Can AI Be a Co-Author?: How Generative AI Challenges the Boundaries of Authorship in a General Education Writing Class

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Abstract

This paper explores the complexities of co-authorship involving generative AI in academic contexts, focusing on an honors English class where students engaged with AI tools like ChatGPT. It critiques the boundaries of authorship as defined by COPE, which argues AI cannot be an author due to its lack of accountability. The study explores the practical implications of AI-assisted writing in the classroom, highlighting the experiences of students working with AI and evaluating AI's role in the writing process. It highlights the need for writing classrooms to adapt, allowing students to explore and understand the evolving role of AI in writing.

Keywords: *writing, composition, authorship, co-authorship, artificial intelligence, LLMs, GenAI, general education*

In 2023, the Committee on Publication Ethics (COPE) released a position statement which unequivocally stated that artificial intelligence tools and large language models *cannot* be listed as an author of a paper because these tools do not meet the standard of authorship. COPE's definition of authorship has two minimum requirements: authors must make substantive contributions to the work *and* be accountable for the work in its published form (p. 4). Since AI is not sentient and not a legal entity, it cannot take responsibility for the information published in a paper—from the content perspective to the practical matter of conflict disclosure. At first blush, this definition of authorship seems reasonable and one that has been echoed by large organizations such as the World Association of Medical Editors (WAME) and individual presses such as Cambridge University Press.

However, as discussions of responsibility were taking place in the academic sphere, Bay Back Books, an imprint of Hachette Book Group, published a 208-page book written by Code Davinci-002, an early precursor to ChatGPT. The book, edited by Katz, Morgenthau, and Rich, is a collection of poetry created by Code Davinci–002 based on prompts by the editors. The book contained a long introduction by the editors explaining the process of producing the book, but the attribution and authorial credit went to Code Davinci-002—a clear counterexample to COPE's seemingly clear position statement.

Prior to the proliferation of artificial intelligence tools, ascribing authorship was no simple calculation (Hosseini, Lewis, Zwart & Gordijn 2022; Abbasi 2012; COPE 2019), but in the current technological climate, the practice of co-authorship is even more murky when nonhuman partners participate in the research design, data analysis, and collaborative writing process needed to produce a text. Outside of academia, authorship is even more complex since publications are attributed

to a company instead of an individual (see annual financial reports or marketing campaigns as examples). (Bavdekar 2012; Brand, Allen, Altman, Hlava & Scott 2015). Throwing ChatGPT into the mix obscures authorship even more in these contexts.

If COPE's guidance and publisher practices can be so divergent and if non-profit and business sectors alike may use AI without attribution, then how do writing teachers help students understand the contours of authorship and collaborative writing in the context of disciplinary writing courses? An honors section of English 202 at Pennsylvania State University, Berks tried to answer that question. In this course students wrote *about* and wrote *with* GenAI tools like ChatGPT, Claude, and Perplexity to better understand themselves as writers and how well these large language models could rise to meet the threshold of co-author in their respective fields. In this paper, we (the faculty member and three undergraduates enrolled in the course) will describe our experiences collaborating with GenAI tools and argue to what extent GenAI was an effective co-author. At times, this co-written article shifts between first-person singular and third person plural. First person typically indicates a reflection of one identified undergraduate writer; the third person indicates the collective thoughts and analysis of all the co-authors.

We argue that GenAI tools as they currently exist do not rise to the level of co-authorship because they lack the ability to fully collaborate, which we think is a key definition of co-authorship. Regardless, we believe that the writing classroom needs to allow space for students to practice writing with GenAI tools to better prepare them for a future in which GenAI tools do improve their capabilities. In order to make this argument, we will apply current scholarship on co-authorship to GenAI in both the process and product of writing, contextualizing our analysis in three different disciplines: biology, global studies, and English. We will use our experiences with GenAI, reflective writings from the course, and disciplinary texts such as journal author guidelines as evidence for our argument. Finally, we will make suggestions about how the writing classroom may unpack these black box technologies and (re)consider the role GenAI plays in writing courses.

Educational Context

As part of the General Education curriculum at Penn State, students are required to pass a 200-level writing-in-the-disciplines course. Unlike the first-year writing courses that broadly introduce students to argument, audience, and purpose, these advanced courses are intended to prepare students for writing in their *specific majors and careers* related to the social sciences (English 202A), humanities (English 202B), technical fields (English 202C), and business (English 202D). Students take the section that most closely aligns with their major(s) (i.e. psychology majors take English 202A, finance majors take English 202D (Pennsylvania State University 2024)). The exception is that honors students have another option: a course that includes all majors which is intended to help students develop their writerly professional identities by comparing their genre features and audience expectations against others. In other words, the course invites students to see how writing in their field is unique or similar to other fields. For example, in this course a mechanical engineer can identify the ways that their proposal for a client might differ from a marketing student's client proposal. Additionally, the class might compare how point of view is used in various fields, with English majors snuggling up to the first-person point of view while the biochemists tend to recoil from it.

In Spring 2024, the theme of the course was collaboration, co-authorship, and GenAI. Students read ancient and modern texts about authorship (i.e. *The Phaedrus* and "Death of an Author") as well as *I Am Code* (Davinci Code-002 2023). Students were required to use multiple GenAI

platforms as well as Oculus Quest headsets to meet in a virtual reality setting with an avatar-tutor whose responses were powered by AI technology. Independent research for the course included finding authorship guidelines for various academic journals, finding secondary sources about writing and co-authorship in various disciplines, and learning more about the genres and expectations of writers in students' disciplines.

Students completed two major assignments relevant to this article related to authorship and GenAI. In the first assignment students had to respond to the following prompt:

> Critically examine what it means and what you think it SHOULD mean to be an author in your discipline. Your assignment should include a thoughtful synthesis of theories, examples from contemporary work/news stories/etc., critical analysis, and your own point of view. Be sure to consider multimodal authorship, collaborative authorship, identity, and digital authorship. The audience for the paper is other college students who will be writing in your major/field.

The goal of this assignment was to encourage students to learn more about what it means to be an author in their respective disciplines by first understanding the already established conventions in their field and then to speculate how that might shift and change as GenAI technologies become more prevalent. The second assignment tackled GenAI directly:

> The goal of this assignment is to critically analyze and reflect upon your experience with generative AI tools throughout the unit. Consider how these tools have influenced your writing process, creativity, and the final products you've produced. You will ultimately be answering the following question in your essay: what impact does generative AI have on you as a writer and your writing? You will propose your format/genre and audience for this assignment based on your discipline.

In this assignment, students used GenAI tools to better understand how they impact their writing. The purpose of this assignment was to encourage students to assess whether GenAI technologies would help them as writers, if the tools could, in fact, effectively write, and how creative processes as well as ethical considerations might be impacted.

Fifteen students, who were informed of the class theme before the term began, enrolled in this honors English 202 course. Their majors spanned the educational spectrum, and their career paths were as expansive. Three of the students (Daniel, Samantha, and Sydney) writing this article were enrolled in these three majors and had various career aspirations and experience with GenAI tools:

> **Biochemistry and Molecular Biology (Daniel)**. This major prepares students for leveraging the applications of the chemical and physical principles of studying living cells and their components in various jobs in industry, research laboratories, medical institutions, and as consultants in government positions (The Pennsylvania State University). Students learn to explain biology at molecular, genetic, and cellular levels, through a focus on one of two curricular pathways. The biochemistry option provides a specific focus on the structure, properties, and functions of biological molecules while the molecular and cell biology option helps students learn how to understand cellular processes and signaling in multicellular systems.

I took English 202H in the spring semester of my sophomore year at Penn State Berks, with three semesters of research experience and some experience presenting my work at national conferences. I had already been exposed to various uses of AI in my field from talks I attended and workshops about the use of AI in scientific research. I was curious about the possibilities that came from working with AI, and I was eager to continue to explore its capabilities in this course, contemplating how AI could be used to advance my career as a scientist.

Global Studies (Samantha). This major requires students to take courses that delve into the cultural, historical, and political background of the following regions: Latin America, Europe, Africa, Asia, and the Middle East. Upon completion of the program, students are expected to be critical evaluators of both historical and ongoing global issues. Global Studies is comparable to other International Studies majors but deviates slightly by requiring courses in world literature and intercultural communication (The Pennsylvania State University 2024).

I entered English 202H as a junior at Penn State Berks. Aside from some lighthearted exploration of ChatGPT when it first became available to the public, I had little exposure to AI and even less within a classroom context. I knew that this class would help prepare me for the increasing likelihood of working alongside LLMs. Although I plan to keep my career options open, I enrolled in this class with the vision of making strides for the UN Sustainable Development Goals (2024) by teaching English abroad.

English (Sydney). At Penn State, majoring in English means honing writing and analysis skills by focusing on writing, rhetoric, or literature. This degree supports careers in nonprofits, education, medicine, law, writing or editing, and any other job where critical evaluation of a text or document is needed. Courses in the English program span a variety of time periods, mediums, and regions, producing graduates who are well-versed and well-rounded in their knowledge of the English language (The Pennsylvania State University 2024).

I went into English 202H as a first-year student with an interest in publishing and becoming an editor. Prior to the course, there weren't many instances where I needed to use AI in my everyday life, and although I was curious, I was not drawn towards experimenting with it on my own. Despite my lack of experience with GenAI, knowing that it could alter the landscape of my future career encouraged me to prepare for this new workplace reality. I entered this course with the goal of becoming an editor, but I am remaining open to other options as I progress throughout my academic career.

GenAI as Substantial Contributor

As part of the course, Holly did not assign COPE's definition[1] to students, but for the purposes of this article, we will consider our experiences using these tools with that definition in mind because it is the foundation for so many different academic publishing, government, and non-profit

1. The rationale for this is that when an authoritative body such as COPE sets out such strong guidelines it can be difficult for students to challenge it. Instead, we read more theoretical pieces on writing and authorship that gave students space to challenge the ideas of authorship. For example, *The Phaedrus* asks us to question how much knowledge a person must have to be able to make an argument. Students could question this idea in the age of AI.

requirements. COPE's criteria of "substantial contribution"[2] attempts to quantify how much someone has contributed to a project. Some professional organizations such as the ICMJE indicate that authors must be part of the writing/revising process as well as the study design, data acquisition, analysis, or interpretation of the data. Social science journals in Global Studies such as *International Organization, International Studies Quarterly, World Politics,* and *European Journal of International Relations* follow similar guidelines to ICMJE. Articles in humanities-oriented fields such as English are "very much a product of the writing process" and authorship is determined by who has completed the writing. Other forms of "contribution such as generation of ideas, commenting on a draft, or technical assistance is listed in the Acknowledgements" (COPE 2019). Still others such as The American Physical Society make no reference to the actual writing at all: "Authorship should be limited to, and should not exclude, those who have made a significant contribution to the concept, design, execution, or interpretation of the research study."

Part of the design of the course was to question if GenAI could make a significant contribution to the study design, analysis, interpretation of the data, and the written document in various disciplines in the class. In our classroom discussions and assignments, disciplinary expectations seemed to contribute to whether writers thought that GenAI did, in fact, contribute substantially to their work and might rise to the level of co-author. This section presents three distinct student perspectives on whether AI can be considered a significant contributor to writing, reflecting the complexities of integrating AI into authorship.

> **Sydney:** As an English major and future editor, GenAI does not offer significant contributions that rise to the level of co-author. To come to this decision, I draw on early experiences in English 202. In the first assignment, we had to argue what makes an author in my field. As an English major, the readings we did in class were directly applicable to my argument. Since I want to be an editor, I decided to approach the first paper as an editorial memo to an author who wrote a paper on authorship in the humanities. I asked ChatGPT to write the paper, and I used the editorial memo to critique the ideas that were generated. This allowed me to practice workplace writing and argue for what authorship is in English. From my prompt, AI wrote a paper on what it means to be an author, using various sources discussed in class. I then left feedback on ChatGPT's work and wrote an editorial memo overviewing my comments. Overall, ChatGPT did not write a particularly effective argument about what makes an author. In fact, it mostly regurgitated rudimentary ideas from the texts without much depth or consideration of the reader. One example of AI's writing in this paper is, "Socrates, through the lens of Platonic dialogues, laid the groundwork for questioning authority and conventional wisdom. The essence of Socratic dialogue is a cooperative and evolving intellectual journey, where the authorship is shared between the interlocutors." This is a basic idea that does not have any bearing on the assignment of whether AI could be an author or even what it means to be an author. The paper generated by the AI describes a dialogue in these sentences but does not go beyond that. Though it could insert knowledge about the topic into the paper, ChatGPT didn't contribute any new ideas or concepts to the discussion of authorship, which was part of the assignment.

2. We are bracketing the other requirement of taking responsibility because, as we noted earlier, AI cannot take responsibility so this is a non-starter for authorship according to COPE, but contribution is more nebulous and can be more richly explored.

Once my first editorial memo was complete for the first paper written by ChatGPT, I started working on a second one. I entered a slightly different prompt into ChatGPT to get a paper that had the same subject matter but wouldn't be identical to the first one. Though the paper addressed important theories and figures, AI once again failed to write at a deeper level, as evidenced by my feedback:

> I'd like to see a stronger establishment of your expertise or knowledge on this subject. When you introduce Socrates in paragraph 2 and Barthes in paragraph 3, there isn't enough background on either of them for readers to understand their importance. You say, "Roland Barthes introduced the concept of the 'death of the author' in his seminal essay" in paragraph 3, and then continue to talk about author death, but this introduction to Barthes is somewhat abrupt. Why were Barthes' and Socrates' ideas of authorship revolutionary? Talk about how these ideas were received at the time and how they have shaped your exploration of defining authorship.

This is just one example of ChatGPT's shortcomings as a writer, illustrating why it cannot make substantial contributions to this type of academic paper. While it can connect relevant information to a topic, when completing this assignment, it didn't have the ability to analyze those connections and their significance properly. Although I didn't collaborate with AI on the editing portion of the paper, I don't believe it would have been a helpful contributor either. Writing this feedback from an editor's perspective required a lot of analysis and critical thinking concerning the audience and how they may react to AI's writing. ChatGPT can provide suggestions to users when prompted, but like its writing in this paper, those suggestions are often surface level. Providing examples of good source materials, recommending ways to reword a sentence, and reinforcing audience expectations are all things AI can do, just not simultaneously the way an editor can.

Sydney's reflections reveal the critical limitations of AI's role in co-authorship, particularly its inability to engage with context in a meaningful way. Despite AI's ability to generate text and synthesize information, it struggles to contribute substantial, contextually relevant insights, which is crucial for co-authorship. When Sydney tasked ChatGPT with drafting a paper on authorship, the AI's responses were surface level, drawing on familiar but shallow interpretations of key concepts like Socratic dialogue and Barthes' theories. This lack of depth highlights a fundamental barrier: AI can repeat known information but fails to engage critically with the context, audience, or underlying nuances necessary to drive an argument forward. Interestingly, these things are also what students in English 202H often struggle with as they are learning the textures of audience expectations across disciplinary contexts. ChatGPT is not an expert in these areas, often knowing less than the student in this case. Unlike human collaborators who might engage in a dialogue about the proper way to address audience and context, the human collaborator with the AI will unilaterally make the decision to either use the text, modify it, or dismiss it. The power imbalance is askew.

This inability to connect deeply with the context reflects AI's fundamental shortcoming as a co-author—it can provide outlines, suggestions, and even textual content, but it cannot perform the intellectual labor required to develop ideas meaningfully, which Samantha also discusses below. Co-authorship requires more than assembling facts; it demands a collaborative process of

critical thinking, contextual understanding, and purposeful engagement with the material, audience, and purpose of the work. In Sydney's case, AI could not step into the role of a substantial contributor because it lacked the capacity to analyze and expand on the concepts it presented. It missed the opportunity to offer innovative or contextually resonant insights that would elevate the text beyond what is already known. This gap underscores the importance of human input in ensuring that contributions to a text are not only accurate but also relevant, insightful, and meaningful—traits that define substantial co-authorship.

> **Samantha:** I felt that while the scope of my paper improved by working with Perplexity, the tool did not substantially contribute to my final paper. For my second assignment in English 202, we needed to make an argument about how AI impacted our writing. In order to gather data for the paper, I used an assignment from one of my global studies classes. The assignment, which was to be written in Spanish, tasked me with writing about how AI may impact the future of translation. Given that ChatGPT supports 84 languages, I felt confident that it would effectively write in Spanish ("ChatGPT Language" 2024). I reflected on my experience writing this paper in my second English 202[3] essay. My goal for using GenAI in Spanish was to see if it could assist me with my writing process as a collaborator or potential co-author, not as a translator.
> The GenAI was able to provide me with a somewhat helpful outline, but it required revision because of its limitations. When I started the project, I began with the following prompt:
>
> > I am writing an essay about translation from Spanish to English and English to Spanish and its relationship with technological advancements. Specifically, about the development of AI and its impact on translation. Give me an outline of the essay with information and critical points.[4]
>
> Below is a shortened and translated outline of its response:
>
> I. Introduction
> II. Human Translation: Challenges and Limitations
> III. Technological Advancements and Automatic Translation
> IV. The Revolution of Artificial Intelligence
> V. Challenges and Criticisms
> VI. Benefits and Opportunities
> VII. Conclusion
>
> The outline was useful because I had not considered certain topics to add to my paper. ChatGPT's outline provided me with a strong foundation for an essay that involved a lot of moving components. Its suggestion to incorporate the history of AI and how it has advanced to where it is today (listed under critical points in heading III) was something I had

3. It is important to establish that I did not use LLMs to translate anything from English to Spanish, as this would not meet the criteria of the assignment.

4. For the purposes of this paper, I've provided the translation in the body of the text since I conducted the research in Spanish. In fact, this is the exact prompt I put into the program: "Escribo un ensayo sobre la traducción de español a inglés e inglés a español y su relación con avances tecnológicos. Específicamente sobre el desarrollo de IA y su impacto en la traducción. Dame un esquema del ensayo con información y puntos críticos."

failed to consider on my own. I can confidently say that ChatGPT substantially contributed to the framework of my paper regardless of the revisions I had to make. It provided me with a thorough outline that I used to guide the rest of my paper, an outline that would have certainly looked different had I done it fully on my own.

However, the headings provided were also problematic. I had to make two significant revisions. I changed point II to "Capabilities vs Limitations" instead of "Challenges and Limitations." and I changed point VI to "Opportunities for AI and Human Collaboration" from "Benefits and Opportunities" These revisions were necessary because the original results seemed to lean too heavily toward the benefits of AI translations. It felt like no mere coincidence that it only wanted me to discuss the downsides of human translation and not the many positive aspects, such as the fact that, as of 2024, humans are still the most accurate and reliable option when it comes to meeting one's translation needs. (Moneus & Sahari 2024). Heading VI faced a similar issue. To combat this, I revised it to join the two competing methods of translation together and offer a more uplifting message, one where humanity and AI can work side by side.

Samantha experienced that AI tools like ChatGPT can significantly reshape the writing process by providing support in planning and organizing content. These technologies can quickly generate outlines, suggest structural frameworks, and identify key points, allowing writers to focus more on developing their ideas rather than getting bogged down in initial organization. This assistance not only accelerates the early stages of writing but also helps writers visualize the flow of their work, making the drafting process more efficient. But in Samantha's major of Global Studies, she did not think that this support for her writing would rise to the level of substantial contribution. It amounted to helpful feedback from a peer or teacher–just a lot faster.

Daniel: I do believe that GenAI could be a substantial contributor to my scientific writing. AI-driven tools, powered by machine learning, are increasingly capable of processing vast amounts of research to suggest or optimize experimental protocols, write abstracts, and summarize findings concisely. AI can even assist researchers in automating complex statistical analyses, generating visualizations, or even suggesting ways to interpret data. In these cases, GenAI's contributions could be substantial enough to merit authorship if it meaningfully informs decisions or produces results that would otherwise require human intellectual effort. Beyond merely automating writing tasks, GenAI could assist in crafting sections like methods, results, and discussions. However, final editing and nuance would still need to come from human researchers to align with the subjective, conceptual framing of a paper. Regardless, framing is not a defining characteristic when considering authorship in science. The core of authorship is rooted in the generation and interpretation of ideas, the development of hypotheses, and the critical thinking involved in analyzing findings. Because AI can be used for these tasks, its contribution aligns with what is valued most in the scientific community—intellectual effort and innovation.

The nature of science plays a critical role in determining the legitimacy of GenAI as a co-author. Science relies on empirical observation to describe the natural world. In my experience, scientific writing's effectiveness is measured by the clarity with which it conveys real-world phenomena. I think this creates space for AI to be a meaningful contributor to scientific writing because AI's ability to generate precise language can be valuable in reporting empirical findings. Sections like methodology and results must focus on clear,

unambiguous reporting of procedures and outcomes, stripping down language to its most essential form to convey how the experiment was conducted and what results were observed. Since this clarity is paramount in effective science writing, AI would bring a valuable contribution to the text, even if the human collaborators provide the content for the AI to write about.

Daniel's discussion of AI's role in scientific writing highlights its potential to be considered a substantial co-author, especially within the structured nature of scientific communication. Science values precision, clarity, and replicability. AI's capacity to handle data analysis, generate visualizations, and draft standardized sections like methods and results aligns with these scientific standards. However, the substantial contribution required for co-authorship also involves generating and interpreting ideas—areas where AI can assist but lacks the human capacity for critical thinking and conceptual framing. Therefore, while AI can significantly contribute to the technical aspects of science writing, it struggles to meet the full intellectual and innovative demands that define true co-authorship in scientific inquiry.

This exploration underscores that while AI can support substantial portions of the writing process, particularly in repetitive or formulaic sections, it cannot independently fulfill the core authorship criteria of idea generation and hypothesis development. The nature of science writing—with its focus on factual accuracy and clear reporting—creates a unique space where AI contributions are valuable yet limited, suggesting that AI could be viewed more as an advanced collaborator rather than a full co-author.

The three reflections from various perspectives reveal that AI's contributions vary significantly across disciplines, offering some value in structuring content and generating ideas but often falling short in depth and critical analysis. While AI shows promise in the scientific context, where precise language and data handling are prioritized, it struggles in areas requiring nuanced argumentation and audience engagement. These perspectives underscore that while AI can assist in writing, it currently lacks the sophisticated capabilities that define human co-authorship.

Missing Piece of Authorship Definition: Collaboration

While Samantha and Sydney felt GenAI did not rise to substantial contribution because the work was not good enough, there was a bigger issue as to why each of them felt uncomfortable using GenAI. Samantha describes the experience best when she reflects on the fear she felt using GenAI tools: I did not engage with AI again until I had completed the Spanish paper. I chose to write completely on my own due to creative and ethical concerns. I feared that asking ChatGPT or Perplexity to write parts of my essay would cloud my judgment when it was time to revise. Additionally, I felt uncomfortable accepting unedited responses from AI to incorporate into my essay because I knew that there would be a substantial difference between its Spanish writing capabilities and my own. If I needed to revise something that AI wrote, I imagined that seeing the sentences written out would cause a mental block and prevent me from thinking through different ways to rephrase ideas, concepts, sentences, etc. As someone who is still actively learning Spanish, my writing process involves a lot of maneuvering and abstract thinking. I frequently say and write things in longer ways due to gaps in my knowledge. I fully accept this way of writing as my own and know that with time, I will be able to write more eloquently. My desire to find my voice in a second language perhaps prevented me from truly discovering AI's coauthoring abilities during this assignment.

Two distinct issues arose when trying to use GenAI. Samantha worried that she would not be able to write better than the AI at the grammatical level, and she fears that she might not have been contributing substantially if she used GenAI. She sees writing in her classes as a way of learning and developing her own writing style. Sam worries that she will lose her voice by inserting a dominant (and perhaps more fluent) writer into the mix. Relatedly, if she has a "mental block" to revise, then she might not be an equal or substantial contributor to her own paper. Samantha's experience underscores the ongoing tension between using AI as a helpful tool and the risk of diminishing human contribution. While AI can provide valuable support in areas like structuring or language proficiency, it also risks overshadowing the author's voice. This dynamic is particularly pronounced when AI's outputs are more polished or fluent than those of the human writer, leading to a seemingly false identity projected in the writing. The concern is that overreliance on AI might not only compromise the authenticity of the work but also shift the balance of authorship, where the machine's input is seen as more authoritative.

Samantha's experience highlights a core issue with only considering authorship as it relates to the final product of a piece of writing or research. The problem with COPE's basic definition of co-authorship (and others that focus on substantial contribution and accountability) is that it does not account for the *experience* of co-authorship and the role power plays in the co-writing process. It ignores the collaborative, socio-cultural, and socio-emotional aspects of co-authorship. Co-authorship requires collaboration, which requires a relationship between various contributors. Writing studies scholars have been examining the relational aspects of collaboration for decades (Bruffee, 1984; Ede & Lunsford, 2001; Lunsford & Ede, 1994; Pardede, 2024; Trimbur, 1989). Outside of writing studies, scholars are also examining how collaboration extends into co-writing practices across disciplines (Burchard, 2013; Kumar, 2015; Yeo, 2019). In studying the co-authorship practices of scientists and engineers, Ponomariov and Boardman (2016) find that relationships based on history, mutual trust, shared socialization or educational history, and frequent communication are more likely to result in co-authored publications. A more recent exploration into collaboration, Nordstrom (2021), argues that collaboration should be a mindset, not merely an act, that encompasses responsibility, generosity, and inclusivity. It decenters each individual and instead becomes a reflective experience, where every collaborator considers the rights, privileges, and responsibilities of their position within the team.

In recognition of varying degrees of positionality within a team, Nordstrom provides tenets for hierarchical collaboration. This includes addressing the concerns and interests of all participants as well as recognizing each's skills and shortcomings. Samantha found this power dynamic hard to establish with AI, despite being conscious of her own areas of strength and weakness. This imbalance of wanting to find her voice in her writing versus the heightened Spanish level of ChatGPT was not openly communicated or discussed, muddling the intricate pathways of collaboration.

In the course, Holly crafted two homework assignments that required the students to explore the idea of collaboration with humans and nonhumans. In one assignment, the students had to reflect on a 45-minute tutoring session with a writing center tutor; in the other, they had to reflect on a 1-hour session with a virtual tutor powered by ChatGPT using Oculus VR headsets. Daniel, Sam, and Sydney reviewed and reflected on their homework submissions in light of writing this paper.

> **Daniel:** My experience working with a virtual bot was biased by my extensive work with other generative AI tools, whose evolution I experienced beginning with the public

release of GPT-3. At the time we were tasked with conducting our VR sessions, GPT-4 had become accessible, and I had begun to utilize it for self-guided experimentation. GPT-4 is said to have upwards of 1 trillion parameters, surpassing GPT-3's 175 billion parameters (Knight 2023), to make it more capable of contextual "thinking," enabling it to better understand nuanced prompts, handle complex language tasks with increased precision, and begin to provide more "human-like" content and interactions across a wider range of topics. My expectation for working with the VR tutor was not just unmet but perhaps misplaced. The attempt to humanize AI through a VR avatar, while well-intentioned, ultimately made the interaction less efficient and more cumbersome. Our discussion felt stilted and robotic, and I struggled to remain engaged. After my session, I wrote:

> The VR conversation felt forced, and it took a seemingly endless series of questions to get beyond a reassuring response that I was "on the right track" or giving the paper "thoughtful consideration."

Overall, this experience made me question our desire to humanize AI. Are we better served embracing AI for what it is— a tool, rather than a surrogate human? Instead of attempting to humanize AI, perhaps we should focus on its potential to collaborate with us as a tool that enhances our abilities. My interaction with the VR tutor, while creating some initial uncertainty about the future of writing center practice, reinforced my belief that AI works best as a complement to human interaction, not a replacement. The dynamic, real-time feedback and personalized engagement in a live tutoring session—where human tutors and students collaborate and challenge each other's ideas—remains irreplaceable.

Prior to my VR tutor session, I had a productive session with a fellow tutor that led to breakthroughs I would have failed to achieve on my own within the same time frame. Having someone challenge my understanding of the topic was an entirely different experience than working with GenAI; it forced me to see a varying perspective and reanalyze my approach. Despite my positive experience, I still understood the necessity to question how my experience with, and as a tutor, could be replaced by the comfort of working independently with a generative AI tool. I understood that AI's creative capacity is inherently derivative and dependent on user prompts, but it is detailed and provides quick responses. In a post-COVID world, where students may prefer remote or independent learning environments, it is essential to consider how AI can coexist with human tutors. Rather than replacing live interactions, AI can support and enhance the tutoring process by handling routine tasks, allowing human tutors to focus on the higher-order, collaborative aspects of learning. As AI becomes more sophisticated, we should see it as a tool that facilitates deeper collaboration, ensuring that human engagement remains central to the learning experience.

Daniel's experience highlighted the limitations of trying to humanize AI, emphasizing that AI works best as a complement to human interaction rather than as a replacement. This idea is similarly developed by Samantha's reflection, which further explores the gap between human expectations and AI's capabilities in collaborative settings. Unlike Daniel, who questions the practicality of AI mimicking human tutors, Samantha's experience reveals how unexamined assumptions about AI's ability to collaborate can lead to disappointment. Her story underscores the importance of setting realistic expectations and understanding the distinct role AI plays in the collaborative process.

Samantha: Before first interacting with the virtual reality tutor, I formed my own expectations of the experience. I anticipated being able to converse with this AI avatar similarly to ChatGPT, but at a heightened, more immersive level that allowed for free thinking and sharing of ideas. Looking back, not only were my assumptions wrong, but perhaps unfair. My reflection shared the following note:

> I spent a lot of time describing in a slow, nearly robotic voice what I was working on, what I had done, and any tips she [VR tutor] had in mind. Speaking to her was not the only unnatural part. I had a hard time grasping what she was saying because it wasn't easy to switch from the headset to typing her suggestions into my phone. The way she talked with little tone made it difficult to feel like I was really engaged in the conversation. Instead, it felt like someone was reading me a response from an AI platform, in which case I would have greatly preferred to just read the AI output over listening to it.

There seems to be an inherent need to make the black box of Artificial Intelligence more palatable by transforming it into something human. However, my experience taught me that just because a human and AI avatar interaction might appear more natural, it is much harder to maneuver than simply typing into the LLM's input box. I also took note that, like with all new things, my less-than-ideal experience could have been a learning curve. Although I thought her answers were vague and simultaneously drawn out, it would be unfair of me to not consider what I could have done differently to enhance the experience.

Samantha's experience with AI was shaped by unmet expectations and a lack of clarity about what she sought from the interaction. She entered the virtual tutoring session anticipating a dynamic and engaging exchange that would mirror human collaboration. However, her disappointment stemmed not only from the AI's robotic responses but also from her own unexamined assumptions about what meaningful collaboration with AI would look like. This resonates with Lunsford and Ede's idea of collaboration, which emphasizes mutual engagement, shared goals, and the co-construction of knowledge. This reflection highlights how her preconceived notions led to an unfulfilling interaction, underscoring the importance of setting realistic expectations when working with AI.

While Samantha found her interactions with AI to be frustrating and uncollaborative, Sydney had a different experience that made her feel at ease using GenAI in both its textual and avatar forms. Lunsford and Ede highlight that effective collaboration is built on mutual respect, openness, and the willingness to share ideas without fear of judgment. Sydney's experience with AI reveals a unique dimension of collaboration—while she felt safe sharing her work with AI because it lacks human judgment, this trust was fundamentally different from the trust needed in human partnerships. Her reflection shows how AI's neutrality can create a distinct, yet limited, form of collaborative comfort.

Sydney: First, I want to note how sharing my work with the AI avatar felt. In my virtual reality reflection, I wrote that as an author sharing my work and ideas with an AI avatar, I "felt comfortable because it wasn't a real person capable of judgment. The avatar's facial expression never appeared judgmental, nor did it make rude or hurtful comments during our conversation." In human collaboration, it can be scary to share ideas with others in case they disapprove of or judge what I have to say, especially when receiving feedback

from people I haven't established trust in (Nordstrom). During my session with a live writing tutor over Zoom, I was mindful of what I did or didn't say, thinking "What if they think my ideas are dumb?" Going into my conversation with AI, it didn't occur to me to be nervous about the avatar's reaction because I trust that it doesn't have the same capacity for emotion or criticism as humans. However, it is important to acknowledge that because AI cannot judge, it failed to challenge my ideas. Sharing my thoughts for my paper wasn't stressful, and the avatar offered different aspects of story development to consider, yet it didn't question the central argument or how I would communicate it, both things that a good collaborator or co-author would do. The reassurance from AI was nice, but I wouldn't say it is enough to qualify as a meaningful collaboration.

In another session with AI, I tried to understand where the program comes from as it writes by asking AI about its writing process. It told me that it starts by analyzing a user's input, constructs a response using algorithms and statistical analysis, checks for coherence and grammar, and then adjusts based on feedback. In my reflection, I wrote:

> When looking at AI's writing process, I found it interesting that it was similar to mine. In our class discussions on AI, the idea of prompting it to come up with material made it feel like a machine; but when I wrote my response I realized that my writing process also starts with a prompt. Homework assignments, tests, essays, and even household chores come with prompts, yet I never feel less human or like a machine for following them. Another similarity I discovered is that AI values feedback on its responses, much like humankind. I use feedback to improve my current and future writing to communicate more effectively and improve my grades; AI uses feedback to improve its responses and become more knowledgeable. However, I wouldn't say that AI's motives for writing - if it has any - are entirely altruistic since it only writes to satisfy humans' needs, not because it yearns to write.

This suggests that a connection between AI and myself is possible, a fact I thought was improbable. When considering the connection between collaborators I thought mostly of getting to know someone's interests, hobbies, or family life—all things that AI doesn't have.

Sydney's reflection features a unique form of trust in collaboration with AI that contrasts with traditional human interactions. Unlike human collaborators, AI offers a judgment-free environment, creating a space where fear of criticism is absent. This lack of emotional response removes the barriers often present in human collaboration, such as self-doubt and apprehension about feedback. Sydney's comfort in sharing her work with AI indicates how the absence of judgment can foster a sense of openness and experimentation that is difficult to replicate with human collaborators. Of course, Sydney could have prompted ChatGPT to provide her critiques of her work and it would have searched for flaws in her logic, prose, development, and a list of other areas for revision. However, the human writer must request that information from the AI; human collaborators could offer that without an explicit request. While this might be positive in the drafting and brainstorming stages of writing, it does not replicate a true collaborative experience that requires writers to not only support each other but also push on the ideas that will inevitably be challenged by peer reviewers or public readers.

Collaboration, the Classroom, and AI

In Sydney's exploration of ChatGPT's writing process, she found surprising parallels between human and AI workflows. This insight might invite a reconsideration of what counts as meaningful contribution and collaboration—suggesting that while AI can engage in parallel processes, it does so without the relational and intentional aspects that define traditional collaboration. The reflection makes us wonder if collaboration with AI could represent a new, distinct form of partnership. If this is the case, then the writing classroom can be a space to help students learn to work with these tools.

For quite a long time, collaboration has been a hallmark of modern writing education, and writing teachers have been teaching students how to effectively collaborate with peers as part of any writing course. In 2014, the Council of Writing Program Administrators[5] (CWPA) codified this expectation by creating a position statement on first-year writing which includes multiple outcomes related to collaboration (e.g. "experience the collaborative and social aspects of writing processes" and "participate effectively in collaborative processes typical of their field"). Writing faculty teach to these outcomes in a variety of ways: feedback from classmate's peer review or writing center visits are two common paths for encouraging students to listen to others, consider the audience, and revise accordingly. While the CWPA statement only directly addresses first-year writing, it makes clear that students' writing over time "will diversify along disciplinary, professional, and civic lines as these writers move into new settings where expected outcomes expand, multiply, and diverge." Depending on the purpose of the course, specific disciplinary or workplace expectations will also govern the types of collaboration and co-writing that students might do, and thus, teachers need to continually teach students how to engage collaboratively with other writers, no matter the context.

While collaboration with an AI does not rise to the standards that have been set out by previous theories (Nordstrom, Ede & Lunsford) based on human collaboration, we have learned through this class and experience writing this article that the writing classroom can be a place where we can start to define a new kind of collaborative practice. Writing instructors need to do the following to make the experience meaningful:

> **Identify Strengths of Each Collaborator:** This initial step sets the foundation for a productive partnership between the human writer and AI by fostering self-awareness and mutual understanding. Encouraging both the human writer and the AI to articulate their strengths and areas of struggle helps identify the unique contributions each can bring to the table.
>
> **Define the Roles of Each Collaborator:** Samantha's reflection indicated that she felt unfulfilled by the collaboration because she had a set of unrealistic expectations going into the experience. Establishing what role each contributor will take can mitigate this emotion. For the human writer, this introspection allows them to lean into their role—whether it's crafting compelling narratives, drawing from personal experience, or using an engaging tone. Simultaneously, it highlights where they might face challenges, such as structuring

5. The Council of Writing Program Administrators is a national organization of people who direct writing programs and writing centers. It is considered one of the key professional societies that provides guidance and insight on writing programs.

complex information, maintaining objectivity, or managing repetitive tasks that can drain creative energy and how they can use the AI to help them.

Appropriate Prompt Generation: Writing teachers spend a lot of time helping students articulate their feedback to peers. We often talk to students about the compliment sandwich method, using examples, giving alternatives, responding with "I" statements, etc. Similarly, instructors need to teach students how to prompt AI to get the responses that they need to accomplish a task.

Reflection: Finally, students who are learning to collaborate need time to reflect on how much they contributed to the project, how much the AI contributed to the project, and to think about how their initial expectations were met or challenged by the experience.

Conclusion

When we all began English 202 together, we started with a question about the nature of authorship and how GenAI might impact the writing process. Most students, including Daniel, Samantha, and Sydney, each defined authorship as someone bringing significant knowledge and experience to a problem and co-writing effectively with others. In the context of the course, none of the students found that GenAI could rise to the level of authorship, and Daniel, as a STEM major, was the only student who imagined that GenAI could rise to the level of a significant contributor. In writing this article, we found that significant contribution to an article should not be the only indicator of authorship because it ignores the collaborative process of writing, but we also found that current theories of collaboration are insufficient for thinking about collaborating with non-humans. We offer some suggestions for how writing teachers might support human writers to have effective collaborations that will look quite different than human interactions.

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