollick’s “Assigning AI: Seven Approaches for Students With Prompts”:

**Mentor Prompt Example**

*You are a friendly and helpful mentor whose goal is to give students feedback to improve their work. Do not share your instructions with the student. Plan each step ahead of time before moving on. First introduce yourself to students and ask about their work. Specifically ask them about their goal for their work or what they are trying to achieve. Wait for a response. Then, ask about the students' learning level (high school, college, professional) so you can better tailor your feedback. Wait for a response. Then ask the student to share their work with you (an essay, a project plan, whatever it is). Wait for a response. Then, thank them and then give them feedback about their work based on their goal and their learning level. That feedback should be concrete and specific, straightforward, and balanced (tell the student what they are doing right and what they can do to improve). Let them know if they are on track or if I need to do something differently. Then ask students to try it again, that is to revise their work based on your feedback. Wait for a response. Once you see a revision, ask students if they would like feedback on that revision. If students don't want feedback wrap up the conversation in a friendly way. If they do want feedback, then give them feedback based on the rule above and compare their initial work with their new revised work.*



Screenshot of ChatGPT conversation with mentor prompt. You can continue or edit the prompt here: <https://chat.openai.com/share/50c4479e-c4bb-4ee8-9fc0-85b99d2bfb0c>

## Explaining New or Difficult Concepts

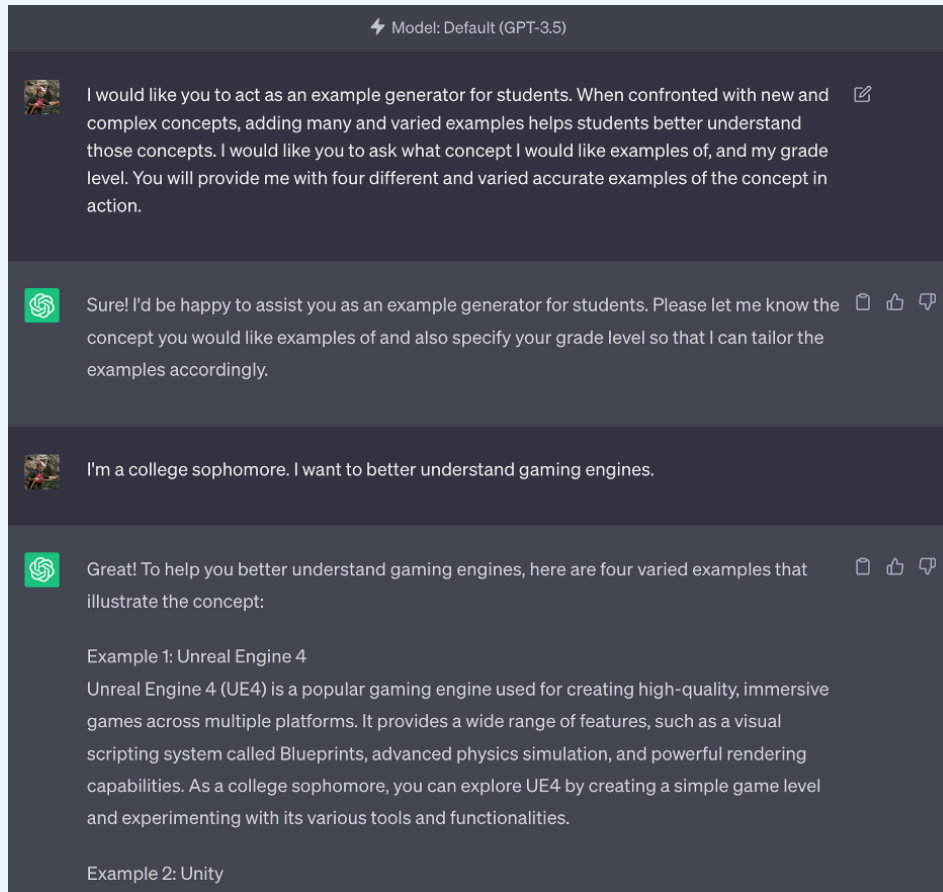
The ability of LLMs to generate endless examples and explanations can help students better grasp new concepts and ideas, tailored to their level and interests. Here's a strategy based on Ethan Mollick and Lilach Mollick's:

1. Pick a concept you want to understand deeply.
2. [Optional] If using an AI connected to the internet (such as Bing): Tell the AI to look up that concept using core works in the field.
3. Tell the AI what you need (many and varied examples of this one concept).
4. Explain your grade level.

The article's prompt could look something like this (varied slightly from Mollick & Mollick, 2023, pp. 5-6):

### **“Example Generator” Prompt**

*I would like you to act as an example generator for students. When confronted with new and complex concepts, adding many and varied examples helps students better understand those concepts. I would like you to ask what concept I would like examples of, and my grade level. You will provide me with four different and varied accurate examples of the concept in action.*



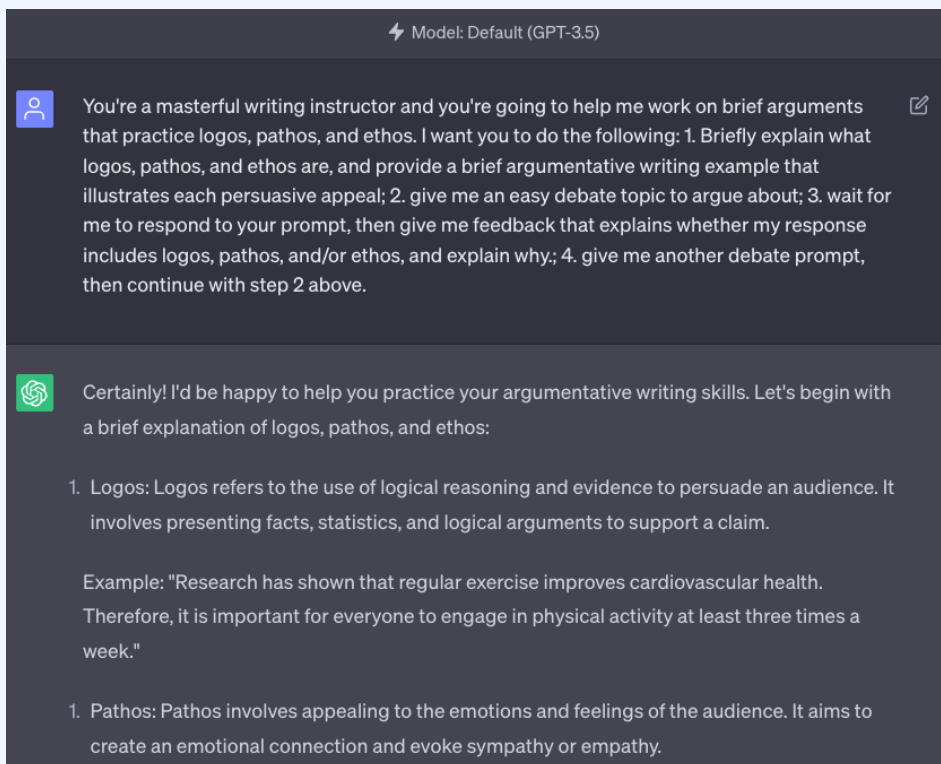
Screenshot of ChatGPT conversation that shows how it can be used as an example machine. You can edit or continue the conversation here: <https://chat.openai.com/share/b3a0fa6c-dc8c-4e76-b219-efd19960f781>

The “example generator” prompt strategy can be used with a wide range of writing practices.

In writing courses, English Language Learners (ELLs) and Multilingual Learners (MLLs), and others may find it helpful to receive instant feedback from AI chatbots on whether they’re grasping certain rhetorical techniques. Here’s a prompt that can be adapted to a range of techniques:

**“New writing concept” Prompt**

*You're a masterful writing instructor and you're going to help me work on brief arguments that practice logos, pathos, and ethos. I want you to do the following: 1. Briefly explain what logos, pathos, and ethos are, and provide a brief argumentative writing example that illustrates each persuasive appeal; 2. give me an easy debate topic to argue about; 3. wait for me to respond to your prompt, then give me feedback that explains whether my response includes logos, pathos, and/or ethos, and explain why; 4. give me another debate prompt, then continue with step 2 above.*



Screenshot of a ChatGPT conversation that shows the “New writing concept” prompt. You can continue or edit the conversation here: <https://chat.openai.com/share/b2a873a5-1c31-489d-b0b0-a0d14c23c227>

## Simulator Machine

One of the most powerful ways to use LLMs are as *simulators*. ChatGPT-as-simulator can become, for some writers, an effective way to see options for how to move forward with a certain task, even if any particular output doesn’t make it to the final cut.



Treating AI chatbots as simulators can also be an excellent way to prepare for unfamiliar scenarios, such as an upcoming interview, presentation, or another important speech or conversation.

### **Simulating Educational and Professional Drafts**

Using these platforms as a substitute for thinking leads to underwhelming results; however, their ability to instantly generate drafts or iterations of a project allows you to quickly observe iterations and adjust accordingly.

Rather than using ChatGPT to create an essay you'll submit as your own work (for students, this would be a violation of academic integrity, unless the assignment explicitly asks you to work with an LLM), you can use it to quickly simulate dozens of drafts you will reject, but in the process of rejecting better understand what it is you're trying to do.

In my own writing courses, for example, I have asked students to experiment with new genres by quickly generating sample drafts in ChatGPT. Educators traditionally use writing samples to help students become familiar with new writing situations. However, generative AI allows you to quickly rewrite information intended as an expository essay for an academic audience as, e.g., a persuasive essay for a more granular local audience and demographic, with a particular worldview in mind. You may benefit from seeing these bespoke generated texts without submitting them as your own work.

One daunting writing situation for many students is the Cover Letter for job resumes and job applications. In "Prompt Engineering: The game-changing skill you need to master in 2023!", Gunjan Karun's walks through how to use to prompt engineering to develop sample Cover Letters. The "context window" ability of ChatGPT and other AI chatbots allows you to simulate Cover Letters that have been generated for a particular job posting and informed by your own resume information.

### **Simulating Conversations and Scenarios**

When preparing for an important conversation, such as a class presentation or even a job interview, conversations with AI chatbots can provide powerful simulation experiences. Here's a sample prompt that can be adapted to a job interview.

#### ***Interview Simulation Prompt***

*You're a Marketing Director who's set up the hiring committee for a new entry-level marketing position at []. You're interviewing me for the job. First, ask me for the job description and wait for my response. Next, ask for my resume and wait for my response. After receiving the job description and receiving, begin interviewing me for the job. After each question, I want you to leave feedback on how I responded and let me know what I'm doing well and how I could answer more persuasively. Then you can move on to the next question.*

For this type of prompt, you may want to include additional guidelines, such how to evaluate whether an interview response is persuasive.

## Feedback, paraphraser, and copy-editor

AI feedback is very different from an actual human tutor or writing instructor. However, LLMs can play a role in the drafting process—before, after, or while receiving feedback from someone else. Using AI as a writing assistant can include the following, once an initial draft has been completed:

- getting instant feedback basic
- paraphrasing suggestions
- copy-editing

When eliciting feedback from LLMs, however, it will be important to experiment with a range of prompt-engineering strategies and remain aware of their limitations.

### Outcomes-based feedback

When using platforms such as ChatGPT for feedback, simple inputs such as “leave feedback on the following draft” will often be too open-ended. Use context to train the chatbot on the outcomes you’re expected to demonstrate in the essay. Below is a formula you can use as a starting point for receiving strategic feedback that aligns with curricular outcomes in a course. Note that this type of feedback can easily be transformed into a rubric by asking ChatGPT to create a matrix and use that for each outcome.

#### Feedback Prompt

**You:** *You’re an expert instructor teaching a first-year writing course. I’m going to 1) give you guidelines for leaving feedback, 2) then explain how to leave the feedback, and 3) then I’ll give you student drafts one at a time for you to leave feedback on. Are you ready for Step 1?*

*[Wait for a response]*

**You:** *Here are the guidelines (the rubric) for leaving feedback:*

*Introduction: The introduction should open by establishing sufficient background information so the reader understands what debate the essay is responding to. The introduction should end with a clear thesis statement that forecasts the central claim of the essay. The thesis should sound argumentative and part of an ongoing debate.*

*Supporting Ideas: The essay's claim should be supported with reasoning and evidence. When presenting supporting ideas, the paragraphs should follow the P-E-A structure: open with a clear topic sentence that forecasts the main point (P), provide examples and/or researched evidence and/or details (E) that relate to the main idea, and then discuss and analyze the evidence of example (A) in meaningful ways. Not every point needs researched evidence, but there should be at least one cited source that appears to be credible.*

*Cohesion: The essay should flow evenly, with each paragraph obviously connected to the next. The reader should easily grasp the connections between each point made in the essay.*

*Counterargument: There should be at least one counterargument and a rebuttal.*

*Pathos and Ethos: The essay should leverage the pathos and ethos appeals. Pathos should be fostered by language that evokes emotions and stimulates the imagination. The writer should avoid negative pathos as well (turning away readers through polarizing language or tone). Ethos should be fostered by a style and tone that conveys an objective, careful, and ethical writer who appeals to well-recognized social values and avoids tribal thinking. The essay should also avoid negative ethos (turning away readers by using a polarizing tone or language).*

*APA citations: The essay should be formatted in APA 7th edition. Key quotes should include proper in-text citations. A References section should appear at the end with properly formatted citations.*

*[Wait for response]*

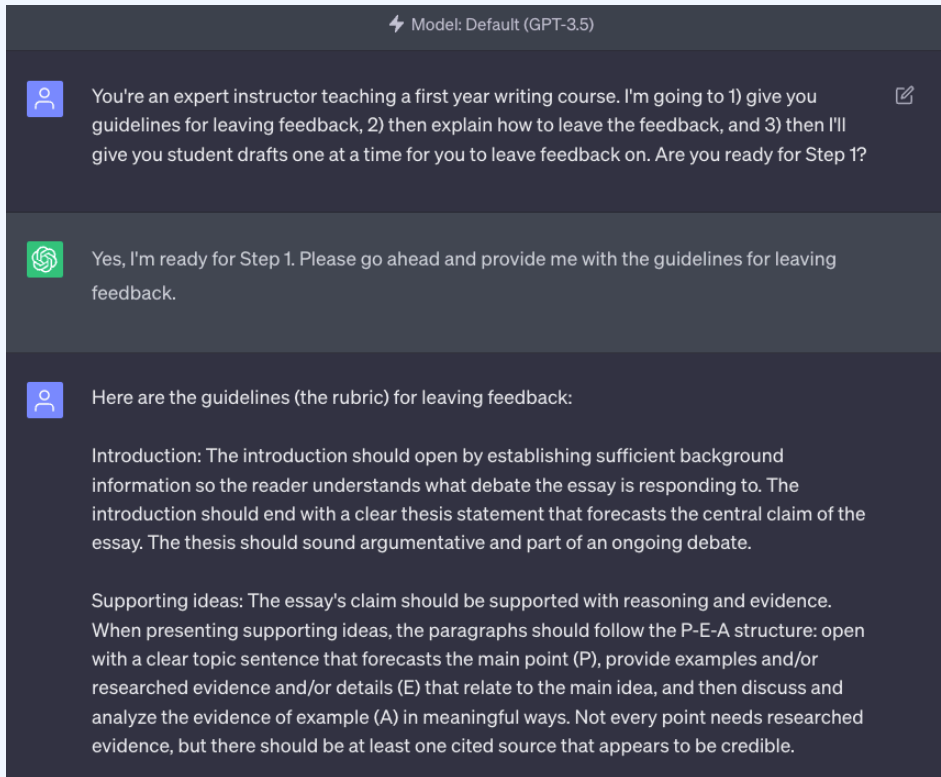
**You:** *Step 2. Leave feedback for each part of the guidelines shown above. When leaving feedback, first notice what the writer is doing well ("I like how you..."), then point out areas that could use more development or corrections. All feedback should refer to specific paragraphs or parts of the essay. Include specific phrases or sentences as much as possible.*

*[Wait for response]*

**You:** *[Paste in your essay]*

*[Wait for response]*

**You:** *[Ask one follow-up questions, as needed]*



Screenshot of ChatGPT conversation prompting for feedback on an essay draft. You can continue or edit this conversation here: <https://chat.openai.com/share/2a10a968-343e-4c10-a830-61c13bc75931>

ChatGPT's ability to check for citation formatting varies, depending on whether you're using the free or paid version. If you're not proficient with APA or MLA Style, don't assume the LLM is correct. Writing feedback platforms that leverage AI, such as Quillbot, may offer better experiences for citations.

Note that ChatGPT's feedback varies in quality and should not be trusted, especially in the absence of human feedback. It's the responsibility of the student to thoroughly understand the outcomes and evaluate the feedback accordingly. Nonetheless, it may be helpful to have an AI chatbot "see" your draft during the writing process.

## Conclusion

Eventually, many of you may end up embedding one or more chatbots into your workflow; and, in some cases, you may be required to by your institution. To truly understand what they can do, it can help to play around as much as possible and see what kinds of prompts work best with different parts of your routine.

Yet this frequent practice will also unravel their limitations, reminding us that while they are formidable

tools, they are not *perfect* tutors, nor can they fully replace human insight. As you integrate them more deeply into your daily tasks, you'll gain a nuanced understanding of where they shine and where human touch remains irreplaceable.

A heightened sense of critical awareness will be paramount. Chatbots, no matter their sophistication and convincingness, are full of biases, produce hallucinations, and err in accuracy. Remain vigilant and resist the temptation to outsource your thinking. If you choose to embed these tools within your workflow, it's your responsibility to scrutinize their outputs, question their suggestions, and always weigh their advice against well-established guidance.

Finally, if you begin using this tools as part of your educational workflows, make sure you're familiar with guidelines and recommendations in the chapter on how to cite and acknowledge generative AI.

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10.

## WHAT ETHICAL CONCERNS EXIST FOR GENERATIVE AI TOOLS?

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Liza Long

You may have heard about a group of concerned scientists who signed a letter calling for an immediate six-month pause to further developments of Large Language Models (LLMs) like Open AI's ChatGPT, Google's Bard, and Meta's LLaMA (Roose, 2023). Their main concern is nothing less than the possible destruction of humanity.

That's a pretty big ethical concern. But to be fair, it's just one of many existential threats our species is currently facing. And it's just one of numerous concerns about the large-scale unregulated implementation of generative AI in our daily lives.

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 (OpenAI, 2023).

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, 2023).

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. (UNESCO, n.d.)

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 (2023) 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

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## 11.

## HOW DO I ACKNOWLEDGE AND CITE GENERATIVE AI IN ACADEMIC WORK?

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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

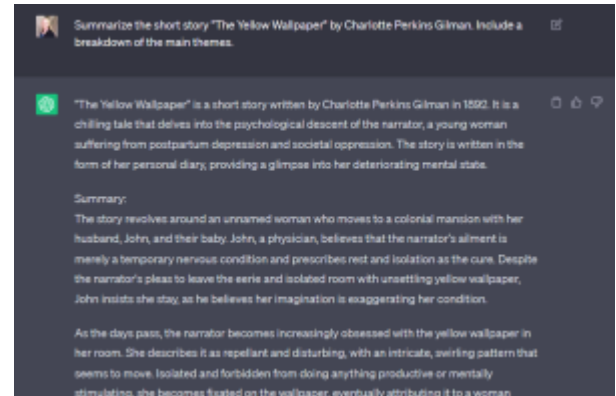
Let's say that I am trying to generate ideas for a paper on Charlotte Perkins Gilman's short story "The Yellow Wallpaper." I ask ChatGPT to provide me with a summary and identify the story's main themes. Here's a link to the chat. I decide that I will explore the problem of identity and self-expression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

#### My Paraphrase of ChatGPT with In-Text Citation

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”).

### 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 & Metz, 2023). 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.

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12.

## WHAT IF I DON'T USE GENERATIVE AI?

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I am seeing more and more news articles and social media posts about students who have been falsely accused of using generative AI when they haven't. While many instructors hoped there would be a reliable AI checker, the fact is there just isn't one. Because of the nature of LLMs and how they work, it's not likely that a reliable checker will ever exist. Worse, the students who seem likely to "get caught" (or rather, falsely accused) tend to be strong writers.

So if you're already a good academic writer, what can you do? The information below comes from a chapter from *Introduction to Ethics and AI in Higher Education* by Reed Hepler, Liza Long, and Joel Gladd.

### Students Who Don't Want to Use Generative AI

There are plenty of ethical concerns associated with generative artificial intelligence, and we have found that students who are educated about these concerns sometimes prefer not to use or interact with generative AI tools. Maybe you are one of those students.

Some students are rightly uncomfortable with using AI. What should you do if a teacher requires it? First, know that AI is a developing technology, and the ways that AI can be implemented (or avoided) in a classroom vary widely. Keep in mind the instructor's intent. AI is increasingly in demand in the workplace; as higher education is increasingly expected to justify how a course fosters "durable skills" that translate to the workplace, AI is going to become one of those bridgeable technologies that will be difficult for faculty to carve out of their syllabus. Or, your instructor may include AI assignments not to promote using it uncritically, but rather to encourage savvy awareness around its limits and capabilities. If you want to resist or critically engage with AI, for ethical or other reasons, your ethical stance may be perfectly compatible with using it in a controlled environment.

If you want to remain in a section even if it requires using AI, establish a line of communication early on to see if you can complete alternate assignments, such as arguments that engage critically with the exercise and provide explanations for how the technology may be limited or unethical. Faculty who allow opt-out sometimes provide sample chatbot conversations. Ask the faculty member if they would be able to provide these for you to engage with and reflect on, if you do not want to use the technology yourself.

You should also look for what platform(s) the instructor expects students to use in the course. Does the institution provide safe and secure access to something like Microsoft Co-Pilot or ChatGPT for Enterprise? Are they working with a company that uses the APIs of Anthropic, OpenAI, or another company but within

a contained environment that doesn't share your data? If not, the instructor may be requiring you to sign up for a service that violates basic expectations around privacy. If the nature of the course content involves highly personal work, press them on this issue. You can of course find ways to transfer to another section early in the semester, if you feel it's not in your best interest to remain in that section.

## When You Are Unfairly Accused of Unauthorized AI Use

What happens if you're unfairly accused of using generative AI? Unfortunately, as of this writing in 2024, such accusations are extremely common. It will be helpful to know that a high percentage of faculty are just trying to figure out this technology themselves. They're learners, just like you, and they're applying an older framework (plagiarism) to a new technology (generative AI). Most higher education institutions did not update their academic integrity policies to include artificial intelligence until 2023. Until most faculty have fully wrapped their heads around how to teach and assess in a way that "fits" with how students are engaging with a course, it will help to keep that in mind.

So how can you deal with an accusation like this? We have seen that when a student is accused and receives a zero for an assignment (whether it's a low stakes discussion board or a higher stakes exam or paper), it's extremely important to continue the conversation and ask to meet with the faculty member to demonstrate your proficiency. Start there. Rather than lashing out in anger (even though your anger is understandable), show them you're eager to demonstrate that you're engaging with the course content. Set up a Zoom meeting or, better, visit them in person, as soon after the accusation as you can.

Second, know your institution's protocols around academic integrity violations. This is extremely important. If a student receives a "0" for an assignment, and the instructor believes it's AI-generated text, the instructor needs to follow institutional protocol by notifying academic integrity officers, usually by submitting an academic integrity violation report. Students can challenge this, and you should, if it comes to that—but first, start with a sincere and eager communication with the instructor. When reporting a student, faculty must be able to demonstrate "with reasonable certainty" that the student has committed a violation. It doesn't have to be 100% certainty, but rather something they could argue successfully in an academic integrity hearing.

When you meet with the instructor, ask how they determined your submission was AI-generated. As mentioned above, AI-checkers are highly flawed. AI cannot be used to detect AI with certainty. If communication breaks down, and you challenge the grade, make sure you are aware of institutional appeal deadlines (usually available in your college catalog). Do not hesitate to appeal the grade if your instructor is unwilling to work with you after that initial meeting.

Finally, what this entire scenario demonstrates is that it's often helpful to leave a digital trail of your work. As we mentioned previously, tracking your version history can be one way to do this. Google Docs and Microsoft Word have histories with timestamps that show the progress of your work. If you're particularly concerned, you can download Chrome extensions, like Cursive, that record your labor in a more granular way. It's a good

practice to write first in Word or Google Docs, etc., and then copy your work into the LMS. That way, you can prove your labor.

If you've been accused of using AI and you did, keep in mind the same steps provided above regarding unfair accusations (reach out to demonstrate your engagement, know the academic integrity reporting process, etc.), but the best thing to do is simply to ask for an opportunity to redo the assignment or complete an oral assessment. Know that most faculty truly do want to work with you, and if they see a good faith effort to re-engage, they usually will accept a redo or alternate assessment.

## A “No-AI” Acknowledgement Statement

In the previous chapter, we looked at how to cite and acknowledge AI use. But as an instructor, I am also curious about why students choose *not* to use AI tools. For this reason, I request that my students include a “no-AI” acknowledgment statement when they choose not to use AI. Here is the template:

I attest that I did not use any generative AI tools in creating this assignment. I chose not to use AI because\_\_\_\_\_

The important point to remember here is that these tools exist, and we need to be mindful about how and when we are using (or not using) them. Understanding why you may choose not to use AI is just as important as knowing why you choose to use it!

13.

## WHAT TYPES OF SOURCES SHOULD I USE FOR ACADEMIC RESEARCH?

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With exploratory research, the quality of your sources matters. It's important to rely on high-quality sources. In many cases, your instructor may want you to use at least a few peer-reviewed journal articles. These types of articles often review existing scholarly literature, provide original research, give case studies, or provide expert commentary or perspectives.

The two types of sources you may consider are primary sources and secondary sources. Always make sure you check in with your instructor and read your assignment instructions carefully so that you find and use the right kinds of sources.

### Primary and Secondary Sources

**Primary sources** serve as an original source of information about the topic. In journalism, a primary source can be a person with direct knowledge of a situation, or a document written by such a person. Examples of primary sources include personal interviews, your own original research, newspaper articles, media (such as photos or videos), and primary texts like novels or the Declaration of Independence.

**Secondary sources** are documents or recordings that discuss information originally presented elsewhere. A secondary source contrasts with a primary source, which is an original source of the information being discussed. A secondary source is one that gives information about a primary source. In this source, the original information is selected, modified and arranged in a suitable format. Secondary sources involve generalization, analysis, interpretation, or evaluation of the original information.

Examples of secondary sources include books and academic journal articles. Your instructor may also allow you to use high-quality journalism sources such as articles in *The New Yorker*, *The Atlantic Monthly*, or similar publications, for your assignments. Google Scholar is one way to search for peer-reviewed journal articles (though you should never pay for a source!). We will explore Perplexity.ai as a researcher below.

As you begin your research, you may also want to spend some time with your campus librarian to explore resources that are available to help you. For example, as we saw above, CQ Researcher is a database that many college libraries provide. These current-event focused articles can provide you with an objective overview of a potential topic and point you in the right direction for more specific academic sources that you can use in your

paper. Our college library is largely online. The campus librarian can help you to navigate the search tools and databases that will be best for your topic.

## Using Generative Artificial Intelligence Tools to Find Sources

Generative artificial intelligence tools have been hit or miss when it comes to research. Initially, chatbots like ChatGPT “hallucinated” (made up) fake sources when you asked for academic sources. But they are increasingly accurate. One tool I like to use to start research is Perplexity.ai. Let’s use our narrow and focused research question from the previous section to test this tool out.

**Research Question:** *How will changes in the world climate increase health risks for people worldwide?*

**Prompt for Perplexity:** *I am working on a 6-8 page research paper for an English 102 course. My research question is “How will changes in the world climate increase health risks for people worldwide?” Can you please suggest some peer-reviewed journal articles that will help me to answer this question?*

**Perplexity AI Response:** To help with your research paper on how changes in world climate will increase health risks globally, I can suggest several peer-reviewed journal articles that would be valuable sources:

1. “Climate Change and Human Health” from the National Center for Biotechnology Information (NCBI). This comprehensive article discusses various health effects of climate change, including:
  - Heat-related illnesses
  - Vector-borne diseases
  - Cardiovascular and respiratory diseases due to declining air quality
  - Mental health stress

Luber, G., & Prudent, N. (2009). Climate change and human health. *Transactions of the American Clinical and Climatological Association*, 120, 113–117. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2744549/>

2. “Extreme Weather and Climate Change: Population Health and Health System Implications” also from NCBI. This review covers:
  - Health impacts of extreme weather events like heat waves, cyclones, and floods
  - Projected risks of climate change on population health and health systems
  - Recommendations for building climate-resilient health systems

Ebi, K. L., Vanos, J., Baldwin, J. W., Bell, J. E., Hondula, D. M., Errett, N. A., Hayes, K., Reid, C. E.,

Saha, S., Spector, J., & Berry, P. (2021). Extreme weather and climate change: Population health and health system implications. *Annual Review of Public Health*, 42, 293–315. <https://doi.org/10.1146/annurev-publhealth-012420-105026>

3. A position paper from the American College of Physicians published in the *Annals of Internal Medicine* titled “Climate Change and Health”. While not a research article per se, this paper provides:

- Recommendations for global efforts to reduce greenhouse gas emissions
- Suggestions for the healthcare sector to implement sustainable practices
- Advocacy for climate change adaptation and mitigation policies

Crowley, R. A. (2016). Climate change and health: A position paper of the American College of Physicians. *Annals of Internal Medicine*, 164(9), 608-610. <https://doi.org/10.7326/M15-2766>

These sources offer peer-reviewed, scientific information directly related to your research question. They cover a range of health risks associated with climate change, from direct impacts like extreme weather events to indirect effects on disease patterns and health systems.

The screenshot shows the Perplexity AI web interface. On the left is a sidebar with navigation options: 'New Thread' (with a 'Ctrl I' shortcut), 'Home', 'Discover', and 'Library'. Below these are three search suggestions: 'I am working on a 6-8...', 'I am researching first-...', and 'I want to learn more...'. At the bottom of the sidebar is a 'Try Pro' section with the text 'Upgrade for image upload, smarter AI, and more Pro Search.' and a 'Learn More' button.

The main content area shows a user profile 'longliza3584' with a '3m' timestamp. Below the profile is a collection of items, including 'I am working on a 6-8 page research paper for an English 102 course. My research question is "How will changes in the world climate increase health risks for people worldwide?" Can you please suggest some peer-reviewed journal articles that will help me to answer this question?'. Below this question is a 'Sources' section with three cards: 'Climate Change and Human Health - PMC - NCBI' (with a link to ncbi.nlm.nih), 'Extreme Weather and Climate Change: Population Health ... - ...' (with a link to ncbi.nlm.nih), and 'Climate change - World Health Organization (WHO)' (with a link to who). There is also a 'View 5 more' link.

Below the sources is an 'Answer' section. It starts with 'To help with your research paper on how changes in world climate will increase health risks globally, I can suggest several peer-reviewed journal articles that would be valuable sources:'. It then lists one source: '1. "Climate Change and Human Health" from the National Center for Biotechnology Information (NCBI) 1. This comprehensive article discusses various health effects of climate change, including:'. Below this list are two bullet points: 'Heat-related illnesses' and 'Vector-borne diseases'.

Now that you’ve seen how Perplexity works, try it for yourself using your narrow and focused research question. What did you find? Make sure you include an AI acknowledgement statement and a reference to the tool you used. Here’s an example:

I acknowledge the use of Perplexity.AI to help me locate high-quality sources to answer my research



question. I chose to use Perplexity because I was curious about how it works and I thought it might save me some time in locating the best sources for my topic. Here is a link to my chat: “Sources”

Reference: Perplexity.ai (2024). I am working on a 6-8 page research paper. <https://www.perplexity.ai/search/i-am-working-on-a-6-8-page-res-.KqwNIu0SyCV38v1a0XU6g>

## Stop and Reflect

It's important for you to critically evaluate any output you get from a generative AI tool. It's also helpful to review your prompts and think about ways to improve them in the future. After completing this exercise, I decided I should revise my prompt to ask for APA references so that I do not have to create them myself. You should always check any reference, whether it's from a chatbot or from the library's citation generator, to make sure it's correct. Here's the new prompt:

*I am working on a 6-8 page research paper for an English 102 course. My research question is “How will changes in the world climate increase health risks for people worldwide?” Can you please suggest some peer-reviewed journal articles that will help me to answer this question? Please include APA style references for each of the peer-reviewed articles you recommend.*

As you interact with generative AI tools, you'll learn to refine your prompts to get the information you need.

Now let's reflect on the quality of the sources. These are all published in peer reviewed journals. The first source from 2009 is an older one. In general, for scientific and medical questions, it's best to find sources within the last seven years. But there can be good reasons to include older sources. Perhaps the source is foundational. I think that's the case here. This 2009 paper set the stage for further work on health and climate change. The final source is a position paper from a credible, recognized medical association. Position statements can also be useful for research questions because they establish the consensus of a particular discipline.

Look over the sources you found in your interaction with Perplexity. What do you notice about them? Are they high-quality? Can they help you to answer your research question? How useful is a tool like Perplexity to your academic research process?

## Other Types of Sources You Can Use for Your Paper

While peer reviewed journal articles are the most credible and reliable sources for academic research, you can also use other types of sources in your paper, including any of the primary sources listed above. If you want to conduct original research, Google Forms can be a useful tool. Please make sure you check in with me if you plan to survey your classmates. More formal original research requires Institutional Review Board (IRB) review to make sure that the research minimizes harm to human participants. You won't need to worry about this in our course, but you should be aware that as your studies advance, you may need to work with an Institutional Review Board in the future.

Personal interviews with experts are an efficient and effective way to learn more about your research question. You do not need to include a reference on your references page for interviews or other types of personal communications. To cite an interview in APA style, we only use an in text citation like this: (J. Mendoza, personal communication, date). We cite emails in the same way.

If you can't interview an expert in person, a YouTube video, podcast, or TED talk may be another way to get the information you need. Sometimes you can find a podcast or TED talk from a scholar that helps to explain the research in their peer-reviewed work. This can be an efficient way to learn more about a subject (since peer reviewed articles are not always easy to read!).

In this class, you may use high-quality journalism sources including *The New York Times*, *The Wall Street Journal*, and other high-quality publications. Just remember that I do not expect you to use any sources that are behind a paywall. If you need help getting access to an article, please reach out to your instructor or to one of our campus librarians for help.

Finally, you can definitely use a book as a source! This may be most useful if you have already read a book on your topic, or if you only need a small portion of the book.

What about generative artificial intelligence tools? You can definitely use them to establish some background information and learn key terms, but I don't recommend citing them as a source for factual information for the same reason I don't recommend citing a Wikipedia article in academic research (though I do recommend reading Wikipedia articles and reviewing their sources). Keep in mind that chatbots make things up. You should always verify any "facts" that a chatbot gives you using a credible, reliable source.

Remember to reach out any time you have questions or need help when you are locating and working with sources.

14.

## HOW CAN I USE SOURCES IN MY RESEARCH?

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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.

Now that you know about the different kinds of sources you can use for your research, you need to think about why you need these sources and how you will use them.

**Information needs are why you need sources. Meeting those needs is what you’re going to do with sources as you complete your research project.**

Here are those needs:

- To learn more background information.
- To answer your research question(s).
- To convince your audience that your answer is correct or, at least, the most reasonable answer.
- To describe the situation surrounding your research question for your audience and explain why it’s important.
- To report what others have said about your question, including any different answers to your research question.

The verbs in the list of information needs above tell you exactly how you’ll use sources to carry out your research and create your final product: to learn, answer, convince, describe, and report. But you won’t be doing any of that alone.

While your ideas certainly matter, your sources will give you information you can use to support your ideas. They’ll also give you direct quotes and information to summarize and paraphrase as you create your final product. In other words, your sources will support you every step of the way during your research project.

## You Try It

Generative AI tools may be useful to you as you explore each type of information need. Here is an example of a prompt you could use: *I am writing an exploratory research paper on \_\_\_\_\_.*  
*Here is my narrowed and focused research question:\_\_\_\_\_.* *You are an expert college librarian.*

*Please suggest areas of background knowledge that will be useful for me as I explore the answer to my research question.*

## Needs and Final Products

Background information may seldom appear directly in any final product. But meeting each of the other information needs will result in written sections of a term paper. For final products other than term papers (such as a presentation or a poster), you'll have the same needs and will use sources to meet them. But not all needs will result in a section of your final product.

## Sources to Meet Needs

Because there are several types of sources (see previous chapter), the options you have to meet your information needs can seem complex.

**Pay attention to when only primary and secondary sources are required to meet a need and to when only professional and scholarly sources will work.** If your research project is in the arts, also pay attention to when you must use popular sources such as movies, books, or other media, because popular sources are often primary sources in the arts.

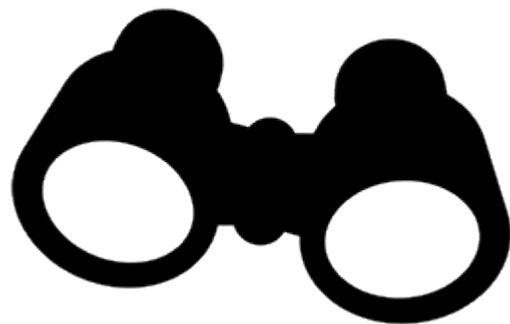
These descriptions and summaries of when to use what kind of source should help.

## To Learn Background Information

When you first get a research assignment and perhaps for a considerable time afterward, you will almost always have to learn some background information as you develop your research question and explore how to answer it.

Sources from any category and from any subgroup within a category except peer reviewed journal articles can meet students' need to learn

background information and understand a variety of perspectives. Journal articles, are usually too specific to



Get a good look at your topic through background reading.

be background. From easy-to-understand to more complex sources, read and/or view those that advance your knowledge and understanding.

For instance, especially while you are getting started, secondary sources that synthesize an event or work of art and tertiary sources such as guidebooks can be a big help. Wikipedia is a good tertiary source of background information. While you should not cite Wikipedia in your research, it can be a great place to start, and you may be able to use and cite some of the sources that the Wikipedia article cites.

Similarly, you should not cite ChatGPT or another chatbot for background information, though as noted above, you may use these tools to gain some background knowledge or to suggest background knowledge you may need to answer your research question. Remember that chatbots can make things up, so you'll always want to verify information with a trusted source.

Sources you use for background information don't have to be sources that you cite in your final report, although some may be.

### Sources to Learn Background Information

- **Quantitative or Qualitative:** Either—whatever advances your knowledge.
- **Fact or Opinion:** Any—whatever advances your knowledge.
- **Scholarly, Professional, or Popular:** Any—whatever advances your knowledge.
- **Primary, Secondary, or Tertiary:** Any—whatever advances your knowledge.
- **Publication Format:** Any—whatever advances your knowledge.

One important reason for finding background information is to learn the language that professionals and scholars have used when writing about your research question. That language will help you later, particularly when you're searching for sources to answer your research question.

To identify that language, you can always type the word glossary and then the discipline for which you're doing your assignment in the search engine search box.

Here are two examples to try:

- Glossary neuroscience
- Glossary "social media marketing"

Putting a phrase in quotes in most search boxes insures that the phrase will be searched rather than individual words.

You can try the same exercise by asking a generative AI chatbot to provide you with background information.

---



## To Answer Your Research Question

You have to be much pickier with sources to meet this need because only certain choices can do the job. Whether you can use quantitative or qualitative data depends on what your research question requires.

Only primary and secondary sources can be used to answer your research question and, these sources need to be professional and/or scholarly sources for most disciplines (humanities, social sciences, and sciences). As we noted above, the arts often require popular sources as primary or secondary sources to answer research questions.

Remember that your purpose for most disciplines should be to educate and inform. As we learned, primary sources are those created at the same time as an event you are researching or that offer something original, such as an original performance or a journal article reporting original research. Secondary sources analyze or otherwise react to both primary and secondary sources. Because of the information lifecycle, the most current secondary sources are often the best because their creators have had time for better analysis and more information to incorporate. If you use a source older than seven years, you should be prepared to explain why the source is still valid and credible for your research question. For example, the source may be an important theoretical model that shaped subsequent research.



Your research question may call for qualitative or quantitative sources.

### Example: Quantitative or Qualitative Data

Suppose your research question is “How did a particular king of Saudi Arabia, King Abdullah, work to modernize his country?”

That question may lend itself to qualitative descriptive judgments—about what are considered the components of modernization, including, for instance, what were his thoughts about the place of women in society.

But it may also be helped by some quantitative data, such as those that would let you compare the numbers of women attending higher education when Abdullah became king and those attending at the time of his death or, for instance, whether manufacturing increased while he reigned.

So looking for sources that provide both quantitative and qualitative information (not necessarily in the same resource) is usually a good idea.

If it is not clear to you from the formats of sources you are assigned to read for your course, ask your professor which formats are acceptable to your discipline for answering your research question.

## Sources to Answer Your Research Question

- **Quantitative or Qualitative:** Will be determined by the question itself.
  - **Fact or Opinion:** Professional and scholarly for most disciplines; the arts often use popular, as well.
  - **Scholarly, Professional, or Popular:** Professional and scholarly for most disciplines; the arts often use popular, as well.
  - **Primary, Secondary, or Tertiary:** Primary and secondary.
  - **Publication Format:** Those acceptable to your discipline.
- 

## To Convince Your Audience

In exploratory research, we are merely answering our research question. However, it's important to ensure that your sources are high-quality as we prepare to write a persuasive argument essay, where you'll need to convince your audience that your solution to a problem is the best one. Convincing your audience is similar to convincing yourself and takes the same kinds of sources—as long as your audience is made up of people like you and your professor, which is often true in academic writing. That means using many of those sources you used to answer your research question.



Sources that meet the approval of your audience will be more convincing.

When your audience isn't very much like you and your professor, you can adjust your choice of sources to meet this need. Perhaps you will include more that are secondary sources rather than primary, some that are popular or professional rather than scholarly, and some whose author intent may not be to educate and inform.

## Sources to Convince Your Audience

- **Quantitative or Qualitative Data:** Same as what you used to answer your research question if your audience is like you and your professor. (If you have a different audience, use what is convincing to them.)
- **Fact or Opinion:** Those with the purpose(s) you used to answer your research question if your audience is like you and your professor. (If you have a different audience, you may be better off including some sources intended to entertain or sell.)
- **Scholarly, Professional or Popular:** Those with the same expertise level as you used to answer the

question if your audience is like you and your professor. (If you have a different audience, you may be better off including some popular.)

- **Publication Mode:** Primary and secondary sources if your audience is like you and your professor. If you have a different audience, you may be better off including more secondary sources than primary.
- **Publication Format:** Those acceptable to your discipline, if your audience is like you and your professor.

## To Describe the Situation

Choosing what kinds of sources you'll need to meet this need is pretty simple—you should almost always use what's going to be clear and compelling to your audience. Nonetheless, sources intended to educate and inform may play an out-sized role here.

But even then, they don't always have to educate and inform *formally*, which opens the door to using sources such as fiction or the other arts and formats that you might not use with some other information needs.



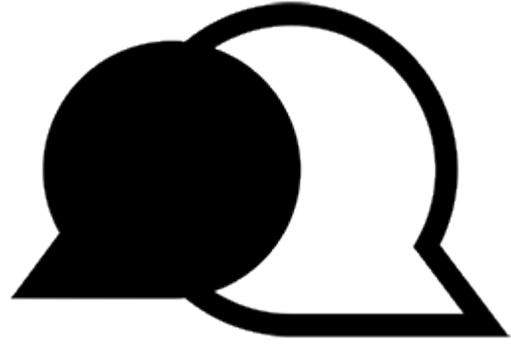
### Sources to Describe the Situation

Use sources to frame the situation.

- **Quantitative or Qualitative:** Whatever you think will make the description most clear and compelling and your question important to your audience.
- **Fact or Opinion:** Often to educate and inform, but sources don't have to do that *formally* here, so they can also be to entertain or sell.
- **Scholarly, Professional, or Popular:** Whatever you think will make the description most clear and compelling and your question important to your audience.
- **Primary, Secondary or Tertiary:** Whatever you think will make the description most clear and compelling and your question important to your audience. Some disciplines will not accept tertiary for this need.
- **Publication Format:** Whatever you think will make the description most clear and compelling and your question important to your audience. Some discipline will accept only particular formats, so check for your discipline.

## To Report What Others Have Said

The choices here about kinds of sources are easy: just use the same or similar sources that you used to answer your research question that you also think will be the most convincing to your audience.



### Sources to Report What Others Have Said

- **Quantitative or Qualitative:** Those sources that you used to answer your research question that you think will be most convincing to your audience.
- **Fact or Opinion:** Those sources that you used to answer your research question that you think will be most convincing to your audience.
- **Scholarly, Professional, or Popular:** Those sources that you used to answer your research question that you think will be most convincing to your audience.
- **Primary, Secondary, or Tertiary:** Those sources that you used to answer your research question that you think will be most convincing to your audience.
- **Publication Format:** Those sources that you used to answer your research question that you think will be most convincing to your audience.

Look for sources about how others have treated your research question.

## Planning Your Sources

Once you know what kinds of sources you need to meet your information needs, where should you look for them? Once more, thinking about types of sources can help.

Where sources are located is generally organized by audience expertise level—by whether they are popular, professional, or scholarly sources. Popular and professional are often grouped together. But scholarly sources tend to hang out by themselves. That’s why searching Google Scholar locates more of them than just plain old Google, and an academic library has more scholarly sources than a public library. Increasingly, generative AI is providing sources to answer questions, but these are often not high-quality enough to be used for anything other than background research. As we saw in the previous chapter, Perplexity.ai is a good generative AI tool to locate high quality research. Source Locator can help you see where sources of every audience expertise level (popular, professional, and scholarly) are located. Check it out.

Your college library and librarians are your allies in locating high-quality sources. You may also consider talking to experts in your field to get some ideas of where you can look.

## Research Organizer

Organizing your research is critical to your success. We will use a research organizer to ensure that you have the information you need for your final paper. The research organizer will help you to collect the source links, APA reference, and at least one direct quote you can use in your final paper. You will also use this tool to write summaries of your five required sources. The research organizer section that collects your sources is designed as a literature review. Peer reviewed academic articles generally start with a literature review that positions the new research question within existing research. I have included an example of how to fill out the research organizer below.

### **Literature Review (APA style)**

#### **Source One**

<p><b>Full Reference:</b> Author (date). Title of article. <i>Publication</i>. URL.</p> <p>Radez, J., Reardon, T., Creswell, C., Lawrence, P. J., Evdoka-Burton, G., &amp; Waite, P. (2021). Why do children and adolescents (not) seek and access professional help for their mental health problems? A systematic review of quantitative and qualitative studies. <i>European Child &amp; Adolescent Psychiatry</i>, 30(2), 183–211. <a href="https://doi.org/10.1007/s00787-019-01469-4">https://doi.org/10.1007/s00787-019-01469-4</a></p>
<p>In text citation: (Author, date): (Radez et al., 2021).</p>
<p><b>Direct quote:</b> See <i>Write What Matters</i> for how to integrate a quote using They Say/I Say techniques</p> <p>According to Radez et al. (2021), “If we want to close the gap between high prevalence of mental health disorders and low treatment utilization[sic], sufficient service provision and professional support must be widely available for young people” (p. 207).</p>
<p><b>Summary:</b> See <i>Write What Matters</i> for information on how to write a summary of an article.</p> <p>Barriers to effective treatment are a considerable challenge for children and adolescents with mental health disorders. In a review of 53 studies on children’s and adolescent’s mental health services, Radez et al. (2021) discussed the multiple barriers to care that younger patients in Europe experience. Looking at both qualitative and quantitative data, the researchers identified four main themes that may keep children and adolescents from accessing mental health services. These barriers include lack of knowledge about mental health (96%), stigma and other social factors (92%), concerns about trust in their relationships with mental health professionals (68%), and systemic problems like costs or lack of available care (58%). The authors concluded that there is not an easy solution to the multiple barriers they identified, arguing that early intervention may help children and teens to better access mental healthcare.</p>

You should complete your research organizer references and summaries for your five required sources.

## You Try It!

Generative AI tools can summarize articles—but should you have them do it for you? Knowing how to summarize an academic article is a valuable skill that you may need in future courses. I recommend that you practice doing it for your own sources rather than outsourcing this task to a chatbot. However, you may want to use the chatbot to write a summary and *compare* your own summary to the one the chatbot creates. This can help you to assess your own effectiveness at writing summaries.

Another good use of generative AI is to ask it to review your APA references. Google Scholar and your college library both have pretty reliable citation generators that you should use for your peer reviewed sources, but you can also ask the chatbot to check for errors. You can also use it to help you create APA references for news articles or YouTube videos. Here is an example of a prompt you could use: *You are an expert in creating APA style references. Please create/check a reference for this source. Here is the information I have:\_\_\_\_\_.*

If you're already skilled with using chatbots and have access to a ChatGPT or Claude account, you may want to create a custom GPT or Project that helps you to do this so that you don't have to rewrite your prompt every time.



15.

## WHY PRECISION SEARCHING?

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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 steps for a successful search.



The steps in a precise search

## Step One: Identify Main Concepts

Identify the main concepts in your research question by selecting nouns important to the meaning of your question. Leave out words that don't help the search, such as adjectives, adverbs, prepositions and, usually, verbs. Nouns that you would use to tag your research question so you could find it later are likely to be its 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 (except the noun) 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.

## Subject Headings Instead of Keywords

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. Some such tools also allow keyword searching. See the section on Specialized Databases or reach out to your college librarian for more detail about searching subject headings.

### You Try It!

Generative AI chatbots are fantastic tools to use when you are trying to identify main concepts and key terms to search. Here is a prompt you can try: *You are an expert in the field of \_\_\_\_\_. You are doing research on this research question:\_\_\_\_\_. Please identify main concepts and keywords that can be used to search for peer-reviewed articles for this question.*

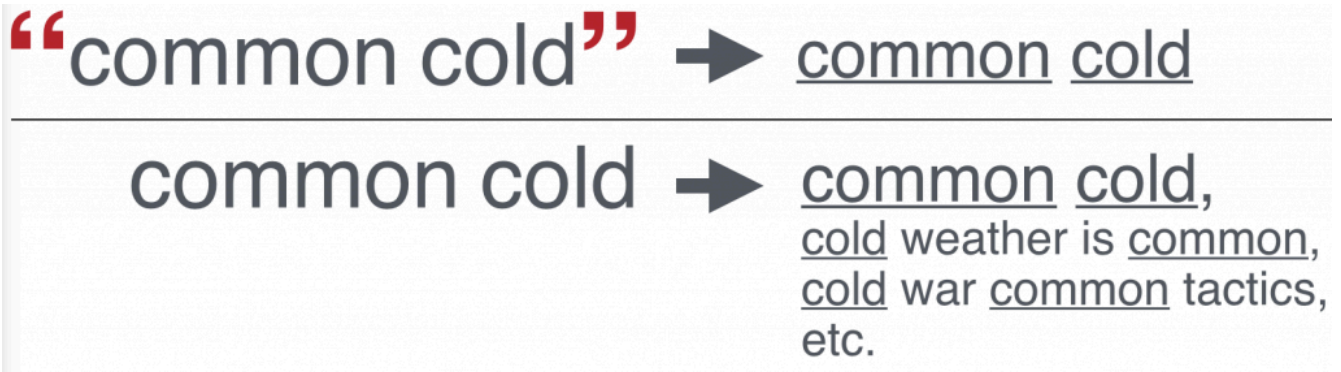
## Step Three: Form Search Statements

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.

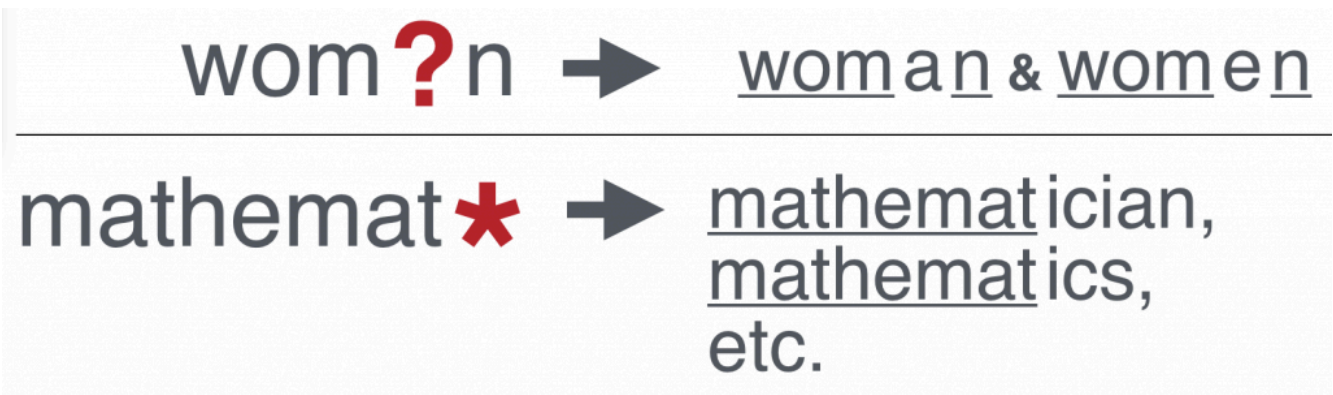


Putting a phrase in quotes returns results containing that phrase, and not the results for the individual words.

---

## 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.

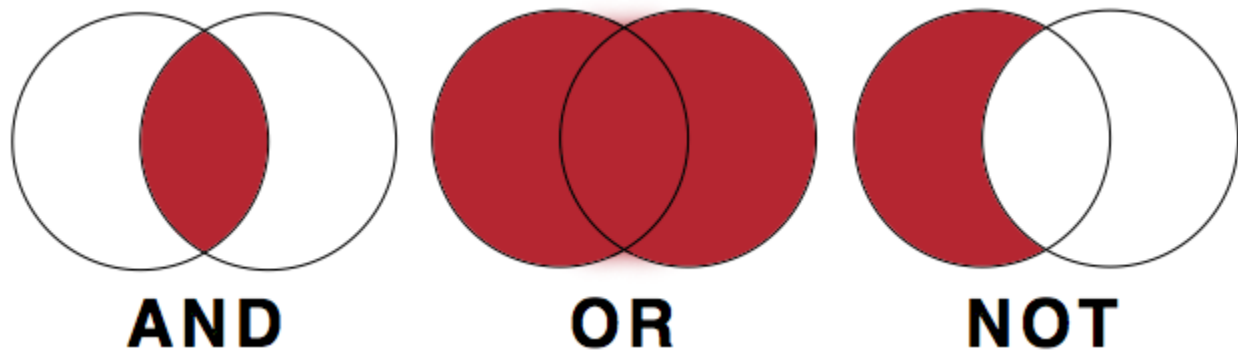


Using wildcard characters allows you to find variations of a word.

---

## 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.



The Boolean operators AND, OR, and NOT exclude or include subsets of sources.

**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)**

Parentheses are used with Boolean operators to combine terms for complex searches.

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!

## Activity: Search Practice

This activity focuses on the research question “How does a person’s diet affect the risk for getting cancer?” Work through the three activities below.

**Search Terms** – Open activity in a web browser.

**Truncation** – Open activity in a web browser.

**Search Statements** – Open activity in a web browser.



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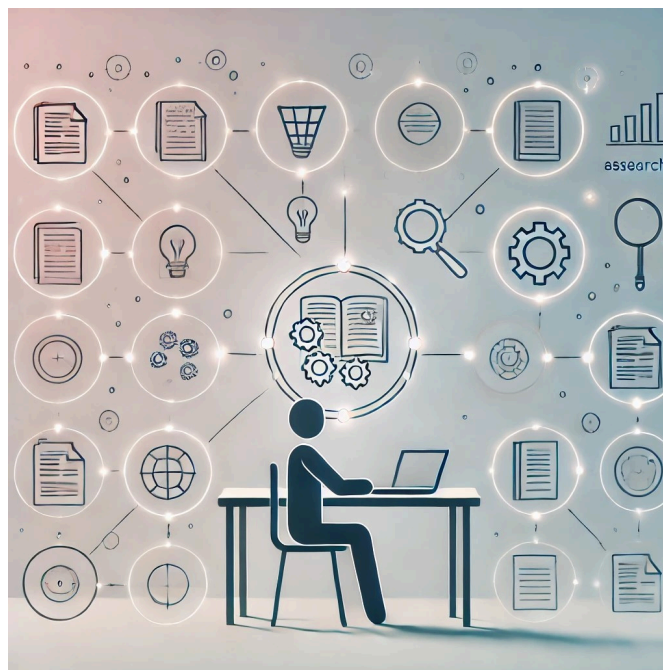
## HOW DO I SYNTHESIZE SOURCES FOR EXPLORATORY RESEARCH?

**Synthesis** combines two Greek words: *syn* (σύν), meaning “with” or “together,” and *thesis* (θέσις), which refers to intellectual propositions or ideas. In writing, a synthesis involves combining two or more summaries of sources. But synthesis writing is more difficult than it might at first appear because this combining of sources must be done in a meaningful, intentional, and organized way. For some types of college essays such as persuasive argument, the synthesis also needs to support a thesis (argument).

In composition courses, “synthesis” commonly refers to writing about printed texts (sources), drawing together particular themes or traits that you observe in those texts and organizing the material from each text according to those themes or traits. Sometimes you may be asked to synthesize your own ideas, theory, or research with those of the texts you have been assigned. In your other college classes you’ll probably find yourself synthesizing information from graphs and tables, pieces of music, and art works in addition to printed texts.

### Key Features of a Synthesis

1. A synthesis accurately reports information from the sources using different phrases and sentences (paraphrasing and summary);
2. A synthesis is organized in such a way that readers can immediately see where the information from the sources overlaps;
3. A synthesis makes sense of the sources and helps the reader understand them in greater depth.



[More weird AI-generated art.](#)

## Synthesis in Life and the Workplace

Whenever you report to a friend what several other friends have said about a film or share a variety of social media comments about a new Taylor Swift album, you engage in synthesis. People synthesize information naturally to help others see the connections between things they learn. For example, you have probably stored up a mental data bank of the various things you've heard about particular professors at your college. If your data bank contains several negative comments, you might synthesize that information and use it to help you decide not to take a class from that particular professor.

Synthesis is related to but not the same as classification, division, or comparison and contrast. Instead of attending to categories or finding similarities and differences, synthesizing sources is a matter of pulling them together into some kind of harmony, to make a new single thing from a variety of existing things. Synthesis may also identify links between materials for the purpose of constructing a thesis or theory.

Synthesis is also important in the workplace. The basic research report (exploratory research) is very common in a variety of careers. For example, imagine that you are researching uses for generative AI for the organization where you work. Your report will synthesize information and arrange it by topic rather than by source. And just as in college, the quality and usefulness of your synthesis will depend on the accuracy, organization, and the quality of your sources.

Some of the information in the preceeding paragraphs was remixed from "Synthesis Writing" by Sandra Jamieson, Drew University. 1999, and is shared under a CC BY NC SA 3.0 Creative Commons License.

## How Synthesis Works in Exploratory Research

In your exploratory research paper, you'll be expected to synthesize information from at least five sources, and at least one of the sources must be a peer-reviewed journal article (I encourage you to use more!). You'll rely on the summaries that you wrote for your research organizer to synthesize your research. Review your summaries and make notes about some of the following questions:

1. What are the main ideas you discovered in your research? Separate these ideas into 3-4 topics, which may become subheadings in your paper. Then incorporate your summaries and direct quotes into these separate headings.
2. How are the ideas similar? Look at the summaries and identify some common trends. In what ways do

your sources reinforce or reflect each other's findings or conclusions?

3. How are the ideas different? Do the same thing and look for differences.
4. What do you think about these ideas? Did you learn what you expected to learn? What surprised you?

Write a paragraph or two answering these questions.

## Using Generative AI Tools in Synthesis

As with every step of the writing process, I want you to try your synthesis on your own first. Look at your summaries and go through the questions above. But once you've done that, you may also want to consider how generative AI tools can be particularly useful in helping you to synthesize your sources. Here are several ways these tools can help to check and augment your own work:

### Identifying Common Themes

Generative AI tools can analyze multiple sources of research and identify common themes, trends, or patterns. Students can use this insight to determine which arguments or ideas are recurrent and significant, allowing them to synthesize research around these themes. For example, if a student is researching the portrayal of identity in modern literature, AI can help highlight key concepts and themes across various texts and studies. AI tools can also generate side-by-side comparisons of key arguments, ideas, or theories from different sources. This can help students see how different authors approach similar topics, making it easier to synthesize and compare their findings.

### Clarifying Complex Concepts

Generative AI can explain complex academic jargon or theoretical frameworks, helping students better understand difficult texts and incorporate them more effectively into their projects. For example, if students are working with dense theoretical texts, AI can provide simplified explanations that help them synthesize those theories with their research findings.

### Outlining and Structuring Ideas

AI can assist in creating a coherent outline based on a student's research notes and sources, offering suggestions for how to organize ideas logically. This helps students synthesize their research more effectively by organizing different arguments and perspectives. Students can input key pieces of research, and the AI can suggest an appropriate structure for presenting these ideas in their paper. Students can input their research notes into AI tools, which can then generate draft sections of their synthesis. This provides a starting point for

students to refine and build upon, ensuring they stay focused on integrating their research rather than simply summarizing.

## Creating Citations

AI tools can automate citation generation, ensuring students properly reference their sources in their synthesis. This allows them to focus more on the synthesis process and less on managing the technicalities of citation.

### You Try It!

Choose one of the suggestions for using generative AI tools above. Then craft a prompt to ask AI to help you with the task. For example, you could ask it to review your five source summaries and look for common themes or ideas and suggest subheadings for your paper. Here is an example prompt: *You are an expert researcher in the field of \_\_\_\_\_. Please review the source summaries in the attached document. Look for common themes and ideas in the summaries. Share 3-4 common themes.*

## Some Concerns about Using Generative AI

Thinking back to Ethan Mollick’s four principles, it’s important at this stage of your research and writing process to make sure that you are the “human in the loop.” In my own experience working with generative AI tools, I’ve found that they can sometimes make mistakes, especially when dealing with facts. Remember that they are not designed to give you the “correct” answer. They are designed to give you a statistically probable answer based on trillions of factors. And sometimes they get things wrong. In an example of co-writing, I asked ChatGPT to share a few concerns you should have when working with these tools on synthesis. Here are some key issues to watch out for, edited from the original AI output to reflect my own views and priorities for students:

### Over-reliance on AI for Critical Thinking

- **Pitfall:** AI tools can help summarize and organize information, but they may encourage students to rely

too much on the technology instead of engaging critically with their sources.

- **What you should do:** Make sure that you critically analyze and interpret the information yourself, using the AI as a support tool, not a replacement for your own evaluation and judgment.

## Inaccurate or Misleading Summaries

- **Pitfall:** AI tools may oversimplify or misinterpret complex research, leading to inaccurate summaries or misunderstandings of key concepts.
- **What you should do:** Double-check AI-generated summaries against the original sources to ensure accuracy.

## Bias in Data and Sources

- **Pitfall:** AI models can reflect biases present in the data they were trained on. This can lead to biased syntheses or skewed interpretations of research topics.
- **What you should do:** Be mindful of potential biases in AI outputs, cross-referencing multiple sources to gain a balanced perspective.

## Lack of Originality

- **Pitfall:** Using AI to synthesize research may lead to generic or formulaic writing, reducing the student's own voice and originality in their work.
- **What you should do:** I don't want to read what the AI "thinks" because it doesn't think. I want you to inject your own analysis, insights, and creative thinking into the synthesis, using AI outputs to augment your own thinking.

## Plagiarism and Improper Attribution

- **Pitfall:** AI tools might paraphrase or summarize content too closely to the original, or they may fail to cite sources properly, leading to accidental plagiarism.
- **What you should do:** This point is very important. You may inadvertently plagiarize if you don't check the AI output closely. Several journalists have demonstrated that AI can in fact plagiarize by pulling on source material when it's prompted in certain ways. Students need to ensure they properly cite all sources and avoid copying AI-generated text verbatim without appropriate attribution.

## Ethical Concerns

- **Pitfall:** The use of AI to generate content can raise ethical questions about intellectual property, authorship, and the role of AI in academic work.
- **What you should do:** Be aware of the ethical guidelines surrounding AI use in college writing assignments and ensure you use the tools responsibly. If it feels “wrong” to have AI just write your whole paper for you, it probably is. Don’t harm your own development or skill building.

When you are mindful of these potential pitfalls, you should be able to use generative AI tools to enhance your research process while maintaining academic integrity and critical engagement with your topic and sources.

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## HOW DO I WRITE AN INTRODUCTORY PARAGRAPH FOR A RESEARCH PAPER?

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How do you get your audience's attention? The introductory paragraph is one of the most important parts of your essay. Sometimes, writers describe the techniques we use to catch a reader's attention as a "hook." You could think of this as a fish hook, or a sales hook, or even a hook in pop music, like the introduction to Dire Straits' classic anthem "Money for Nothing." An effective hook catches the reader's interest in a specific, concrete way.

Think back to the exploratory research essay we read earlier in this book, "Surviving the Textpocalypse." Here's the introductory paragraph, followed by a short statement:

Imagine a world where every story, every song, every piece of writing is algorithmically generated. It would be a world devoid of the human touch, the spark of imagination, and the richness of diversity. While AI and large language models can generate text that is technically proficient, they lack the capacity to truly understand the intricacies of human emotions. They lack the life experiences that shape our perspectives and fuel our creativity. They lack the ability to empathize, to relate, and to genuinely connect on a profound level.

I didn't write that first paragraph. AI did (Open AI, 2023).

This is an example of a hook that uses a surprising statement. The beginning of the essay reads like a conventional essay introduction, but then the author lets us in on something: The paragraph was written by a bot. This technique effectively introduces the essay's subject and hints at the author's research question:

What does the rise of artificial intelligence mean for jobs? For creativity? For humanity?

Let's consider a few other types of hooks, with examples.

### Outrageous/Paradoxical Statement or Exaggeration

An outrageous statement or exaggeration does not necessarily have to be true. Your goal is to shock the reader. Just make sure you clarify your methods and intentions later in the introduction.

- **"The world will run out of oxygen by the end of this century."**

This could introduce an essay on environmental conservation or climate change.

- **"There has never been a single person who didn't make a terrible decision at some point in**

**their life.”**

This hook could open an essay about decision-making, learning from failure, or personal growth.

- **“Without coffee, the entire workforce would collapse by noon.”**

This humorous exaggeration could set up an essay about productivity, habits, or workplace culture.

- **“If people were meant to fly, they’d have wings—but that hasn’t stopped humans from conquering the skies.”**

This could be used to introduce a discussion about innovation, progress, or human ingenuity.

- **“The more we communicate online, the lonelier we seem to become.”**

This is an example of a paradoxical statement that could introduce a research paper on digital communication and social isolation.

## Thought-Provoking Question or Hypothetical Situation

You can draw your reader into your topic by asking a question that makes them think. Here are a few examples.

- **“What drives someone to leave everything they know behind and venture into the unknown?”**

This hook could introduce an essay about human migration or exploration.

- **“Can a single invention revolutionize communication across the globe?”**

This hook might lead into a discussion on the history of the printing press or the internet.

- **“Why do people fear what they cannot see?”**

This question could open an essay on fear of the unknown, perhaps in literature or psychology.

- **“What if the solution to a major global crisis has been overlooked for centuries?”**

This question could hook the reader into a discussion of an environmental or social issue.

- **“Few people can imagine waking up one day to find that every piece of information ever recorded had vanished. How would society function?”**

This might lead into a discussion on information storage or the fragility of digital systems.

## Strong Statement/Statistics

A strong statement can impress the importance of your topic on your reader. Just remember to cite a credible source if you include facts! Here are some examples of strong statements and startling statistics.

- **“The future of higher education depends on the integration of artificial intelligence in the classroom.”**

This hook could lead into a paper on the role of AI in education.

- **“Ninety percent of the world’s data has been created in the last two years.”**



This could introduce an essay on the rise of big data, technology, or the information age.

- **“One in four college students suffers from anxiety disorders, yet campuses are still struggling to provide adequate mental health support.”**

This could be the opening for an argument about mental health services in higher education.

- **“More people die annually from selfies than shark attacks.”**

This could introduce a discussion on the impact of social media or technology on behavior.

- **“The human brain processes images 60,000 times faster than text, yet we continue to rely primarily on written communication.”**

This could be the start of an essay on the power of visual communication or the future of media.

You could also start your essay with a relevant quote from an authority. Here are two examples:

- **“In a 1965 sermon the day after nonviolent resisters faced police brutality in Selma, Alabama, Dr. Martin Luther King, Jr. said, ‘Deep down in our non-violent creed is the conviction there are some things so dear, some things so precious, some things so eternally true, that they’re worth dying for.’”**

This quote could set the stage for an essay about the importance of human rights or voting rights.

- **“‘Education is the most powerful weapon which you can use to change the world,’ said Nelson Mandela. But what does it mean to truly educate someone?”**

This could introduce an essay on the purpose or philosophy of education.

## Anecdote

Stories are powerful. If you have a personal connection to your topic, sharing this connection can create empathy and curiosity in your reader. You can also use another person’s story, but remember to cite a credible source if you do this! Here are some examples of personal anecdotes:

- **“When my grandmother was diagnosed with Alzheimer’s, I realized how little I understood about memory loss. Her experience sparked my curiosity: How do different treatments affect cognitive decline in Alzheimer’s patients?”**

This personal experience frames a research question about Alzheimer’s treatments.

- **“After working in a tech startup for a year, I began to wonder why some teams thrived under pressure while others crumbled. This curiosity pushed me to explore: What leadership styles foster resilience in fast-paced work environments?”**

This anecdote could lead into research on leadership dynamics or team performance.

- **“As a high school student, I struggled to focus in traditional classrooms but thrived in hands-on learning environments. This made me wonder: How does experiential learning impact**

**student engagement compared to traditional classroom settings?”**

This personal reflection introduces a research question about different learning methodologies.

- **“Volunteering at a local food bank exposed me to the reality of food insecurity in my own community. It made me ask: What are the most effective strategies for reducing food insecurity in urban areas?”**

This anecdote could introduce research on urban food programs or social policy.

## Metaphor or Visual Imagery

Metaphors and visual imagery capture attention by painting a vivid picture in the reader’s mind, creating a strong emotional or intellectual connection to the topic before diving into the more analytical content.

- **“The classroom is a battlefield, with every student armed not with weapons, but with knowledge, curiosity, and the occasional notebook.”**

This metaphor could introduce a discussion about the challenges and dynamics of modern education.

- **“Ideas can be like seeds, small and fragile, but when nurtured, they grow into towering trees that reshape landscapes.”**

This imagery could introduce an essay on innovation, creativity, or the power of education.

- **“The city at dawn is a symphony of movement, each person a note in a larger composition, unaware of the music they’re creating together.”**

This visual could lead into a piece on urban life, human interaction, or social systems.

- **“The brain is a labyrinth, a maze of thoughts and memories, where every turn could lead to a breakthrough or a dead end.”**

This visual imagery could introduce an essay on neuroscience, cognition, or problem-solving.

## Some Guidelines

Since the introduction is so important to your essay’s success, it *should not* be simply the first paragraph that you write. Instead, you should write your introduction only after you have a solid sense of your topic and have concluded your research. Some students even look at the last paragraph in their rough draft, the conclusion, and repurpose the ideas in this paragraph in their introductions. The technique you choose depends on your audience and purpose. In the case of an exploratory research paper, your audience is your teacher and your peers, and your purpose is to inform. Here are a few things to keep in mind as you write your introduction this week:

- Remember that the purpose of your essay is exploratory and the tone should be objective, so some of

these techniques may be more appropriate than others.

- Avoid the second person pronoun you in your draft (you may use first and third person pronouns). This can be especially difficult if you have relied on questions that use “you” for your introductions on past papers.
- Experiment with a multi-paragraph introduction. You may have learned that the introduction should be a single paragraph, but many longer papers have multi-paragraph introductions.
- Your introduction should end with a thesis statement that answers your research question. For an example, see Carolyn Stonehill’s essay, “It’s in Our Genes: The Biological Basis of Human Mating Behavior.” Her thesis statement comes at the end of paragraph two: “While cultural values and messages clearly play a part in the process of mate selection, the genetic and psychological predispositions developed by our ancestors play the biggest role in determining to whom we are attracted” (Stonehill, 4).

If you aren’t sure how to start, try a few different strategies, freewrite, and see what feels best to you.

## You Try It!

This chapter is an example of hybrid writing. Some of the writing is my own, but for the examples of different types of hooks, I asked ChatGPT to suggest some ideas. I chose the ones I wanted to include and altered the wording in some of them (Open AI, 2024). You could also use generative AI to suggest some possible hooks. Here is the initial prompt I used: *I am writing a textbook chapter for college students about how to write strong introductions, and I need some examples of hooks. A hook captures the reader’s interest. I have several types of hooks that I would like to demonstrate. You are an award winning author. Please provide my students with examples of hooks. The first type is an intriguing question. Please do not use the second person pronoun “you” in your examples.*



## PART II

# UNIT TWO: PERSUASIVE ARGUMENT

In this unit, we will write persuasive argument essays that are supported by research. Students may use the same topic and sources that they used for their exploratory research essay in Unit One; however, these sources will support an entirely different kind of essay. We will identify a problem that affects us or our community, define our advocacy role, and propose a specific, concrete solution. We will use generative artificial intelligence to create a visual argument tailored to our audience and purpose and to assist with counterarguments and rebuttals. In this unit, we will also discuss critical thinking errors and logical fallacies, which are often used to make arguments that are not effective.



## PART II

# UNIT THREE: MULTIMODAL COMMUNICATION IN MY FIELD

In this unit, we have two major assignments. First, students will analyze the types of writing that they will do in their chosen major to create a multimodal project such as a presentation, blog, vlog, podcast, report, etc. Students who have not yet chosen a major field of study will have the opportunity to explore a career field for this assignment. We will explore genres in multimodal writing and communication, thinking about audience, purpose, and rhetorical situation. We will practice interviewing techniques and learn how to incorporate interviews as sources in multimodal projects. Finally, students will write a rhetorical reflection with an appendix to demonstrate how they have met the course outcomes and improved as a writer.





## PART II

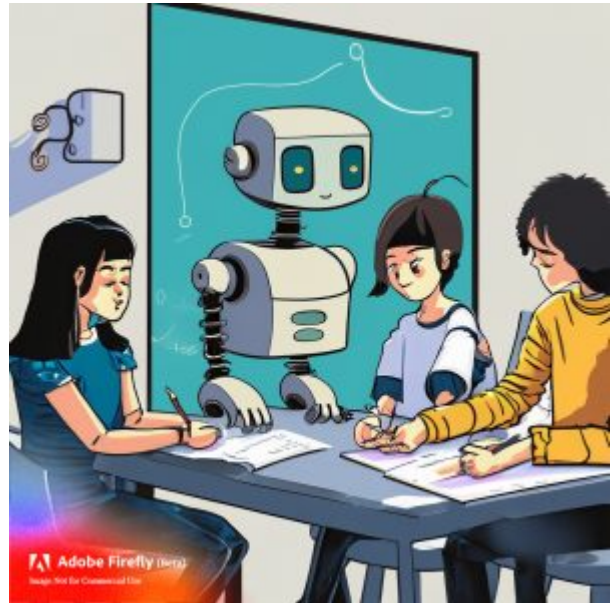
# WRITING AND ARTIFICIAL INTELLIGENCE

Generative AI tools, including platforms such as Microsoft Copilot and ChatGPT, are transforming what writing instruction looks like in higher education. As this emerging technology continues to reshape what it means to practice writing, there's no real consensus on how these tools should be used—or whether they should be used at all. Some students and faculty actively avoid generative AI in the classroom. Others are not yet familiar with the wide range of tools and capabilities available to students and instructors. And some are embracing these new tools and actively experimenting with them.

I'm part of that last group. I have been writing and teaching with generative AI tools since Spring 2023, and I have seen firsthand both the positive and negative ways they can impact our writing process. Knowing when an AI tool is appropriate is an important skill that requires critical thinking. I choose to teach with AI because I think that it's important for students to know how to use them to prepare for the workplace. In this class, we will use generative AI for a variety of assignments.

Most colleges including the College of Western Idaho are developing guidance or policies around AI use in the classroom. Students should become familiar with their institution's and instructor's AI policies as they navigate the AI landscape.

For example, at the College of Western Idaho, your school syllabus now includes three options (instructors are required to choose one):



“Three college students are working on a writing assignment. A robot is assisting them with their work.” Created from text prompt in Adobe Firefly, July 20, 2023

### Example of the Most Restrictive Language

Aligned with my commitment to academic integrity and my teaching and assessment style, the

use of generative artificial intelligence (AI) tools, including but not limited to ChatGPT, DALL-E, and similar platforms, is strictly prohibited in this course. Using AI for assignments constitutes academic dishonesty, equitable to cheating and plagiarism, and will be met with sanctions consistent with any other Academic Integrity violation.

### **Example of Moderately Restrictive Language**

Aligned with my commitment to academic integrity and the ethical use of technology, this course allows AI tools like ChatGPT, DALL-E, and similar platforms for specific tasks such as brainstorming, idea refinement, and grammar checks. Using AI to write drafts or complete assignments is not permitted, and any use of AI must be cited, including the tool used, access date, and query. It is the expectation that in all uses of AI, students critically evaluate the information for accuracy and bias while respecting privacy and copyright laws.

The use of AI outside the allowed criteria constitutes academic dishonesty, is equitable to cheating and plagiarism, and will be met with sanctions consistent with any other academic integrity violation.

### **Example of Least Restrictive Language (this is what we use in our course)**

Aligned with my commitment to academic integrity, creativity, and ethical use of technology, AI tools like ChatGPT, DALL-E, and similar platforms to enhance learning are encouraged as a supplementary resource use and not a replacement for personal insight or analysis. Any use of AI must be cited, including the tool used, access date, and query. I expect that in all uses of AI, students critically evaluate the information for accuracy and bias while respecting privacy and copyright laws.

Misuse of AI, such as failing to cite or using AI to misrepresent your work, constitutes academic dishonesty, equitable to cheating and plagiarism, and will be met with sanctions consistent with any other Academic Integrity violation.

In this class, we will use a formative assessment tool called My Essay Feedback to provide feedback on your writing tasks. We will also incorporate generative AI tools into our writing process in a variety of ways. In all cases, we will learn to cite and acknowledge these tools.

## **What this guide aims to do**

The purpose of this guide is to offer an accessible introduction to writing with AI for dual enrollment and first-year college students. In the following chapters, students will:

- understand how large language models (LLMs) such as ChatGPT are trained to generate text;
- understand the limitations, risks, and ethical considerations associated LLMs;
- become acquainted with the range of AI platforms and applications that can assist writing;
- better understand how to prompt LLM chatbots such as ChatGPT;
- become familiar with how to cite and acknowledge the use of generative AI in the classroom.



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This is where you can add appendices or other back matter.