



Artificial Intelligence in a Writing Intensive Lifespan Development Course: Rates and Functions of Student Usage

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Abstract

Artificial intelligence (AI) has transformed usual processes of higher education, including teaching with writing. Grounded in sociocultural theory, this study considers the role of generative AI (GenAI) within students' zone of proximal development, where learning is supported through scaffolding that bridges what students can do independently and what they can achieve with guidance. Students ($n = 114$) enrolled in a writing intensive, lifespan development course in Fall 2024 completed eight writing assignments and disclosed any GenAI use; specifically, they could submit no more than a paragraph of their writing to a GenAI tool to solicit feedback that could be applied throughout the papers. Required AI disclosure statements revealed infrequent GenAI use, with only 22 unique users of GenAI for less than 8% of the assignments. Thematic analysis of the disclosure statements revealed three themes of use: writing mechanics, higher-order writing concerns, and content understanding. Despite students reporting that GenAI feedback was helpful, the impact on writing scores and final grades were mixed. Findings highlight the complex role of GenAI as a potential scaffolding learning assistant and suggest implications for instructors seeking to strategically incorporate GenAI into teaching with writing.

Keywords: Higher Education; Writing Pedagogy; Artificial Intelligence; Teaching with Writing

1 Introduction

The widespread adoption of open generative artificial intelligence (GenAI) tools in higher education accelerated with the release of ChatGPT in 2022, marking a turning point in making advanced GenAI widely accessible to faculty and students. Alongside this, the digital transformation driven by COVID-19 further pushed institutions toward adopting GenAI; these tools have become ubiquitous, transforming traditional processes by enabling more innovative and flexible approaches to teaching and learning (Haleem et al. 2022; Owoc et al. 2021). GenAI systems have evolved not only to deliver information but also to act as co-creators of knowledge, mentors, and assessors. When used strategically, GenAI can make resources more accessible and can foster student engagement through intuitive digital tools.

The new AI tools are generative, meaning they can produce novel sentences, images, and other output that higher education has traditionally used to assess student understanding and mastery. Thus, it is essential that educators understand how GenAI is being used in higher education (Crompton and Burke 2023). Current estimates on GenAI usage rates vary, and relatively few studies specifically address GenAI usage rates for writing. Website surveys have found that a majority of students report using GenAI tools; for example, [campustechnology.com](https://www.campustechnology.com) surveyed over 5000 college and graduate students internationally and found that 86% reported using GenAI tools to support their academic work. Harvard's Center for Digital Thriving, in partnership with Common Sense Media and Hopelab (2024) surveyed 1,274 U.S. students aged 14-22 and found that 51% reported using GenAI at some point, with 11% using once or twice weekly and only 4% using daily. Peer-reviewed research has reported, in general, somewhat lower usage rates. For example, in a sample of 296 college students, [Strayhorn \(2025\)](#) found that 70% reported using Grammarly and that 54% used other GenAI tools for writing assistance. Given its prevalence, it is imperative that educators understand how students use and perceive GenAI in writing and make course decisions to promote learning.

Recent studies highlight the benefits of integrating GenAI into higher education, including improved personalization, increased efficiency, and novel instructional supports (Haleem et al. 2022; Tapalova and Zhiyenbayeva 2022). In the context of writing tasks, GenAI can assist users in brainstorming ideas, organizing thoughts, improving language clarity, and refining grammar and style. Rather than replacing original thinking, strategic GenAI use encourages deeper student engagement by providing feedback, examples, and structural support (Black and Tomlinson 2025; Wang et al. 2024). Furthermore, when students receive guidance on effective GenAI use, they develop a clearer understanding of its limitations and learn to apply it as a valuable supplement to their own creativity and effort.

Despite the benefits and growing adoption of GenAI in education, its use in writing tasks introduces several risks and implementation challenges. From the student perspective, GenAI use has been linked to reduced decision-making skills, increased passivity, and heightened privacy concerns. A study involving students in Pakistan and China found that over two-thirds associated GenAI with laziness and privacy risks, and more than a quarter reported a decline in decision-making ability (Ahmad et al. 2023). These findings suggest that over-reliance on GenAI may undermine students' critical thinking and motivation. Ethical concerns are also prominent. While students express appreciation for GenAI support in writing, they may also raise concerns about fairness, academic honesty, and over-dependence (Farhi et al. 2023). While many saw GenAI as a helpful tool, they cautioned that excessive use could compromise the purpose of education by discouraging original thinking and creative effort.

At the institutional level, the successful integration of GenAI in education depends on several foundational components. A clear strategy is needed to define the goals of GenAI use, ensure alignment with educational priorities, and guide implementation across courses and departments. Organizational readiness involves preparing faculty, staff, and students by offering professional development, technical training, and clear

policies on ethical and effective GenAI use. Reliable data governance ensures that student data used by AI systems are managed securely and ethically, with attention to data quality, privacy, and access. Finally, compatible infrastructure, including both hardware and software, should support the integration of AI tools within existing learning platforms and ensure seamless, scalable performance. Without coordinated efforts across these areas, institutions may struggle to implement GenAI in ways that are both pedagogically sound and operationally sustainable (Owoc et al. 2021). Data governance presents a particular concern, as GenAI systems depend on high-quality, secure, and well-managed data. Weak oversight in this area can lead to issues with accuracy, privacy, and system reliability (Owoc et al. 2021). Overall, when implementing GenAI in writing education, it is important to take a thoughtful approach that upholds ethical standards, supports student growth, and ensures innovation enhances rather than replaces meaningful learning experiences.

Recent research highlights the potential of GenAI tools to enhance college student writing when integrated thoughtfully into instruction. For example, Sumakul et al. (2022) found that English as a Foreign Language (EFL) learners reported positive experiences using GenAI in writing classes, noting that it helped them learn theoretical concepts, expand vocabulary, and improve grammar throughout the writing process. In addition, students using GenAI tools to complete writing assignments not only benefited from the tool's structured templates and polished language but also became aware of its limitations, particularly its tendency to produce vague or generic content (Wang et al. 2024). Similarly, in a large undergraduate course on sustainability and technology, Black and Tomlinson (2025) found that students used GenAI for a range of writing-related tasks, including conceptual analysis, evidence generation, and revision. While students appreciated GenAI's ability to enhance clarity and efficiency, many expressed a commitment to preserving their own intellectual contributions. Collectively, strategic integration of GenAI into writing instruction can promote not only technical improvements but also reflective and ethical engagement with the writing process.

GenAI is undeniably changing the process of writing as well as the process of teaching with writing. The sociocultural theory of writing is well-equipped to help instructors integrate GenAI strategically in the writing process. Sociocultural theory assumes that learning and development are social processes that incorporate the tools of the culture (Vygotsky 1980). A key concept of the theory is the zone of proximal development (ZDP). The ZDP extends beyond what an individual can do independently and includes the tasks an individual can achieve through interactions with a more knowledgeable other. As an individual develops and achieves independence in achieving learning outcomes, the more knowledgeable other (e.g., teacher, tutor, peer) alters their support and the ZDP shifts to more complicated tasks and outcomes that had previously been impossible to accomplish. The sociocultural theory of writing, then, assumes that writing development requires interaction and regular feedback from instructors, tutors, peers, or even GenAI—a tool of the culture. It assumes that support should be dynamic so that as students show mastery of learning outcomes, the nature of the support changes. Scaffolding assignments is one way that this occurs (Hodges 2017; Al Hamdani and Yousif 2025). Assignments are completed in logical steps with feedback from a more knowledgeable other throughout; thus, as students incorporate feedback in future steps, they are able to achieve learning outcomes and produce a higher-quality assignment than what they could have done independently at the beginning of the semester.

1.1 Aim

In this study, we explore how students use GenAI in writing, examining its role in supporting students' learning process in writing. The study seeks to understand how AI serves as a scaffold that helps students progress from mastering basic conventions of academic writing to engaging in complex cognitive processes such as planning, revising, and integrating disciplinary knowledge, ultimately highlighting GenAI's potential to enhance both writing development and deeper learning. With a mixed-method approach, we aim to answer the following research questions:

1. How frequently did students disclose GenAI use in writing?
2. Were writing scores and final grades different for those who used GenAI and those who did not?
3. For those who used GenAI, how did they use it, and was it helpful?

2 Methods

2.1 Course Overview: GenAI in Lifespan Development Writing Intensive Course

We conducted the study in an introductory, writing-intensive 4-credit-hour course covering lifespan development. The course covers a wide range of material, including human development from conception to death, the influence of context on developmental trajectories, and the development of professional writing skills for social sciences. Students attended two large lectures each week and participated in weekly small discussion labs led by a graduate teaching assistant (TA). Their evaluations assessed both their comprehension of the course material and the quality of their writing.

We designed the course intentionally to encourage appropriate GenAI use using tenets of the sociocultural theory of writing (e.g, scaffolding assignments; frequent feedback; using AI as both a tool of the culture and as a more knowledgeable other for writing feedback) and existing strategies for integrating AI into writing instruction. [Wang et al. \(2024\)](#) identified four such strategies: (1) Being aware of individual differences and personalizing writing tasks; (2) designing effective evaluation rubrics; (3) offer training for educators; and (4) provide instruction for students on AI use. The specific strategies we used in the course are described below.

2.1.1 Personalized writing tasks

For the large, scaffolded literature review assignment, students chose one of seven prompts that address different topics (e.g., physical health habits, social media engagement, school readiness, successful aging, in-

timate relationships). For each prompt, students selected the appropriate developmental period and developmental theory. Despite the choices, all prompts required: (1) a review of relevant literature; (2) a discussion of physical, cognitive, and socioemotional development; (3) integration of developmental theory; and (4) five suggestions for an identified audience (e.g., parents, teachers, adolescents). With these choices, students were able to personalize the writing so that the topics could be relevant to their majors or personal interests. Further, students wrote three, one-page reflections, all of which were based on students' personal experiences.

2.1.2 Effective rubrics

Rubrics were detailed and incentivized the AI disclosure statement. In addition, teaching assistants (TAs) responsible for the lab sections provided examples and guidance on how to write an AI disclosure statement, ensuring that students gained hands-on experience with the process before using GenAI independently. The TA team also followed a standardized grading approach to maintain consistency across labs, applying a detailed rubric that both incentivized completion of the AI disclosure statement and ensured fairness in evaluation. The rubric clearly stated a 5% point deduction if the AI disclosure statement was missing or incomplete. To further promote responsible use of sources and minimize reliance on GenAI-hallucinated sources, students also were required to include the DOI numbers and annotated PDFs of the outside sources they used and listed on the reference list.

2.1.3 Training for educators

TAs and the instructor attended a department-wide AI training and the instructor held another training just for TAs specific to this course to better understand the boundaries of appropriate GenAI use in the classroom. Gaining this clarity allows educators to collaborate with GenAI more effectively in support of student learning.

2.1.4 Instruction for students to use AI

Early in the semester, both lecture and labs introduced GenAI, how it works, how it can be harnessed appropriately in the course, and common pitfalls to avoid. In lecture, students were encouraged to discuss and

ask questions about course AI policies, and in lab, students were guided through a hands-on activity to practice effective prompting, critical review of output, and ethical use of GenAI. For example, the activity required developing a prompt, annotating the output for errors, bias, incomplete information, and sources. Because students had struggled to ask effective questions that enabled GenAI to provide ethical responses aligned with class requirements (providing feedback rather than re-writing passages), the students were also provided a resource, titled “Using AI as Your Writing Tutor,” developed by the instructor that included four elements of a successful prompt: provide context, give GenAI a role, be explicit with what the tool should and should not do, and define the output (Mollick 2024). It also provided example prompts for revision of a paragraph of writing¹ and prompts for idea development and brainstorming.²

2.1.5 Hands-on activities

We also included more active learning elements to the lecture, with hopes that it promoted engagement, knowledge, and sense of self-confidence and investment in the topic; ideally, this competence and confidence would prevent relying on GenAI to replace their own thinking.

2.1.6 Policy

The goal of the course is to teach writing as well as teach the content through writing. We wanted to allow GenAI use only in a way that supported students’ writing development, critical thinking, and understanding of the content. Thus, we allowed GenAI use as a writing tutor—to give feedback on their writing and mechanics, to help identify gaps in their logic, to provide immediate dialogue about an idea or approach, or to highlight places where a statement or a conclusion is

1. Example

Here is one paragraph. Can you check grammar, sentence structure, cohesion and whether my claims are supported with scholarly evidence. Please only provide feedback that will help me revise. Do not re-write the paragraph. Does this introduction paragraph clearly preview the structure and argument of my paper? Can you suggest where I could add more explanation or examples to support my points?

2. Example

What are some questions I should try to answer if I’m writing about topic for an academic audience?

unsupported by research. All the ideas and words must be the students' own. There were no restrictions on which GenAI tool could be used. Only one paragraph of students' writing could be submitted per assignment (not the whole assignment, to protect students' intellectual property). All writing assignments required a disclosure statement where students could indicate whether they did or did not use GenAI. If they did not use GenAI, they stated as such. If they used it, their disclosure statement was more involved to include how they used GenAI, what prompt they used, and a reflection on whether it was helpful and why. They also needed to keep their metadata and produce it upon request. Including metacognition and reflection was important for a few reasons: (1) it helped the TAs and instructor have some oversight to determine whether use was appropriate and to get a sense of what was happening in the course; (2) it held students accountable (hopefully knowing that they will have to disclose what they did and why prevented some from going overboard); and (3) it helped students learn more about GenAI, its benefits, and its limitations.

To answer the research questions, we analyzed the AI disclosure statements from the Fall 2024 semester for the in-person, writing intensive lifespan development course. The Institutional Review Board at our university approved this as a quality improvement project (2120527); thus, informed consent was not required. This course had an enrollment of 114 students (see [Table 1](#) for demographic information). The students were primarily sophomores (20.4%) and represented a variety of majors (most frequent majors listed were Health Sciences 29.2%, Nursing or Pre-Nursing 15.9%, and Psychological Sciences 11.5%). There were eight writing assignments that required AI disclosures: three personal reflections, and five scaffolded assignments for the larger literature review (i.e., prospectus, detailed outline, draft one for peer review, draft two for TA feedback, draft three). A total of 912 writing assignments were submitted, and 79 were missing AI disclosure statements (8.6%); thus, we analyzed 833 AI disclosure statements.

	Category	n	%
Gender	Female	91	79.44
	Male	23	20.56
Age	18	8.41	10
	19	58.88	67
	20	28.04	32
	21	0.93	1
	22	0.93	1
	>22	2.79	3
	Race/Ethnicity	White	88
	Hispanic/Latino	10	8.41
	Black or African American	6	5.61
	Two or More Races	4	3.74
	Asian	2	1.87
	Race and Ethnicity Unknown	2	1.87
	Native Hawaiian or Other Pacific Islander	1	0.93

Table 1: Descriptive Statistics by AI Use Group ($n = 114$)

To examine whether there were group differences in writing scores or final grades between students who used GenAI in their writing assignments and those who did not, we conducted two independent samples t-tests. The dependent variable was the final writing grade or writing assignment grade-only, and the independent variable was GenAI use (0 = no AI use; 1 = used AI).

2.2 Thematic analysis of AI disclosures

To analyze how students used GenAI in their writing assignments, we conducted a thematic analysis of open-ended AI use disclosures (Braun and Clarke 2019). First, we identified participants who both used GenAI in their assignment and completed the AI-use disclosure statement. All responses were organized and coded in an Excel spreadsheet. Using an inductive approach, the first author closely reviewed each segment to

identify recurring patterns. The segments were coded under one or more themes, which allowed us to capture the varied ways students engaged with GenAI in their writing assignments. This initial round of analysis generated three emergent themes: writing mechanics, higher-order concerns, and content understanding. Next, a second coder applied the three themes to independently code all responses. After one round of discussion, both coders reached consensus on coding and collaboratively developed clear definitions for each theme.

3 Results

3.1 Tests of Assumptions

Given the large difference in group sizes (AI group $n = 22$, 19.3%; non-AI group $n = 85$, 74.56%, 7 non-responders, 6.1%), we assessed key assumptions carefully. Normality of grade and writing distributions for the GenAI-user and non-user groups were evaluated using Shapiro-Wilk tests. For the user group, the p -values for the final grade ($p = .200$) and the writing scores ($p = .120$) were above .05; thus, we can assume normal distribution of scores. The non-user group, however, had p values below .05 ($p < .001$ for both final grades and writing scores); normal distribution cannot be assumed for this group. Levene's test was used to assess homogeneity of variances; for both final grades ($p = .974$) and writing scores ($p = .388$), the p -values are above .05, so this assumption was met. A power analysis indicated that our sample size was insufficient to detect medium effect sizes (Cohen's $d \geq .50$) with adequate statistical power (80%) at $\alpha = .05$. The achieved power was .55, which is below the recommended threshold of .80. Thus, this analysis is exploratory and results should be interpreted with caution. Given the small sample size and the inability to assume normality in one group, we also employed the Mann-Whitney U nonparametric test, which evaluates differences in distributions rather than solely differences in means.

3.2 Frequencies of Use

Of the 833 total submissions in the course, 65 (7.8%) AI disclosure statements indicated GenAI use. Use was the highest for the first assignment, which was a one-page paper where the student selected the prompt, identified the developmental period and theory to be used, and used scholarly evidence to explain the importance of the topic ($n = 16$). GenAI use disclosure was lowest for 1-page personal reflections ($n = 6, 5, 6$, respectively), and the detailed outline for the literature review ($n = 6$). For the literature review drafts 1, 2, and 3, GenAI use disclosure increased slightly ($n = 9, 9, 8$, respectively).

3.3 Student Grades

There were 22 unique users of GenAI throughout the course, and of those 15 were repeat users. Those who used GenAI to support their writing earned higher final letter grades than did their non-AI using counterparts (for example, 63% of GenAI users earned an A letter grade, but 44% of non-users earned an A). When looking at final scores as a continuous variable and not discrete letter grades, an independent t-test revealed that non-users of AI scored a mean difference of 3.71 percentage points higher than users, with a 95% confidence interval ranging from -0.24 to 7.65 . There was no statistically significant difference in final grades between students who used GenAI and those who did not, $t(105) = 1.86$, $p = .065$. Similarly, there was no statistically significant difference in writing scores between students who used GenAI and those who did not, $t(105) = 1.23$, $p = .222$. The mean difference was 2.93 points (95% CI: -1.80 to 7.65), with non-users having the higher mean score.

Because of the low sample size and because only the users group met assumptions of normality, we used the Mann-Whitney U test to detect group differences in score distributions. This test uncovered a statistically significant difference between groups. Students who used GenAI had significantly lower final grades (mean rank = 40.11) than those who did not (mean rank = 57.59), $U = 882.50$, $p = .019$. Students who used GenAI had significantly lower writing scores (mean rank = 40.7) than those who did not (mean rank = 57.44), $U = 895.50$, $p = .024$. The effect sizes for

final grades and writing scores ($r = .22$, $r = .21$, respectively) are small, so while there is statistical significance, it may not represent a meaningful difference.

	AI Users ($n = 22$)		Non-Users ($n = 85$)					Effect Size	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i> (105)	<i>p</i>	95% <i>CI</i>	Cohen's D	
t-test	Final Grade	86.44	7.97	90.14	8.40	1.86	.065	[-0.24, 7.65]	.446
	Writing Score (continuous)	82.18	7.10	85.11	10.56	1.23	.222	[-1.80, 7.65]	.294
Mann-Whitney U		Mean Rank		Mean Rank		<i>U</i>	<i>p</i>		<i>r</i>
	Final Grade (non-normal)	40.11		57.59		629.50	.019*	-	.22
	Writing Score (non-normal)	40.70		57.44		642.50	.024*	-	.21

Table 2: Group Differences in Final Grades and Writing Scores: t-Test & Mann-Whitney U Test

Notes:
 $p^* \leq 0.05$, $p^{**} \leq 0.01$, $p^{***} \leq 0.001$;
M = Mean;
SD = Standard Deviation;
CI = Confidence Interval.

3.4 How Students Used GenAI

Through thematic analysis of 64 segments from the open-ended responses, we found that students used GenAI as a multi-functional writing tool, revealing three overarching patterns: writing mechanics, higher-order issues, and content understanding. Writing mechanics describes students' use of GenAI to enhance sentence-level clarity, correct grammar,

adjust tone, and improve overall fluency. This was also the most commonly observed theme in the current study. Students described using GenAI for “grammar corrections.” And one student asked questions like “How can I make this sentence more formal?” to improve their wording, suggesting that GenAI was frequently employed to refine surface-level elements. Others noted using GenAI to revise specific phrasing, such as “refining sentences like ‘such an age,’” indicating attention to style and readability.

The second theme, higher-order issues, reflects students using GenAI to enhance the structure and flow of their writing. One student noted that GenAI helped them with “suggestions on improving the flow of the ideas,” while another mentioned “strengthening transitions between sections for a much better flow.” As practicing professional writing was one of the goals for this course, some students also used GenAI to adjust the overall tone, as reflected in comments such as “improve my professional tone while writing.” These examples suggest that students saw GenAI as a tool for improving the coherence and sophistication of their writing beyond simple edits.

The last theme, content understanding, reflected students’ use of GenAI to engage more deeply with course concepts and strengthen connections between their ideas and theoretical frameworks. For instance, students reported using GenAI to assist in the “justification of [their] selected theory” or to “add more real-world examples that would reinforce the application of Bandura’s theory.” One student also noted that GenAI helped identify a mismatch between their content and the theory, stating that their writing “did not correlate Erikson’s belief of adolescent development.” These responses illustrate how some students used GenAI not only for writing assistance but also as a tool for conceptual clarification and reflection, especially in writing assignments that ask students to show their understanding of a concept or theory.

Theme	Definition	Examples
Writing Mechanics	Using AI to improve sentence-level clarity, grammar, tone, and fluency by refining how writing sounds and reads.	<ul style="list-style-type: none"> • "How can I...improve my wording?" • "Specifically, for grammar corrections..." • "Refining sentences like 'such an age'..."
Higher Order Issues	Using AI to enhance the structure, flow, organization, or tone of paragraphs or the entire piece of writing.	<ul style="list-style-type: none"> • "Suggestions on improving the flow of the ideas." • "Strengthening transitions between sections for much better flow." • "Improve my professional tone while writing."
Content Understanding	Using AI to evaluate or strengthen the connection between ideas and core concepts or theories relevant to the topic.	<ul style="list-style-type: none"> • "Justification of my selected theory (Bandura's social learning theory)." • "Adding more real-world examples that would reinforce the application of Bandura's theory." • "Did not correlate Erikson's belief of adolescent development."

Table 3: Themes Identified in Student AI Use Disclosures.

Notes: $n=64$, where n indicates the number of AI disclosure statements (also segments)

Most instances (76.9%) of total GenAI use disclosed included multiple themes; of the 50 disclosures with multiple themes, 44 included writing mechanics (88%). Eight disclosures (12.3%) indicated using GenAI for all three themes.

Together, these results demonstrate that students employed GenAI in diverse ways, ranging from surface-level edits to deeper engagement with disciplinary content, highlighting its potential as both a technical and cognitive scaffold in academic writing.

4 Discussion

Consistent with previous research findings (Black and Tomlinson 2025; Wang et al. 2024), we found that students used GenAI for different

purposes, including writing mechanics, higher-order issues, and content understanding. Because students usually utilize GenAI for multiple purposes, we can conclude that GenAI can serve as a multi-functional tool that can assist students in different aspects of writing.

In addition, GenAI acts as a more knowledgeable other that through interaction and immediate feedback may help scaffold students within the zone of proximal development, the space between what learners can do independently and what they can achieve with guided support (Vygotsky 1980; Al Hamdani and Yousif 2025). For example, students' use of GenAI to refine grammar, tone, and sentence fluency (writing mechanics) may help internalize basic conventions of academic communication. GenAI assistance with paragraph organization, transitions, and tone (higher-order issues) suggests students' consideration of more complex literary tasks, such as planning and revising, which are typically developed through dialogue and modeling. Students' writing and revision practices may be shaped by how GenAI tools suggest rewording and refining their language. Skills of revising, always important in writing, become critical in the world of GenAI. Finally, the theme of content understanding illustrates that some students are using GenAI to engage more meaningfully with disciplinary content. This includes using GenAI to clarify theoretical concepts, evaluate the accuracy of explanations, and generate relevant examples that connect abstract ideas to real-world applications. Such uses align with the Vygotsky (1980) view that writing is not merely a technical skill but a tool for knowledge construction situated within social, cultural, and academic contexts. By interacting with GenAI to interpret and apply course concepts, students participate in a learning process in which language and tools support the internalization of disciplinary thinking.

While the themes of GenAI use can be linked to the sociocultural theory of writing, our results do not suggest a linear progression of writing whereby students move from mechanics to higher-order issues to content understanding through the course of the semester. Rather, our results create a snapshot of where students are within their broader college writing

development. While a clear understanding of what writing development looks like in higher education is debated, a general consensus is that it begins with basic writers who focus on grammar and writing mechanics. Because this course served primarily first- and second-year students, it is unsurprising that most of the GenAI use disclosed was focused on writing mechanics. Beyond basic writing, the development of writing has been described as an ability to produce more complicated writing forms and to juggle an increasing number of complex literacy tasks in addition to writing mechanics, such as deep reading, simultaneous consideration of multiple perspectives, and critical analysis (Carroll 2002). Consistent with this conceptualization of writing development, the results of this study indicate that GenAI was most often used for multiple literary tasks at once. Only 23.1% of AI disclosure statements indicated using GenAI for a single use.

Although students disclosed that they believed GenAI was beneficial in their writing, those who used GenAI had lower writing scores overall compared to non-AI users. There could be several explanations for this discrepancy. For example, it is possible that less skilled writers used GenAI; using it might have improved their skills, but not enough to equal a more skilled writer. Similarly, it is possible that those who used GenAI as a writing tutor for a paragraph of writing (consistent with course policy) might have felt that paragraph improved, but they may not have been skilled in generalizing its feedback and applying it throughout their papers, which would have yielded a higher overall writing score.

These conclusions should be interpreted with caution, as our sample and effect sizes were small. A small percentage of students disclosed using GenAI—smaller than what previous research would suggest—and an even smaller subset indicated repeated use. This limited disclosure may be influenced by individual factors such as current grades, confidence in writing ability, or unmeasured group differences. Additionally, the academic year may help explain why GenAI users had lower writing scores overall compared to non-users. First-year students, who represented 15% of the current sample, are still developing a “questioning mindset” and

often struggle to achieve the critical distance needed for strong academic writing (Sommers and Saltz 2004). If many GenAI users were concentrated in earlier years, their novice status as writers, rather than GenAI use alone, may partially account for lower scores. It is also possible that actual GenAI use was higher than reported, with some students withholding disclosure due to uncertainty or discomfort about admitting their use.

From a sociocultural perspective, GenAI tools can function as a scaffold that supports students' progression from what they can do independently to what they can achieve with guided assistance. In this sense, GenAI use is not inherently detrimental or beneficial but rather depends on how it is embedded within intentional instructional practices. For example, freshmen or recent transfer students may be more likely to use GenAI to fill gaps in their skills or confidence, seeking support at an earlier stage of development. However, without structured guidance, reliance on GenAI could lead to superficial learning rather than the deepening of writing competence. Future courses should include opportunities for supervised writing and guided practice using GenAI ethically.

Instructor modeling is especially important for fostering ethical and transparent GenAI use. By openly sharing our own practices, including when we rely on GenAI for class tasks and how we document that use, we can normalize disclosure, reduce stigma, and establish clear expectations. As suggested by Vygotsky (1980), learning occurs in social contexts where tools and language mediate development. Demonstrating transparent GenAI use provides a live example of how technology can function as a legitimate learning scaffold rather than a shortcut.

In promoting writing as both a skill to be learned and a means of learning disciplinary content, we now face the additional responsibility of cultivating critical AI literacy. The goal is not only to help students write effectively but also to teach them to engage with GenAI in ways that enhance, rather than replace, meaningful learning. This requires balancing appropriate

boundaries and supports so that GenAI use facilitates progress within the ZPD rather than bypassing it.

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Generative AI Use

Generative AI was not used at any point in this project.

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References

AHMAD, Sayed Fayaz, HAN, Heesup, ALAM, Muhammad Mansoor, REHMAT, Mohd. Khairul, IRSHAD, Muhammad, ARRAÛO-MUÛOZ, Marcelo and ARIZA-MONTES, Antonio, 2023. Impact of artificial intelligence on human loss in decision making, laziness and safety in education. *Humanities and Social Sciences Communications*. Online. June 2023. Vol. 10, no. 1. DOI [10.1057/s41599-023-01787-8](#).

AL HAMDANI, Dawood and YOUSIF, Jabar H., 2025. Artificial Intelligence Revolution for Enhancing Modern Education Using Zone of Proximal Development Approach. *Applied Computing Journal*. Online. March 2025. DOI [10.52098/acj.20255239](#).

BLACK, Rebecca W. and TOMLINSON, Bill, 2025. University students describe how they adopt AI for writing and research in a general education course. *Scientific Reports*. Online. March 2025. Vol. 15, no. 1. DOI [10.1038/s41598-025-92937-2](https://doi.org/10.1038/s41598-025-92937-2).

BRAUN, Virginia and CLARKE, Victoria, 2019. Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*. Online. August 2019. Vol. 11, no. 4. DOI [10.1080/2159676X.2019.1628806](https://doi.org/10.1080/2159676X.2019.1628806).

CARROLL, Lee Ann, 2002. *Rehearsing new roles: How college students develop as writers*. SIU press.

CENTER FOR DIGITAL THRIVING, COMMON SENSE MEDIA and HOPELAB, 2024. *Teen and young adult perspectives on generative AI: Patterns of use, excitements, and concerns*. Online. Available from: <https://digitalthriving.gse.harvard.edu/wp-content/uploads/2024/06/Teen-and-Young-Adult-Perspectives-on-Generative-AI.pdf>

CROMPTON, Helen and BURKE, Diane, 2023. Artificial intelligence in higher education: the state of the field. *International Journal of Educational Technology in Higher Education*. Online. April 2023. Vol. 20, no. 1. DOI [10.1186/s41239-023-00392-8](https://doi.org/10.1186/s41239-023-00392-8).

FARHI, Faycal, JELJELI, Riadh, ABUREZEQ, Ibtehal, DWEIKAT, Fawzi Fayez, AL-SHAMI, Samer Ali and SLAMENE, Radouane, 2023. Analyzing the students' views, concerns, and perceived ethics about chat GPT usage. *Computers and Education: Artificial Intelligence*. Online. 2023. Vol. 5. DOI [10.1016/j.caeai.2023.100180](https://doi.org/10.1016/j.caeai.2023.100180).

HALEEM, Abid, JAVAID, Mohd, QADRI, Mohd Asim and SUMAN, Rajiv, 2022. Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*. Online. 2022. Vol. 3. DOI [10.1016/j.susoc.2022.05.004](https://doi.org/10.1016/j.susoc.2022.05.004).

HODGES, Tracey S., 2017. Theoretically Speaking: An Examination of Four Theories and How They Support Writing in the Classroom. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*. Online. July 2017. Vol. 90, no. 4, , p. 139ñ146. DOI [10.1080/00098655.2017.1326228](https://doi.org/10.1080/00098655.2017.1326228).

MOLLICK, Ethan, 2024. *Co-intelligence: Living and working with ai*. Portfolio/Penguin.

OWOC, Mieczysław L., SAWICKA, Agnieszka and WEICHBROTH, Paweł, 2021. Artificial Intelligence Technologies in Education: Benefits, Challenges and Strategies of Implementation. In: OWOC, Mieczysław Lech and PONDEL, Maciej (eds.), *Artificial Intelligence for Knowledge Management*. Online. Cham: Springer International Publishing. ISBN 9783030850005.

SOMMERS, Nancy and SALTZ, Laura, 2004. The Novice as Expert: Writing the Freshman Year. *College Composition & Communication*. Online. September 2004. Vol. 56, no. 1. DOI [10.58680/ccc20043993](https://doi.org/10.58680/ccc20043993).

STRAYHORN, Terrell L., 2025. College Students' Use and Perceptions of Artificial Intelligence (AI): A Survey Study. *Journal of College Student Development*. Online. March 2025. Vol. 66, no. 3. DOI [10.1353/csd.2025.a962923](https://doi.org/10.1353/csd.2025.a962923).

SUMAKUL, Dian Toar Y. G., HAMIED, Fuad Abdul and SUKYADI, Didi, 2022. Artificial Intelligence in EFL Classrooms: Friend or Foe?. *LEARN Journal: Language Education and Acquisition Research Network*. Online. 2022. Vol. 15, no. 1. Available from: <https://eric.ed.gov/?id=EJ1336138>

TAPALOVA, Olga and ZHIYENBAYEVA, Nadezhda, 2022. Artificial Intelligence in Education: AIED for Personalised Learning Pathways. *Electronic Journal of e-Learning*. Online. December 2022. Vol. 20, no. 5. DOI [10.34190/ejel.20.5.2597](https://doi.org/10.34190/ejel.20.5.2597).

VYGOTSKY, L. S., 1980. *Mind in Society: Development of Higher Psychological Processes*. Online. Harvard University Press. Available from: <http://www.jstor.org/stable/10.2307/j.ctvjf9vz4>

WANG, Changzhao, AGUILAR, Stephen J., BANKARD, Jennifer S., BUI, Eric and NYE, Benjamin, 2024. Writing with AI: What College Students Learned from Utilizing ChatGPT for a Writing Assignment. *Education Sciences*. Online. September 2024. Vol. 14, no. 9. DOI [10.3390/educsci14090976](https://doi.org/10.3390/educsci14090976).