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Facilitating the Research Writing Process with Generative Artificial Intelligence

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Abstract: In higher education, generative chatbots have infiltrated teaching and learning. Concerns about how and if to utilize chatbots in the classroom are at the forefront of scholarly discussion. This quick-hit article presents a plan to teach learners about generative AI writing tools and their ethical use for writing purposes. As generative AI tools continue to emerge, this guide can support instructors from all disciplines to engage learners in getting the most accurate information.

Keywords: Generative AI, chatbots, research writing process, GAI, writing AI prompts

Generative artificial intelligent chatbots are like a hurricane blowing onto the academic landscape as a force to be reckoned with for institutions, faculty, and learners. The power and path of these technological wonders have not reached their full potential, and the future path is in a cone of uncertainty. Generative artificial intelligence chatbots are large language models that predict text responses to user-generated prompts. In practice, generative artificial intelligence can provide unfettered responses to writing prompts.

In academia, the scope of learners' use of generative artificial intelligence to complete writing assignments ranges from idea generation to cutting and pasting a generative chatbots answer to a prompt without attribution. For instructors in higher education, banning generative artificial intelligence might be a lesson in futility as AI detectors are in their infancy and yield false positives (Sullivan et al., 2023). Likewise, the accuracy of the information from generative artificial intelligence can be wrong and limited (Tlili et al., 2023). A popular and forerunner of generative artificial intelligence, Chat GPT, has been adopted by many people. Specifically, learners are employing its vast capabilities in their daily lives including academics (Dwivedi et al., 2023). As guardrails for the ethical and responsible use of generative artificial intelligence in academia have yet to be established, macro-level disciplinary fields are making concerted efforts to update policies, professional guidelines, and codes of ethics to navigate the use of generative artificial intelligence. On a micro-level, instructors are adding ChatGPT usage clauses into their syllabi (Sullivan et al., 2023). However, assigning edicts about generative artificial intelligence does not mean they will be followed therefore, a more proactive approach includes increasing learners' digital literacy capacity. "Digital literacy is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills." (American Library Association Digital Literacy Taskforce, p1, 2011). Perhaps by increasing learners' digital literacy about generative artificial intelligence, there will be a more responsible and ethical use of this emerging technology.

Therefore, the following plan is presented for disciplines where writing is a learning outcome (e.g., discussions, essays, presentations, and term papers). Instructors can utilize parts or all of this plan to support their learners in effectively incorporating generative artificial intelligence in their

coursework by building digital literacy capacity. The following plan aims to increase learners' responsible use of generative artificial intelligence. Before presenting this plan in a course, instructors should explore some generative artificial intelligence to familiarize themselves with its capabilities.

Background Information

Generative Chatbots for Writing

While ChatGPT by Open AI is an easy-to-use generative artificial intelligence, others may be more suited to those in higher education who are writing (see Table 1). Generative artificial intelligence can assist writers in (a) finding relevant scholarly articles, books, and databases; (b) summarizing key points of a paper or book; (c) finding grammar errors; and (d) providing structure and organization for outlines and sentence structure. However, be forewarned that some information may be inaccurate.

Table 1. Chatbots for Academic Tasks.

AI	Function	Link	Purpose
Elicit	Research Questions	https://elicit.org/	Literature Reviews
Research Rabbit	Literature Review	https://www.researchrabbit.ai/	Literature Reviews
Paperpal	Editing drafts	https://paperpal.com/	Manuscript Editing
R Discovery	Staying updated with the literature	https://discovery.researcher.life/	Stay up to date with research
Quilbott	Paraphrasing	https://quillbot.com	Paraphrasing Tool
GrammarlyGo	Generating Ideas, summarizing, and writing in your style.	(https://www.grammarly.com/grammarlygo, 2023)	Papers
Humata	Summarizing long texts	https://www.humata.ai/	Papers, Assignments

Finally, instructors incorporating generative artificial intelligence can work with educational technologist, instructional designers, or library specialist to build their personal background knowledge regarding generative artificial intelligence.

The Plan

A. Begin by reviewing what generative artificial intelligence chatbots are and their basic capabilities. Ask the learners how they have already utilized generative artificial intelligence. Next, build a few prompts (queries) to ask generative artificial intelligence and, as a group, test the prompt.

   Writing an Effective Prompt

   1. Be specific in your language.
   2. Add relevant information (details).
   3. Ask that the generative artificial intelligence to utilize known resources.

4. Indicate the audience for the answer.
5. Check for spelling errors.

If the response is inaccurate and a follow-up is needed, options include:

1. Use synonyms to further explain misunderstood text.
2. Identify the specific area that requires follow up and then regenerate a prompt.

B. Review the generative artificial intelligence chatbots answers for accuracy, which can help to increase learners' digital literacy (evaluate - critical thinking).

C. Next, test some of the provided scenarios using a current topic in the course. Engage in a discussion about the results from testing the scenarios.

D. Finally, have an open-ended discussion about:

(a) cutting and pasting the information directly or summarizing or paraphrasing ideas generated.
(b) whether citing generative artificial intelligence as an author is an allowable practice in your classroom. (If attributing AI as an author is not allowed consider an AI statement like this one: "The author wrote a first draft, AI was consulted with this prompt. "Please clarify the following writing."] The authors kept a 10% of the grammar section.")
(c) accuracy of a generative artificial intelligence response like ChatGPT can produce inaccurate or vague information, citations, and biased responses.
(d) documenting general information that generative artificial intelligence provides. Some generative artificial intelligence chatbots provide some attribution to primary sources, and others do not. So, when should you consider a primary source?

Discussion

Ethical concerns exist when writing a paper with a generative artificial intelligence. For some, the idea that someone would represent writing generated by a generative artificial intelligence without attribution equates to plagiarizing work The ubiquity and ease of use of generative artificial intelligence chatbots can be a temptation for some learners to just copy and paste generated writing. Therefore, learners need to know that they may use generative artificial intelligence to facilitate the writing process but not to completely author the work.

The extent to which learners utilize and implement generative artificial intelligence provides new ethical dilemmas for educators to consider as the proliferation of continues. The advent of generative artificial intelligence, a technology revolution, has many considering their scholarly practice through a moral and ethical lens. Finally, generative artificial intelligence may not be available to all due to the cost. For some generative artificial intelligence applications, there is a cost to extend services or to utilize extra features; a more formal plan is needed. Others have outdated information and features for free, and the superior content requires a subscription. Questions as to the access and income disparities and the use of generative artificial intelligence need further exploration. Will generative artificial intelligence further extend learning gaps based on access?

Conclusion

Generative artificial intelligence is not infallible. Although generative artificial intelligence can generate content based on prompts there are some cautions to heed. For example, generative artificial intelligence chatbots can generate APA citations; however, the designated object identifiers (doi) may not be accurate. Likewise, the citation may contain erroneous information. Therefore, learners should-check AI generated references for accuracy. The ethical challenges of generative artificial intelligence are vast. Teaching learners the best ways to utilize generative artificial intelligence may be the best way to support the ethical use in writing and research. Instructors need to consider generative artificial intelligence as a partner and tool for research. Generative artificial intelligence does not negate the need for instruction in the fundamentals of writing, citing, synthesizing, and paraphrasing. Knowing the fundamentals of writing will support learners as they integrate generative artificial intelligence in the production of scholarly work. The hurricane of generative artificial intelligence has blown in with little warning, leveraging its force can provide new learning opportunities for higher education.

Appendix A

Scenarios

The following scenarios were created and tested based in response to an overarching question of how chatbots can support learning. The principle is listed first, then the scenario is presented, followed by the prompt to present to generative artificial intelligence. These scenarios can be investigated in a whole group, small group, or individual setting. The follow-up can spark a group discussion.

#1. Generative Chatbots can provide specific information from an article.
Scenario: Spencer wanted to determine a particular article's theoretical or conceptual framework. Spencer asked a chatbot to assist him in determining what theories or frameworks were mentioned in a certain article.
Prompt: *In the article [Insert Article here], what theory or theoretical framework is cited?*
Follow up: Look at the article. Did the CG provide the correct information? Could more information help the response? [AI may not be able to access articles behind a paywall.]

#2. Generative Chatbots can provide correctly formatted citations.
Scenario: Maverick finds creating a reference list to be a tedious task. While using several online tools to help him record the references, he noticed errors such as italicizing, title case, or no doi. Maverick asked the chatbot to help him with each reference since he felt finding the correct doi takes time, and a chatbot could save him valuable time.
Prompt: *For the article titled [insert title here], please provide the APA 7th edition citation with the doi.*
Follow up: Was the reference provided, or were there directions for you to complete the reference? Would the results be different if you used a different generative artificial intelligence program.

#3. Generative Chatbots can function as critical friends.
Scenario: Wade single-authored a paper and wanted to ask someone to read it to recommend expanding an argument or making a recommendation about his argument. He decided to share the portion of his paper that contained the argument.
Prompt: *Please evaluate this argument and make a recommendation. The writing is for a college assignment.*
Follow up: Did the generative artificial intelligence provide new ideas? Should he cut and paste the response into his paper? Should he read the response and then find literature to support the idea?

#4. Generative Chatbots can support summarizing text quickly.
Research Scenario: Lea has an article to read. She read the abstract and title and wanted to know more about the article. She asked generative artificial intelligence to summarize the article's key points and results.
Prompt: *Please provide a one-page summary of the article [cite the article here].*
Follow up: Look at the article. Did the generative artificial intelligence provide an accurate summary of the article? Was it in-depth or just a review of the abstract? Was there a difference between open access articles and articles behind a paywall?

#5. AI chatbots can support Grammar Questions.
Research Scenario: Rebecca authored a paper about a [topic here]. She wanted an outside proofreader. She consulted a generative artificial intelligence chatbot instead.
Prompt: Please review the following passage for grammar errors. [Insert text here]
Follow-up: Did the generative artificial intelligence provide corrections? Were the suggestions accurate? Did it remove citations?

#6. AI chatbots support academic writers to generate ideas.
Scenario: Matt was brainstorming ideas for an article. After writing down a few ideas, he consulted with a generative chatbot by typing in prompts to generate suggestions.
Prompt: Hi Chat, I am writing about [insert topic here] I am looking for some additional ideas. Here are my ideas. Do you have any more?
Follow up: Did the generative artificial intelligence think of new ideas? Would a friend or a classmate have provided the same type or quality of information? What would you do with the information you received?

#7. AI chatbots can rewrite these sentences for flow and organization.
Scenario: Daisy wrote a sentence with two complex ideas for an article. After struggling to combine the statements, she consulted with a generative artificial intelligence.
Prompt: Hi Chat, here are my two sentences. Can you combine these two sentences to improve flow?
Follow-up: Did the generative artificial intelligence combine the ideas in a coherent sentence?

#8. AI chatbots can integrate feedback.
Scenario: Harold has an essay that received feedback from his instructor. Harold asked a generative artificial intelligence for a suggestion of how he can integrate the feedback from the instructor into a current section of his paper.
Prompt: Hi Chat, how would you integrate feedback in the current document?
Follow-up: Did the generative artificial intelligence provide useful suggestions for integrating the feedback? Did it provide a suggestion that you could further expand on as you are incorporating the instructor's feedback.

#9. AI chatbots alphabetize a reference list.
Scenario: Nikki has a list of references, but they are not in alphabetical order. Nikki asks generative artificial intelligence to alphabetize the references.
Prompt: Hi Chat, can you alphabetize the references by last name?
Follow-up: Did the generative artificial intelligence provide the references in alphabetical order? Was there anything missing?

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