MODULE 5

ARTIFICIAL INTELLIGENCE (AI) FOR RESEARCH

Introduction

Artificial intelligence (AI) technologies have proliferated rapidly into a phenomenon that cannot be ignored in the academic arena, offering innovative tools that enhance research efficiency, automate repetitive tasks, and improve decision-making processes.

What is AI?

There is no pure definition for AI and its definition remains a topic of debate among experts. However, the term 'artificial intelligence' was coined by John McCarthy in 1956 (Gravett: 2020; Sharma: 2022; Titov: 2024), which marks the inception of this field. Titov further describes AI as the creation of intelligent systems that emulate human behaviours that exhibit human-like intelligence (2024: 6). Despite varying definitions, the unifying theme of AI is programming machines to mimic human intelligence and behaviour, allowing outputs to match human efforts while reducing time and energy.

AI tools for research – Examples

AI tools have increased over the past five years, with ChatGPT leading the way as the top generative AI tool (AGI). AI tools are utilized for many different things such as research, image creation, video development, and audio and grammar checkers. Here are a few examples:

Research

ChatGPT (for brainstorming): An AI chatbot by OpenAI, used to generate ideas and explore concepts interactively.

Claude: An AI assistant by Anthropic, designed for conversational tasks, drafting, and providing detailed responses.

IdeaMap.ai: A creative AI platform for brainstorming and organising ideas into actionable plans or visual formats.

Perplexity: An AI-powered search and answer tool that provides concise and accurate information by combining web search and contextual understanding.

SciSpace: An AI tool for researchers that simplifies academic papers, explains concepts, and enhances research understanding.

Research Rabbit is a powerful citation-based literature mapping tool. By adding one or more foundational 'seed' papers to your account, the tool identifies additional relevant papers aligned with the topics and references you've selected. This makes it an excellent resource for conducting comprehensive literature searches and reviews.

Image Creation

DallE is an AI tool that generates images from text descriptions for creative and visual projects.

MidJourney is an AI image-generation tool that creates high-quality visuals from text prompts. This tool specialises in artistic and imaginative designs, often producing visually striking and detailed images.

Video AI Tools

Runway is an AI tool for creating and editing video content. Its features include background removal and animation.

Synthesia converts text into professional videos using AI-generated avatars and voices.

Audio AI Tools

Descript is an AI tool that edits audio files, transcribes spoken words, and generates voiceovers. This tool can also be used to add narration to presentations.

Grammar Checkers

Grammarly is an AI tool that improves grammar, spelling, and style, offering real-time suggestions for clearer and more polished writing.

Quillbot combines grammar checking with paraphrasing and tone improvements.

Writefull is an AI writing tool for academic work, offering grammar corrections, language improvements, citation checks, and templates for academic phrases.

Understanding AI – Use

AI tools can assist in various ways to enhance simple daily tasks. Many AI-powered tools, such as ChatGPT and research assistants, can help with brainstorming, summarizing, and refining ideas. However, AI is not a substitute for critical thinking – its outputs can be biased, inaccurate or incomplete. Responsible AI use means verifying information, maintaining academic integrity, and following institutional guidelines on citation and ethical use.

Benefits

AI tools offer a wide range of benefits for students beyond just research and writing support. They can enhance productivity by automating repetitive tasks such as formatting citations and transcribing audio lectures. AI-powered language tools can help non-English speakers refine their writing and improve clarity, making academic communication more accessible. Additionally, AI can assist with data analysis, identifying trends and patterns that might otherwise be overlooked. Some tools even provide real-time feedback on assignments, helping students improve their work before submission. By integrating AI into studies, students enhance and develop critical digital literacy skills that will be valuable in future careers. However, it is essential to approach AI use with critical thinking, ensuring that that it complements rather than replaces human judgment and academic integrity.

Risks

As great as AI tools are at helping us brainstorm and unpack concepts, there are risks involved. AI tools can often misinterpret prompts or not understand the subject matter to the extent at which you would need to understand the information. AI tools are also known to hallucinate information or references to legitimate looking journal articles or books on the subject matter. Hallucinations are unintentionally fictitious pieces of information made up by the AI tools (Janse van Rensburg & van der Westhuizen, 2024). These hallucinated pieces of information or references are a clear indication of use of AI in your work. It is important to check the information

It is also important to remember that as much information as you are getting from generative AI tools, they are also learning from you. Each query you put into AI tools means it is learning from you and about you. Data privacy is an important concern to take note of as you could potentially be leaking sensitive data about yourself to companies which own and operate these AI tools. It is also important to be aware that by uploading any information which you did not author yourself, you could be breaching intellectual property and copyright law.

AI tools are useful resources; however, it is important to remember that it is not without risk. If you are going to use these tools remember that you still need to ensure a high standard of work and maintain your academic integrity.

AI integrity / ethical use

Generative AI tools such as ChatGPT can be a great starting point for your research, but it is important to remember that it is a tool meant to assist you but not do the work for you. Often, the purpose of your assignments is to gauge your learnings and understanding of the course material, and if you allow an AI tool to do the work you rob yourself of the opportunity to learn. Generative AI can be useful in helping you understand complex topics or creating quizzes or flashcards to prepare for tests or exams. However, there are many downsides when using AI tools: the information can be outdated, incorrect, and prone to bias. It is important to be discerning when looking at the content generated from these AI tools. Treat the results with suspicion and double check the information presented in the AI generated responses. The responses

from AI tools often contain made up (also known as 'hallucinated') references which looks like a reference to a legitimate article or research paper.

Remember to clearly indicate in your work if you have used any information from an AI tool, as copying and pasting the content directly into your work can also be considered plagiarism. This requires you to be mindful and apply critical thinking when using information generated from these tools in your work. Follow the general rules for avoiding plagiarism and use the AI generated responses sparingly.

Citing AI tools

It is important to acknowledge if you have made use of any AI tools in your work. You can do this by citing the AI tool according to whichever referencing style is applicable to your course/institution.

Referencing AI tools by style

American Psychological Association (APA) 7th edition

In-text: (OpenAI, 2025)

Reference list: OpenAI. (2025). ChatGPT (May 10 version) [Large language model]. https://chat.openai.com/chat.

Source: APA Style blog

Modern Language Association (MLA) 9th edition

In-text: Explain the prompt in your text, e.g. "In 200 words please discuss three core themes in Shakespeare's *Romeo and Juliet*"

Reference list: "In 200 words please discuss three core themes in Shakespeare's *Romeo and Juliet*" prompt. OpenAI, 15 May 2025, chat.openai.com.

Source: https://style.mla.org/citing-generative-ai/

The Chicago Manual of Style 17th edition

In text: explain prompt in your text e.g. When prompted with "Please explain the significance of Chomsky's role in the cognitive revolution" ChatGPT lists the following ….[1]

Reference list: 1. Text generated by ChatGPT, OpenAI, March 7, 2023, https://chat.openai.com/chat.

Source: https://www.chicagomanualofstyle.org/qanda/data/faq/topics/Documentation/faq0422.html

UCT Author-Date

In-text: (OpenAI, 2025)

Reference list: Perplexity. 2024. Perplexity response to the prompt: "what are the central tenets of the hippocratic oath?" [Large language model]. Standard version. Available: https://www.perplexity.ai/search/what-are-the-central-tenets-of-EsnI6fD1TXmDvkI_ElsbRA#0 [2025, 15 May].

Source: https://libguides.lib.uct.ac.za/c.php?g=1440358&p=10698243

Recommendations

AI has many uses in academia; however, it is always important to consult with any guidelines laid out by your institution and department before using AI within an academic project. Use AI ethically by acknowledging where you have used it and cite it accordingly, whether it be for essays or creative projects. AI can be a fun way to learn and create study material, however you still need to be mindful of uploading potentially copyrighted material and giving access to a third-party site to others' intellectual property, as this could have longer term consequences.

Conclusion

AI has been an exciting innovation in education. It has provided us with many opportunities such as streamlining the creation of study material, helping us structure our thoughts, and prompting our thinking. It can help us transcribe lectures and assist non-native English speakers. However, it also creates an opportunity for potential academic misconduct, whether intentional or unintentional. Many institutions have implemented the use of AI-checkers within their plagiarism software, as the unacknowledged use of AI could be seen as academic misconduct. To protect yourself and ensure that you are engaging with the course material, try relying more on your own ideas and understanding and limiting the use of AI in your academic projects.

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