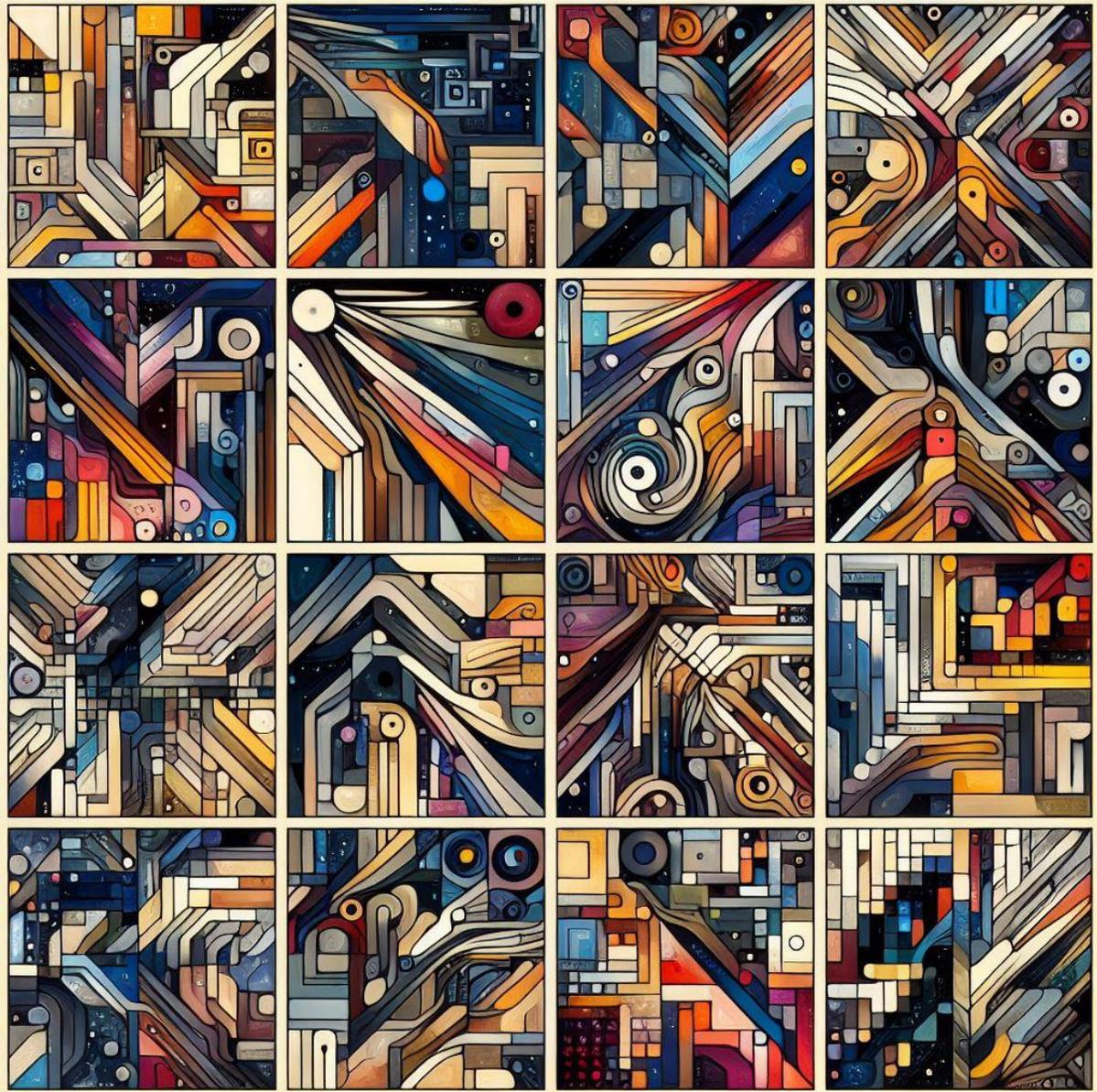


# Generative AI & Education



A Learning Resource for the Hybrid Classroom

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(Illustration “Generative AI” created by Bing Chat Enterprise)

When we represent technology to ourselves through its own common sense we think of ourselves as picking and choosing in a supermarket, rather than within the analogy of the package deal. We have bought a package deal of far more fundamental novelty than simply a set of instruments under our control. It is a destiny which enfolds us in its own conceptions of instrumentality, neutrality, and purposiveness.

-George Grant (*Technology & Justice*)

The new illiteracy is about more than not knowing how to read the book or the word; it is about not knowing how to read the world.

-Henry Giroux (*Zombie Politics and Culture in the Age of Casino Capitalism*)



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## I. Generative AI

### What Generative AI is

Most people experience Generative AI as a chatbot, or “a computer program that simulates and processes human conversation (either written or spoken), allowing humans to interact with digital devices as if they were communicating with a real person” (*What Is a Chatbot?*, 2023).

The word “generative” refers to the ability of artificial intelligence (AI) to generate new content in the form of “text, imagery, audio and synthetic data” (Lawton, 2023). Unlike a traditional search engine, users can ask AI questions, and the bot provides direct “conversational” responses. An AI bot like ChatGPT or Microsoft Bing Chat often comes across as knowing far more than we do because it generates content on a seemingly infinite range of topics in seconds. It can develop outlines, papers, and presentations faster than human experts, often dazzling and intimidating users.

## **How Generative AI works**

Unlike a traditional search engine such as Google, Duck Duck Go, or Mozilla Firefox, Generative AI provides direct responses rather than refer you to specific sites on the world wide web. Since it differs from traditional search engines but uses them to collect and collate information, I asked Microsoft Bing Chat, a Generative AI chatbot, to define itself as a resource.

It replied:

“Generative AI, also known as GenAI, is a type of artificial intelligence that is capable of generating new content such as text, images, or other media. It uses generative models to learn the patterns and structure of their input training data and then generate new data that has similar characteristics.

“Generative AI can learn from existing artifacts to generate new, realistic artifacts (at scale) that reflect the characteristics of the training data but don’t repeat it. It can produce a variety of novel content, such as images, video, music, speech, text, software code and product designs.

“Generative AI uses a number of techniques that continue to evolve. Foremost are AI foundation models, which are trained on a broad set of unlabeled data that can be used for different tasks, with additional fine-tuning. Today, generative AI most commonly creates content in response to natural language requests — it doesn’t require knowledge of or entering code” (Microsoft & OpenAI, 2023).

Perhaps the two most important things to take away from Bing’s response is A.) that it continues to evolve and B.) “creates content in response to natural language requests.” We will explore that latter point below.

## **A provocative topic**

The emergence of Generative AI, or “Artificial Intelligence” generally is a popular and provocative topic frequently covered by the media. Like with any influential development, AI has boosters and naysayers.

Many people in computer programming and software development believe Generative AI will improve human productivity and creativity. They argue that it will enable individuals, schools, businesses, and public institutions to become more productive and efficient in completing their daily tasks and longer-term projects (Anderson, 2023; Marr, 2023b).

On the other hand, skeptics in educational fields question whether AI will detract from teacher-student interactions and lead to the deskilling and replacement of teachers (Snow, 2019; Green, 2019).

But before forming an opinion about Generative AI, we should discuss some of its educational features and uses.

## **Machine Learning (ML)**



Generative AI is able to generate content through a process called “Machine Learning.” Machine Learning (ML)

is a branch of artificial intelligence (AI) and computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy. It is the process of using mathematical models of data to help a computer learn without direct instruction. It's considered a subset of artificial intelligence (AI).

(Microsoft & Open AI, 2023; Online, 2023; *What Is Machine Learning? | Microsoft Azure*, n.d.)

Users need to remember that ML cannot make independent judgments, which can lead to “hallucinations” or a situation where the chatbot “perceives patterns or objects that are nonexistent or imperceptible to human observers, creating outputs that are nonsensical or altogether inaccurate” (*What Are AI Hallucinations? | IBM*, n.d.).

To better understand this, I asked Bing Chat to explain how it conducts research. I wrote, “When I ask Generative AI a question, how does it collect data to provide me with an answer?”

Bing said:

Generative AI models like me don't collect data in the traditional sense. Instead, we're trained on a large dataset of text from the internet. This training process involves learning patterns and structures in the data, which allows us to generate responses to prompts.

When you ask a question, I generate a response based on what I've learned during training. If more specific or up-to-date information is needed, I can use my predefined tools to search the web or create graphical content. However, I don't have the ability to recall or store personal data from one interaction to the next, as I am designed to prioritize user privacy and data security.

It's important to note that while I strive for accuracy, my responses should be used as a guide and not a definitive source of information. Always consult with a professional or trusted source when making important decisions based on the information provided.

(Microsoft & OpenAI, 2023)

I understand that chatbots can marshal copious data but cannot interpret it with an expert's insight.

## Superior to search engines

I want to highlight a portion of Bing’s response I just quoted: “I generate a response based on what I’ve learned during training.” This is different from a “traditional” search engine like Google that follows a process that includes

- Query processing
- Searching the index
- Ranking results

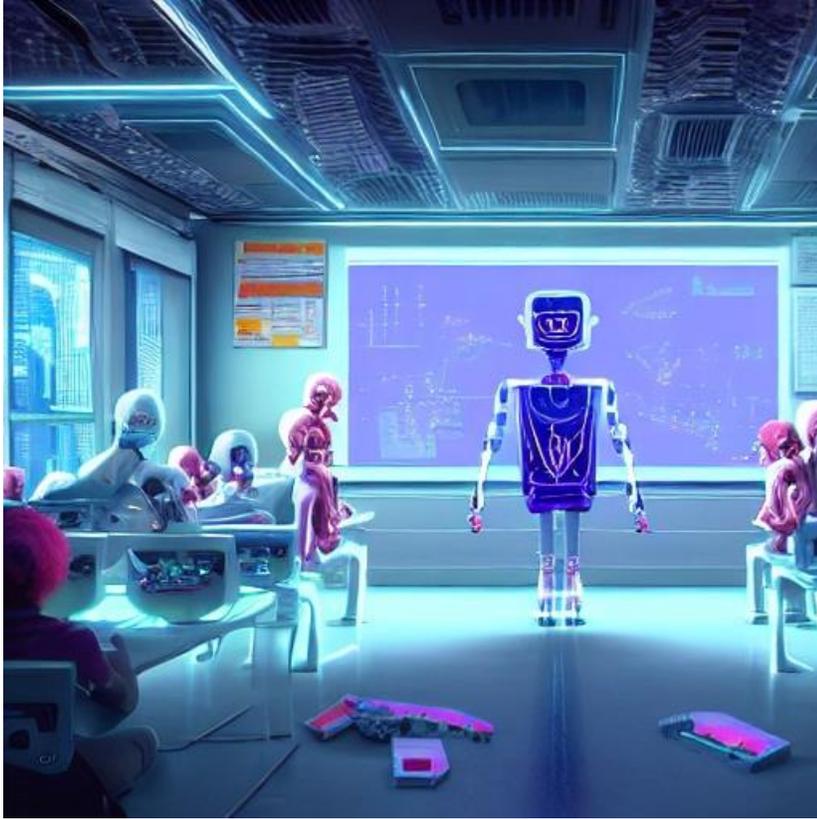
(Davies, 2020b).

Search engines “primarily use machine learning to improve their algorithms, which are used to crawl the web, index information, and rank search results.” Generative AI, on the other hand, learns “from a large dataset of text (like books, websites, etc.) during their training phase,” including “the structure, style, and content of the language in this data.” It allows the AI bot to “generate a completely new response that wasn’t in our training data but is based on the patterns we learned.” Its training comes from a “large language model” that collections billions of bytes of information and then uses this data to respond to the prompts users create to seek answers or content from the both. Generative AI uses “next word prediction engines” that follow word association patterns used to assemble their answers in response to the prompts users create to engage with the bot (Microsoft & OpenAI, 2023).

When we consider the role of Generative AI as a research and content generation tool in education, we should remember that chatbots cannot think, nor are they experts. They use prediction engines to provide us with answers, while instructors utilize reasoning, experience, and judgment in their teaching. Raymond Williams notes that “learning takes place in diverse sites, employs complex technologies, and produces varied circuits of power” (Giroux, 2012, p. 69). An instructor can facilitate this diverse process using heuristic and spatial methods that a chatbot cannot.

Generative AI is but one (albeit quite powerful) circuit of power.

## II. Generative AI: its purpose in learning



Generative AI chatbots are new to education. The first widely available chatbot, ChatGPT, only appeared in November 2022, meaning that instructors and learners have used it for less than a year (if at all). Since its emergence is such a recent development, we can only sketch out some broad arguments for and against using chatbots in education.

As you will see, the overall message in this learning guide is that the potential benefits of using chatbots outweigh the demerits. But we need longitudinal studies that examine and critique this evolving relationship.

## **Pro**

Generative AI has revolutionized learning because it generates content in various modes. Chatbots can write papers for learners and produce images and charts to build presentations. They can take questions, reply to them, and make referrals to ideas, arguments, and sources the learner might not have considered or been aware of. This generative process supersedes the more traditional search engine that "merely" collates and ranks data. Chatbots are also an excellent way to challenge students to engage with data sets and sources unknown to their instructors. Chatbots streamline the process of collecting relevant data, something search engines cannot do with the same degree of precision (Hwang & Won, 2021).

## **Con**

On the other hand, chatbots can lead learners to pass off bot-generated content as their own work, raising ethical concerns among educators, including whether learners will actually master material or turn in work that is pasted or plagiarized ("Is Using AI Content Plagiarism?," 2021). Educational institutions are working to develop new ways to detect chatbot plagiarism in student assignments (Fazackerley, 2023).

Learners also need to learn how to fact-check chatbot content. If they lack this training, chatbots can mislead them with faulty (or hallucinatory) information.

\*

We can now explore the tools of Generative AI with these pros and cons in mind.

### III. Tools



#### A. Learner-bot relationship

Generative AI chatbots can be a valuable learning tool because, unlike search engines, they encourage questions from learners in response to the content they generate (Stanford University, 2023; Mollick & Mollick, 2023, p. 17). Chatbots like Microsoft Bing generate content that invites follow up questions because the bot demands precise prompts to fulfill its generative function.

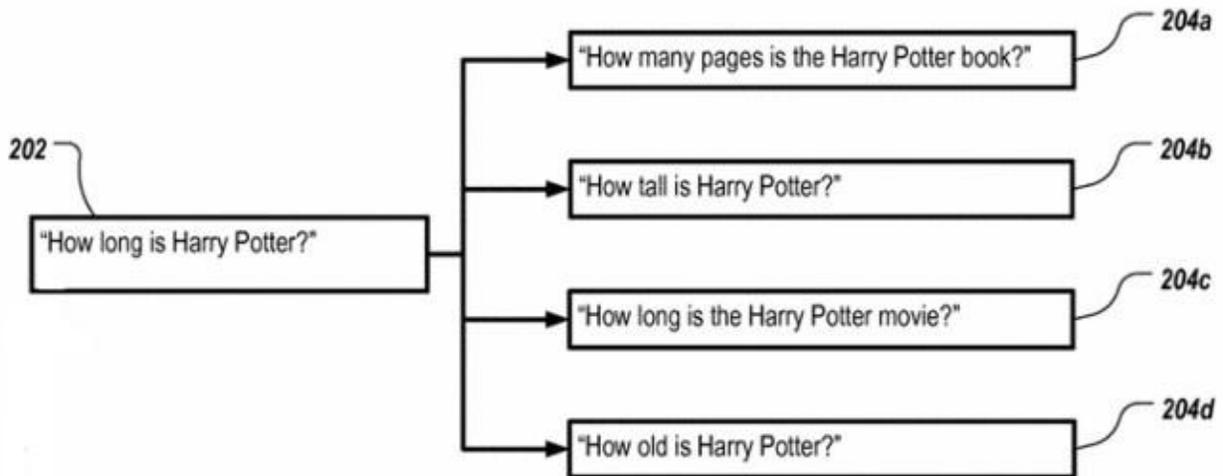
Learners can use search engines like Google to input keywords and precision phrases to achieve solid search results. However, search engines only take learners to sites that appear to line up with the keyword criteria the learner provided. Often, this means they encounter websites only tenuously related to their topic of interest. Dave Davies offers a good synopsis of this process:

So a user has entered a single word and the engine has jumped through its many hoops to establish that it is likely a request for a specific answer. They are now left to determine what that answer is (Davies, 2020b).

When learners interact with search engines, platforms like Google lack context for the learner's search. As Search Engine News put it, "The problem Google is dealing with is that as searchers we often assume context when there is none inherently. In the real world if I ask a question, the

listener will have a context based on what’s going on at the time. Google does not have this advantage” (Evaluating Semantic Interpretations of a Search Query, 2016).

Here is an illustration of how a decontextualized question appears to a search engine:



(Evaluating Semantic Interpretations of a Search Query, 2016).

A seemingly simple question like “How long is Harry Potter? Can lead to multiple lines of inquiry because the search engine does not know what the user means by “length.”

When learners use a chatbot, prompts allow them to provide context. A bot like Microsoft Bing allows the learner thirty responses, twenty-nine of which are follow ups to the learner’s initial prompt. During this conversation, the learner can provide the bot with additional information to help it respond more precisely to the learner’s cognitive context. Better yet, the learner and bot interact to create an informational process whereby each party acquires informed content from the other (Corti & Gillespie, 2016, 434).

## **B. Prompts**

AI chatbots rely on prompts to conduct research and generate content. Prompts are similar to the search terms and key words learners use when conducting research on a search engine. A prompt

“is a mode of interaction between a human and a language model that lets the model generate the intended output. This interaction can be in the form of a question, text, code snippets or examples” (Yasar, 2023).

The primary difference between a search term and a prompt is that the learner must produce “well-crafted AI prompts to achieve the desired relevancy and accuracy in the outputs AI models produce,” otherwise they are more likely to receive inaccurate or irrelevant results (Yasar, 2023).

The stakes are higher for learners when designing prompts than inputting keywords and search terms for a Google search. An excellent AI prompt enables the chatbot to provide the learner with topic-specific content targeted to delivering a precise response to the prompt. The bot can also help the learner refine their prompt by responding to it with suggested follow-up with questions to aid in drafting (“engineering”) subsequent prompts. Sometimes, the chatbot will ask the learner to be more specific or reframe their prompt in order to generate appropriate content.

The bot's generative function is possible because it forms its responses using algorithms that predict appropriate answers based on analyzing the words the learner used to produce their prompt, which is the definition of Machine Learning (Mollick & Mollick, 2023, p.3; Kapronczay, 2022).

### **C. Fact-checking**

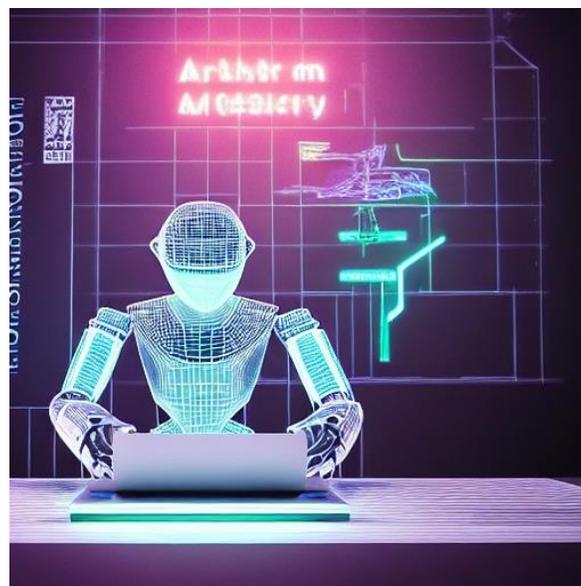
Generative AI can be an excellent fact-checking tool if the learner recognizes the bot is not infallible. The Machine Learning chatbots use does not verify data; it collects it, providing users with “patterns and structures in the data” (Microsoft & OpenAI, 2023; Kapronczay, 2022). The learner must look at the bot's sources and cross-reference them with their existing knowledge. Learners should interrogate bot-produced content using other sources like books, journal articles, lectures, videos, and the opinion and expertise of professionals in the field (Mollick, 2023).

Learners will enjoy better results if they produce prompts based on careful research. In other words, the learner should use the chatbot to expand *existing* knowledge rather than assume the bot will tell them all they need to know. However, if the learner is new to a topic, they can use the chatbot to recommend sources they can use to expand their knowledge independently.

Another way to describe Machine Learning is that it conducts “a probability distribution over words used to predict the most likely next word in a sentence based on the previous entry. Language models learn from text and can be used for producing original text.” Bots can predict “the next word in a text,” but this is not the same as making objective or empirically-sound decisions (Kapronczay, 2022). As Microsoft Bing’s chatbot told me, “my responses should be used as a guide and not a definitive source of information” (Microsoft & OpenAI, 2023).

Also, “generative AI systems share challenges to oversight similar to other AI applications—such as assessing the reliability of data used to develop the model—because their inputs and operations are not always visible” (*Science & Tech Spotlight: Generative AI*, 2023). Instructors and learners should proceed with caution and develop their fact-checking capabilities. They can do this by working together to produce prompts based on existing factual information and credible resources. Instructors should take the lead and teach prompt design or “engineering” as a research method.

Generative AI offers a significant pedagogical advance over search engine research because it engages learners in ways no search engine can: by being a content creator. To enjoy the benefits of this technological advance, instructors and learners should become skilled fact-checkers.



## IV. Benefits of Generative AI tools



Chatbots allow learners to transmute ideas and concepts learned in class into new content. They can ask the bot questions and have it turn their ideas into images, charts, and texts while also using the bot as a study partner with a level of detail and sophistication far beyond anything traditional online searches allow.

### **Creative generation (“relationships”)**

The interactive nature of Generative AI chatbots allow learners to treat them as a study partner while conducting research. The bot engages in creative generation, providing learners with text, images, and references that stimulate learners to develop their ideas and explore new concepts and perspectives. Microsoft Bing chatbot describes its creative generation process as “not just to provide answers, but to stimulate curiosity, encourage active learning, and foster a deeper understanding of the subject matter” (Microsoft & OpenAI, 2023).

When learners cannot access peers or friends who can stimulate their creativity or provoke thought, creative generation is an excellent tool for moving the individual learner's learning process forward.

### **Prompt writing: a tool for subject mastery**

Since chatbots rely on well-crafted prompts to be effective creative generators and deliver informational content, learners must be well-informed to take advantage of what Generative AI chatbots offer.

The goal of a good instructor is to increase each learner's understanding of a topic. Many strategies exist for facilitating mastery. Prompt writing is a valuable heuristic tool because it allows the learner to ask questions and engage with the bot independent of the instructor's direction. In other words, the learner is free to discover the gaps in their own understanding of a topic and, if they are willing, to begin "thinking about their thinking" (metacognition) (Price-Mitchell, 2020). Since the bot will not always correct the learner, they assume a degree of personal risk by turning to it for intellectual guidance. However, this risk can be rewarding if the learner comes prepared.

Instructors who use Generative AI should teach learners how to write literate prompts. There are numerous strategic approaches to prompt writing, by one simple strategy is

1. Know the purpose of your prompt.
2. Keep the prompt simple and clear.
3. Use context, examples and ask for specific output
4. Offer feedback (to the chatbot)

(Dickson, 2023)

Instructors should "check-in" with their learners to assess their progress in prompt generating. They should understand that writing prompts can *prompt* more profound conversations between learners and instructors that will help each party map (create a visual representation) of the learner's understanding of the topic (Juillion, 2019b). The prompts can be the basis for the

instructor and learner to sketch a cognitive model of how the learner formulates questions and processes the bot's answers.

### **Fact-checking for integrity (combating implicit bias)**

The benefit of Generative AI tools is they confront instructors and learners with a machine that not only has access to unfathomable amounts of data but presents the learner with its ability to “perceive and classify” and “create an image or text description.” However, if the instructor and learner are not careful, they will forget that the data sets the machine learns from are human-generated and subject to flaws (*What Is Generative AI?*, 2023).

Fact-checking requires the instructor and learner to go back to basics or to ask the questions: what do I know, and how do I know it? Instructors can raise these questions through different techniques like the Socratic discussion model to help the class identify their own implicit biases or how they act “on the basis of prejudice and stereotypes without intending to do so” (*Implicit Bias (Stanford Encyclopedia of Philosophy)*, 2019b). One example of an unintended prejudice is to assume the chatbot is omniscient.

The fact-check process can be elaborate, but there are simple ways to learn how to do it. This short list is an excellent place to begin:

1. Check the source
2. Verify the information
3. Question the logic
4. Consider the context
5. Update regularly (revisit a source)

(Microsoft & OpenAI, 2023).

Learners and instructors can also

- Consult fact-checking sites like Snopes.com
- Use books and scholarly articles to cross-reference factual claims made by the bot
- Evaluate the bot's output compared to information and context learned in class (Mollick & Mollick, 2023b)

As I mentioned above, learners must question the bot’s findings and explore their personal assumptions. Some learners will be naturally inclined to question their beliefs, but the instructor must assume that even the most well-intentioned learners will profit from fact-checking strategies.

## V. Best practices: Applying the benefits of Generative AI



### **Integrity**

Instructors and learners must learn how to use chatbots with integrity and in the spirit of inclusion. A short list of strategies includes

- “[A] human-centered approach to teaching with GenAI that values human imagination and creativity as well as other core human values

- “[C]o-creating AI policies with students and revisit, reflect, and make changes as necessary.
- “Update your course syllabus to clarify your expectations regarding how GenAI may be used in your course.
- “Explore further resources on how to adapt assessment to better support learning in an AI-enabled world.
- “[R]eflect and discuss with peers and students what it would mean to teach and learn about AI tools alongside students. Bring topics for discussion into the classroom, such as whether these tools will flatten inequalities or heighten them.”

(Kkaras, 2023)

Integrity requires instructors teach learners how to use Generative AI according to principles of academic integrity, such as avoiding plagiarism. Learners need to learn how to site sources appropriately and learn the art of paraphrasing and quotation use to refrain from passing off chatbot content as their own.

### **Fact-checking**

Fact-checking is a tool *and* a best practice.

Generative AI chatbots can produce plausible sounding information that is not necessarily accurate. Instructors and learners need to know how to fact-check them. They should understand that “AI can carry biases, stemming from its training data or human intervention. These biases vary across LLMs and can range from gender and racial biases to biases against particular viewpoints, approaches, or political affiliation” (Microsoft & OpenAI, 2023).

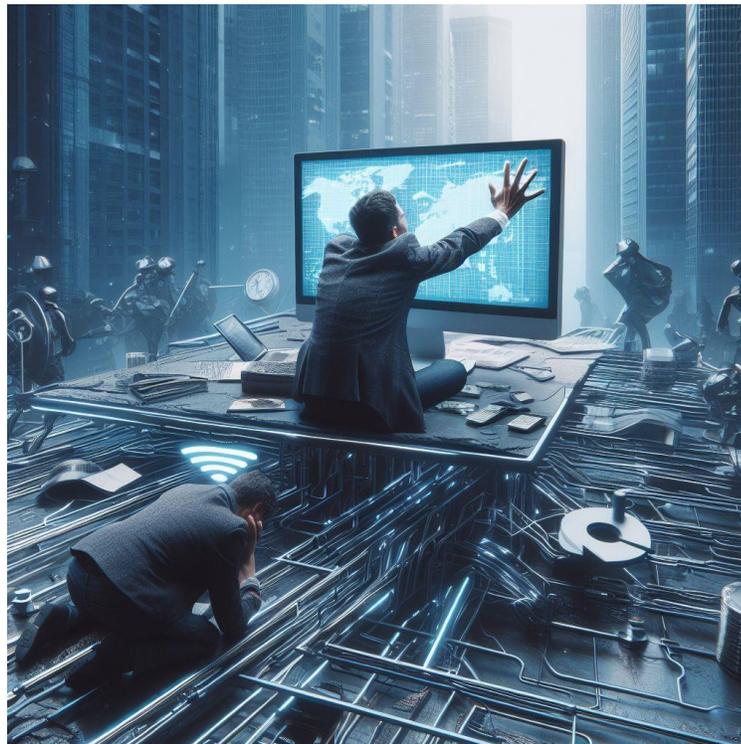
### **Exploring bias**

Using AI to explore bias is valuable because it teaches learners how to engage with bots critically. In any classroom or research setting, learners benefit from developing critical thinking skills that enable them to interrogate information skilfully.

To think critically means understanding that reading and processing “is not just about understanding what is being said, but also why it’s being said, how it’s being said, and what the implications are” (Microsoft & OpenAI, 2023). In other words, learners benefit from understanding epistemology by making “an attempt to understand how our degrees of confidence are rationally constrained by our evidence” (“Epistemology (Stanford Encyclopedia of Philosophy),” 2020).

An instructor can also discuss with learners how Machine Learning contains built in biases based on the nature of the model. They can accomplish this without drifting “into the weeds” of algorithmic design models (*What Is Machine Learning?* | IBM, n.d.). The goal of exploring bias is to ensure the learner understands they must not accept everything AI teaches them.

## VI. Barriers to AI use



## **The Digital Divide**

Fortunately, ChatGPT and Microsoft Bing now offer free and unlimited searches for their bots. However, there are differences between the free version of ChatGPT and what is available for a \$20US per month paid subscription. The free version provides many services, including advice and guidance on creating prompts and suggestions on conducting a productive conversation with the bot (Somoye, 2023). But the paid version allows users to generate far more sophisticated text-based and imagistic content.

No instructor should not assume that learners have access to reliable internet services in their homes or possess devices capable of utilizing Generative AI efficiently. There is always an underlying equity issue when we introduce digital technology into learning, which is known as “the digital divide” or “the gap between those with Internet access and those without it. But the digital divide is multifaceted and includes many factors such as access, affordability, quality, and relevance” (Muller & De Vasconcelos Aguiar, 2023).

## **Familiarity with Generative AI**

Instructors should teach learners who have never used chatbots to create effective prompts.

Instructors will want to know if their learners face any neural-cognitive or physical barriers before teaching them chatbot use. For this reason, instructors should familiarize themselves with accessibility and the types of extension software and Apps learners can use to ensure positive and productive encounters with a digital interface. I recommend they consult the CAST Guidelines on Universal Design for Learning (UDL) (UDL: The UDL Guidelines, 2018).

## **Accessibility**

Accessibility “is the concept of whether a product or service can be used by everyone -however they encounter it” (“What Is Accessibility?,” 2023). In Canada, this means that educational institutions and employers are responsible for “creating barrier-free communities, workplaces and services for all Canadians” (*Towards an Accessible Canada*, 2023).

Instructors should not assume that all of their learners interact with digital devices the same. Some require extension software that can help them concentrate by dimming screens, blocking ads, and focusing on the main content on a page. Others might require a screen reader to narrate the content of a webpage, chatbot, or search engine. There are many different types of extensions and software applications (Apps) to overcome barriers to navigation and access that learners with neural diversity, vision and hearing loss, or physical impairments face (Cohoon, 2023; Tigwell & Shinohara, 2021).

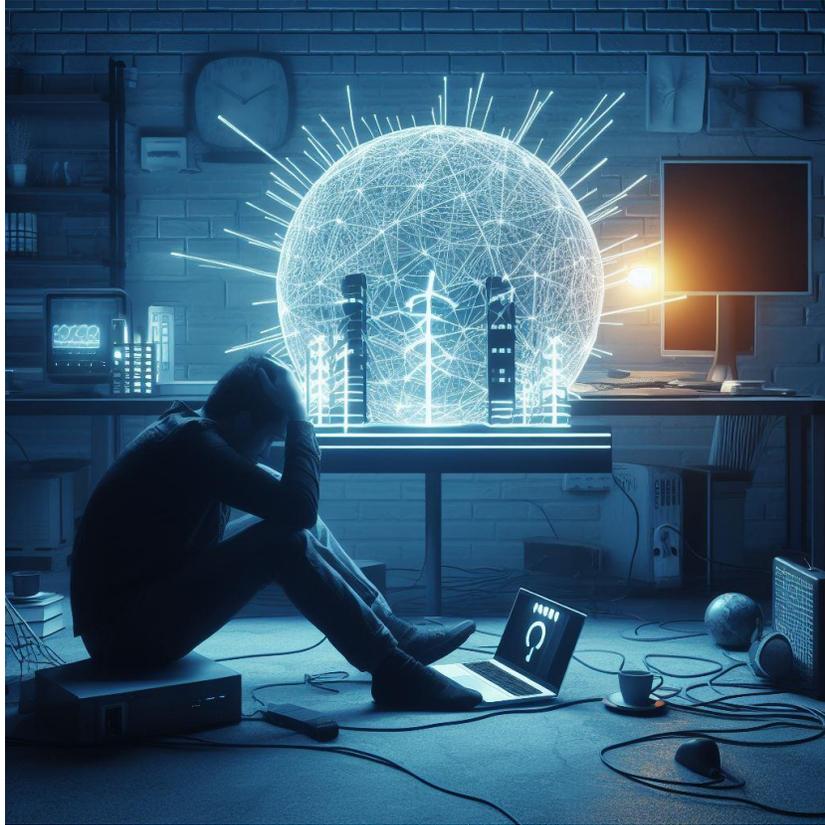
Instructors should consider whether they have the tools and resources to assist their learners utilize chatbots through devices containing extensions and Apps that will support accessibility.

### **Plagiarism**

Instructors should strategize how to avoid learner plagiarism. Generative AI will write papers and conduct research for learners that they can then pass off as their own. To prevent this, experts suggest developing a teaching strategy that discusses the ethical use of chatbots while showing learners how interacting with a bot can enhance their learning experience (Mollick & Mollick, 2023).

It is wise for instructors to talk to their departments (and supervisors) about institutional policy regarding plagiarism, including how to detect it in a world shaped by Generative AI.

## VIII. Tips for leveraging Generative AI tools



### Ask the Chatbot

An excellent way to begin thinking about how to use the tools in this guide is to “ask the Chatbot.”

I asked Bing Chat this question:

When working with a group of teachers who are new to Generative AI, what tips would you recommend to them to maximize their use of the technology?

The bot replied:

“Generative AI can be a powerful tool in the hands of educators, especially when they are new to it. Here are some tips to maximize the use of this technology:

1. **Understand the Basics:** Before diving in, it's important to understand what Generative AI is and how it works. This includes understanding the concept of machine learning, neural networks, and natural language processing.
2. **Start Small:** Begin with small projects or tasks. This could be as simple as generating a poem or a short story. As you become more comfortable with the technology, you can move on to more complex tasks.
3. **Experiment and Learn:** Generative AI is all about learning from data. Don't be afraid to experiment with different types of data and see what results you get. The more you experiment, the more you learn.
4. **Collaborate and Share:** Generative AI can be a great tool for collaboration. Share your results with other teachers and learn from their experiences. This can lead to new insights and ideas.
5. **Ethics and Responsibility:** It's important to understand the ethical implications of using Generative AI. This includes issues related to privacy, bias, and misinformation. Always use the technology responsibly.
6. **Continuous Learning:** The field of AI is constantly evolving. Stay updated with the latest developments and trends in the field.
7. **Leverage Available Resources:** There are numerous resources available online for learning about Generative AI, including tutorials, courses, and forums. Make use of these resources to enhance your understanding and skills.

“Remember, the goal is not just to use the technology, but to use it effectively to enhance teaching and learning (Microsoft & OpenAI, 2023).”

As you can see, the bot provided answers designed to help me work with a group of teachers who want to use the technology. I arrived at this result because I provided an adult learning or literacy and basic skills (LBS) context. There are many different ways to ask the bot questions. For example, if I alter my wording (but maintain its general nature), the bot gives me a different answer.

Here is how I rephrased my prompt:

When working with a group of teachers who are new to Generative AI, what tips would you recommend to them to help them improve learning outcomes for adult learners in the field of Literacy and Basic Skills (LBS)?

The bot replied:

“Certainly! Here are some tips for teachers who are new to Generative AI:

1. **Start with the Basics:** Understand the fundamental concepts of AI and machine learning. This includes how models are trained and how they generate outputs.
2. **Define Clear Goals:** Identify what you want to achieve with Generative AI. This could be enhancing creativity, automating tasks, or personalizing learning experiences.
3. **Experiment and Learn:** Don't be afraid to try different things and learn from the outcomes. Generative AI can produce unexpected results, which can be a great opportunity for learning.
4. **Use Pre-Trained Models:** There are many pre-trained models available that can be used for a variety of tasks. These can be a great starting point for those new to Generative AI.
5. **Understand the Limitations:** While Generative AI is powerful, it's not perfect. It's important to understand its limitations and potential biases.
6. **Ensure Ethical Use:** Always consider the ethical implications of using AI in the classroom. This includes issues related to privacy, fairness, and transparency.
7. **Keep Up with Latest Developments:** The field of AI is rapidly evolving. Stay updated with the latest research and developments in the field.
8. **Collaborate and Share:** Collaborate with other educators who are using AI in their classrooms. Sharing experiences and learnings can be incredibly valuable.

Remember, the key is to start small, learn by doing, and always keep the needs of your students at the forefront (Microsoft & OpenAI, 2023).”

As you can see, by providing a different context (LBS learners), the bot kept some recommendations and altered others, proving why we should review and revise our prompts.

### **Main tip: The importance of prompts**

By now, you know that it all comes back to prompts. As we have seen, the Chatbot will deliver answers tailored to what it predicts you want to learn. Always be clear, specific, creative, and provide the bot with a context illustrating how and where you will utilize Generative AI.

Since Chatbots do not think for themselves and rely on a predictive language model, they cannot interpret the nature of your question. The bot predicts which combination of words will deliver a satisfactory answer, letting you ask follow-up questions to help it finetune its response. And while it is true that Chatbots can ask you to clarify your question, they are not programmed to grapple with the nuances of language (yet). In other words, the effective use of Generative AI chatbots begins with skilful prompt writing.

Once you master writing effective prompts, the rest of Generative AI's benefits will follow.

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The computer is an enigma, not in its making or its usage, but because man appears incapable of foreseeing anything about the computer's influence on society and humanity. We have most likely never dealt with such an ambiguous apparatus, an instrument that seems to contain the best and the worst, and, above all, a device whose true potentials we are unable to scrutinize.

-Jacques Ellul (*The Technological Society*)



## Sources

Anderson, J. (2023, February 9). *Educating in a World of Artificial Intelligence*. Harvard Graduate School of Education. Retrieved September 24, 2023, from <https://www.gse.harvard.edu/ideas/edcast/23/02/educating-world-artificial-intelligence>

Cohoon, C. (2023, August 30). *Accessibility in Artificial Intelligence Technology: A Conversation with Mike*. Literacy Link South Central. Retrieved October 1, 2023, from <https://www.llsc.on.ca/accessibility-in-artificial-intelligence-technology>

Corti, K., & Gillespie, A. (2016). Co-constructing intersubjectivity with artificial conversational agents: People are more likely to initiate repairs of misunderstandings with agents represented as human. *Computers in Human Behavior*, 58, 431–442.

<https://www.sciencedirect.com/science/article/pii/S0747563215303101>

Dickson, H. (2023, September 25). *How to create effective AI prompts for your learning journey*.

Khan Academy Blog. Retrieved October 13, 2023, from

<https://blog.khanacademy.org/how-to-create-effective-ai-prompts/>

Davies, D. (2020b, May 27). *How Search Engines Answer Questions*. Search Engine Journal.

Retrieved September 30, 2023, from <https://www.searchenginejournal.com/search-engines/answering-questions/#close>

Dreibelbiss, E. (2023, August 9). *Microsoft Bing Chat Review*. PCMAG. Retrieved September

30, 2023, from <https://www.pcmag.com/reviews/microsoft-bing-chat>

Ellul, J. (1964). *The Technological Society*. Vintage.

Epistemology (Stanford Encyclopedia of Philosophy). (2020). In *Stanford Encyclopedia of*

*Philosophy*. Retrieved October 1, 2023, from

<https://plato.stanford.edu/entries/epistemology/>

*Evaluating Semantic Interpretations of a Search Query*. (2016, March 31). Bean Stalk: Marketing News & Consulting. Retrieved September 30, 2023, from <https://beanstalkim.com/learn/search-engine-news/evaluating-semantic-interpretations-of-a-search-query/>

Fazackerley, A. (2023, March 20). AI makes plagiarism harder to detect, argue academics – in paper written by chatbot. *The Guardian*. Retrieved September 30, 2023, from <https://www.theguardian.com/technology/2023/mar/19/ai-makes-plagiarism-harder-to-detect-argue-academics-in-paper-written-by-chatbot>

*Generative AI: What is it, tools, models, applications and use cases*. (2023, September 24). Gartner. Retrieved September 24, 2023, from <https://www.gartner.com/en/topics/generative-ai>

Giroux, H. A. (2012). *Twilight of the social : resurgent publics in the age of disposability*. In *Paradigm eBooks*. Paradigm Publishers. <http://ci.nii.ac.jp/ncid/BB09748825>

Giroux, H. A. (2011). *Zombie Politics and Culture in the Age of Casino Capitalism*. Peter Lang Publishing. <https://doi.org/10.3726/978-1-4539-1371-0>

Grant, G. (1991). *Technology and justice*. House of Anansi Press.

Green, B. P. (2019, March 15). *Artificial Intelligence, Decision-Making, and Moral Deskilling*. Markkula Center for Applied Ethics at Santa Clara University. Retrieved September 24, 2023, from <https://www.scu.edu/ethics/focus-areas/technology-ethics/resources/artificial-intelligence-decision-making-and-moral-deskilling/>

*How have generative AI and natural language processing technologies evolved over time?*

(2023, April 19). Harvard Online. Retrieved September 24, 2023, from <https://www.harvardonline.harvard.edu/blog/benefits-limitations-generative-ai>

Hwang, A. H., & Won, A. S. (2021, May 6). *IdeaBot: Investigating Social Facilitation in Human-Machine Team Creativity*. CHI '21: Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems. <https://doi.org/10.1145/3411764.3445270>

*Implicit Bias (Stanford Encyclopedia of Philosophy)*. (2019, July 31). Stanford Encyclopedia of Philosophy. Retrieved October 1, 2023, from <https://plato.stanford.edu/entries/implicit-bias/>

Is Using AI Content Plagiarism? (2021). *quetext blog*. Retrieved September 30, 2023, from <https://www.quetext.com/blog/is-using-ai-content-plagiarism>

Juillion, P. (2019b, July 7). *What is cognitive mapping in psychology? - Studybuff.com*. Studybuff.com. Retrieved October 1, 2023, from <https://studybuff.com/what-is-cognitive-mapping-in-psychology/>

Kapronczay, M. (2022, December 14). *A Beginner's Guide to Language Models*. Built In. Retrieved September 30, 2023, from <https://builtin.com/data-science/beginners-guide-language-models>

Lawton, G. (2023, September 9). *What is generative AI? Everything you need to know*. Tech Target: Enterprise AI. Retrieved September 24, 2023, from <https://www.techtarget.com/searchenterpriseai/definition/generative-AI>

Marr, B. (2023b, June 27). *Boost Your Productivity with Generative AI*. Harvard Business Review. Retrieved September 24, 2023, from <https://hbr.org/2023/06/boost-your-productivity-with-generative-ai>

Mollick, E. (2023, April 5). Thinking companion, companion for thinking. *One Useful Thing*. Retrieved September 30, 2023, from <https://www.oneusefulthing.org/p/thinking-companion-companion-for>

Mollick, E., & Mollick, L. (2023). *Assigning AI: Seven Approaches for Students with Prompts*. Wharton School of the University of Pennsylvania & Wharton Interactive. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4475995](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4475995)

Mollick, E., & Mollick, L. (2023b, September 25). *Student Use Cases for AI*. Harvard Business Publishing. Retrieved October 1, 2023, from <https://hbsp.harvard.edu/inspiring-minds/student-use-cases-for-ai>

Muller, C., & De Vasconcelos Aguiar, J. P. (2023, August 31). *What Is the Digital Divide?* - *Internet Society*. Internet Society. Retrieved September 30, 2023, from

<https://www.internetsociety.org/blog/2022/03/what-is-the-digital-divide/>

Online, H. (2023, April 19). *The Benefits and Limitations of Generative AI: Harvard Experts Answer Your Questions*. Harvard Online. Retrieved October 2, 2023, from

<https://www.harvardonline.harvard.edu/blog/benefits-limitations-generative-ai>

OpenAI (2023). Microsoft Bing (Oct. 13 version) [Large language model].

<https://www.bing.com/?PC=ER02>

OpenAI (2023). Microsoft Bing (October 2 version) [Large language model].

<https://www.bing.com/?PC=ER02>

OpenAI (2023). Microsoft Bing (October 1 version) [Large language model].

<https://www.bing.com/?PC=ER02>

OpenAI (2023). Microsoft Bing (Sept. 30 version) [Large language model].

<https://www.bing.com/?PC=ER02>

OpenAI (2023). Microsoft Bing (Sept. 24 version) [Large language model].

<https://www.bing.com/?PC=ER02>

Price-Mitchell, M. (2020, October 9). *What Is Metacognition? How Does It Help Us Think?: Metacognitive strategies like self-reflection empower students for a lifetime*. Psychology Today. Retrieved October 1, 2023, from <https://www.psychologytoday.com/us/blog/the-moment-youth/202010/what-is-metacognition-how-does-it-help-us-think>

Rogers, R. (2023, March 24). *Is GPT-4 Worth the Subscription? Here's What You Should Know*. WIRED. Retrieved September 30, 2023, from <https://www.wired.com/story/what-is-chatgpt-plus-gpt4-openai/>

*Science & Tech Spotlight: Generative AI*. (2023, September 6). U.S. GAO: U.S. Government Accountability Office. Retrieved October 2, 2023, from <https://www.gao.gov/products/gao-23-106782>

Snow, J. (2019, January 15). *AI Technology is Disrupting the Traditional Classroom*. PBS NOVA. Retrieved September 24, 2023, from <https://www.pbs.org/wgbh/nova/article/ai-technology-is-disrupting-the-traditional-classroom/>

Somoye, F. L. (2023, September 28). *Is ChatGPT free and unlimited? In short – yes*. PC Guide. Retrieved September 30, 2023, from <https://www.pcguides.com/apps/chat-gpt-free/>

Stanford University. (2023). *Exploring the pedagogical uses of AI chatbots*. Stanford Teaching Commons. Retrieved September 30, 2023, from <https://teachingcommons.stanford.edu/teaching-guides/artificial-intelligence-teaching-guide/exploring-pedagogical-uses-ai-chatbots>

Tigwell, G., & Shinohara, K. (2021, June 9). *Why we need to get more people with disabilities involved in developing technology*. World Economic Forum. Retrieved September 30, 2023, from <https://www.weforum.org/agenda/2021/06/people-with-disabilities-developing-technology/>

*Towards an Accessible Canada*. (2023, September 1). Government of Canada. Retrieved September 30, 2023, from <https://www.canada.ca/en/employment-social-development/programs/accessible-canada.html>

*UDL: The UDL guidelines*. (2018). Retrieved October 13, 2023, from <https://udlguidelines.cast.org/>

*What are AI hallucinations? | IBM*. (n.d.). IBM. Retrieved October 2, 2023, from <https://www.ibm.com/topics/ai-hallucinations>

*What is a Chatbot?* (2023). Oracle.com. Retrieved October 13, 2023, from <https://www.oracle.com/chatbots/what-is-a-chatbot/>

*What is Accessibility?* (2023). *The Interaction Design Foundation*. <https://www.interaction-design.org/literature/topics/accessibility>

*What is generative AI?* (2023, January 19). McKinsey & Company. Retrieved October 1, 2023, from <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-generative-ai>

*What is Machine Learning? | IBM*. (n.d.). IBM. Retrieved October 1, 2023, from <https://www.ibm.com/topics/machine-learning>

*What is machine learning? | Microsoft Azure*. (n.d.). Azure. Retrieved October 2, 2023, from <https://azure.microsoft.com/en-us/resources/cloud-computing-dictionary/what-is-machine-learning-platform/>

Yasar, K. (2023, September 26). *What is an AI Prompt?* Enterprise AI. Retrieved September 30, 2023, from <https://www.techtarget.com/searchenterpriseai/definition/AI-prompt>