

Generative Artificial Intelligence: Practical Uses in Education

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RED RIVER COLLEGE POLYTECHNIC AND CAMPUS MANITOBA



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Navigating this resource

In this brief overview, we'll explore the user-friendly features and intuitive interface of Pressbooks, designed to streamline your content creation experience. Whether you're a seasoned visitor or new to digital textbooks, this guide will walk you through the essentials of navigating Pressbooks with ease.

Instructions: Select each section below to reveal additional information on navigating this resource effectively.



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<https://pressbooks.openedmb.ca/aiineducation/?p=1521#h5p-14>

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Accessibility statement

At Red River College Polytechnic we believe that education should be accessible to all. We are dedicated to enhancing the accessibility and user-friendliness of the resources we develop.

Instructions: Select each section below to reveal additional information about accessibility for this book.



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About Open Education Manitoba



Welcome to OpenED Manitoba

OpenED Manitoba isn't just an initiative; it's a movement transforming higher education in our province. Established in 2015, we've been steadfastly committed to making education more accessible by leveraging openly licensed textbooks.

Instructions: Select each section below to reveal more information about OpenED Manitoba.



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How we can help you

At OpenED Manitoba, we're committed to your success every step of the way. Here's how we can support you:

- **Research support:** Let us help you find the perfect OERs for your subject areas or specific interests.
- **Adaptation assistance:** We'll work with you to tailor OERs to align with your institutional vision and academic goals.
- **Advocacy and workshops:** From workshops to advocacy campaigns, we'll empower you to champion open education within your institution.
- **Community events:** Join us at our annual events, where Manitoba's open education community comes together to learn, grow, and inspire.
- **Digital resources:** Explore our informative and celebratory digital content, offering insights into all things open education.
- **Best practices sharing:** Gain valuable insights into existing open education practices across North America.
- **Faculty support program:** Receive a \$250 honorarium for reviewing existing resources, contributing to the advancement of open education.

At OpenED Manitoba, we're not just shaping the future of education; we're redefining it. Together, let's create an educational landscape that's open, inclusive, and empowering for all.



CAMPUS
Manitoba

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Disclaimer regarding the use of artificial intelligence in this textbook

AI Use in the Development of this OER

As mentioned in the [Supporting Students to Use AI Effectively](#) section, modelling transparent and responsible use of AI is an important step in teaching effective and ethical use of AI. In order to model this transparency, here is a list of ways that AI tools have been used to produce or improve content for this OER:

- turning a set of notes on a topic into a draft chapter outline;
- generating suggestions for examples and case studies;
- scanning lengthy resources for suggestions of which sections to read for information about practical uses for AI tools in education;
- finding a term that wouldn't easily come to mind ("what's it called when students learn something but it wasn't the primary learning outcome?");
- as a thesaurus ("what are twenty other ways to say 'AI tools can be used to...'");
- for suggestions of how to rephrase sentences that ended up too long, convoluted, or disorganized; and
- generating first drafts of some image alt texts.

AI Tools Referenced in this Resource

Terminology

For the sake of consistency and brevity, the term 'AI tools' is used repeatedly throughout this resource in place of 'generative AI tools' or 'genAI tools'. This may refer to AI chatbots like [ChatGPT](#), [Copilot](#), [Gemini](#), or [Claude](#), which are based on **large language models**. It may also refer to tools that produce images (like [DALL-E](#) or [Midjourney](#)) or video (like [Sora](#) or [Synthesia](#)).

Sample Interactions

This OER contains a number of screenshots showing sample interactions with AI tools, and most of them are interactions with ChatGPT 4.0. This is not necessarily a recommendation of ChatGPT over other AI tools. ChatGPT was chosen for most examples because it is possible to share a link with readers that they can follow to view the full conversation, including full outputs and reprompting. Other AI tools can complete many of the same tasks as ChatGPT—several of them are explored in the [Generative AI Tools for Education](#) section.

Linked AI Tools

This resource also links to a number of specialized AI tools. Mentioning or linking to an AI tool does not constitute a recommendation—with limited resources, it wasn't possible to fully explore every tool mentioned in the resource. It's suggested that readers evaluate AI tools prior to interacting with them, including their benefits and drawbacks, and how using them at work aligns with their institution's policies. For more information about how to evaluate an AI tool, visit [Critically Evaluating AI Tools](#) from the University of Toronto Libraries.

Acknowledgements

Land acknowledgement

Red River College Polytechnic (RRC Polytech) campuses are located on the lands of Anishinaabe, Ininiwak, Anishininew, Dakota, and Dené, and the National Homeland of the Red River Métis.

We recognize and honour Treaty 3 Territory Shoal Lake 40 First Nation, the source of Winnipeg's clean drinking water. In addition, we acknowledge Treaty Territories that provide us with access to electricity we use in both our personal and professional lives.

We respect the Treaties that were made on these territories, and we dedicate ourselves to move forward in partnership with Indigenous communities in a spirit of reconciliation and collaboration.

RRC Polytech is committed to a renewed relationship and dialogue with Indigenous peoples based on the principles of mutual trust, respect, and reciprocity.

Development of This Resource

Funding and Support

This OER was funded by a RRC Polytech [Strategic Transformation and Applied Research \(STAR\) grant](#). STAR grants fund a variety of initiatives at RRC Polytech, focused on academic innovation, applied research, and college-wide improvements. This project has also received additional funding and support from [Campus Manitoba](#).

Method

Information for this OER was gathered through a scan of existing resources on generative AI in education in fall 2023 and winter 2024, as well as a series of focus groups conducted at RRC Polytech in November 2023, an undertaking approved by the RRC Polytech [Research Ethics Board](#). Focus group discussions with RRC Polytech staff have provided insightful examples and anecdotes about how AI tools can be productively utilized in polytechnic education. Staff members who contributed to the resource had the option to be credited by name or remain anonymous.

During the fall of 2024, this OER was updated to add information about new developments in AI. This revision also included a rewriting of two chapters ([What is Generative AI?](#) and [Capabilities and Limitations](#)), which were initially adapted from another OER.

Indigenous Perspectives

The incorporation of Indigenous perspectives and content into this resource has been a priority. In terms of interacting with AI tools in any context related to Indigenous knowledge, it is important to note that Indigenous knowledge is best gained through direct consultation with Indigenous people and accessing Indigenous-created resources. Additionally,

some Indigenous traditional knowledges have protocols related to how, when, and by whom they can be shared. For more information about protocols around Indigenous knowledge sharing, visit the [Protocols for Culturally Appropriate Knowledge Sharing page from the Indigenous Digital Literacies course by Connie Strayer and Robyn Grebliunas](#). For emerging Indigenous perspectives on AI, visit the [Indigenous Protocol and Artificial Intelligence Working Group](#) and the [Indigenous Perspectives in AI](#) course.

Contributors

This OER was made possible with help from dozens of RRC Polytech staff who contributed their time and ideas. This includes sixteen staff who participated in focus groups in November 2023 and shared how they have used AI tools in their work. It also includes a group of reviewers who read a draft of the OER in February 2024 and provided valuable feedback that shaped the final version, and a second group of reviewers who provided feedback on version 2.0 in November 2024. Thank you to RRC Polytech staff who reviewed all or part of this resource, including:

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- Meagen Chorney, Instructor, Nursing;
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- Christopher Harder, Tutoring Services Supervisor, Academic Success Centre;
- Rebecca Molly Hiebert, Chair, Professional and Academic Advancement;
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Thank you to [Campus Manitoba](#) for supporting this project with an OER Development Grant, and to Kristy Lacroix, DawnDena Gordon, and Carley McDougall for support with Pressbooks and other aspects of this resource's development.

Thank you to [Red River College Polytechnic](#) for funding this OER through the [Strategic Transformation and Applied Research Fund](#).

Thank you to Winnipeg artist Braelyn Koop for designing the cover art.

Introduction

Welcome to *Generative Artificial Intelligence: Practical Uses in Education*, an open educational resource (OER) produced by RRC Polytech. This OER was produced for educators who wish to find positive and productive ways to incorporate generative artificial intelligence (AI) tools into their work. This includes:

- using AI tools to develop courses, lesson plans, activities, assessments, and rubrics;
- leveraging AI tools to enhance student learning, and existing in-class activities and assignments;
- teaching students how to engage with AI effectively, ethically, and responsibly; and
- utilizing AI tools to efficiently complete administrative tasks.

This resource is focused on how AI tools can be used in polytechnic education. However, much of the content will also be relevant to educators in other educational contexts, like university or high school. The term ‘instructional staff’ is used widely in this resource and is meant to include instructors, professors, lecturers, teachers, educational assistants, and tutors.

One topic that is not covered is how the rapid rise of AI chatbots like ChatGPT has affected academic integrity and forced educators to rethink assignments, tests, and exams in order to ‘AI-proof’ assessments. Those topics have been expertly covered in many other resources. For more information about academic integrity and generative AI tools, consult your institution’s policies and guidelines as well as:

- [AI-Squared](#) from the University of Alberta;
- [Statement on Artificial Intelligence and Academic Integrity](#) by the International Centre for Academic Integrity Canada;
- [Recommendations on the Ethical Use of Artificial Intelligence in Education](#) from the European Network for Academic Integrity; and
- [Academic Integrity and Artificial Intelligence: Research Project Update](#) from Dr. Sarah Elaine Eaton.

To learn about redesigning assessment with AI tools in mind, please visit:

- [Designing assessments to mitigate the use of AI writing tools](#) from Brock University;
- [What to Do about Assessments If We Can’t Out-Design or Out-Run AI?](#) from the University of Sydney;
- [Effective Assessment Practices for a ChatGPT-Enabled World](#) by Jonna Lee.
- [Four Directions for Assessment Redesign in the Age of Generative AI](#) by Julia Chen.

The following table contains a brief description of each chapter’s content.

Chapter Name

Content

1. [What is Generative AI?](#)

- The recent proliferation of new AI tools, and some ways they have impacted education.
- The origins and evolution of artificial intelligence.
- The training methods and inner workings of text-, image-, video-, and audio-producing AI tools.

2. [Capabilities, Benefits, and Drawbacks](#)

- Capabilities and uses of generative AI tools.
- Benefits of AI tools in education.
- Drawbacks and limitations of AI tools.

3. [Generative AI Tools for Education](#)

- Leading AI chatbots and their relative strengths and weaknesses.
- Image-producing and video-producing AI tools, and other applications that may be useful in education.

4. [Setting Policy and Communicating Expectations](#)

- How institutional policies can promote responsible and ethical use of AI tools.
- How instructional staff can create or co-create course AI policies that enhance learning.
- How AI usage guidelines can be shared and reinforced along with each assignment.
- How learning outcomes should be reconsidered now that powerful AI tools are widely available.

5. [Supporting Students to Use AI Effectively](#)

- Learning how to use an AI tool through experimentation and research.
- Evaluating and adapting AI outputs for real-world use.
- Differentiating between ethical and unethical use of AI tools.

How AI tools can be used to:

- tutor students;
- simulate real world tasks, from a salary negotiation to an engine overhaul;
- generate practice questions based on a topic or text;
- teach a concept using analogies or examples;
- help language learners build their vocabulary; and
- support reading, research, and writing skills development.

6. [Using AI to Enhance Student Learning](#)

Chapter Name	Content
7. Writing and Refining Prompts	• Three strategies for supplying an AI tool with an initial prompt. • Adapting AI outputs for professional use through reprompting and human editing. • How tone and language affects AI outputs. • Ways to prompt AI tools to write in your voice.
8. Course Content Development	• How AI tools can assist with the course-planning process. • Ways that AI tools can generate multimedia content for course LMS or other materials.
9. Lesson Planning	• How to prompt an AI tool to produce a draft lesson plan, and how to adapt it for classroom use. • How to use AI tools to brainstorm classroom activities.
10. Assessment and Rubric Development	Using AI tools to: • assist with creating assessment questions based on supplied prompts or materials; • generate project topics and assessment scenarios; and • help to develop rubrics.
11. Feedback and Grading	• Using AI tools as a source of formative feedback. • How AI tools can assist with summative feedback. • Fun ways to use AI to make feedback more engaging. Using AI tools to:
12. Administrative Tasks	• write first drafts of emails, agendas, templates, and other documents; • help staff manage large amounts of information to summarize, identify trends, or target a search.

We sincerely hope that this resource will allow readers to integrate AI into their teaching practice in ways that enhance student learning and support students to work responsibly with current and emerging AI technologies. For further learning about AI in education, please check out RRC Polytech's [Teaching and Learning with Artificial Intelligence](#) suite of micro-credential courses.

PART I
ABOUT GENERATIVE ARTIFICIAL
INTELLIGENCE

I. What is Generative AI?

What is Generative AI? What are some key terms to know?

This chapter explores:

- the recent proliferation of new AI tools, and some ways they have impacted education;
- the origins and evolution of artificial intelligence;
- the training methods and inner workings of text-, image-, video-, and audio-producing AI tools.

Since the public release of ChatGPT 3 in November 2022, the use of powerful generative AI tools has become a part of everyday life for hundreds of millions of people. The most recent versions of generative AI tools can produce a wide range of content including text (essays, dialogue, correspondence, code), images, video, and audio.

The increased prevalence of AI tools has had positive and negative impacts on education. After the release of ChatGPT, many educators initially reacted with concern over its potential impact on academic integrity, as they noticed AI tools were able to generate passable content for assignments, essays, and exam questions. Over the past few years, as educators have incorporated AI tools into their courses—creating engaging simulations, providing students with additional formative feedback, and brainstorming lesson plans—sentiment has shifted and many now recognize the benefits of using AI in their teaching practice.

This chapter aims to provide a basic overview of the history of artificial intelligence and the inner workings of modern AI tools, as well as links to further readings.

History of Artificial Intelligence

AI has a history spanning centuries. The following slideshow overviews important milestones in the evolution of AI. It is adapted from [Generative Artificial Intelligence in Teaching and Learning at McMaster University](#), by Paul R MacPherson Institute for Leadership, Innovation and Excellence in Teaching and is used under a [CC BY 4.0](#) license.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.openedmb.ca/aiineducation/?p=1150#h5p-9>

How Generative AI Tools Work

This section introduces the basic technologies underlying text, image, video, and audio AI tools. For more information about specific AI tools and their features, please see the [Generative AI Tools for Education](#) chapter.

AI Text Generators

Popular AI chatbots like ChatGPT and Gemini use **large language models**(LLMs) to generate text. LLMs like OpenAI's GPT 4 and Google's PaLM 2 are generative AI algorithms that are capable of producing text such as essays, stories, dialogues, and code by predicting likely combinations of tokens (words or strings of characters) that should be used for a given task. LLMs are trained on massive volumes of text from online sources, with some leading LLMs processing over 3 billion pages of information as part of their training. This training involves having LLMs repeatedly predict the next word in a text in order to build a model of language patterns and structures. In addition to being trained on information from the internet, feedback from interactions with users provides information used to retrain and fine-tune LLMs.¹

For more information about how the technology underpinning LLMs works, please visit [What are large language models](#) and [A Beginner's Guide to Neural Networks \(Deep Learning\)](#), or watch the following video.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://pressbooks.openedmb.ca/aiineducation/?p=1150#oembed-1>

AI Image Generators

AI image generators create images from user text prompts. They are trained using advanced machine learning models that analyze vast quantities of images (art, photographs, etc.) and accompanying text descriptions. The most recent versions of image generators like Dall-E and Midjourney use a process called **diffusion**. Diffusion models are trained by incrementally converting images to static 'tv noise' and back to images again, which teaches the models how to generate images from random noise. Through this process, the diffusion models learn how to accept user input and generate novel images.²

1. Jamie Amarat Sandhu, "What are LLMs and generative AI? A beginner's guide to the technology turning heads," University of Toronto, last modified January 25, 2024, <https://srinstitute.utoronto.ca/news/gen-ai-llms-explainer>.
2. Rachel Gordon, "3 Questions: How AI image generators work," MIT CSAIL, last modified October 27, 2022, <https://www.csail.mit.edu/news/3-questions-how-ai-image-generators-work>.



Forward Diffusion

Noise is slowly and iteratively added to corrupt the images in the training set. The goal here is to move them away from their existing “subspace”.



Reverse Diffusion

Noisy images are iteratively reversed by referring to the steps taken during forward diffusion. There are multiple paths that could bring us back into the image “subspace”.

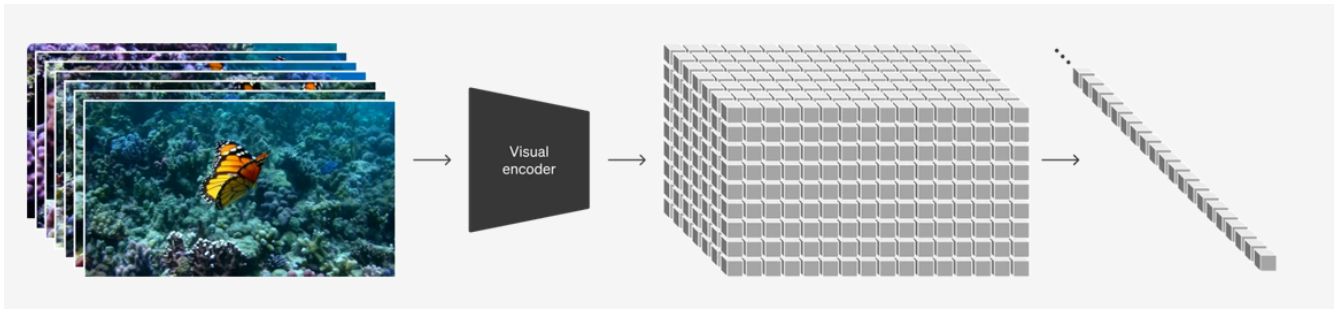
Image from University of Toronto Libraries Research Guides-Artificial Intelligence for Image Research: [How Generative AI Models Work](#), used with permission.

For more detail on how AI tools produce images, visit the University of Toronto Libraries' [AI for Image Research](#) guide.

AI Video Generators

AI video-producing tools like OpenAI's Sora use similar training methods to LLMs. Whereas an LLM is trained to predict how text *tokens* will interact with each other, Sora's training breaks videos down into *patches*. Each patch is a smaller part of a video, in both size and length. Video-producing tools use **diffusion** to learn how to create original patches, which are refined to create video frames, and sequenced to produce a video.³

3. OpenAI, Tim Brooks, Bill Peebles, et al., “Video generation models as world simulators,” February 15, 2024. <https://openai.com/index/video-generation-models-as-world-simulators/>.



Brooks, Peebles, et al., *Video generation models as world simulators*, 2024, <https://openai.com/index/video-generation-models-as-world-simulators/>.

For more information about the technology underlying AI video generators, please visit [AI Video Generation: What is it and how does it work?](#)

AI Audio Generators

AI audio generators can produce various forms of audio including realistic speech, music, sound effects, and ambient noise. AI audio tools are also trained on enormous amounts of data, and use **machine learning** to recognize and produce rhythm, pitch, tempo, and inflection in a piece of music, voice, or other type of audio.

Most AI audio generators are subscription based with limited functionality for free. [ElevenLabs](#) is one tool that allows users to produce a sample audio piece free of charge.

Read more about how AI audio generators work at [What is an AI voice generator?](#)

AI Tools of the Future

The capabilities of leading AI tools are expanding rapidly, with new features added to [Gemini](#), [ChatGPT](#), and [CoPilot](#) nearly every month. Some new features on the horizon include:

- image generators that can include high-quality text within images;⁴
- increased integration with voice assistants;⁵
- greater ability to interpret multimedia input;
- capacity to complete a series of tasks on a computer or other device—for example, viewing a screen, opening

4. Bernard Marr, “The Future of Generative AI: 6 Predictions Everyone Should Know About,” *Forbes*, last modified March 5, 2024, <https://www.forbes.com/sites/bernardmarr/2024/03/05/the-future-of-generative-ai-6-predictions-everyone-should-know-about/>.

5. Bernard Marr, “The 10 Biggest AI Trends of 2025 Everyone Must Be Ready For Today,” *Forbes*, last modified Sept. 24, 2024, <https://www.forbes.com/sites/bernardmarr/2024/09/24/the-10-biggest-ai-trends-of-2025-everyone-must-be-ready-for-today/>.

applications, and entering text ([the AI tool Claude is already piloting this](#));

- wider availability of generative video functionality;
- greater ability for AI tools to carry out a series of interconnected tasks—for example, planning a project, completing steps at the appropriate times, and reporting progress on each step;⁶
- increased integration with the field of robotics.⁷

It is also becoming easier for educational institutions, departments, and instructors to set up and customize their own AI tool for use in a particular institution, program, or course. Customizing an AI tool allows educators to create engaging learning experiences tailored to course and program learning outcomes. Read more about it in [How to Create Custom AI Chatbots that Enrich Your Classroom](#) from Harvard Business Publishing.

Key Takeaways

- AI has a long history, and the capability of AI tools has grown exponentially over time.
- Generative AI tools turn plain language prompts into text, code, images, videos, and audio.
- Generative AI tools are trained on massive amounts of content in the formats they aim to produce—like text, images, and videos.
- AI tools learn about users in order to customize interactions. As well, interactions and user feedback contribute to improving future versions of LLMs.

Exercises

- How can AI tools be useful in your professional role? Make a list, ensuring that each item aligns with your employer's institutional policies.
- Experiment with an AI tool like Copilot, ChatGPT, or Gemini. Ask it to complete a few tasks related to your work context or out-of-work interests, reflecting on what it does well and what its weaknesses are. Consider which tool you prefer in terms of its interface and performance.
- Try generating an image or video using one of the tools mentioned in the AI Image Generators and AI

6. Bernard Marr, "The 10 Biggest AI Trends of 2025 Everyone Must Be Ready For Today," *Forbes*, last modified Sept. 24, 2024, <https://www.forbes.com/sites/bernardmarr/2024/09/24/the-10-biggest-ai-trends-of-2025-everyone-must-be-ready-for-today/>.

7. Bernard Marr, "The Future of Generative AI: 6 Predictions Everyone Should Know About," *Forbes*, last modified March 5, 2024, <https://www.forbes.com/sites/bernardmarr/2024/03/05/the-future-of-generative-ai-6-predictions-everyone-should-know-about/>.

Video Generators section. How could you use one of these tools in your work?

2. Capabilities, Benefits, and Drawbacks

What can AI tools do well, and what are their limitations?

This chapter explores:

- capabilities and uses of generative AI tools;
- benefits of AI tools in education;
- drawbacks and limitations of AI tools.

Capabilities of AI Tools

As introduced in [What is Generative AI?](#), AI tools can accept input from users in the form of text, audio, video, and images in order to:

- generate text, including essays, reports, stories, and correspondence that reasonably replicates human writing;
- review documents in order to find information, summarize, analyze, or give feedback;
- analyze large amounts of data to identify trends and patterns;
- translate between languages or regional dialects;
- produce, debug, and optimize computer code in a variety of languages;
- generate graphics and illustrations;
- create audio content including voice, music, and sound effects;
- create original video content, as a standalone video or to extend an existing video.

Some of these outputs are not possible with all types of input (text, audio, video, and images), however the capabilities of AI tools continue to broaden.



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<https://pressbooks.openedmb.ca/aiineducation/?p=1593#oembed-1>

Dreams, a poem by IN-Q, accompanied by a video created by Wayne Price using OpenAI's Sora.

Benefits of AI Use in Education

This section provides a high-level overview of some benefits of AI in education. Each section links to a relevant chapter for further reading.

Benefits for Students

AI tools can act as a 24/7 personalized tutor, which can supply students with practice questions or give feedback on student work. When course and institutional policies allow, AI tools can also be used by students to assist with aspects of assignments that are time consuming but have limited learning potential, in order to focus more on higher value learning opportunities. AI tools can also power interactive and immersive simulations that allow students to practice real-world tasks and get feedback. A number of studies on student engagement with AI tools have reported increases in student motivation, engagement, happiness, and achievement when AI tools are integrated with coursework.¹ Additionally, learning how to use AI tools effectively and responsibly prepares students to use AI in the workforce. For more information, see the [Using AI to Enhance Student Learning](#) chapter.

Benefits for Instructional Staff

For instructional staff at educational institutions, AI tools have the potential to help with prep and administrative tasks, including lesson planning, idea generation, editing, and assessment development. This kind of AI-based ‘cognitive offloading’ can result in a more manageable workload, better work-life balance, and increased job satisfaction, as well as more working hours available for student contact and support, updating and enhancing curriculum, and continuous learning. For more information, see the [Using AI to Enhance Student Learning](#) chapter as well as each chapter in the [Practical Uses for Preparatory and Administrative Work](#) section.

Benefits for Accessibility

AI tools can be used to support accessibility in teaching and learning. Some examples are AI-powered text-to-speech and speech-to-text tools, auto-captioning/auto-transcribing, summarizing or adapting a resource, writing assistance, and time-management tools. They can also help instructional staff to increase accessibility of course materials, including generating the first draft of alt text for images, changing the language level or format of a resource, and checking a document for accessibility.

It should also be noted that although AI tools bring a host of potential benefits for accessibility, according to a series

1. Tufan Adiguzel, Mehmet Haldun Kaya, and Fatih Kürşat Cansu, “Revolutionizing Education with AI: Exploring the Transformative Potential of ChatGPT,” *Contemporary Educational Technology* 15, no. 3 (July 1, 2023):ep429. <https://doi.org/10.30935/cedtech/13152>.

of tests on nine AI tools in 2023 at Langara College, some AI tool interfaces are lacking in accessibility—for example, they may be difficult to navigate with a screen reader, voice control software, or using keyboard-only navigation.²

For more information about AI tools and accessibility, see the [Generative AI Tools for Education](#) chapter.

Drawbacks and Limitations of AI Tools

Errors and Inaccuracies

Large language models rely on predicting which tokens (words or strings of characters) will be used to satisfy a particular prompt, and in which order. These predictions often result in correct and factual information, but also commonly produce inaccurate content, often called **hallucinations**. Hallucinations may be due to falsehoods in training data, or by a faulty prediction by the LLM.³ AI tools can also be suggestible, and may produce inaccurate or biased content when they believe it is what the user wants—for an example, see [ChatGPT and Generative Artificial Intelligence \(AI\): Potential for bias based on prompt](#) from the University of Waterloo Library. Since AI tools are now being used to write volumes of content for websites, videos, and social media accounts, errors and inaccuracies in AI outputs lead to the spread of misinformation and eroding trust in the accuracy of available information.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://pressbooks.openedmb.ca/aiineducation/?p=1593#oembed-2>

Bias

Numerous tests, studies, and everyday interactions with AI tools have uncovered patterns of bias in AI outputs. This includes gender bias related to occupations (a hypothetical doctor is more likely to be male and a nurse female), racial and religious bias related to criminality, and even preference for particular national political parties. AI tool biases are caused by a variety of factors, including the model's training data, its settings, and decisions made by its creators and trainers.⁴ A 2023 study of 5,100 images produced by AI image generator Stable Diffusion found that images generated of

2. Luke McKnight, “Accessibility of AI Interfaces”, Langara College, accessed November 25, 2024, <https://langara.ca/about-langara/academics/edtech/AI-Accessibility.html>
3. Karen Weise and Cade Metz, “When A.I. Chatbots Hallucinate,” *New York Times*, last modified May 9, 2023, <https://www.nytimes.com/2023/05/01/business/ai-chatbots-hallucination.html>.
4. Golnoosh Babaei, David Banks, Costanza Bosone, Paolo Giudici, and Yunhong Shan, “Is ChatGPT More Biased Than You?” *Harvard Data Science Review*, July 31, 2024, <https://hdsr.mitpress.mit.edu/pub/gh3dbdm9/release/2>.

individuals in higher paying jobs had lighter skin tones and were more likely to be male, while individuals in lower paying jobs had darker skin tones and were more likely to be female.⁵

AI-tool training data relies heavily on content produced by communities that have a high level of technological literacy and access. As a result, AI tool outputs reflect common, dominant viewpoints from these groups, and exclude other voices. Users relying on AI tools as a source of information may miss out on authentic and diverse viewpoints, which further marginalizes already underrepresented groups, including the Global South and marginalized populations in the Global North.⁶

Privacy Issues

Tools like ChatGPT may employ user input in training their models, except for data of users who have created an account and switched off the data collection setting. When a user enters sensitive data into an AI tool, there is a risk that others could intentionally or inadvertently gain access to that information through future interactions with the model,⁷ or through cybersecurity breaches during the transmission, storage, or processing of data.⁸ AI-tool creators have been secretive about their training methods and data sets, leading to a lack of trust even when safeguards like opting out of data collection exist.

Copyright Issues

AI companies are deliberately opaque about what information their models have been trained on. However, it is clear from their familiarity with copyrighted works that they have been fed volumes of copyright-protected information without the consent of copyright holders. Lawsuits filed on behalf of artists and corporations are working their way through the courts, alleging that copyrighted works have been used without permission and AI outputs amount to unauthorized derivatives.⁹

Indigenous groups globally have raised concerns about data sovereignty and generative AI. The Indigenous Protocol and Artificial Intelligence Working Group's 2020 position paper argues that "Indigenous communities must control how their data is solicited, collected, analyzed and operationalized" and that AI tools risk perpetuating cultural

5. Leonardo Nicoletti and Dina Bass, "Humans are Biased. Generative AI is Even Worse," *Bloomberg*, June 9, 2023, <https://www.bloomberg.com/graphics/2023-generative-ai-bias/>.

6. Fengchun Miao & Wayne Holmes, "Guidance for generative AI in education and research", UNESCO, 2023, <https://doi.org/10.54675/EWZM9535>.

7. Tom McKay, "Generative AI data leaks are a serious problem, experts say," *IT Brew*, May 8, 2023, <https://www.itbrew.com/stories/2023/05/08/generative-ai-data-leaks-are-a-serious-problem-experts-say>.

8. Office of the Provost & Vice-President, "Privacy Considerations and Generative AI Tools," McMaster University, Accessed Oct. 16, 2024, <https://provost.mcmaster.ca/office-of-the-provost-2/generative-artificial-intelligence-2/privacy-considerations-and-generative-ai-tools/>.

9. Gil Appel, Juliana Neelbauer, and David Schewiedel, "Generative AI has an Intellectual Property Problem," *Harvard Business Review*, April 7, 2023, <https://hbr.org/2023/04/generative-ai-has-an-intellectual-property-problem>.

homogenization of Indigenous communities.¹⁰ It's clear that these concerns are well-founded, since the training methods used for AI tools rely on collecting vast datasets without regard for Indigenous data sovereignty, and the generic outputs of AI tools can exacerbate cultural erasure and homogenization.

Labour Concerns

AI companies have been accused of exploiting low-wage labour pools in Kenya, India, and elsewhere to carry out the psychologically difficult task of filtering objectionable content from AI training data. As part of a project to train AI-powered filtering tools, workers were tasked with evaluating text passages to flag objectionable content. These text passages included descriptions of suicide, sexual abuse, murder, and other disturbing topics. Workers have reported lasting mental health struggles from exposure to this information.¹¹

Environmental Impact

AI tools perform a high number of calculations to respond to a single prompt. Running and cooling the servers that power AI tools uses large amounts of water—up to one bottle of water per 100-word email, according to a study by the Washington Post and the University of California, Riverside.¹² AI tools also have a massive energy and carbon footprint; ChatGPT alone uses 500,000 kilowatts of electricity per day, enough to power 180,000 U.S. homes.¹³ The environmental impacts of AI tools have been exponentially amplified by their recent integration into everyday platforms like Google, Facebook, and Instagram, where users are provided AI-produced content without asking for it. Those interested in reducing their AI-related carbon footprint can [use the Web tab when searching in Google](#), and [mute AI features on Facebook, Instagram, and Snapchat](#).



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://pressbooks.openedmb.ca/aiineducation/?p=1593#oembed-3>

10. Jason Edward Lewis et al., “Indigenous Protocol and Artificial Intelligence Position Paper,” 2020, <https://doi.org/10.11573/spectrum.library.concordia.ca.00986506>.
11. Billy Perrigo, “Exclusive: OpenAI Used Kenyan Workers on Less Than \$2 Per Hour to Make ChatGPT Less Toxic,” *Time*, January 18, 2023, <https://time.com/6247678/openai-chatgpt-kenya-workers/>.
12. Pranshu Verma and Shelly Tan, “A Bottle of Water Per Email: the Hidden Environmental Costs of Using AI Chatbots,” *The Washington Post*, September 18, 2024, <https://www.washingtonpost.com/technology/2024/09/18/energy-ai-use-electricity-water-data-centers/>.
13. Cindy Gordon, “ChatGPT and Generative AI Innovations are Creating Sustainability Havoc,” *Forbes*, March 17, 2024, <https://www.forbes.com/sites/cindygordon/2024/03/12/chatgpt-and-generative-ai-innovations-are-creating-sustainability-havoc/>.

Drawbacks for Students and Educators

Several more drawbacks exist that are specific to the educational context. One issue is the disparity in educational opportunities arising from use of AI tools—students who can afford premium subscriptions benefit from advanced features and no wait times, while those using free versions face reduced capabilities and potential wait times. There is also a risk that AI tools may be intentionally or unintentionally used by students to violate academic integrity policies, which is leading educators to rethink teaching and assessment approaches. Some educators are concerned that excessive reliance on AI tools will lead to a loss of critical skills, like document organization, problem solving, critical thinking, and creativity. For both educators and students, failing to recognize the limitations of AI tools could have consequences if AI outputs are used without fact checking, adapting, and other forms of human refinement. These consequences could include damaged professional reputations due to inaccurate or unoriginal work and potential legal or ethical violations from the misuse of AI-generated content.

Recommendations for Educators

This chapter outlines numerous issues related to AI tools including inaccuracies, bias, and issues related to privacy, copyright, labour, and the environment. All of these issues cause concern for AI use in educational environments. Users of AI tools should be informed about AI's drawbacks and should consider them when deciding if and how to use AI tools as part of their work. When an educator is introducing students to AI, providing a rundown of its drawbacks and ethical issues is essential, as is providing guidance about responsible and ethical use of AI in academia and the workforce. Librarians and library reference technicians are also an excellent resource for understanding and navigating the use of AI tools, and may be available to support students in navigating these technologies.

Key Takeaways

- AI tools are capable of generating many kinds of outputs, tailored to the user's needs.
- AI tools have a number of potential benefits for students and instructors, as well as potential drawbacks.
- AI outputs may contain errors and bias, and need to be thoroughly vetted and adapted for real-world use.
- There are a number of downsides to using generative AI tools, including copyright, privacy, labour, and environmental issues.
- Educators who use AI tools need to be aware of their risks and drawbacks, and should ensure students are informed as well.

Exercises

- Consider the capabilities of AI tools. How would you consider using AI to help with your work? What are some tasks that you would never consider offloading to an AI tool?
- Use an AI tool to generate content related to a sensitive or controversial subject. Review the content—can you spot bias or disinformation?
- Reflect on the drawbacks of AI tools, including bias, disinformation, and issues related to privacy, copyright, labour, and the environment. Draft a preliminary plan for addressing these limitations with your classes. What do you want students to know about the limitations of AI, and how will you communicate this information?

3. Generative AI Tools for Education

Which AI tools could be useful for educators?

This chapter explores:

- leading AI chatbots and their relative strengths and weaknesses;
- image-producing and video-producing AI tools, and other applications that may be useful in education.

Multipurpose AI Tools

Several multi-use AI chatbots have practical uses for instructional staff. Click through the following slides to learn the basics about ChatGPT 4, Copilot, and Gemini.



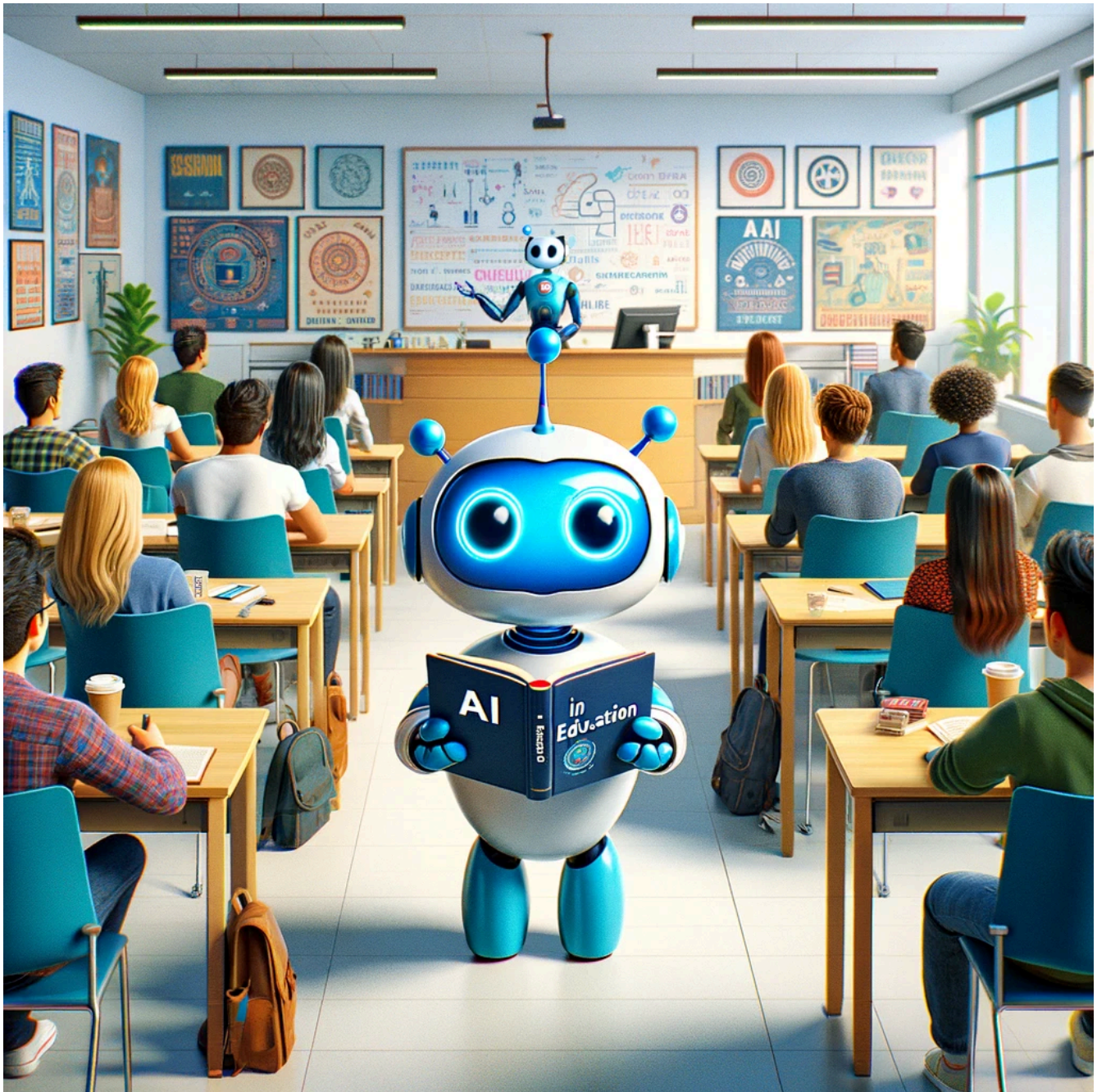
An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.openedmb.ca/aiineducation/?p=1155#h5p-11>

Multipurpose AI chatbots can be used in a variety of ways in education. For example, instructors can use them to generate content including quiz questions, activity ideas, examples, and case studies, and students can use them as a personal tutor, a debate partner, and in a variety of ways to support the writing process. See the [Practical Uses for Courses](#) and [Practical Uses for Preparatory and Administrative Work](#) sections for information about many more ways that multi-use AI tools can be used in education.

Image-Producing AI Tools

Several AI tools are able to produce images based on natural text inputs. OpenAI's [DALL-E](#) produces images based on text and image inputs, and is available to ChatGPT Plus subscribers. [Midjourney](#) is another prominent text-to-image tool, with subscriptions starting at \$10 USD per month, while [Adobe Firefly](#) has free and paid versions. These tools can be used by instructional staff to produce images for course content or activities, and by students to produce images for a presentation or infographic.



A mascot for the Generative Artificial Intelligence: Practical Uses in Education OER, generated by DALL-E in February 2024. Much reprompting was needed, especially to make the words on the textbook appear with correct spelling.

Video-Producing AI Tools

AI tools can produce custom videos based on a text, image, or video prompt. Two notable tools are [Runway](#) and [OpenAI's Sora](#), which can produce videos in a realistic or animated style and can extend a video clip forward or backward in time. These tools can be used in education for producing course content like a visual demonstration, explanation, simulation, or other tailored content.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://pressbooks.openedmb.ca/aiineducation/?p=1155#oembed-1>

An AI-generated car commercial, produced with Runway Gen 3.

A number of other AI tools can accept a script and produce a video in which an avatar reads the user's inputted text. One example is [Synthesia](#), which features 160 different avatars and 120 languages. Most text-to-video tools offer limited free trials followed by paid memberships that start around \$30 USD per month. [Adobe Express Animate from Audio](#) creates a video of a talking avatar (like a cartoon person, frog, or taco) to match an audio recording supplied by the user. These tools can be used in education to add variety to course content or assignment feedback.

Education-Specific AI Tools

Thousands of specialized AI tools are now available, nearly all of which build off a major **LLMs** like GPT-4. Many are tailored to complete tasks for educators and students. The following table lists several that are relevant to education. For further exploration, [access a searchable database of over 24,000 AI tools](#).

AI Tools	Task
NotebookLM	Compiling and summarizing learning materials, creating study guides
Quizgecko Testportal	Producing practice and test questions
ClassPoint	Generating quiz questions from a supplied PowerPoint
SlidesAI Curipod	Generating slides
Education Copilot	Producing course content and assignments
AI Tutor Pro	Personalized tutoring
Consensus Elicit	Conducting research
StepWise Math	Math tutoring
GitHub Copilot AlphaCode	Generating code
Q-Chat	Vocabulary building
MyEssayFeedback	Reviewing written work and providing formative feedback

AI Tools for Accessibility

A number of AI tools can help make teaching and learning more accessible. These include AI-enhanced speech-to-text tools like [Dragon NaturallySpeaking](#) and [AudioPen](#), which can help students with certain physical disabilities to draft written assignments, and text-to-speech tools like [NVDA](#), which helps visually impaired students to access online course content. [Seeing AI](#) can also assist visually impaired students by providing an audible description of content captured by a smartphone or laptop camera. Potential uses in education include describing a setting during fieldwork or a hands-on activity, or reading content from written documents while conducting research.

Writing tools like [Ghotit](#) can offer reading and writing support to students with dyslexia, dysgraphia, and other learning disabilities. AI-based organizational tools like [Goblin.tools](#) can help neurodiverse students with prioritizing tasks, estimating the time needed to complete a task, and understanding tone in writing.

AI tools can also help instructional staff to make their courses more accessible. This includes using an AI tool like [Copilot](#) to generate an alt text for an image and using an AI tool like [Veed](#) to auto-create captions for a video. In both cases, AI outputs need to be proofread and edited in order to ensure accuracy. AI tools can also review a document and make recommendations about how to make it more accessible, including headings, colour contrast, and image accessibility.

Key Takeaways

- A number of AI chatbots are available to use, and each has strengths and weaknesses.
- Other AI tools can convert text, image, or audio prompts to images or videos.
- Specialized AI tools can perform specific tasks related to teaching and learning.

Exercises

- Input the same prompt into ChatGPT, Copilot, and Gemini. Consider which AI tool produces the highest quality output and is easiest to work with.
- Experiment with a few AI tools listed in the [Education-Specific AI Tools](#) and [AI Tools for Accessibility](#) sections. List some ways that these tools could be used for teaching and learning.
- Explore [There's an AI for That](#). Search for a specialized AI tool that can assist with completing tasks related to your work context.

PART II

INTERACTING WITH AI TOOLS ETHICALLY AND EFFECTIVELY IN EDUCATION

4. Setting Policy and Communicating Expectations

How can AI tools be effectively and responsibly utilized in education?

This chapter explores:

- how institutional policies can promote responsible and ethical use of AI tools;
- how instructional staff can create or co-create course AI policies that enhance learning;
- how AI usage guidelines can be shared and reinforced along with each assignment;
- how learning outcomes should be reconsidered now that powerful AI tools are widely available.

Integrating AI in Education

An attempt to ban students from using AI tools in all aspects of their coursework is not likely to be successful. Moreover, this approach is a disservice to students, who will likely be expected to use AI tools responsibly and effectively in their future workplaces. Dr. Sarah Elaine Eaton of the University of Calgary states that AI tools “can be used ethically for teaching, learning and assessment,” and that student use doesn’t necessarily constitute an academic integrity breach.¹

AI is here to stay and will be integrated into most aspects of education. Accordingly, institutions, departments, and instructors need to set policy and clarify learning outcomes, and provide students with clear expectations on AI use for every assignment.

Setting Institutional Policy

An October 2023 report from the Canadian Digital Learning Research Association recommends that institutional policies should be developed that promote the “effective, creative, equitable, and responsible use/nonuse” of AI tools and promote staff learning and experimentation around AI tools.² See the table below for a selection of AI policy/guideline highlights from Canadian polytechnics.

1. Sarah Elaine Eaton and Lorelei Anselmo, “Teaching and Learning with Artificial Intelligence Apps,” University of Calgary, last modified January 12, 2023, <https://taylorinstitute.ucalgary.ca/sites/default/files/teams/1/Resources/AI/Teaching-With-AI-Apps.pdf>.
2. George Veletsianos, “Generative Artificial Intelligence in Canadian Post-Secondary Education: AI Policies, Possibilities, Realities, and Futures,” Canadian Digital Learning Research Association, accessed January 30, 2024, <https://www.d2l.com/resources/assets/cdlra-2023-ai-report/>.

Institution	Key Policy Details
British Columbia Institute of Technology(BCIT) (see also: BCIT's Official Position Statement)	• Allows the use of AI tools for creating first drafts of course schedules, lesson plans, learning outcomes, quiz questions and more • Encourages instructors to communicate guidelines around AI use • Promotes student learning around prompting and responsible use of AI tools
Kwantlen Polytechnic University	• Allows instructional staff to permit or ban AI tools in their courses • States that students can't be required to create an account with an AI tool • Suggests numerous ways to integrate AI into courses to enhance learning • Proposes several ways that educators can encourage students to think critically about AI outputs
Red River College Polytechnic	• Recommends open conversations with students about AI tools at the beginning of the course and with each assessment • Suggests defining acceptable and unacceptable use of AI tools within a course or discipline
Seneca Polytechnic	• Sets guidelines for approved AI tools • Prohibits entering sensitive or copyrighted information into AI tools • Advises educators and students to fact-check AI outputs, and to be transparent about which content was generated by AI

Educators and students should check with their institutions for emerging policy and guidance on appropriate use of AI tools. For a roundup of AI policies at educational institutions, visit Higher Education Strategy Associates' [Observatory on AI Policies in Canadian Post-Secondary Education](#).

Engaging Students on the Topic of AI

Discussion around AI tools should begin early in a course, ideally in the first week when introducing the course outline. This raises student awareness that AI tools are a part of the educational landscape, and positions the instructor as one who is aware of AI's capabilities and is willing to talk about appropriate usage.

Creating a Course AI Policy

Course AI policies set clear expectations about acceptable and unacceptable uses of AI tools. Policies should clearly state how AI tools can be ethically used for coursework as well as procedures for documenting AI use on assignments. Depending on institutional and departmental protocols, there may be a set policy that instructors need to share with their class, or instructors may be able to set their own or co-create a policy with their students. In any case, instructors must ensure that their course's AI policy aligns with their institution's policy on AI use, and are also responsible for following institutional policies regarding consistency across different sections of a course, and across courses within a program.

Several RRC Polytech instructors have reported success in engaging classes in establishing a course AI policy. Two RRC Polytech communication instructors conducted activities in which the classes were divided into groups and asked to draft lists of acceptable and unacceptable uses for AI tools on upcoming assignments. Subsequently, each group shared their lists, and the class collaboratively developed an AI policy for their course. In some cases students set stricter policies than the instructor would have chosen.³ Indeed, many students want to engage with AI tools but don't want to miss out on developing critical thinking and other key skills.⁴

Both instructors found that co-creating an AI policy led to an increase in dialogue around AI tools throughout the course and a decrease in AI-based plagiarism compared to the previous term.⁵ Research shows that engaging students in collaborative decision making around expectations leads to better uptake of a class policy, a more positive classroom culture, and increased engagement.⁶

See the following text box for an example of a collaboratively drafted AI policy.

3. Anonymous focus group participants, November 2023.

4. Olina Banerji, "How Schools Are Coaching—or Coaxing—Teachers to Use ChatGPT," EdSurge, last modified August 3, 2023, <https://www.edsurge.com/news/2023-08-03-how-schools-are-coaching-or-coaxing-teachers-to-use-chatgpt>.

5. Anonymous focus group participants, November 2023; Anonymous RRC Polytech instructor, February 2024.

6. Hope Wilder, "Collaborative Classroom Management," Edutopia, last modified January 19, 2022, <https://www.edutopia.org/article/collaborative-classroom-management/>.

Generative AI and COMM-1173

In our Week 2 class meeting on Sept. 8, we worked together to create a policy for use of Generative AI tools like ChatGPT in this course. This policy applies to our section of COMM-1173 only. For other courses, ask your instructor before using AI tools. Students in other sections of COMM-1173 should ask their instructor before using AI tools as part of their course work.

Acceptable uses of AI Tools

- To use it as a tutor/find out more about a topic after completing your course readings.
- In research, to generate a list of resources to explore.
- To generate a list of possible topics for a project.
- To generate an image for a presentation.
- To look for errors in your work (it is never okay for an AI tool to rewrite your work for submission; instead, ask it to generate a list of suggestions for improvement).

If you'd like to use AI tools to help you in a way that isn't listed here, please contact me.

Unacceptable Uses of AI Tools

- Writing content for your assignment (an essay, paragraph, sentence), or content for you to adapt to put in your assignment.
- Citing the AI tool as a source in a research project.
- Paraphrasing research materials for your assignment.
- Generating ideas for a reflection assignment.
- Rewriting, revising, or reorganizing your work.

Other Considerations

- If you use a generative AI tool to help you with an assignment in any way, you must include a note at the bottom of your document that explains how you used the AI tool. Failing to note the ways that you used AI in your assignment could be considered an [Academic Integrity](#) breach.
- Here's an example of how you can note your AI usage: *I used ChatGPT to generate a list of twelve possible topics. I adapted one of these topics for my paper. When I finished writing, I asked ChatGPT to review my work and make suggestions about grammar, punctuation, and organization. It made twenty-*

four suggestions. I implemented some of these suggestions.

- If you use AI tools to help you with an assignment, save copies of your interactions with the AI tool. ChatGPT will do this automatically as long as you leave the *Chat History & Training* setting on.
- Make sure that you understand the limitations/weaknesses of any AI tool that you use. [This article](#) summarizes the major limitations of ChatGPT.

Setting Clear Expectations on Assignments

Students need to be presented with clear expectations about how AI tools can be used on each assignment. For courses with an established AI policy, students could be asked to revisit the policy once a new assignment is introduced, and report back about how AI tools can and can't be used. Another approach is to find or create a scale that has multiple levels of AI use, and to indicate which level should be followed for each assignment. Here is one example of an AI Use Scale, adapted from [an April 2024 publication by Perkins, Furze, Roe, and MacVaugh](#) by Tyler Steiner, Melissa Deroche, and Carleigh Friesen of the Teaching for Learning in Applied Education program at RRC Polytech.⁷

7. The Teaching for Learning in Applied Education team also consulted Elwell's AI Transparency Rubric (https://www.linkedin.com/posts/ryan-elwell-a2224667_aiassessment-aieducation-digitalpedagogies-activity-7234656960761978880-XnoP/), the RRC Polytech GenAI Use Expectations: Course outline/LEARN Sample Statements (internal document), and OpenAI's ChatGPT 4o.

AI Assessment Scale

Across all levels, your critical thinking, analysis, and unique contributions are essential to the learning process. This guide provides clear instructions for using AI in your college work, showing how AI can support your learning while keeping your original ideas and understanding at the forefront. It outlines the different ways you can use AI—from working independently to collaborating with AI—and explains when and how to acknowledge AI's role. You're encouraged to use AI as a tool for growth, ensuring that the final product truly reflects your own knowledge and skills. Remember, using unmodified AI content without making it your own is not allowed.

Level	Description	Acknowledgement
Level 1: Independent Work	You must complete tasks entirely on your own, without AI assistance. This approach allows you to demonstrate and strengthen your individual skills and knowledge.	No acknowledgement required - the work is entirely your own.
Level 2: AI-Assisted Ideation and Refinement	You may use AI to generate ideas and improve the structure and quality of your work. The core content remains your own, but AI can assist with brainstorming, refining structure, or checking spelling and grammar. This enhances your final product's quality while developing your skills in evaluating AI suggestions and maintaining originality in your work.	AI was used for idea generation and refinement of this work. [Specify the aspects where AI was used.]
Level 3: AI-Assisted Drafting	You can use AI to create initial drafts, which you then critically evaluate and revise. This allows you to use AI to provide a starting point, but you are responsible for reviewing, modifying, and ensuring the originality of the final product. This allows you to integrate AI with your work while developing your critical thinking skills.	AI was used to generate an initial draft, which was then critically revised and adapted for this work. [Explain your process of working with and modifying the AI-generated content.]
Level 4: AI Collaboration	You may work collaboratively with AI to complete tasks while demonstrating effective and responsible AI use. This level allows you to use AI creatively while critically assessing the content it generates and maintaining ownership of the final product.	AI was used to generate content that was critically evaluated before use in this work. [Describe your collaborative process and how you ensured the final product reflects your knowledge and skills.]

Many course and institutional policies around student use of AI tools require students to disclose the role that AI tools played in creating an assignment. This might involve a simple declaration in the assignment or footnotes that explain how AI was used. Theresa Senft of Macquarie University has required students to submit full documentation of AI usage on assignments, including the prompts used, information gained, and explanations of how that information was used. This task was designed to highlight the importance of documentation in AI usage, considering the numerous examples

of [AI-generated hallucinations and errors resulting in employment termination](#).⁸ This type of exercise has several other benefits—it gives students an opportunity for feedback on their prompting and AI literacy, promotes critical thinking about how AI outputs are adapted and used, and models responsible use of AI tools.

The image below shows the beginning of Theresa Senft's AI tools documentation template. Click the image to view the full template.

AI TOOLS DOCUMENTATION TEMPLATE

MMCC8046 AY 2023

Students who use AI tools to prepare their assessment must SUBMIT THIS TEMPLATE

(To learn how to use this template, please see page 2 of this document.

Questions? Terri.senft@mq.edu.au)

Student name	Student email address	Today's date

Session	Date, time, tool, link	First prompt	Follow up prompt (s)	Most useful info from tool:	How I used info from tool in assessment	Notes or questions for Terri
Session #1	Date: Time: Tool name: Link to chat (if possible)	My first prompt:	Follow up prompt 1: Follow up prompt 2: Follow up prompt 3:	Copy-pasted language from AI tool chat:	How I checked info for accuracy: What I decided to use: How I decided to use it:	
Session #2	Date: Time: Tool name: Link to chat (if possible)	My first prompt:	Follow up prompt 1: Follow up prompt 2: Follow up prompt 3:	Copy-pasted language from AI tool chat:	How I checked info for accuracy: What I decided to use: How I decided to use it:	

Part of Theresa Senft's AI Tools Documentation Template.

Clarifying Learning Outcomes

The rapid rise of powerful AI tools has reminded instructors of the need to critically consider how assignments connect to learning outcomes and real-world tasks. It also serves as a reminder to engage in dialogue with students about the learning outcomes for each assignment, why they are important, and how they will prepare students for the workplace. This can be useful alongside each new module or theme and as each assignment is introduced. Carly Schnitzler of Johns Hopkins University suggests exploring the importance of course learning outcomes while crafting a course AI policy, with a provocative discussion question like “What’s the point of being in a writing class if language models can generate passable text and score well on exams?”⁹

8. Theresa Senft, “AI Tools Documentation,” Exploring AI Pedagogy—A Community Collection of Teaching Reflections, last modified November 14, 2023, <https://exploringaipedagogy.hcommons.org/2023/11/14/developing-ai-standards-of-conduct-as-a-class/>.

9. Carly Schnitzler, “Developing AI Standards of Conduct as a Class,” Exploring AI Pedagogy—A Community Collection

With the power of today’s AI tools, learning outcomes may need to be adjusted to ensure that they reflect skills that students will need in the workforce and that AI tools are not able to reasonably demonstrate. Oregon State University suggests an updated version of Bloom’s Taxonomy, which focuses on “distinctive human skills” that go beyond the capabilities of AI tools.¹⁰

The following image shows Oregon State University’s suggestions for updating Bloom’s Taxonomy. Click the image for more information, or [download a PDF copy of Bloom’s Taxonomy Revisited](#).



Bloom's Taxonomy Revisited

Use this table as a reference for evaluating and making changes to aligned course activities and assessments (or, where possible, learning outcomes) that account for generative Artificial Intelligence (AI) tool capabilities and distinctive human skills.

All course activities and assessments will benefit from **review** given the capabilities of AI tools; those at the **Remember** and **Analyze** levels may be more likely to need **amendment**.



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	RECOMMENDATION	AI CAPABILITIES	DISTINCTIVE HUMAN SKILLS
CREATE	Review	Suggest a range of alternatives, enumerate potential drawbacks and advantages, describe successful real-world cases	Formulate original solutions incorporating human judgement, collaborate spontaneously
EVALUATE	Review	Identify pros and cons of various courses of action, develop rubrics	Engage in metacognitive reflection, holistically appraise ethical consequences of alternative courses of action
ANALYZE	Amend	Compare and contrast data, infer trends and themes, compute, predict	Critically think and reason within the cognitive and affective domains, interpret and relate to authentic problems, decisions, & choices
APPLY	Review	Make use of a process, model, or method to illustrate how to solve a quantitative inquiry	Operate, implement, conduct, execute, experiment, and test in the real world; apply creativity and imagination to idea & solution development
UNDERSTAND	Review	Describe a concept in different words, recognize a related example, translate	Contextualize answers within emotional, moral, or ethical considerations
REMEMBER	Amend	Recall factual information, list possible answers, define a term, construct a basic chronology	Recall information in situations where technology is not readily accessible

Bloom’s Taxonomy Revisited from Oregon State University, licensed CC-BY 4.0.

of Teaching Reflections, last modified November 14, 2023, <https://exploringaipedagogy.hcommons.org/2023/11/14/developing-ai-standards-of-conduct-as-a-class/>.

10. Oregon State University, “Artificial Intelligence Tools,” Online | Ecampus, accessed February 2, 2024, <https://ecampus.oregonstate.edu/faculty/artificial-intelligence-tools/meaningful-learning/>.

Key Takeaways

- Institutional and course AI policies should be created, which encourage responsible and ethical use of AI tools.
- Co-creating an AI policy with students can lead to greater understanding and uptake of the policy.
- Students need clear guidelines on each assignment about how AI tools can and can't be used.
- Learning outcomes need to be revised to focus on distinctive human skills.
- Educators need to clarify the importance of course learning outcomes, especially when it seems like an AI tool can complete the task reasonably well.

Exercises

- Investigate your institution's policy on AI use in teaching and learning.
- Reflect on what a fair and reasonable AI use policy would look like in your courses. Would you engage students in co-creating a policy, and if so, how?
- Draft a plan for communicating AI policies at the beginning of your next course and as each assignment is presented.
- Consider whether any of your courses' learning outcomes need to be updated. How could you update them to focus on distinctive human skills?

5. Supporting Students to Use AI Effectively

What do students need to know to prepare them for using AI tools in the classroom?

This chapter explores how to:

- learn how to use an AI tool through experimentation and research;
- evaluate and adapt AI outputs for real-world use;
- differentiate between ethical and unethical use of AI tools.

Teaching Effective Use of AI

Interacting with AI Tools

It's likely that most students in a Canadian polytechnic classroom have already engaged with AI tools. However, many lack effective strategies for prompting, reprompting, and adapting AI outputs. The [Writing and Refining Prompts](#) chapter outlines three strategies for prompting an AI tool, which can be explored in the classroom and even tested against one another. One activity could involve having different student groups test out competing strategies to complete the same task, then comparing the quality of the final product. Heidi McKee of Miami University suggests having students submit a record of their prompting and reprompting, with annotations that explain reasoning, then present their strategy to the class.¹ Students may also benefit from learning how to adapt AI outputs, including reprompting and human refinement strategies.

The way we interact with AI tools is likely to change rapidly as they evolve, and methods currently used to prompt and coach AI tools may be less relevant once students enter the workforce.² Due to this, building the skills necessary for working with a new AI tool through research and experimentation, and learning how to critically evaluate an AI tool's outputs, may be a more productive use of limited class time than an exhaustive study of today's best practices for AI tool prompting.

1. Heidi McKee, "Rhetorical Strategies for Prompting: Developing Prompt Literacies," Exploring AI Pedagogy: A Community Collection of Teaching Reflections, last modified November 27, 2023, <https://exploringaipedagogy.hcommons.org/2023/11/27/rhetorical-strategies-for-prompting-developing-prompt-literacies/>.

2. Phillip Dawson, "Don't Fear the Robot," YouTube video, 1:25:54, last modified July 18, 2023, <https://www.youtube.com/watch?v=ZEhRFVO6rr0>.

Evaluating AI Outputs

One starting point for promoting effective AI usage is having students understand the strengths and weaknesses of AI tools. A range of potential classroom activities can address this as the primary intention of an activity or as collateral learning when AI tools are used as part of learning another skill or concept.

Comparing AI Output and Human Writing

RRC Polytech Civil Engineering Technology instructor Ellowyn Nadeau has students evaluate AI outputs as part of a unit on report writing. After students complete their own report-writing exercises, they are asked to have ChatGPT address the same report-writing task, then analyze the quality of the AI output. In a previous term, students overwhelmingly agreed that ChatGPT's raw output provided some usable structure but was ineffective overall until it had been adapted significantly.³ Mollick and Mollick agree that activities like Nadeau's, which involve critical reflection on AI outputs, "sharpen [student] skills while having the AI serve as a supportive tool for their work, not a replacement."⁴ Follow-up activities to an exercise like Nadeau's could focus on the kind of reprompting and human refinement that would be needed to turn an AI-produced report into one that is usable in professional and academic settings.

Identify the AI Output

Another approach to investigating AI tools' strengths and weaknesses is having students attempt to distinguish between human- and AI-produced works. One activity idea is for students to use AI tools to create a work, reprompting to refine the output until it appears as if it were produced by a human. Following that, students produce their own work on the same topic, and the class attempts to identify which works were produced by AI and which by fellow students. In addition to promoting critical discussion on the strengths and weaknesses of AI outputs, this activity offers the opportunity to practice writing prompts, reprompting to refine AI outputs, and coaching AI tools to produce text that closely resembles their voice.⁵

Fact-Checking AI Output

Another way to build AI literacy is by fact-checking AI-generated content. As part of RRC Polytech Library and Academic Services presentations on information literacy, reference technician Fatima DeMelo has students analyze an

3. Ellowyn Nadeau, focus group, November 22, 2023.

4. Ethan Mollick and Lilach Mollick, "Assigning AI: Seven Approaches for Students, with Prompts", SSRN, last modified September 23, 2023, <https://doi.org/10.2139/ssrn.4475995>.

5. Mark Marino and Mary Traester, "The Turing Test," Exploring AI Pedagogy: A Community Collection of Teaching Reflections, last modified November 27, 2023, <https://exploringaipedagogy.hcommons.org/2023/11/27/the-turing-test/>.

AI-produced biography of a prominent member of the RRC Polytech community, using the [SIFT method](#) to verify facts and correct errors.⁶ RRC Polytech communications instructor Jacob Carewick has explored AI-produced deepfake video and image examples as part of a unit on media literacy, in which students learned to recognize common hallmarks of faked imagery. Carewick’s activity also included an exploration of online sources for fact-checking viral disinformation, which equips students with strategies for verifying the authenticity of potential fakes.⁷ Both Carewick’s and DeMelo’s activities equip students with strategies for verifying AI output that are likely to remain useful as the strengths and weaknesses of AI tools continue to develop.

AI Literacy as Collateral Learning

Most uses of AI in education aren’t intended primarily to teach AI literacy, but instead to enhance learning of another skill or concept. Instructors have a variety of options for adding extension activities to help students develop AI expertise. The following table outlines a number of extension activities that could be added on in order to boost student capacity for using AI tools effectively.

6. Fatima DeMelo, focus group, November 22, 2023.

7. Jacob Carewick, focus group, November 6, 2023.

Original Activity	Extension Activity
Write an essay or report with limited use of AI tools allowed.	Write a short reflection evaluating the strengths and weaknesses of the AI tool's output.
Produce a table, chart, or graph with an AI tool.	In small groups, share final drafts and the prompting process that produced them.
Conduct a research project on which AI was allowed for initial research and planning stages.	In pairs, compare information from AI to that of secondary sources and reflect on accuracy and relevance.
Create a web application using an AI tool as a coding assistant.	After reviewing and debugging AI-produced code, engage in a class discussion about its strengths and weaknesses.
Use an AI tool to produce custom images.	Compare AI-produced images to human-produced images in order to evaluate their appropriateness for a task.
Incorporate AI into recipe creation or menu planning.	Compare AI output to culinary practices and industry norms to identify what changes are needed and why.
Prompt an AI tool to produce a set of instructional slides about a healthcare workplace process (like hand washing).	Evaluate AI outputs against local knowledge, checking for accuracy.

Teaching Responsible and Ethical Use of AI

It's likely that students who learn to use AI responsibly and ethically during their studies will carry these habits into the workforce. Consequently, it is essential to equip students with the skills and attitudes needed to use AI appropriately in their program of study.

Instructor Disclosure of AI Use

Promoting ethical and responsible use of AI tools begins with an open dialogue between students and instructors. Instructor use of AI tools (when allowed by institutional and departmental policy) should be disclosed to students in order to open or continue the conversation and model responsible usage. Instructors can share how AI tools have helped them to brainstorm case studies or project topics, produce a set of images, or draft outlines for lesson plans. AI usage can be disclosed in the course outline, in class meetings, or in materials posted to the course learning management system (LMS) to demonstrate transparency, build trust, and position the instructor alongside the students as someone who is learning about and experimenting with AI.⁸ See the following image for an example of how one RRC Polytech communication instructor disclosed use of an AI tool in developing an assignment.

** While based on real issues, these scenarios are fictional/include fictional details.*

*** Your instructor used AI tools to help brainstorm the list of project scenarios for the Winter 2024 term. Topics 2 and 8 are adapted from ideas generated by ChatGPT.*

An example of instructor disclosure of AI use.

Course AI Policies

Clear expectations can be set by crafting an AI policy for a course that lists acceptable and unacceptable uses of AI. Co-creating the policy with your class makes room for deeper conversation and reflection, and can lead to stronger

8. Paul R. MacPherson Institute for Leadership, Innovation and Excellence in Teaching, "Generative Artificial Intelligence in Teaching and Learning at McMaster University," McMaster University, last modified 2023, <https://ecampusontario.pressbooks.pub/mcmasterteachgenerativeai/>.

relationships, greater trust, and increased student ownership of the policy.⁹ For more on how to craft course AI policies and an example, please see the [Setting Policy and Communicating Expectations](#) chapter.

Addressing Inappropriate Student Use of AI Tools

It can be difficult to handle a breach of course AI policy (which is potentially also a breach of institutional academic integrity policy). Suspected inappropriate use of AI tools is difficult to prove, since AI-detection tools are unreliable and usage may violate institutional policies around privacy and student work.

An exploratory meeting with the student offers an opportunity to gather more information about the student's work, by asking questions about their drafting process, content choices, and supports used, and verifying that the work submitted matches the student's knowledge and abilities. An exploratory meeting also gives instructors a chance to clarify expectations around AI use, guide students in developing strategies for the appropriate completion of academic work, and make referrals to academic supports. Information collected is also valuable for instructors to refine their approach for communicating academic integrity and AI use policies.

Case Studies

Exploring case studies about appropriate and inappropriate use of AI in academia, the workforce, and the community may also be impactful. Here are a few case studies and corresponding discussion questions that can be adapted for use in the classroom:



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.openedmb.ca/aiineducation/?p=1165#h5p-12>

Exploring Bias

Bias exists in AI tools based on the decisions of designers and engineers, and the data sets that **large language models** were trained on. Michael McKenna calls bias “the backbone of machine learning” and highlights the need to differentiate between useful bias, like an AI tool that believes patients with a family history of breast cancer are more likely to have breast cancer, and harmful bias, like an AI tool for law enforcement that believes people of some races are more likely

9. Jessica Gemella and Anwen Burk, “Digital Pedagogy Toolbox: Digital Literacy Outcomes,” BCcampus, last modified December 8, 2023, <https://bccampus.ca/2023/12/08/digital-pedagogy-toolbox-digital-literacy-outcomes/>.

to commit crimes.¹⁰ Students need to be made aware of the potential for AI tools to produce outputs that have gender, racial, socioeconomic, disability-related, and other forms of bias. Some example activities to explore bias include:

- analyzing AI tools’ text and visual outcomes for gender or other biases;¹¹
- exploring case studies, such as those of law enforcement case-management systems like [COMPAS](#) or [OASYS](#), hiring algorithms, or facial recognition software, to raise awareness of real-world impacts of AI bias;
- organizing a jigsaw activity in which students explore one type of AI bias, its implications, and how to spot it, and share their findings with the class.

Key Takeaways

Students need to be taught:

- basic prompting skills;
- strategies for learning a new AI tool;
- how to critically evaluate AI output;
- how to adapt AI outputs for real-world use; and
- how to use AI tools ethically at school and in the workplace.

Exercises

- Reflect on your students’ level of aptitude with AI tools. What do they know already and what do they need to learn?
- Plan ways to integrate AI into an upcoming class. How can the lesson include instruction on using AI tools effectively?
- Consider how you will disclose your use of AI tools to your next classes.
- Develop a strategy for incorporating learning about AI bias and the unethical use of AI tools in upcoming courses.

10. Michael McKenna, “Bias in AI: How to Mitigate AI Bias,” Toptal, accessed January 24, 2024, <https://www.toptal.com/artificial-intelligence/mitigating-ai-bias>.

11. Chrissi Nerantzi, Sandra Abegglen, Marianna Karatsiori, and Antonio Martínez-Arboleda, “101 Creative Ideas to Use AI in Education, A Crowdsourced Collection,” Zenodo, last modified June 23, 2023, <https://doi.org/10.5281/zenodo.8072950>.

PART III

PRACTICAL USES FOR COURSES

6. Using AI to Enhance Student Learning

How can AI tools help students learn more effectively?

This chapter explores how AI tools can be used to:

- tutor students;
- simulate real-world tasks, from a salary negotiation to an engine overhaul;
- generate practice questions based on a topic or text;
- teach a concept using analogies or examples;
- help language learners build their vocabulary;
- support reading, research, and writing skills development.

AI as a Personal Tutor

AI-based learning allows students to actively engage by interacting with AI tools to learn the skills required for a particular task. AI-based individual tutoring can adapt to each student's learning style, pace, and preferences, offering a personalized educational experience. Since AI tools can produce errors, AI-based tutoring is best used as a supplement to readings or lectures, which will supply students with a base of knowledge on which to fact-check AI output. Multipurpose AI tools can act as a personal tutor, as can specialized tools like [NotebookLM](#), which allows students to compile course slides, readings, videos, and notes, and produce study guides and practice quizzes.

AI as a Simulation Tool

AI tools are well-suited to function as a simulator, allowing students a low-stakes, low-pressure opportunity to apply knowledge before engaging in a real-world task.¹ The following table illustrates some sample applications for AI as an in- or out-of-class simulation partner.

1. Danny Liu, "Prompt Engineering for Educators—Making Generative AI Work for You," University of Sydney, last modified April 27, 2023, <https://educational-innovation.sydney.edu.au/teaching@sydney/prompt-engineering-for-educators-making-generative-ai-work-for-you/>.

Area	Task for Simulation	Sample Interaction with AI Tool
Business, legal	Negotiation	AI chatbots can be prompted to act as business or legal negotiating counterpart.
Hospitality management	Event planning	AI chatbots can be prompted to simulate the planning and execution of an event, incorporating common issues that arise.
Healthcare	Patient interaction	PCS allows students to practice opposite an avatar of a patient, and view themselves from a patient's perspective.
ESL	Conversation practice	Quizlet's Q-chat can act as a conversation partner or quizmaster.
Trades	HVAC installation, repair, and maintenance	SkillCat has AI simulations on dozens of tasks from changing an air filter to wiring a compressor.
Indigenous language learning	Pronunciation and conversation practice	Rongo evaluates and corrects pronunciation of Maori learners, and several other apps are in development for Indigenous languages in Canada.
Technology	Cyberattack response	AI chatbots can produce detailed and iterative simulations of cyberattacks.
Business	Pitching a business plan	Shark Tank AI offers a fun and engaging way of getting detailed feedback on a business plan.

In many of the above examples where a specific AI tool is mentioned, multipurpose AI tools like Copilot, Gemini, and ChatGPT can often complete the same tasks, but potentially with a less immersive visual environment.

Here is one example of prompting an AI tool for an iterative simulation—click the image for the full interaction (ChatGPT login required). Note how ChatGPT handles a poor answer from the student (about the Breakout Sessions issue).

I am a hospitality management student taking an event planning course, and I'd like to run a practice simulation of a day-long business conference that I have planned for 250 attendees, from 8:30 am to 4:30 pm, at the Winnipeg Convention Centre. The conference includes registration, multiple keynote speeches, breakout sessions, a lunch break, and networking opportunities.

Please simulate this event for me, including common problems that might arise throughout the day. For each part of the event, present me with a specific issue to solve. After you present me with the first issue, stop there and ask me how I'd solve it. Don't move forward until I provide a satisfactory solution. Here is the schedule for the event:

1. Registration and light refreshments(8:00 am - 8:30 am)
2. Keynote Speeches (9:00 am - 11:00 am)
3. Breakout Sessions (11:15 am - 12:45 pm)
4. Lunch Break (1:00 pm - 2:00 pm)
5. Networking Opportunities (2:15 pm - 3:45 pm)
6. Closing remarks and Feedback (3:45 pm - 4:30 pm)

Example prompt of a student running a simulation with ChatGPT.

AI as Practice Question Generator

RRC Polytech reference technician Rosemary Woodby encourages students to use AI tools as a “study buddy” to generate practice questions.² In this way, students have an extensive supply of example questions or problems, and can also generate questions that are adapted to their learning style, appropriate for their language level, or connected to an

2. Rosemary Woodby, focus group, November 6, 2023.

area of interest. AI tools can generate matching activities,³ multiple-choice questions, cloze passages,⁴ word problems, crossword puzzles, and short- or long-answer questions. AI tools can even be prompted to present a series of practice questions in a fun and familiar format, like *Who Wants to Be a Millionaire?* or *Family Feud*.⁵ Here is an example of using ChatGPT to run a *Jeopardy!*-style practice quiz on the Manitoba Electrical Code. Click the image to see the full interaction, including the original prompt and the reprompting needed to have a table displayed.

General Rules	Wiring Methods	Grounding and Bonding	Protection and Control	Services and Service Equipment	Special Installations
		100	100	100	100
200	200	200	200	200	200
300	300	300	300	300	300
400	400	400	400	400	400
500	500	500	500	500	500

You currently have 100 points. Please choose your next category and point value to continue the game.

Practicing for an exam on the Manitoba Electrical Code in the style of Jeopardy!

A number of specialized AI tools exist solely to produce sample questions, with or without supplied materials—[Quizgecko](#) and [Testportal](#) are two examples. Since AI tools can produce incorrect information, students need the subject-matter knowledge and critical-thinking skills to understand when a tool has provided an incorrect answer, or when it has misevaluated a response. Woodby encourages students to think of AI as “your less-than-reliable friend” who knows about a lot of things, but can’t be trusted to always provide accurate information.⁶

It’s important for students to be aware of copyright and academic integrity concerns that may arise when uploading protected course materials to an AI tool. Instructional staff need consult institutional and department policies to find

3. CampGPT, “Open Prompt Book,” Crowded Learning, last modified November 1, 2023, <https://edtech.worlded.org/wp-content/uploads/2023/07/campgpt-prompt-book-2-compressed.pdf>

4. “Prompts to help you learn,” University of Sydney, accessed January 17, 2024, https://canvas.sydney.edu.au/courses/51655/pages/prompts-to-help-you-learn-2?module_item_id=2035977

5. Chrissi Nerantzi, Sandra Abegglen, Marianna Karatsiori, and Antonio Martínez-Arboleda (Eds.), “101 Creative Ideas to Use AI in Education, A Crowdsourced Collection,” Zenodo, last modified 2023, <https://doi.org/10.5281/zenodo.8072950>.

6. Woodby, 2023.

out what components of their course (readings, slides, etc.) should not be shared with an AI tool or should only be shared with the **data collection** feature disabled. When recommending AI-based practice questions to students, instructional staff should clarify information about which course content can and cannot be shared with AI.

Analogies and Examples

For students who are having difficulty understanding a concept, AI tools can provide analogies to connect the topic to an area of prior understanding.⁷ Students can benefit from having an AI tool compare a challenging concept to a familiar concept from their area of study, or to a sport, movie franchise, or everyday process. These tailored explanations provide new pathways to understanding a concept. They add an element of novelty that can boost enjoyment of learning and lengthen attention spans, and serve as a mnemonic aid. Here's an example of ChatGPT explaining a marketing concept in hockey analogies. Click the image to see the full interaction (login required).



Certainly! Using ice hockey analogies to explain the concept of STP (Segmentation, Targeting, and Positioning) in marketing can make the concept more relatable and easier to grasp, especially for those familiar with the sport.

1. **Segmentation** (like identifying different player roles in hockey): In marketing, segmentation is about dividing a broad market into smaller, distinct groups of consumers with similar needs, characteristics, or behavior. Think of it as how a hockey team is divided into different roles - forwards, defensemen, and goaltenders. Each group has unique skills and responsibilities: forwards focus on offense, defensemen on protecting their own goal, and goaltenders on stopping the puck. Similarly, in market segmentation, you identify groups based on demographics, psychographics, geographics, or behavior, much like recognizing different player roles based on their skills and duties.
2. **Targeting** (like choosing the right players for a game strategy): After segmentation, targeting involves choosing which segment(s) to focus your

ChatGPT's explanation of STP in hockey terms.

7. Liu, "Prompt Engineering for Educators."

AI tools can also provide volumes of examples to connect new concepts to real-world tasks or to prior knowledge.⁸ AI tools can be prompted to produce examples that are tailored to a specific industry or position, geographical location, cultural context, project, or task. Here's how ChatGPT provides examples connecting an aircraft maintenance engineer course concept to a real-world workplace. Click the image to see the full interaction.

Please give five examples of how an aircraft maintenance engineer will need to apply concepts of sheet metal repair and/or fabrication. The engineer works on ATR 42 and ATR 72 planes that fly to northern Canada.



An Aircraft Maintenance Engineer (AME) working on ATR 42 and ATR 72 planes, especially those operating in the challenging environments of northern Canada, would need to apply concepts of sheet metal repair and fabrication in various ways:

1. **Skin Patch Repairs:** The skin of the aircraft, primarily made of aluminum alloys, is susceptible to damage from various sources like hail, bird strikes, or minor accidents on the ground. In such cases, the AME would need to cut out the damaged area and fabricate a new patch of metal, which must be riveted precisely to restore the structural integrity and aerodynamic properties of the aircraft.
2. **Corrosion Control and Repair:** Aircraft operating in northern Canada are exposed to harsh weather conditions and de-icing chemicals, which can lead to corrosion. An AME would frequently inspect for corrosion, and in cases where it is found, they might need to remove the corroded section and fabricate new metal pieces to replace it, ensuring that the new parts are treated to resist future corrosion.
3. **Structural Reinforcement:** Over time, the airframe of aircraft can develop fatigue, especially in

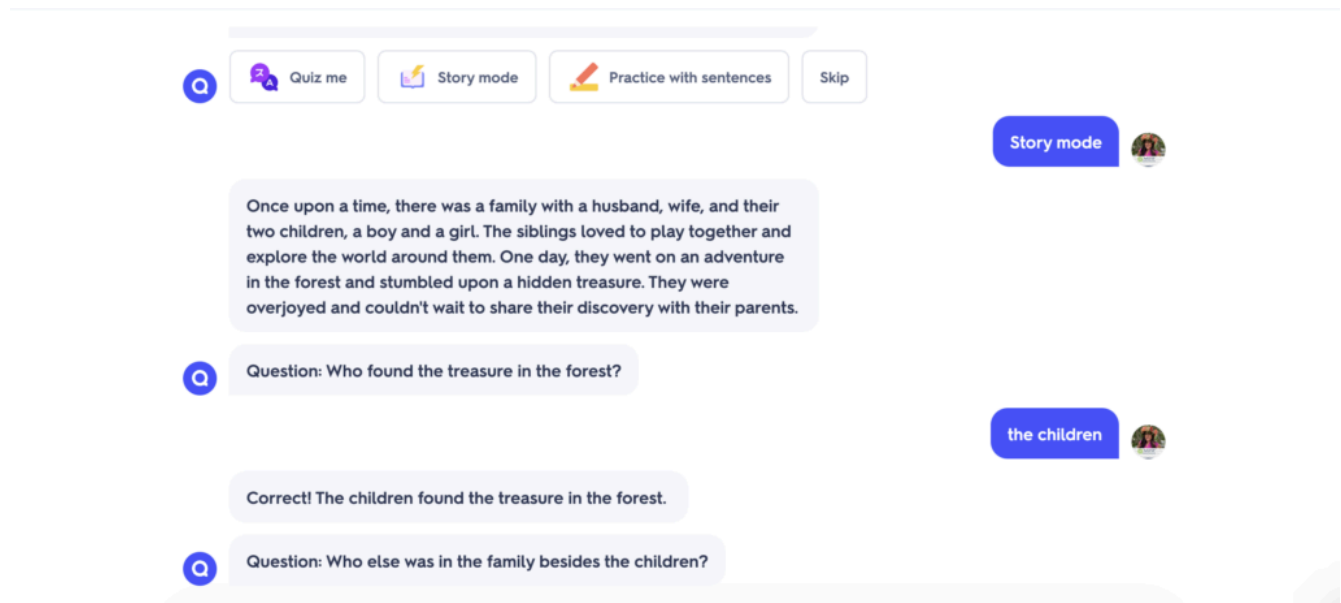
ChatGPT providing examples of real-world applications of a course concept.

AI for Language Learning

AI tools have numerous applications for language learning. RRC Polytech ESL instructor L. Brunette uses Quizlet's [Q-Chat](#) for vocabulary building and sentence-structure development. After customizing a vocabulary set for the week, Brunette sets students up to have Q-chat quiz them on the words. The app can ask students to define a word or use it in a sentence, and will give detailed feedback on their answers. This gives students a 24/7 source of formative feedback and reduces instructor marking load. Brunette reports that students find the app especially useful since they can complete

8. Danny Liu, "Prompt Engineering for Educators—Making Generative AI Work for You."

their vocabulary practice anywhere, like while riding the bus to class.⁹ Another useful feature of Q-Chat is Story Mode, which can generate a story that incorporates vocabulary from the set, and a corresponding set of comprehension questions.¹⁰ Other AI chatbots like Copilot, Gemini, and ChatGPT can do the same, with more prompting required on the student's end.



An example of Q-Chat's Story Mode, from Rachel Mamiya Hernandez "Quick and Quirky Stories for the Language Classroom: Exploring Quizlet's AI-powered Q-Chat" (click the image to link to the article).

AI for Career Readiness

AI tools can help students to prepare for a post-graduation job search. Multi-use AI tools, as well as specialized tools like [VMock](#), can offer feedback on resumes and cover letters; subscribing educational institutions can even train and customize their own version of a career-development AI tool, tailoring its feedback to local industry expectations. AI tools are excellent at generating a list of practice job interview questions based on a supplied job posting, and they can also give feedback on interview responses.

AI tools can also generate complete resumes and cover letters based on supplied information. However, since making a personal connection with the employer is a key part of producing a competitive resume and cover letter, AI-generated applications are not likely to be successful for a competitive posting. Instead, job seekers can:

- supply their resume, cover letter, and the job posting to an AI tool, asking for suggestions of key job requirements that still need to be addressed;
- share their resume and cover letter with an AI tool, asking for a list of suggestions about how to improve the

9. L. Brunette, focus group, November 25, 2023.

10. Rachel Hernandez, "Quick and Quirky Stories for the Language Classroom: Exploring Quizlet's AI-Powered Q-Chat," *FLTMAG*, last modified May 15, 2023, <https://fltmag.com/quizlet-q-chat/>.

writing style; or

- start with an AI-generated resume or cover letter, making substantial revisions that transform the documents to reflect their personality and voice.

For more about the potential benefits and risks of using AI in the application process, visit [Using AI to Your Advantage When Becoming Career Ready](#) from the University of Connecticut.

Reading and Research Skills Development

AI tools can be used to assist with reading and research by summarizing a text or passage, scanning for content on a theme, adapting a text to a student's reading level, or translating it into another language. More advanced research uses for AI tools include uploading multiple articles and asking an AI tool for comparisons, takeaways, and strengths and weaknesses. [Consensus](#) and [Elicit](#) are two tools equipped to handle this kind of processing.¹¹ The reading capabilities of AI tools are a time saver for students, allowing them to quickly focus their research, cast a wider net, and allocate significant time to analysis and writing.

The following example shows how an AI tool can be prompted to review resources for content on a particular topic. Click the image to review the full conversation. Note the initial prompts in which the user has the AI tool define the concept of reciprocity and list some related terms. Without these initial prompts, ChatGPT did not perform nearly as well on this task.

11. Marc Marino, "Reading and Researching with LLMs," Exploring AI Pedagogy: A Community Collection of Teaching Reflections," last modified November 27, 2023, <https://exploringaipedagogy.hcommons.org/2023/11/27/reading-and-researching-with-llms/>



Imagine that you are researching how the Indigenous principle of reciprocity can be applied in business and management. Review the attached open-source textbook. Make a list of content in the textbook that relates to teaching of reciprocity (or any related terms or keywords). Make a bulleted list of each piece of relevant content. For each one, include a brief summary and a page number for further reading.



Based on the content of the textbook "Introduction to Business," here is a list of content related to the teaching of reciprocity or related terms and concepts:

1. Chapter Overview:

- Summary: This chapter provides an overview of ethical decision-making and managing a socially responsible business.

Prompting ChatGPT to search a textbook for information related to a particular concept.

Since gathering information from documents is likely to be an important skill into the future, AI tools should be used as an enhancement to a traditional research process rather than a replacement. Marc Watkins of the University of Mississippi notes that AI tools like [ExplainPaper](#) and [SciSpace](#) are useful for students with disabilities and low language levels, but could hinder their ability to develop close reading skills. Watkins recommends that students reserve the use of AI tools until they hit a “pain point” in a text, one that would normally cause a barrier to comprehension.¹²

Writing Skills Development

In the same way that Watkins worries about AI's effects on close reading skills, many instructors worry about its effects on student writing development. There are a number of ways students can use AI tools to write more effectively while also developing their writing skills. One idea is to use a multipurpose AI tool like Gemini or specialized tool like [MyEssayFeedback](#) to give formative feedback on an early draft. Prompts can include specifics about what the student would like the AI tool to look for, like tone, organization, coherence, or conciseness. When suggesting that students

12. Marc Watkins, “Reading Assistants: ExplainPaper and SciSpace,” Exploring AI Pedagogy: A Community Collection of Teaching Reflections, last modified November 27, 2023, <https://exploringaipedagogy.hcommons.org/2023/11/27/reading-assistants-explainpaper-and-scispace/>

submit written work for AI-based formative feedback, instructional staff should include information about how AI tools may incorporate submissions into their training data unless the **data collection** setting is turned off.

Some AI tools may attempt to revise a student's work unless specifically instructed not to. One way to avoid this is explicitly prompting the tool to provide a bulleted list of suggestions for improvement (this can even be added as a universal **custom instruction**). Evaluating an AI tool's list of suggestions for improvement and deciding which ones to incorporate involves reflecting and thinking critically about our writing as well as the abilities of the AI tool. Students who have language or writing difficulties can ask AI to explain each suggestion for improvement, such as why a grammatical error is an error.¹³ Here is an example of a prompt asking for feedback on a piece of writing.

Please review the attached research paper and make recommendations for improvement. Do not rewrite it, but instead give me a bulleted list of ways that I could improve it. I am especially interested in feedback about:

- the tone- I want the paper to be professional without being overly formal or too casual
- organization- is it broken down into enough sections? What are some paragraphs or sections that need to be divided?
- coherence- are there any inconsistencies or missing parts?
- conciseness- are there sentences that could be cut or made shorter?

Asking ChatGPT for feedback on a piece of writing.

Key Takeaways

AI tools can enhance student learning by:

- acting as a personal tutor;

13. Ethan Mollick, "The Practical Guide to Using AI to Do Stuff," One Useful Thing, last modified January 24, 2023, https://www.oneusefulthing.org/p/the-practical-guide-to-using-ai-to?r=i5f7&utm_campaign=post&utm_medium=web

- carrying out detailed simulations of future workplace tasks;
- producing volumes of sample questions based on a theme or supplied resource, and responding with feedback to answers;
- explaining a topic using analogies or examples tailored to a student's areas of knowledge or interest;
- quizzing language learners on a set of vocabulary words;
- providing assistance with reading and research tasks; and
- reviewing a piece of writing and making suggestions for improvement.

In all cases, AI tools can make errors. Students engaging with AI tools need enough subject-matter knowledge to recognize AI **hallucinations**, and need to know how to fact-check AI output.

Exercises

- Reflect on ways that students in your courses could use AI to enhance their studying and learning. Which methods would you be most likely to recommend? What would you want students to know about AI tools before they dive in?
- Consider ways that AI tools can assist with reading, research, and writing. How can students use AI tools in ways that help to develop their reading and writing abilities? What is the role of educators in ensuring that students use AI tools responsibly in the reading and writing process?

7. Writing and Refining Prompts

How can users interact with AI tools effectively?

This chapter explores:

- three strategies for supplying an AI tool with an initial prompt;
- adapting AI output for professional use through reprompting and human editing;
- how tone and language affects AI output;
- ways to prompt AI tools to write in your voice.

Three Strategies for Writing Effective Prompts

Several different strategies can be employed for prompting AI tools, including:

- the One Big Prompt strategy—writing a detailed initial prompt, trying to include all the information that the tool will need;
- prompt chaining—using an iterative prompting strategy, in which the user asks the AI tool to complete smaller parts of a task, waiting for instructions after each one; and
- question-and-answer prompting—supplying the tool with an initial prompt, and having it ask follow-up questions until it has enough input.

The One Big Prompt Strategy

Some users may find it easiest to write one prompt in which they supply an AI tool with all the information it needs to complete a task. Adding detail is essential; without adequate detail, AI tools will make assumptions about what the user is looking for. Several frameworks have been proposed for what needs to be included in a prompt. In the book *The AI Classroom*, Fitzpatrick, Fox, and Weinstein suggest the PREP framework, which stands for:

Prompt: Give the AI tool a general instruction, such as: *Write three sample dialogues between two subcontractors who both need to work in the same area of a building at the same time.*

Role: Explain the perspective the AI tool should take, so that it has information about purpose of the output. For example: *You are an instructor at a polytechnic teaching construction electrician apprentices about communication and working through difficulties on the job.*

Explicit Instructions: This includes specific details about what the AI tool should do, which could look like: *The subcontractors are a plumber and an electrician who work at different companies. They have never met before. Dialogue 1 should demonstrate poor use of communication, negotiation, and collaboration skills. Dialogue 2 should demonstrate*

satisfactory use of communication, negotiation, and collaboration skills. Dialogue 3 should demonstrate excellent use of communication, negotiation, and collaboration skills.

Precise Parameters: Define limitations for the AI output, like the length, tone, or language level.¹ For example: Each dialogue should be 120-150 words long and should represent the type of language used in building trades workplaces in Canada.

Click the following screenshot to see how ChatGPT responds to the One Big Prompt strategy and the PREP framework.

You are an instructor at a polytechnic, teaching student apprentices about communication and working through difficulties on the job. Write three sample dialogues between two subcontractors who both need to work in the same area of a building at the same time. The subcontractors are a plumber and an electrician who work at different companies. They have never met before. Dialogue 1 should demonstrate poor use of communication, negotiation and collaboration skills. Dialogue 2 should demonstrate satisfactory use of communication, negotiation and collaboration skills, and dialogue 3 should demonstrate excellent use of communication, negotiation and collaboration skills. Each dialogue should be 120-150 words long and should represent the type of language used in building trades workplaces in Canada.



Dialogue 1: Poor Communication, Negotiation, and Collaboration

Electrician: "Hey, I need to work here. You're in my way."

Plumber: "Too bad, I was here first. Find somewhere else to work."

Prompting ChatGPT with the One Big Prompt strategy and the PREP framework.

Alternatives to PREP include RACEF (Role, Action, Context, Example, Format)² and Role, Task, Requirements, Instructions.³

1. Daniel Fitzpatrick, Amanda Fox, and Brad Weinstein, *The AI Classroom: The Ultimate Guide to Artificial Intelligence in Education*, (Beech Grove, IN, TeacherGoals Publishing, 2023): 91-95.
2. CampGPT, "Open Prompt Book," Crowded Learning, last modified November 1, 2023, <https://edtech.worlded.org/wp-content/uploads/2023/07/campgpt-prompt-book-2-compressed.pdf>
3. Danny Liu, "Prompt Engineering for Educators—Making Generative AI Work for You," University of Sydney, last modified April 27, 2023, <https://educational-innovation.sydney.edu.au/teaching@sydney/prompt-engineering-for-educators-making-generative-ai-work-for-you/>.

Initial prompts become even more effective when the user supplies an example. In the above case, this could be a similar set of dialogues that the instructor developed, or the first dialogue in the series.

AI tools may or may not have information about specific standards, frameworks, jargon, and acronyms.⁴ It's likely that they will have knowledge of widely used standards, frameworks, and language, but not those that are more obscure or local. To use the example of building codes, as of early 2024, ChatGPT was familiar with the Manitoba Building Code but not the building code of the city of Flin Flon, Manitoba. Users can query an AI tool about its level of knowledge on specific language or standards before crafting a prompt. When an AI tool is not familiar with a particular term or set of standards, users can supply this information via the chat or an attachment.

Prompt Chaining

Prompt chaining involves supplying an initial prompt, including the scenario and role of the AI tool, along with an initial instruction and a direction to stop and wait for further instruction after the initial output. This can be useful in situations where AI output will have multiple components that build on each other, since it allows users to refine the first set of output before moving forward.

See the following screenshot for an example of an instructor starting a prompt chain to produce questions for a quiz, and click the image to view the full conversation.

You are an instructor in a Workplace Health and Safety micro-credential course. Your task is to come up with a 12-question quiz about the WHMIS 2015 guidelines. First, I need three true/false questions. Please come up with a list of five to ten true/false questions, and I'll choose three of them.



Sure, I can help with that. Here's a list of true/false questions related to WHMIS 2015 (Workplace Hazardous Materials Information System) guidelines:

1. **True/False:** WHMIS 2015 is only applicable to chemical manufacturers and not required in workplaces where chemicals are only used, not produced.
2. **True/False:** In WHMIS 2015, Safety Data Sheets (SDSs) have 16 sections and must be available in the workplace for all hazardous products.

The start of an interaction with ChatGPT to produce a WHMIS quiz, using prompt chaining.

4. CampGPT, "Open Prompt Book," Crowded Learning, last modified November 1, 2023, <https://edtech.worlded.org/wp-content/uploads/2023/07/campgpt-prompt-book-2-compressed.pdf>.

Question-and-Answer Prompting

Question-and-answer prompting involves explaining an overall task to an AI tool and requesting that it ask questions until it has enough information to produce the desired output. This tactic might be useful when a lot of information is needed in a prompt, the user isn't sure what information is needed, or the user is worried about leaving out key details.

The following image shows the beginning of an interaction with ChatGPT using question-and-answer prompting. Click on the image to read the full conversation, including the remaining questions and ChatGPT's output.

You are a college instructor and you need to write an email to a student and their department chair about attendance concerns. Before writing the email, please ask me as many questions as you need to so that you have enough information. Please ask the questions one at a time.



Certainly! To begin, could you tell me the name of the course and the specific attendance issue with the student?

WOOD-1033 Woodworking Trends. The student has missed 3 out of 7 classes (weeks 2, 5, 7)



Thank you for the information. Next, could you tell me if there is a specific attendance policy for WOOD-1033 Woodworking Trends, such as how many classes can be missed before it becomes a concern?

Missing three classes is pretty much the maximum for the term, unless there is an approved absence.



Understood. Have you had any previous communication with this student regarding their attendance, or is this the first formal contact on this issue?

Prompting ChatGPT using question-and-answer prompting.

Adapting AI Output for Professional Use

In most cases, content produced by AI tools needs adapting before it can be used for its intended purpose. It may contain unwanted content, lack sufficient detail, be too general or vague, be overly repetitive, or sound wholly unlike the user's voice. Users have a few options for refining AI output:

- use reprompting strategies to ask the AI tool to make changes to the content until the output is suitable;
- take the initial output and refine it manually; or
- use a combined approach, involving some reprompting followed by manual refinement.

In most situations, the combined approach of reprompting and manual refinement is most effective. Reprompting is particularly useful for broad edits, such as making the output more concise or changing the formality of the language used. However, it can be less efficient for specific minor adjustments, like changing a single word in a sentence. Ultimately, the decision of when to transition from reprompting to manual editing depends on the user's judgment of what is most efficient for their needs.

Reprompting

The following table outlines a number of ways to reprompt an AI tool for a piece of written work, along with sample prompts:

Reason	Sample Prompts
Make the output more concise	• Reduce the word count by 25%. • Remove the intro paragraph and replace it with a single opening sentence.
Change the level of language or content complexity	• Simplify the language so that it will be easy to understand for students with IELTS reading level 4 to 4.5. • Adapt the section on machine learning so that a 12-year-old can understand it. • Eliminate the basic explanations of coding principles—this document is for students in their final term of a web development diploma.
Change the tone	• Make the email more direct and firm, yet still polite and professional. • Rewrite it to be more funny, light, and casual.
Avoid repetition	• Avoid sharing the same ideas in the first and last paragraphs.
Add or remove specific content	• Please add these two instructions: participants should use the breakout room chat if they have a question for the facilitators, and participants should watch the breakout room chat for further instructions. • Take out the sentences about safety precautions.
Expand one part	• Expand the section on conflict resolution. Add step-by-step instructions on how to de-escalate a situation involving an irate guest.
Change one part	• Instead of the example about the dangers of distracted driving, use an example about the dangers of fatigued driving.
Generate more content	• Out of the ten project topics, #1, #6, and #7 are the best for this course, because they are achievable in a six-week project and closely connected to the real-world work of mechanical engineering technology graduates. Could you generate more project topics like those?

Once reprompting is no longer effective, AI output can be transferred to another application for manual refinement.

Tone and Language in Prompts

AI tools model the tone of a user's prompts in their output,⁵ and even make content choices based on it. Compare these three prompts and the resulting invitations written by ChatGPT (click any prompt to view the full conversation, login required):

5. Mark Marino and Jeremy Douglass. "Tell Me Without Telling Me," Exploring AI Pedagogy: A Community Collection of Teaching Reflections, last modified November 27, 2023, <https://exploringaipedagogy.hcommons.org/2023/11/27/tell-me-without-telling-me/>.

Prompt

I'm gonna throw a party at my place tmr and need to hit up my crew. Can u write an invitation to text to my friends

Output

🎉 Hey Team Awesome! 🎉

Guess what? It's party time at my place tomorrow! 🏡 🎊
I'm planning an epic night filled with music, laughter, and some unforgettable memories. 🎵 🌟
Here are the deets:

- 📅 **Date:** [Tomorrow's Date]
- 🕒 **Time:** 7 PM till the stars go home
- 📍 **Location:** My place (you know where the magic happens!)
- 🍷 **Food & Drinks:** Got some snacks and drinks, but feel free to bring your favorite dish or beverage!
- 🎵 **Music:** DJ [Your Name] on the deck, but I'm taking song requests now!

Dress code? Come as you are or as your favorite movie character – let's make it fun! 🎬 🌟
Let's make this a night to remember! Hit me up if you're in and let me know if you're bringing anyone along. 📱 🍷
Can't wait to see you all! Let's rock this! 🎸 🥳

Hey there, friends! 🎉

I'm thrilled to announce I'm throwing a party at my place and you're all invited! 🏡 🌟

📅 **Date:** [Tomorrow's Date]

🕒 **Time:** 7:00 PM onwards

📍 **Location:** [Your Address]

Get ready for an evening full of fun, music, and great company! 🎵 🎊 🍷

There will be plenty of snacks and drinks to enjoy, but feel free to bring your favorite dish or beverage to share. 🍷 🥳

Please RSVP by tonight so I can make sure we have enough for everyone. Can't wait to see you all and make some unforgettable memories! 💎

Cheers,

[Your Name]

🎉 **You're Invited!** 🎉

Hey there! I'm thrilled to invite you to a special party at my place tomorrow! It's going to be an evening filled with fun, laughter, and great memories. Here are the details:

📍 **Location:** [Your Address]

🕒 **Time:** 7:00 PM onwards

🎵 **Music, Games & More:** Get ready for some awesome tunes, exciting games, and lots of surprises!

🍷 **Food & Drinks:** Delicious snacks and drinks will be served.

Dress casually and bring your best party spirit! 🎉 🍷

Please let me know if you can make it. I'm looking forward to seeing you and having a blast together!

Cheers, [Your Name]

I am hosting a party at my home tomorrow. Could you please write an invitation to text to my friends?

Notice how the tone of each invitation matches its prompt. Beyond that, ChatGPT has attempted to tailor content choices to the language used. For example, the first prompt is written in casual language with some slang indicative of a young person, and the invite uses nineteen emojis and mentions that the party will go all night. The third prompt is written in more formal language, and the corresponding invite is the only one of the three that doesn't suggest that guests bring snacks and drinks.

Prompting AI Output to Imitate Your Voice

Instructional staff may want AI tools to produce content in their voice so that it is easier to adapt for use in courses or correspondence. One simple way to make an AI tool sound like the user's voice is to submit a writing sample along with the prompt and ask the AI tool to write in the same style. A writing sample can be included in the chat window or as an attachment. The more information available to the tool, the more accurately the AI tool will be able to replicate the user's voice. For users who plan to use AI extensively for content drafting, it may be worthwhile to provide an AI tool with a selection of writing samples, ask it to describe the writing style, and use that description when prompting the AI tool to produce content.⁶

Take a look at how ChatGPT 4.0 summarizes this OER's principal author's writing style after reviewing an early draft of the [Using AI to Enhance Student Learning](#) section. Click the image to read the full conversation.



The author's writing style in this sample is structured, informative, and focused on educational applications of AI. It employs a clear and expository tone, adeptly balancing technical detail with accessibility to cater to a general audience. The writing is organized with distinct headings and subheadings, facilitating easy navigation through various topics. Notably, it incorporates specific examples and references to real-world applications, enhancing credibility and practical understanding. The inclusion of interactive elements suggests a design for digital media, aiming to engage readers actively. While primarily advocating for AI's educational use, the author maintains a balanced perspective by acknowledging potential limitations. This style is characteristic of instructional materials, aiming to inform and guide readers about the practical implementation of AI in learning environments.

ChatGPT's summary of this OER author's writing style.

Of course, the above described writing style is not appropriate for all types of documents. It may be useful to develop a set of paragraphs describing intended writing style for different purposes. To contrast, here is how ChatGPT describes the same writer's style after reviewing a set of emails they wrote to students.

6. Ethan Mollick and Lilach Mollick, "Practical AI for Instructors and Students Part 3: Prompting AI," Youtube video, 11:41, accessed February 7, 2024, <https://www.youtube.com/watch?v=wbGKfAPIZVA>.



The emails in the document exhibit a formal and structured writing style, characteristic of academic or professional communication. They begin with a polite salutation, followed by a clear and direct statement of the email's purpose. The language is precise, avoiding colloquialisms, and the tone is consistently respectful and considerate, even when addressing issues of concern or underperformance. The emails are well-organized, with each paragraph focusing on a specific point or request, and they often include specific instructions or deadlines. They typically conclude with an offer of assistance, a thank you, or a forward-looking statement, followed by a formal closing. This style reflects a balance between professionalism and approachability, maintaining clarity and formality while also offering support and guidance.

ChatGPT's description of a writing style for performance-related emails to students.

These descriptions can be saved in a file for use as needed, or could be included as **custom instructions**. Custom instructions allow users to set universal instructions that apply whenever they are interacting with an AI tool. In ChatGPT, they can be set by clicking on the user's initials in the top right corner, then 'Customize ChatGPT'. A custom instruction including descriptions of a writing style may read "when I ask you to write an email to a student, the writing style should be (insert paragraph). When I ask you to write an email to a department chair, the writing style should be (insert paragraph)."

Key Takeaways

- Several styles of prompting can be effective, including the One Big Prompt strategy, prompt chaining, or question-and-answer prompting.
- AI tools perform better with more information. This may include giving examples of what the user is looking for, demonstrations of the user's writing style, or information about specific structures, frameworks, jargon, or acronyms.
- AI tool initial output are likely not ready for use in a professional setting and will need a combination of reprompting and manual refinement.
- AI tools will evaluate the language used in your prompt to decide how to produce content for you.
- Custom instructions can be set that show an AI tool how you'd like it to produce content.

Exercises

- Experiment with prompting an AI tool using the One Big Prompt strategy, prompt chaining, and question-and-answer prompting. Consider which strategy is most effective and efficient for your purposes.
- Review a selection of unedited AI output. In what ways do they need to be modified before being ready to use in your work? Consider whether it would be more efficient to use reprompting or human editing to refine them.
- Submit a selection of your writing to an AI tool and ask it to describe your writing style in a concise paragraph. Save this description, and consider using it as a **custom instruction**, or when prompting an AI tool to produce content in your voice.

PART IV

PRACTICAL USES FOR PREPARATORY AND
ADMINISTRATIVE WORK

8. Course Content Development

How can AI tools support course development?

This chapter explores:

- how AI tools can assist with the course planning process;
- ways that AI tools can generate multimedia content for course LMS or other materials.

Course Planning

It's clear that AI tools cannot yet create a ready-to-use course that can be dragged and dropped into an LMS. Their strength in this moment lies in generating ideas for course structures, themes, topics, and learning outcomes, which can be reviewed and adapted by developers. One instructional designer at RRC Polytech has found that AI tools are beneficial in generating initial ideas for course development, like an overall module structure. This has streamlined the consultation process, saving time for instructors and subject matter experts, for whom course development is not their main responsibility at work.¹

Leon Furze, an educator completing a PhD on Generative AI in writing education, supports the approach of using AI “as a collaborative tool, rather than outsourcing the entire process to the model.” Furze suggests that AI tools take the role of idea generation, after which educators collaboratively transform suitable ideas into course material.²

Educators need to carefully consider which aspects of course development cannot be offloaded to an AI tool. This might include making a final decision on a course textbook, the precise wording of learning outcomes, or course policies about allowed use of AI tools.

The following table illustrates more ways that AI tools can be used in course development. As always, instructional staff should consult institutional and departmental policies prior to using an AI tool in course development or sharing internal information like learning outcomes with an AI tool.

1. Anonymous focus group participant, November 2023.

2. Leon Furze, “Practical Strategies for ChatGPT in education,” last modified January 23, 2023, <https://leonfurze.com/2023/01/23/practical-strategies-for-chatgpt-in-education/>.

Supplied Input	Requested Output
Description of summative assessment.	Suggestions for formative assessments.
List of assignments and class timetable.	Proposed table of due dates.
Completed unit plan.	A critique—generally or for completeness, organization, or alignment with learning outcomes.
Completed unit plan.	List of required resources and materials. ³
Course description and learning outcomes.	Draft of a welcome email to students
Course description and learning outcomes.	Suggested set of assessments
Course description and learning outcomes.	Suggested set of topics and sub-topics to cover

3. Furze, “Practical Strategies for ChatGPT in Education.”

The following image shows a user prompting ChatGPT to generate suggested course topics and assignments based on a course description and learning outcomes.⁴ A link is not available for this interaction with ChatGPT, since it was completed with the memory and **data collection** settings turned off.

To view the full sample user interaction with ChatGPT, please select the image below to expand it.



You



Modern Controversies in Healthcare.do...

Document

The attached document contains a course description and learning outcomes for the course Modern Controversies in Healthcare, an elective for nursing students at a polytechnic in Canada. Please generate a list of ten suggested topics for the 2024-2025 school year. Each topic must be a current medical controversy that nurses in Canada may encounter during their work. Next, suggest an assessment plan for the course.



ChatGPT

Based on the course description and learning outcomes for the "Modern Controversies in Healthcare" elective at a polytechnic in Canada, here are ten suggested topics for the 2024-2025 school year. Each topic is a current medical controversy that Canadian nurses may encounter in their work:

1. **Ethical Implications of Artificial Intelligence in Healthcare:** Explore the use of AI for diagnostics and treatment, addressing concerns about bias, privacy, and the potential replacement of human judgment.
2. **Mandatory Vaccinations for Healthcare Workers:** Discuss the ethical and practical aspects of mandatory vaccinations, balancing public health needs with personal choice and bodily

Prompting ChatGPT to suggest topics and assignments.

Producing Multimedia Content with AI

AI tools can be used to produce custom images or videos for course LMS or presentations, or turn text or audio content

4. Thank you to Meagen Chorney, RRC Polytech nursing instructor, for assistance in creating this example.

into an engaging format like a comic or animation. See the [Generative AI Tools for Education](#) chapter for information about a few tools that can produce multimedia content for courses.

Key Takeaways

- AI tools can help with course development by supplying initial ideas and frameworks.
- AI tools can use limited information about a course to produce suggested learning outcomes, assignments, schedules, and more.

Exercises

- Experiment with submitting information about a course or module to an AI tool and asking for a suggested module, assessment, or lesson plan. Consider the strengths and weaknesses of this plan, and what would need to be refined in order to implement it.

9. Lesson Planning

How can AI tools help produce engaging lesson plans and class meeting activities?

This chapter explores:

- how to prompt an AI tool to produce a draft lesson plan, and how to adapt it for classroom use;
- how to use AI tools to brainstorm classroom activities.

Drafting Lesson Plans

The first steps in any writing task can be the most difficult and time consuming. AI tools can write a first draft of a lesson plan, which can be made classroom-ready through a combination of reprompting and human editing. Here is an example of a prompt for generating a lesson plan first draft:

Imagine that you are an instructor for the course Impact of Climate Change on Communities, an elective course in the School of Indigenous Education at a polytechnic in Canada. Create a draft module plan that addresses the learning outcome 'discuss how land based ecological knowledge and scientific principles can mitigate the impact of climate change on communities'. This module should take up 6 hours of class time. It will be presented during the fifth week of the course.

First, begin by drafting an outline for the module.



Module 5: Integrating Land-Based Ecological Knowledge and Scientific Principles to Mitigate Climate Change Impacts

Total Duration: 6 Hours

1. Introduction to Land-Based Ecological Knowledge (1 Hour)

- Definition and significance of land-based ecological knowledge in indigenous communities.
- Historical perspective and evolution of land-based practices.
- The relationship between indigenous knowledge and climate change mitigation.

2. Scientific Principles of Climate Change (1 Hour)

- An overview of the key scientific principles underlying climate change.
- How climate change impacts different ecosystems.

Prompting ChatGPT to produce a draft lesson plan.

One RRC Polytech communication instructor, who used ChatGPT to generate a first-draft lesson plan about asking for clarification in a culinary workplace, found that the tool was useful for generating ideas and structure, but significant reworking was needed to make it useable for class.¹ Carefully editing and refining AI output is critical to ensure that the lesson plans produced are as good or better than the instructor could create without the use of AI tools.

Consider [ChatGPT's response](#) to the prompt in the screenshot above. Some instructors may wish to start the class with an intro activity that raises student interest, turn the interactive lecture into a facilitated discovery activity, or have the guest speaker visit prior to the application activities. One or two rounds of reprompting followed by the instructor's own revisions could turn that initial output into a usable lesson plan.

For those who plan to use an AI tool to produce multiple lesson plans, adding **custom instructions** could save time. One example of custom instructions might be "Every time I ask for a lesson plan, make sure that each hour of class time has a ten-minute break, no portion of an activity is longer than twenty minutes, and facilitative teaching and active

1. Anonymous focus group participant, November 2023.

learning strategies are employed whenever possible.” Uploading one or more previous lesson plans with a prompt could also improve the quality of the AI tool’s initial output. For more about reprompting, custom instructions, and adapting AI outputs, please see the [Writing and Refining Prompts](#) chapter.

In addition to speeding up lesson planning, AI tools can make lesson plans more effective. One RRC Polytech instructor has used AI to improve their scaffolding by sharing a lesson plan with an AI tool and asking it for a checklist of foundational skills that students would need for completing a task.² When provided with information about what has already been covered in the course, AI tools can remind instructors to integrate review of previously taught concepts into lesson plans and make recommendations about how to draw connections between different course topics.³

AI tools can also provide suggestions for integrating multiple literacies into a lesson, such as incorporating digital or cultural literacy alongside a core topic,⁴ and can be prompted to check or adapt a lesson plan according to a chosen framework or set of principles, such as [Universal Design for Learning](#). AI tools can also review and critique an existing lesson plan, in general or according to chosen criteria such as accessibility, active learning, or connection to course learning outcomes.

Producing Classroom Activities

Once a lesson plan has been established, AI tools are able to brainstorm ideas for interactive classroom activities, accepting input about topic, audience, style, and other requirements. One RRC Polytech instructor teaching in an education-related program reported that AI tools allowed them to brainstorm activities in new formats when they had been using the same kinds of activities over and over.⁵ See the following screenshot for an example of how to prompt an AI tool to generate classroom activity ideas, and click the image to read the full conversation (ChatGPT login required).

2. Anonymous focus group participant, November 2023.

3. Danny Liu, “Prompt Engineering for Educators—Making Generative AI Work for You,” University of Sydney, last modified April 27, 2023, <https://educational-innovation.sydney.edu.au/teaching@sydney/prompt-engineering-for-educators-making-generative-ai-work-for-you/>.

4. CampGPT, “Open Prompt Book,” Crowded Learning, last modified November 1, 2023, <https://edtech.worlded.org/wp-content/uploads/2023/07/campgpt-prompt-book-2-compressed.pdf>.

5. Anonymous focus group participant, November 2023.

Suggest a few possible classroom activities for the following context:
Course: Carpentry mathematics
Topic: Calculating board footage of lumber needed for a project
Style: Peter Liljedahl's 'Thinking Classrooms' approach
Location: College classroom with whiteboards on three walls



Integrating Peter Liljedahl's 'Thinking Classrooms' approach into a carpentry mathematics course focusing on calculating board footage of lumber can be both engaging and effective. This approach emphasizes active learning, problem-solving, and collaborative thinking. Here are a few classroom activities tailored to this context:

1. **Vertical Non-Permanent Surfaces (VNPS) Problem Solving:** Utilize the whiteboards on the three walls as vertical non-permanent surfaces. Present a real-world carpentry problem that

Prompting ChatGPT for classroom activity ideas.

The above prompt generated eight suggestions, some of which could be usable or adaptable for the classroom. Once an activity is refined, AI tools can be prompted to produce a set of instructions for students, or instructions that a substitute instructor could follow.

In activity planning, the most common reported use of AI tools among RRC Polytech staff is creating or adapting a diverse set of examples, questions, or case study scenarios. The following sections share more information about these topics.

Generating Examples

AI in education researchers Mollick and Mollick note that providing students with a diverse range of examples leads to increased comprehension, recall, critical thinking, and ability to apply new information, and suggest weaving examples into lectures, practice questions, and course materials.⁶ When teaching the same course in different programs, RRC Polytech communication instructor Jacob Carewick has used AI tools to rework an existing set of examples for a new context, noting that AI tools can incorporate jargon and workplace issues from specific industries.⁷ Library and Academic Services Reference Technician Rosemary Woodby reported using AI tools to generate sample project topics for a research-related presentation to a civil engineering geomatics class.⁸

In addition to generating examples that make activities, lessons, and courses more relevant and engaging, AI tools can

6. Ethan Mollick and Lilach Mollick, "Using AI to Implement Effective Teaching Strategies in Classrooms: Five Strategies, Including Prompts," SSRN, last modified March 17, 2023, <https://doi.org/10.2139/ssrn.4391243>.

7. Jacob Carewick, focus group, November 6, 2023.

8. Rosemary Woodby, focus group, November 6, 2023.

help vary a set of examples. This could include asking an AI tool to provide examples from varied perspectives, such as different organizational roles, generations, or backgrounds,⁹ or to provide counterpoints.¹⁰ AI outputs need to be carefully reviewed to ensure that attempts to diversify content don't perpetuate stereotypes, such as placing only males in traditionally male-dominated jobs.

The following screenshot shows one way to prompt an AI tool for a list of examples. Click the image for ChatGPT's response.

Please generate 20 example sentences that each include a preposition followed by a gerund. Use as many different prepositions as possible. Use mostly single-word prepositions, but you could use phrasal prepositions in the last 5 examples. As much as possible, relate the sentences to the theme of employment. They should be written at a language level understandable by students at the Canadian Language Benchmark 5/6 level.



Certainly! Here are 20 example sentences related to the theme of employment, each featuring a preposition followed by a gerund. These sentences are crafted to be understandable for students at the Canadian Language Benchmark 5/6 level:

1. **Before applying** for the job, make sure your resume is updated.
2. He succeeded **in negotiating** a higher salary during his interview.
3. She is interested **in learning** new skills for career advancement.

An ESL instructor prompting ChatGPT for examples.

Generating Questions

AI tools can produce a large number of questions appropriate to a topic and level of knowledge. These might be questions for discussion, a review quiz, or in-class practice activities, and can be based on an AI tool's training data, a web search, or a supplied document. For example, Jacob Carewick and other RRC Polytech instructors have

9. Danny Liu, "Prompt Engineering for Educators—Making Generative AI Work for You," University of Sydney, last modified April 27, 2023, <https://educational-innovation.sydney.edu.au/teaching@sydney/prompt-engineering-for-educators-making-generative-ai-work-for-you/>.

10. Paul R. MacPherson Institute for Leadership, Innovation and Excellence in Teaching, "Generative Artificial Intelligence in Teaching and Learning at McMaster University," McMaster University, last modified 2023, <https://ecampusontario.pressbooks.pub/mcmasterteachgenerativeai/>.

used ChatGPT while preparing for mock job interview activities to produce technical questions outside their areas of expertise.¹¹

See the following image for an example of how to prompt an AI tool to produce a set of questions.¹² Click the image for a ChatGPT's full response and user reprompting to increase the level of difficulty.

Imagine you are a college Medical Laboratory Sciences instructor. Write 10 multiple choice questions at the applied thinking level on the topic of urinalysis. These questions are to help students prepare for the CSMLS Medical Laboratory Technology General Certification Exam.



Certainly! Here are 10 multiple choice questions focused on urinalysis, aimed at an applied thinking level for students preparing for the CSMLS Medical Laboratory Technology General Certification Exam:

1. **A patient's urinalysis report shows a high level of proteins. This could indicate:** a. Dehydration
b. Kidney stones c. Glomerulonephritis d. Overhydration
2. **Upon microscopic examination of a urine sample, you observe numerous red blood cells. What could be the potential cause?** a. Pyelonephritis b. Diabetes mellitus c. Hyperthyroidism d. Cystitis

Prompting ChatGPT to generate practice questions.

Generating Case Studies

AI prompts can also be the starting point for a range of case studies and scenarios. One RRC Polytech instructor has used ChatGPT to brainstorm ideas for communicative scenarios related to culinary employment, and has found them to be more closely connected to the cultural and social context of students' future workplaces than scenarios they had drafted on their own. They engaged students in the process of revising the scenarios, increasing both the utility and relevance of the scenarios and students' understanding of refining AI tool outputs.¹³

AI tools can create a list of potential scenarios or case studies based on a simple prompt. Including a few sample scenarios that have already worked in a course could improve the tool's first output. Once an AI tool has generated a list of scenarios, one technique for follow-up prompting is to indicate which ones from the list work best and why, and to ask for more scenarios that are along the same lines.

11. Jacob Carewick, focus group, November 6, 2023.

12. Thank you to Michele Sykes, RRC Polytech Medical Laboratory Sciences instructor, for helping to create this example.

13. Anonymous focus group participant, November 2023.

The following image shows a sample prompt for generating case study scenarios.¹⁴ Click the image to view the full interaction with ChatGPT, including follow-up prompts.

Imagine you are a college instructor in Early Childhood Education. You need to develop eight different case study scenarios for a small group activity. Each scenario needs to be about a minor issue or concern with a child age 2 to 4 who attends the childcare centre. Each group will be assigned one case study, and will have to come up with possible reasons that the issue is happening (including issues with the space, materials, schedule or transitions) and a strategy for addressing the issue, referencing at least one source from their course readings. To begin, please list at least 12 different potential case study topics, in brief.



Certainly! Here are 12 potential case study topics focusing on minor issues or concerns with children aged 2 to 4 in a childcare center setting:

1. **Difficulty in Sharing Toys:** A 3-year-old child consistently struggles with sharing toys during playtime.

Prompting ChatGPT to generate case study scenarios.

Key Takeaways

- AI tools can produce first drafts of lesson plans that can be adapted for use in class.
- AI tools can generate ideas and instructions for classroom activities.
- AI tools are useful for brainstorming examples, questions, and case studies.

Exercises

14. Thank you to RRC Polytech Early Childhood Education instructor Monica Lytwyn for co-creating this example.

- Consider the lesson plan generated by ChatGPT earlier in this chapter. What changes need to be made to the lesson plan before delivering it? Would reprompting be an efficient way to refine the lesson plan, or should the instructor edit it themselves?
- Experiment with prompting an AI tool to generate case studies, examples, questions, and classroom activities related to your area of instruction. How would you rate the AI tool's outputs? What prompting techniques yield the best results?

10. Assessment and Rubric Development

How can AI tools assist with assessment and rubric development?

This chapter explores how AI tools can:

- assist with creating assessment questions based on supplied prompts or materials;
- generate project topics and assessment scenarios;
- help to develop rubrics.

Developing Assessments

AI tools can help to develop assessments that are closely connected to learning outcomes, performance standards, and industry needs. Prior to using AI tools to help with any assessment development, ensure that institutional and departmental policy allows it. As well, instructors should consider consulting with educational developers and instructional designers at their institution to ensure that assessments are in line with institutional policies and practices.

Creating Questions

The [Using AI to Enhance Student Learning](#) chapter explores in detail how students can use AI tools to generate practice questions. In the same way, instructors can use AI tools to generate potential questions for assessments. Prompting AI with information about the course, program, level, and topics covered can yield a list of questions that may be reviewed and adapted for assessment. Another approach is to share a previous set of exam questions with an AI tool, and ask it to produce a new set of questions in order to vary assessments from term to term. Instructors should consult institutional and departmental policies before uploading internal information to an AI tool, and should consider uploading with **data collection** turned off.

AI tools can also be prompted to generate questions based on a supplied text. RRC Polytech aerospace manufacturing technician instructor Chris Marek has engaged AI tools to create a bank of assessment questions by submitting a passage from an aviation manual and information about the course level and types of questions needed. Marek reported that questions produced were largely appropriate to the context and just needed reviewing and refining.¹

Instructors should consult copyright laws before uploading any protected content to an AI tool. [Read more about AI tools and copyright considerations.](#)

1. Chris Marek, focus group, November 6, 2023.

Alternate Assessment Formats

For instructors looking to diversify their assessment approach, AI tools can generate ideas for alternate assessment types or formats. As input, AI tools can accept an existing assessment or a course description and set of learning outcomes (if allowed by institutional and departmental policies). AI tools can also be prompted to produce assessment ideas related to a particular pedagogical approach, like problem-based or inquiry-based learning.²

Scenarios, Case Studies, and Project Topics

AI tools can be used to create detailed and varied scenario-based assessments, and to present them in engaging and novel ways, such as a detailed letter from a client requesting services.³ Numerous RRC Polytech instructors have employed AI tools to generate a pool of possible group project topics on a given course and theme.⁴ In addition to basics about the course, level, and topic, sharing examples of previous project topics can lead to better output from an AI tool. Here is an example of a RRC Polytech School of Indigenous Education instructor prompting an AI tool for potential project topics. Click the image to view the full conversation.

2. Paul R. MacPherson Institute for Leadership, Innovation and Excellence in Teaching, “Generative Artificial Intelligence in Teaching and Learning at McMaster University,” McMaster University, last modified 2023, <https://ecampusontario.pressbooks.pub/mcmasterteachgenerativeai/>.

3. Chrissi Nerantzi, Sandra Abegglen, Marianna Karatsiori, and Antonio Martínez-Arboleda, “101 Creative Ideas to Use AI in Education, A Crowdsourced Collection,” Zenodo, last modified 2023, <https://doi.org/10.5281/zenodo.8072950>.

4. Jacob Carewick, focus group, November 6, 2023; Anonymous focus group participants, November 2023.

Imagine that you are an instructor for the college course Reconciling our Economic Futures, which about economic reconciliation between Indigenous and non-Indigenous people in Canada. The course has a major assignment that involves using the PATH process to make a plan for implementing a project. Each assignment topic is a potential change that will further economic reconciliation in Manitoba or Canada. Students can choose their own topic or select from a list. Please suggest at least 12 different potential project topics.



Certainly! As an instructor for a course focused on economic reconciliation between Indigenous and non-Indigenous people in Canada, the assignment topics should aim to foster understanding, collaboration, and practical solutions. The PATH (Planning Alternative Tomorrows with Hope) process is an ideal framework for students to develop these projects. Here are 12 potential project topics for your course:

1. **Cultural Tourism Development:** Students could create a plan to develop cultural tourism that respects and highlights Indigenous heritage and culture, offering economic benefits and promoting cultural understanding.

Prompting ChatGPT to generate potential project topics.

Even with a detailed prompt, AI tools will likely suggest some project topics that could work well, and others that miss the mark. One idea for reprompting is to evaluate the first set of project topics generated by an AI tool, let it know which ones are most useful and why, and ask for more that are similar.

Developing Rubrics

Creating rubrics is a time-consuming task for instructors and course developers. AI tools—both all-purpose tools and specialized ones like [ClickUp](#)—are well-suited to assist in the process of rubric development. If a set of rubric criteria are already established, an AI tool can be prompted with a course description, task description, and the list of criteria and levels of performance, and can produce a first draft of performance descriptions, which is often the most labour-intensive part of building a rubric.

Another approach is to supply an AI tool with a description of the course, the task and the learning outcomes that need to be addressed (if allowed by institutional and departmental policy), and the desired number of criteria and levels of performance. The AI tool can then be prompted to make suggestions for both criteria and descriptions. After AI tools have been reprompted for bulk editing, the rubric can be pasted into a Word document for further refining, or exported in a variety of file formats.

In the Winter 2024 term, one course in RRC Polytech's Teaching for Learning in Applied Education program, a three-year program taken by instructors transitioning from industry to teaching roles, began allowing students to use AI tools

to assist in a rubric-development assignment.⁵ Incorporating AI into rubric-creation assignments for new instructors ensures that they get an opportunity to experiment with AI tools and receive expert feedback on the suitability of their AI-assisted rubric.

Here is an example of a prompt used to generate a rubric. Click the image to read the full conversation. By the end of the conversation, the rubric is still not ready for student use, but is at the point where manual refining will be more efficient than further reprompting.

Please help me make a rubric for a mock job interview for a college-level communication class. The rubric needs to be in table form with six or seven criteria listed in the left column. Along the top, there should be four more columns with point values of 3, 2, 1, 0. Here are some related learning outcomes in the course.

2.3. Adjust context and tone of job search ready communication to a variety of purpose and audience needs.

2.4. Tailor responses to common interview question types/styles to personal experience and skills using an interview skills model (such as, the situation, task, action, result (STAR) model).

Prompting ChatGPT to generate a rubric.

Below is ChatGPT's first attempt at a rubric, based on the supplied prompt. Click on the hotspots to view more information about some potential areas for reprompting and refinement. [An accessible version of this content](#) is also available.



An interactive H5P element has been excluded from this version of the text. You can view it online here: <https://pressbooks.openedmb.ca/aiineducation/?p=1200#h5p-13>

Some issues with this rubric are well-suited to reprompting, such as asking ChatGPT to eliminate negative language in the rubric. Other issues may be more nuanced and may be quicker to refine manually, such as changing the adjectives in the header row.

For those who plan to develop multiple rubrics, adding some guidance to your **custom instructions** may be a time

5. Anonymous focus group participant, November 2023.

saver. An example custom instruction is: *Every time I ask you to create a rubric, it should have four performance levels listed in the top row. Those performance levels should read (from left to right): Developed (3 points), Developing (2 points), Beginning (1 point), Not yet (0 points). Please avoid negative language in rubric descriptions. My preferred adjective for the Developed category is consistently.*

Key Takeaways

- AI tools can assist with producing assessment questions, topics, and scenarios.
- AI tools can produce detailed rubrics.

Exercises

- Try using an AI tool to generate a series of practice or test questions on a topic related to your area of instruction. Considering the level and content of the questions, what kind of reprompting or editing is needed to make them suitable for use?
- Ask an AI tool to produce a list of suggested project topics or case studies. Reflect on the appropriateness of the output, and consider what strategies could be employed to improve it, including refining prompts or providing an example.
- Experiment with using an AI tool to generate a rubric. Considering the reprompting and editing needed, reflect on whether the AI-assisted rubric surpasses traditional methods in terms of quality and production efficiency.

Rubric Image Description

The table below shows ChatGPT's first attempt at generating a rubric for a mock job interview assignment. Following the rubric is a list of bullet points that outline some potential changes that instructional staff might like to make to the rubric before using it in their course.

Criteria	3 Points (Excellent)	2 Points (Good)	1 Point (Fair)	0 Points (Poor)
Understanding of the Position	Demonstrates an excellent understanding of the job requirements and company.	Shows a good understanding but may miss some details.	Shows a basic understanding, with several important aspects missing.	Shows no understanding of the job or company.
Communication Skills	Communicates ideas clearly and confidently, maintaining professionalism.	Communicates well but may lack clarity or confidence in some responses.	Communication is somewhat clear but lacks confidence and professionalism.	Poor communication skills; lacks clarity and professionalism.
Response to Common Interview Questions	Provides detailed, relevant responses using the STAR model effectively.	Responses are relevant but may not fully utilize the STAR model.	Responses lack detail or clear structure; limited use of STAR model.	Fails to provide relevant or structured responses; does not use STAR model.
Context and Tone Adjustment	Excellently adjusts context and tone to suit different questions and scenarios.	Generally adjusts context and tone appropriately but with minor inconsistencies.	Struggles to adjust context and tone, leading to inappropriate responses in some cases.	Unable to adjust context and tone; responses are consistently inappropriate.
Personal Experience and Skills Integration	Integrates personal experience and skills seamlessly into responses.	Integrates personal experience and skills but with some lack of relevance or clarity.	Attempts to integrate experience and skills, but it's poorly executed or irrelevant.	Does not integrate personal experience or skills into responses.
Overall Impression and Professionalism	Creates an excellent overall impression; highly professional demeanor.	Good overall impression; generally professional with minor lapses.	Fair overall impression; shows a lack of professionalism in several aspects.	Poor overall impression; unprofessional demeanor throughout.

Some Potential Issues with This Rubric

- In the first row, instructors may wish to use alternate adjectives that are more descriptive, avoid negative language, and are consistent with other course or department rubrics. Many rubrics list the adjectives first, with point values in parentheses.
- The Communication Skills criterion may be too broad, considering the rubric is for a communication course. Rubric developers may wish to get more specific or split it into multiple criteria.
- The Response to Common Interview Questions row mentions using the STAR model, but the associated learning outcome requires students to use a model *such as* STAR. Rubric descriptions need to indicate that STAR is not the only acceptable response model.
- The Context and Tone Adjustment criterion may be confusing. Students in this course will be aware of what it means to adjust tone but may not understand what it means to adjust context. Another word choice could increase clarity, like “adjusts tone to the context and to suit different questions and scenarios.”
- The rubric contains some negative language, like “it’s poorly executed or irrelevant.” Rubric developers might wish to choose more positive language, even when pointing out weaknesses in student performance.
- Unless a holistic category is desired, the Overall Impression and Professionalism criterion could be more specific. Since tone is already covered, as well as professionalism and the student’s communication skills, perhaps this category could be about non-verbal communication like body language, gestures, facial expressions, and eye contact.

[Return to the Developing Rubrics Section](#)

II. Feedback and Grading

How can AI tools help with feedback and grading?

This chapter explores:

- using AI tools as a source of formative feedback;
- how AI tools can assist with summative feedback;
- fun ways to use AI to make feedback more engaging.

Formative Assessment

As explored in the [Using AI to Enhance Student Learning](#) chapter, AI tools can be used by students as a means to get formative feedback on draft work—for example, by uploading a draft to an AI tool and asking for a targeted list of suggestions for improvement, or by engaging in a practice quiz activity with an AI tool. When institutional and departmental policies allow, instructional staff may wish to try in-class or homework activities in which students engage with AI tools in order to get formative feedback. Prior to such activities, students need to be informed about potential for errors, privacy concerns, and institutional policies surrounding the sharing of course materials.

Some institutions, like McMaster University, are allowing and encouraging instructors to also use AI tools to produce formative feedback on student work, providing that students are informed in the course outline and in class, and **data collection** is turned off.¹ Instructional staff who wish to use AI tools to produce formative feedback for their courses should ensure that institutional policies around use of AI tools and sharing of student information are followed.

Some potential applications for AI-based formative feedback are:

- submitting written work and a rubric or learning outcomes and asking for suggestions for improvement;
- analyzing a transcript of an online meeting and asking AI to generate individualized engagement feedback;²
- having an AI tool analyze student-produced code and offer suggestions.

1. Paul R. MacPherson Institute for Leadership, Innovation and Excellence in Teaching, “Generative Artificial Intelligence in Teaching and Learning at McMaster University,” McMaster University, last modified 2023, <https://ecampusontario.pressbooks.pub/mcmasterteachgenerativeai/>.

2. John Spencer, “Sal Khan on A.I. and Personalized Learning,” John Spencer, last modified August 8, 2023, <https://spencerauthor.com/sal-khan/>.

Summative Assessment

Instructional staff may be hesitant or unable to use AI tools as part of summative assessment grading and feedback. This may be due to a lack of institutional approval, worries about accuracy and bias in AI output, reputation and credibility concerns, and privacy issues. One 2024 survey of academics indicated enthusiasm over using AI tools to grade work that has simple correct and incorrect answers, but skepticism about the ability of AI tools to grade work involving creativity and critical thinking.³ Even if institutional policy allowed AI-based grading, instructors would need to carefully consider whether or not to rely on AI tools for this important part of their work, considering the potential impacts that it could have on privacy, accuracy, fairness, and their understanding of students' achievement levels.

AI tools can assist in drafting summative assessment feedback. One way to improve efficiency is for the grader to take notes in their preferred style while reviewing student work, then have an AI tool turn it into a cohesive paragraph or set of bullet points.⁴ Voice-to-text tools like [AudioPen](#) can also be used to save time while drafting feedback.

AI tools can also review a document containing every student's individual feedback on an assignment and search it for trends, suggesting areas for further skill development or drafting an email to the class. Click the image below for an example of how ChatGPT responded to a request for feedback analysis.



marking cut and paste resume.docx

Document

Attached is a document containing feedback to a group of students on their targeted resume submissions. Please review it, searching for trends. Provide me with a list of suggestions for further study in class, a draft of a posting I can make to the class LMS with group feedback, and an outline for discussing the assignment next class.

Prompting ChatGPT to analyze feedback and make suggestions for further study and communication.

Alternative Forms of Feedback

Instructors may find that some students check their grades but don't fully evaluate written feedback. AI tools can

3. Paul Breen, "Academics Wouldn't Drink to the Handover of Marking to AI," Times Higher Education, last modified January 27, 2024, <https://www.timeshighereducation.com/blog/academics-wouldnt-drink-handover-marking-ai>.

4. Danny Liu, "Prompt Engineering for Educators—Making Generative AI Work for You," University of Sydney, last modified April 27 2023, <https://educational-innovation.sydney.edu.au/teaching@sydney/prompt-engineering-for-educators-making-generative-ai-work-for-you/>.

be used to increase student engagement with written feedback by providing a creative alternative that supplements written feedback. University of Leeds Professor Chrissi Nerantzi and colleagues suggest using AI tools to convert instructor feedback to poetry in order to increase student interest.⁵ Other options could include song lyrics, a story, or a monologue in a particular style. Since many students prefer feedback in plain language, this should be offered only as an optional supplement to plain language feedback, not a substitute.

Key Takeaways

- Students can use AI tools as a way to get more formative feedback.
- AI tools can provide some assistance with summative feedback.
- AI tools can translate feedback into a variety of engaging formats, potentially increasing student interest in reviewing feedback.

Exercises

- Examine your institution's policies around sharing student-produced content with an AI tool in order to determine limitations for AI tools in feedback and grading.
- Experiment with ways that AI tools can assist in writing feedback. For example, submit a set of notes to an AI tool and ask it to convert it to a paragraph, or provide verbal feedback using a voice-to-text AI tool. Consider whether the output is readily usable as assessment feedback, or whether revision is required.

5. Chrissi Nerantzi, Sandra Abegglen, Marianna Karatsiori, and Antonio Martínez-Arboleda, "101 Creative Ideas to Use AI in Education, A Crowdsourced Collection," Zenodo, last modified 2023, <https://doi.org/10.5281/zenodo.8072950>.

12. Administrative Tasks

How can AI tools help instructional staff to complete administrative tasks?

This chapter explores how AI tools can:

- write first drafts of emails, agendas, templates, and other documents;
- help staff manage large amounts of information to summarize, identify trends, or target a search.

Email Writing

In writing, getting started is often the most difficult and time-consuming part. AI tools can produce a first draft of an email from a simple prompt. AI-produced emails tend to need a fair amount of revision to be appropriate to the task, since most instructional staff want to make sure that the emails they send reflect their voice. Still, several RRC Polytech staff have reported that they save time overall and end up including important points that they otherwise may have overlooked.¹ One RRC Polytech leadership staff commented that AI tools are useful for turning a set of notes into a draft of a follow-up email after a meeting with a student, and that AI tools are useful for reviewing a quickly written email to check for tone and professionalism.² AI tools can also accept a lesson plan as input and craft an email to a student who missed the class, informing them about key points in the lesson and steps to take to catch up, and can draft a welcome email based on a course description or outline. For more information on training an AI tool to draft emails in your voice, see the Prompting AI Tools to Imitate Your Voice section in the [Writing and Refining Prompts](#) chapter.

Document Production and Management

AI tools are effective in producing and managing a variety of documents, including agendas, templates, and data sets. Instructors can take a prepared lesson plan and have an AI tool produce a concise agenda to be posted to the course LMS in advance of the lesson. Some instructors write lesson plans that are for personal use and would be tough for a substitute instructor to follow. AI tools have the potential to prepare a detailed plan for a substitute to follow, based on a rudimentary lesson plan, agenda, or set of notes. One RRC Polytech staff member reported using AI tools to draft

1. L. Brunette, focus group, November 25, 2023; Anonymous focus group participants, November 2023.

2. Anonymous focus group participant, November 2023.

meeting agendas, especially for those in which they need to have “difficult conversations.”³ AI tools can accept a brief description of a situation or an email exchange as input for producing a meeting agenda.

Information Management

In the middle of a teaching term many instructors are too busy with planning, teaching, grading, and student contact to devote adequate time to continuous learning. When interesting but lengthy resources come across an instructor’s desk during a busy working period, AI tools can be employed in reviewing them and producing a summary of key points, or isolating information that is relevant to an instructor’s context. YouTube video transcripts can also be summarized or searched by AI tools, and an [extension for Chrome](#) makes this especially easy.⁴ AI tools are also able to analyze the transcript of a meeting in order to make recommendations for next steps⁵ or to produce draft meeting minutes.

AI tools can also be employed to review a collection of student feedback (for example, an exit survey that asks about the ‘muddiest point’ from the class) in order to make recommendations of what to review in the next class.⁶ A practical method for completing a task like this would be to have students complete the survey in Microsoft Forms or another tool that allows the results to be downloaded as an .xlsx file. The instructor could then review the results and delete any personal information such as names and usernames, then share the file with an AI tool, asking it to make recommendations on what to review in the next class.

The following screenshot shows the beginning of ChatGPT’s summary of a class exit survey. Click the link to review the full conversation.

3. Anonymous focus group participant, November 2023.

4. Bonnie Stachowiak, “Designing Courses in an Age of AI, with Maria Andersen,” last modified January 31, 2024, in *Teaching in Higher Ed*, podcast, 44:40, <https://teachinginhighered.com/podcast/designing-courses-in-an-age-of-ai/>.

5. John Spencer, “Sal Khan on A.I. and Personalized Learning,” John Spencer, last modified August 8, 2023, <https://spencerauthor.com/sal-khan/>.

6. Ethan Mollick, “Using AI to Make Teaching Easier & More Impactful,” One Useful Thing, last modified March 17, 2023, <https://www.oneusefulthing.org/p/using-ai-to-make-teaching-easier>.



Exit Survey Week 2.xlsx
Spreadsheet

Please review this table of feedback from a college class meeting, summarizing key points and trends.



The table contains feedback from a college class, with two main columns: "One thing I liked about today's class" and "One thing that could have made today's class better." Let's analyze the key points and trends from this data.

Positive Feedback

1. **Interactive Elements:** Several students appreciated the interactive nature of the class, mentioning "group work" and "questions asked to the whole class."
2. **Specific Activities:** Particular activities, such as a group activity or specific questions posed by

ChatGPT summarizing student feedback.

Key Takeaways

- AI tools can write first drafts of emails, templates, meeting agendas, and meeting minutes.
- AI tools can review large amounts of information in order to summarize or make recommendations.

Exercises

- Ask an AI tool to write an email, reprompting and refining until it is usable. Consider whether AI tools can improve your emails and make their production more efficient.
- Experiment with taking an anonymized set of student feedback and asking an AI tool to produce a concise report that highlights key takeaways.

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Glossary

artificial intelligence

The theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision making, and translation between languages.

chatbot

A computer program designed to simulate conversation with human users, especially over the internet.

custom instructions

A set of instructions that a user establishes with an AI tool, which apply to all of their interactions. Custom instructions can be set in ChatGPT by clicking on the user's name near the bottom left corner, then on Custom Instructions.

data collection

A feature that users can toggle on some AI tools. When data collection is turned off, the tool will not use inputs to improve its models. To toggle this setting in ChatGPT, click on the user name in the bottom right corner, then Settings, Data Controls, Chat History & Training.

diffusion

a process where a random 'tv noise' image is progressively refined into an image.

hallucinations

Incorrect information supplied by an AI tool as if it were factual.

large language models

AI tools that can generate human-like text, based on predictions made after learning from vast amounts of written text.

machine learning

The theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision making, and translation between languages.

probabilistic

Based on or adapted to a theory of probability; subject to or involving chance variation.

Versioning History

This page lists major changes to this book with major changes marked with a 1.0 increase in the version number and minor changes marked with a 0.1 increase.

Version	Date
1.0	05/31/2024
2.0	12/18/2024

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