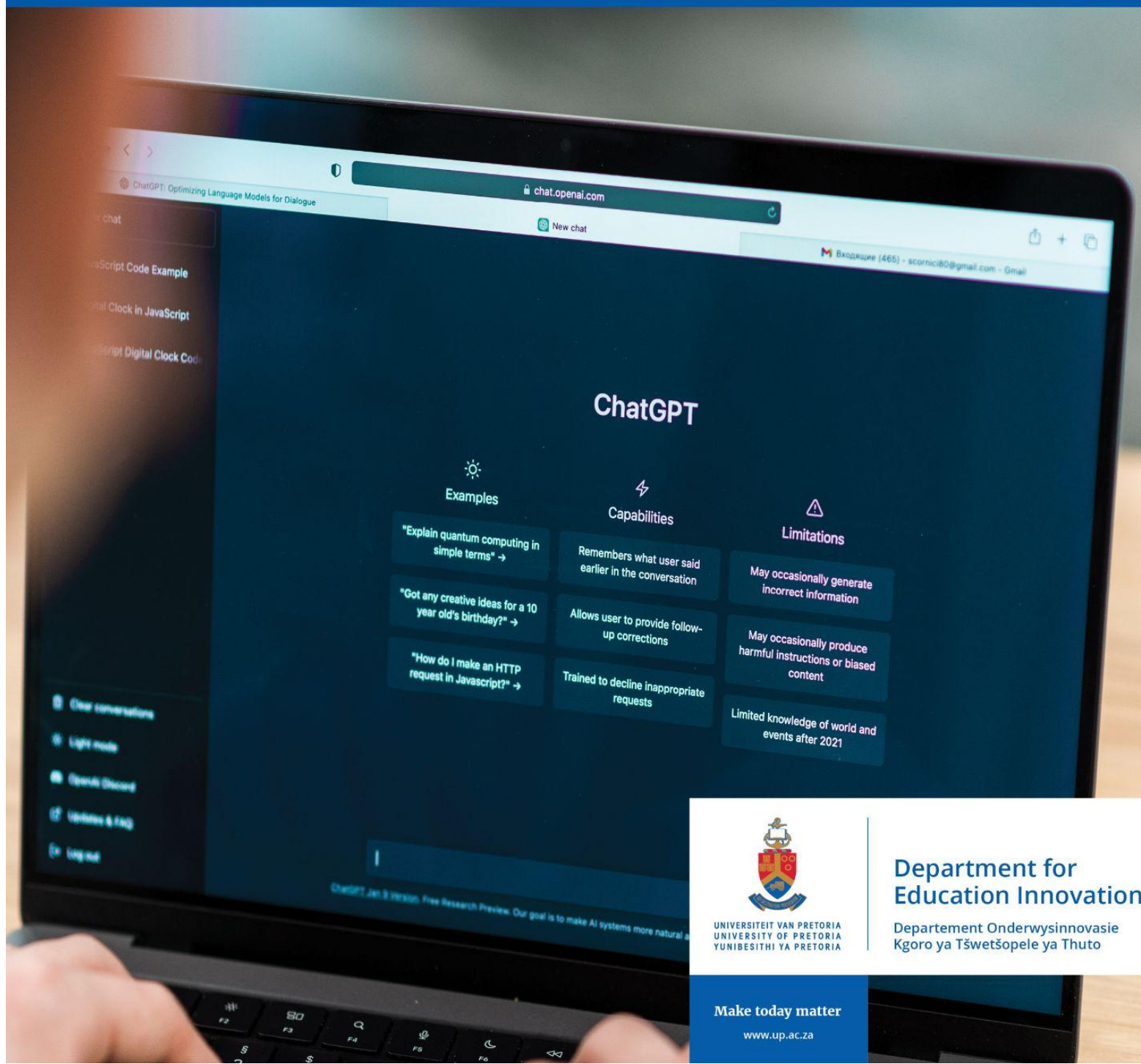DEPARTMENT FOR EDUCATION INNOVATION

Student's Guide:
Leveraging Generative Artificial Intelligence for Teaching and Learning Enhancement at the University of Pretoria

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Introduction

Artificial Intelligence (AI), particularly in its generative forms, is revolutionising various facets of human life, from communication to entertainment, and education is no exception. This guide offers practical tips to maximise the benefits and the ethical use of Generative AI. ChatGPT, activated by OpenAI in November 2022, sparked a significant conversation about the impact of Artificial Intelligence in Higher Education. It disrupted the status quo when students used it to craft their essay submissions. Alongside Google's BARD and Microsoft's BING, OpenAI's ChatGPT is a prime example of a powerful large language model (LLM) capable of mimicking human conversation. Large language models have demonstrated impressive results in identifying language patterns and predicting contextual words and excel at generating coherent and relevant textual responses with minimal input from the user. By leveraging its extensive database of trained language patterns, large language models can provide generated textual responses that accurately reflect the context of the user's input. With their command of languages, they can construct creative poems and write comprehensive and coherent essays, analyse topics in depth and present arguments persuasively.

As a student at the University of Pretoria, you have access to generative AI, a valuable tool that can significantly enhance your learning journey. As you delve deeper into your studies, you'll be honing vital workplace skills, ranging from self-motivation and professional communication to ethical practices, teamwork, and problem-solving capabilities. While Generative AI harbours tremendous potential for augmenting our productivity and learning processes, it is crucial to be cognizant of the inherent risks. Large language models (LLMs) do not truly comprehend the semantic content of the text. Instead, they generate text based on patterns and relationships between words identified during their training phase. Thus Generative AI should only assist learning and not act as a substitute for human creativity and critical thinking. While Generative AI has many strengths, it also has some weaknesses. One of its main limitations is its limited contextual understanding, which can lead to incorrect or irrelevant answers. Its dependence on data quality and quantity can also lead to biases or limitations, and the lack of references makes it difficult to verify the accuracy of the information provided. Therefore, it is essential to evaluate the output carefully and use it in conjunction with other educational resources, and never to replace practising and learning critical human reflection.

To get started, it's important to familiarise yourself with Google's BARD and Microsoft's BING, OpenAI's ChatGPT and other AI tools: The URL for accessing ChatGPT is https://chat.openai.com/auth/login. The free access to ChatGPT is sometimes unavailable due to high demand. The URL for accessing Google BARD is https://bard.google.com, or you can use Microsoft Edge or the Bing search engine with built-in support for OpenAI's ChatGPT, which provides citations and uses updated data sources. Dall-E (https://labs.openai.com/) and Midjourney (https://www.midjourney.com) are the most popular art generation tools. Numerous other AI tools are accessible, as illustrated by the website https://www.futuretools.io.
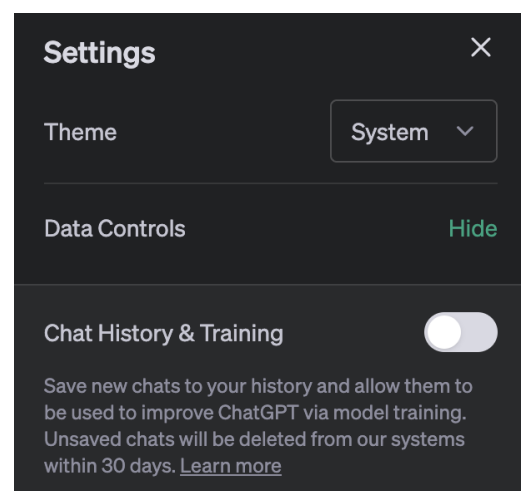
General Principles and Guidelines

When using generative AI like ChatGPT, it is essential to follow some guiding principles to ensure the technology is used effectively and ethically. Some guiding principles could be considered:

- *Understand AI capabilities and limitations:* Gain a solid understanding of generative AI's strengths and weaknesses to utilise it effectively for learning.
- *Use as a supplementary tool:* Treat generative AI as an aid to expand your knowledge, enhance your critical thinking, and assist with generating ideas rather than as a replacement for thorough research and academic rigour.
- *Cite sources properly:* When using information from generative AI in academic work, ensure proper citation and attribution to avoid plagiarism.
- *Fact-check and verify the information:* Verify the accuracy of the information provided by generative AI using credible sources, as the AI may not always provide the most up-to-date or accurate information.
- *Consider ethical implications:* Be aware of biases in the AI and work to mitigate them. Use AI responsibly, avoiding generating harmful, offensive, or misleading content.
- *Ensuring Data Privacy and Confidentiality:* When using generative AI technologies in the classroom, it is crucial to ensure that personal or confidential data is not included in the training data, as the AI could unintentionally reproduce or leak sensitive information. Always use anonymised, non-identifiable data for training purposes and be aware of data privacy regulations to protect all individuals involved. Some generative AI technologies, like ChatGPT, allow users to apply the appropriate settings to prevent ChatGPT from utilising or learning from your interactions involving personal, sensitive, or confidential information. Failing to do so may result in the model learning from your exchanges and considering the data as publicly accessible.

To ensure compliance with data privacy laws, applying the appropriate settings to prevent ChatGPT from utilising or learning from your interactions involving personal, sensitive, or confidential information is crucial. Failing to do so may result in the model learning from your exchanges and considering the data as publicly accessible.

To deactivate model training and the storing of your chat history in ChatGPT, follow these steps:

1. Click on your name in the bottom-left corner of the page.
2. Select "Settings" to open the settings popup, and click on "Data Controls" followed by "Show."
3. A menu will appear, allowing you to adjust the "Chat History & Training" setting. When enabled, the setting appears as shown below.
4. When you disable this setting, new conversations will no longer be utilised for training and enhancing our models.

Additionally, new conversations will not be displayed in the history sidebar.

By following these guiding principles, generative AI, like ChatGPT, can be a valuable tool for teaching and learning at universities.

Academic Integrity

In the era of high-tech tools like artificial intelligence and generative AI, you must be careful and clear to ensure your work maintains its academic integrity. If you are unsure about whether or how you are permitted to use generative AI tools like ChatGPT, Google BARD, or Microsoft BING for your assignments or assessments, consult your study guide or ask your lecturer. Failing to adhere to these guidelines would be considered academic dishonesty.

Plagiarism

Generative AI, such as ChatGPT, should be acknowledged and cited like any other source. Presenting generative AI work as one's own is (although not "plagiarism" as such) fraudulent since it is not original work. The University of Pretoria's plagiarism declaration states, "*I declare that this essay, report, project, assignment, dissertation, thesis, etc. is my own original work. Where other people's work has been used (either from a printed source, the internet or any other source), this has been properly acknowledged and referenced in accordance with the requirements as stated in the University's plagiarism prevention policy.*"

You have to reference or acknowledge the use of generative AI. An example of Acknowledgement is: "The creation, enrichment, and editing of this article for enhanced clarity was facilitated by the use of ChatGPT". For content generated by the AI, provide a citation that includes the name of the AI, the version (if applicable), the organisation that created it (OpenAI for ChatGPT), and the date of access. It's also a good practice to mention that the content was AI-generated. For example, ChatGPT-3, OpenAI. (2023). AI-generated content accessed on [date].

Strategies for Optimising AI Prompts and Achieving Desired Results

If you are new to using generative AI, it may be helpful to have some hints on how to improve your prompt (input) and receive the desired result:

Hint	Examples of prompts (input)
Be clear, concise and specific	Explain the concept of blockchain technology in simple terms.
Provide context	What are some effective study techniques for someone preparing to take a biology exam
Ask follow-up questions	Explain more about how they work.
Specify the language output	Respond in UK English
Specify the length of the response	I would like a brief/detailed/300 words response (the maximum is about 3000 words)
Specify the response format	Present your response in bullet points/table/paragraph
Specify the level of output	Respond suitable for a second-year university student" or "an A-rated student," or "I would like an in-depth analysis.

Specify the tone/style of the output	Write my text in the style of Shakespeare.

Use Generative AI to Enhanced Learning

Task	Examples of prompts (input)
Summarise and theme your information	Provide a 300 words overview/summary/essay about the role of central banks in addressing macroeconomic challenges or use your text.
Solve mathematical equations and explain the steps	Solve the following quadratic equation: $x^2 + 5x + 6 = 0$ and explain the steps. Then, practice solving these equations yourself using these steps to solve equations with different values.
Provide an overview of complex, lengthy concepts	Can you provide an overview of quantum mechanics?
Generate writing prompts for creative writing assignments	Suggest a creative writing prompt for a short story involving time travel. Evaluate the suggestions and use one or a combination to write your creative piece.
Get alternative phrasing for difficult-to-express ideas	I am having trouble expressing my argument for why … rephrase my main points.
Help with language learning and practising grammar and sentence structures	Give me an example of a complex sentence using the word 'notwithstanding'.
Generate outlines for writing assignments	I have to write an essay about the causes of World War II. Can you help me create an outline to organise my ideas? Evaluate the output against the assignment requirements and the module content to make sure you address the main points.
Get feedback on written work	Provide feedback on my essay about climate change and suggest areas where I could improve.
Get formative assessment feedback on the quality of the language	Provide feedback on grammar and vocabulary usage of the following …
Test preparation	Create six multiple-choice questions to assess the students' understanding of integration from first principles in a first-year university mathematics course. Remember that your lecturer might set different questions than these.
Write a computer code or Excel formula and ask generative AI	Explain how the 'for' loop works in Python, and provide an example.

Task	Examples of prompts (input)
to explain how it works	
Use generative AI to plan projects and essays	What main topics need to be covered on this topic: African indigenous plants? Evaluate the output against the assignment requirements and the module content to make sure you address the main points.

Boosting Student Productivity with Generative AI

Task	Examples of prompts (input)
Proofread written work and check for grammar, punctuation, and spelling errors	Proofread the following text: …
Create an Excel formula to automate calculations	Create an Excel formula to calculate the average of a range of cells.
Create PowerPoint slides for presentations	Create ten slide PowerPoint presentation on the topic of renewable energy or use your text. Then personalise it to your style.
Generate code for various programming languages and applications	Write a Python program that calculates the Fibonacci sequence.
Edit your CV, write a cover letter, and prepare for an interview	Write a CV based on the following information …; follow-up prompt: Use my CV to write a cover letter based on the following key requirements in the job description – paste job description; follow-up prompt: Give me ten possible interview questions and the appropriate reply to them based on my CV and the job description.
Data analysis and identifying themes analyse and identify themes when dealing with large data sets	Data analysis and identifying themes analyse and identify themes when dealing with large data sets

Providing Personalized 24/7 Tutor Support via Generative AI

Task	Examples of prompts (input)
Explain and teach a topic like a tutor	Teach me how to solve cubic equations and include a quiz at the end. Allow me to answer, and if it is wrong, explain the steps.
Summarise long or complex readings to make it easier to	Write a half-page summary about the main ideas of … . Evaluate the output against the assignment requirements

understand and retain critical concepts	and the module content to ensure you address the main points.
Assist with homework E.g., Calculate $\int_{0}^{5}\left(3x^3 + 2x^2 - 4x + 6\right)dx$	Solve $\int_{0}^{5}\left(3x^3 + 2x^2 - 4x + 6\right)dx$ Follow-up prompt: Give an example of a real-world problem that could be solved using this formula. Then, practice solving these equations yourself using these steps to solve equations with different values.
Generate alternative phrasing or synonyms to improve the quality and clarity of written work	Provide an alternative phrasing for the sentence: 'The research findings were inconclusive'.
Identify prior knowledge required to understand a topic	What prior knowledge do I need to understand the principles of supply and demand in economics?
Translate into home languages	Translate the following passage from English into isiXhosa: 'The internet has revolutionised how people communicate and share information. If you are unsure if the output is correct, check it with another person who knows both languages'.
Provide scaffolding support	Break down the steps involved in solving a quadratic equation and explain each step in simple terms.
Ask generative AI for examples	Provide an example of a deductive argument and an inductive argument, and explain the difference between the two.
Provide coding support and explanations for different programming languages	Explain how to use a 'for' loop in Python to iterate over a list of numbers.
Give study tips or ideas to improve marks or time management tips	What are some effective study strategies for preparing for exams?
Create a glossary of terms for a topic in different languages	Create a glossary of terms for an introduction to psychology course in English and isiZulu.
Generate questions and answers for studying or test preparation	Generate ten multiple-choice questions and answers on organic chemistry.
Get feedback on written work	Review my essay on climate change and provide feedback on its clarity and organisation.

Providing Support

Student support	Example Prompt
Time management	How can I improve my time management skills to study more effectively?

Motivation	How can I stay motivated to study, even when I don't feel like it?
Study habits	What are some good study habits that I can develop?
Test-taking strategies	What are some tips for taking tests effectively?
Procrastination	How can I overcome procrastination and start studying sooner?
Stress management	How can I manage stress so that it doesn't interfere with my studies?
Academic help	Where can I find academic help if I'm struggling with a class?
Career planning	How can I start planning for my career?
Financial aid assistance	Where can I find financial aid at the University of Pretoria
NSFAS queries	When do NSFAS applications open

Summary

ChatGPT is a valuable tool for learning due to its many strengths. One of its key strengths is its automation and 24/7 availability, providing instant student support. It also offers personalised assistance, helping you better understand complex topics. ChatGPT's ability to summarise information in an easy-to-understand way promotes self-directed learning, and its speedy answers save time for both students. Its multilingual capability ensures accessibility for a broader range of users, while its quick accessibility and availability mean that support is always available whenever needed.