

Evaluating the Use of AI to Promote Creativity in Online Creative Writing Courses

Oregon State University Extended Campus Research Fellow Program Proposal

Presented by

J.T. Bushnell

Senior Instructor II

School of Writing, Literature, and Film

j.t.bushnell@oregonstate.edu

Wayne Harrison

Senior Instructor

School of Writing, Literature, and Film

Wayne.Harrison@oregonstate.edu

Sponsoring College and Department

School of Writing, Literature, and Film

Tim Jensen

Director of the School of Writing, Literature, and Film

Tim.Jensen@oregonstate.edu

ABSTRACT

Creative writing students are being flooded with online advice for how to use generative AI, such as ChatGPT, to improve their fiction. However, the effects of ChatGPT on the creative process are not well understood, especially in the context of online creative writing courses.

Using a within-subjects design, this study will investigate how ChatGPT impacts the creativity of students enrolled in online creative writing courses, and whether additional support from the instructor can alter the impact. Students will participate in three experimental conditions in which they will perform the same creative exercise three times: (1) no ChatGPT assistance (baseline control condition); (2) with ChatGPT but no instructor support; and (3) with both ChatGPT and instructor support on its usage. All three writing assignments produced by students will be coded for creativity using Teresa Amabile's Consensual Assessment Technique (CAT), a widely used method for measuring creativity based on the judgments of expert raters. The coded results from each condition will be compared to gain insights into the impact of ChatGPT on students' creativity, as well as the role of instructor support in the use of ChatGPT on students' creative writing outputs. These results are expected to shed light on how the use of ChatGPT impacts student creativity, especially in online creative writing courses, and how online instructors can support students' use of this technology to maximize learning outcomes. Such findings could also impact other disciplines that involve writing, or even instructional practices in general, as schools everywhere confront the educational disruptions presented by this new technology.

PROBLEM STATEMENT AND RESEARCH QUESTIONS

Creative writing is a valuable skill that can enhance students' academic, personal, and professional development, but it is being threatened by the release of generative AI, such as ChatGPT – especially in an online setting where instructors have less direct contact with students. Experts have recently been urging writing instructors to “assume that 100 percent of their students are using ChatGPT” (Roose, 2023) and, therefore, overhaul their curricula (Grobe, 2023; Scott, 2023; Heaven, 2023; Ceres 2023). But in an online, asynchronous setting, many of the strategies for avoiding this new technology, such as oral exams, in class writing, and extemporaneous discussion, aren't possible. Previous research shows that online students are sometimes vulnerable to the temptations of online shortcuts, from cheating (Holden et. al., 2021; Milak et. al., 2023) to plagiarism (Schaffhauser, 2021); it's possible, then, that online students might be impacted disproportionately by this new technology. OSU instructors have reported in interviews that they've seen more widespread usage of generative AI in Ecampus courses – and have responded with strategies that seek to prohibit, detect, and punish its usage (Drummond, 2023; Delf, 2023).

But preliminary research suggests that, when harnessed correctly, tools like ChatGPT might actually be used to improve student creativity. Researchers have demonstrated that collaborative creative writing involving two or more students enhances focus and inspires creativity (Hodges, 2017). This appears to hold true even when the collaborator is nonhuman. One study published half a year before the debut of ChatGPT examined student creativity in collaborative short stories with an AI system called Text Generator, which predicted and generated text based on user input, providing output at different lengths (word, sentence, paragraph) to inspire writing ideas. The results demonstrated that Text Generator significantly enhanced students' creativity, fostering originality in their writing, along with the flexibility and elaboration that can lead to greater effectiveness (Woo & Guo, 2023). Less than a year earlier, researchers found that

secondary students who used AI systems to develop and analyze Mars rover designs believed that AI helped them develop their creativity (although would never match human ingenuity). Students who had more exposure also reported more positive thoughts about AI and students with less exposure and tended to be fearful of it (Marrone et. al., 2022). Similarly, there is evidence indicating that access to computer chess programs, such as the one that beat grandmaster Gary Kasparov in 1997, not only helps human players improve their play but also enhances their creativity (Piezunka, 2021) .

But it's not well known how these findings apply specifically to Ecampus pedagogy , creative writing instruction, or how they have been affected by the transformational release of GPT 3.5 in November 2022. Our research seeks to shed light on these gaps by addressing two questions:

- 1) Does using ChatGPT enhance students' creative output in asynchronous online creative writing courses?
- 2) Does instruction about how to use ChatGPT enhance students' creative output in asynchronous online creative writing courses?

The core positive or negative outcomes established by the study can be the basis for subsequent secondary exploration of the scale, contexts, and effects of Chat GPT in writing classes.

BACKGROUND LITERATURE ON CREATIVITY

Defining Creativity

The standard definition of creativity typically hinges on two essential attributes: originality and effectiveness (Runco & Jaeger, 2012). Though originality alone, or the novelty of an idea, is often conflated with creativity, it can be achieved by producing bizarre alternatives that might remain unique for a reason: they're not necessarily useful (Taylor et. al., 2018). Effectiveness is a corollary attribute of creativity that is defined by the value of an idea in addressing a particular problem or objective.

Cognitive Processes in Creativity

The process of generating creative ideas includes multiple phases. The initial phase, often referred to as "problem finding," involves seeking opportunities for innovation or enhancement, identifying where they exist, and defining the kind of creativity they warrant (Reiter-Palmon & Robinson, 2009). Naturally, this requires a certain level of expertise. A novice writer might not look for, let alone recognize, the opportunity to establish a literary setting through sensory details. An intermediate writer might establish the sensory details of a setting, but only in conventional ways for conventional settings. A more advanced writer might do all of this, but recognize the opportunity to use a novel setting and/or to convey unconventional details about it.

The next phase in the creative process is "divergent thinking." In this stage, the focus shifts to the generation of new ideas from the existing knowledge base, with a particular emphasis on producing a wide array of possibilities (Weir, 2022). In psychological research, a classic example

might involve assessing the number of distinct uses a participant can envision for an ordinary object like a brick (Christensen, 1957). In creative writing, the equivalent would be the writer's capacity to conjure up a multitude of settings or a great variety of sensory details within a setting.

After this phase of expanding possibilities comes a phase of selectivity, requiring the application of self-regulation to determine the best or most creative solution from the array of alternatives, which must then be adapted to the specific context through loops of feedback and revision (Zielińska, 2023). Choosing to set a scene at a landfill, for example, might require adjustments to character circumstance or motivation, which might then also require further adjustments to the setting.

Finally, this gives way to “convergent thinking.” Here, the focus is on identifying commonalities among seemingly disparate phenomena. It involves the act of merging and uniting distinct ideas to yield additional richness or insight (Drago & Heilman, 2012), like when a writer discovers and then emphasizes resonance between ostensibly unrelated aspects of a setting and a character , such as the asbestos disposal site at the landfill and the character's mood after a quarrel.

The entirety of this process demands an unusual level of coordination between two distinct (and even antagonistic) neural networks: the cognitive control network, responsible for executive functions like planning and problem-solving, and the default mode network, typically active during moments of mind-wandering or daydreaming. Ordinarily, these two networks are at odds, undermining each other, but creativity appears to generate a unique scenario where they collaborate (Beaty et. al, 2021). This unusual alliance might explain why a creative state can be so difficult to achieve.

The Role of AI in Enhancing Creativity

Creativity experts theorize that AI can help enhance this coordination, but only if used in specific ways at specific junctures (Florent, 2023). These programs are excellent at the second phase of creativity, divergent thinking, capable of generating dozens of ideas in seconds, and at analysis of existing content, with the ability to generate detailed feedback, but they need significant human judgment both to initiate these phases with “problem-finding” and to make good use of them afterward through selectivity, adaptation, and convergent thinking. That is the human element of the collaboration, in which writers, whether student or professional, are able to exercise the creativity that comes from their interests, experiences, intuitions, and good judgment.

Large language models like ChatGPT are trained to produce text by anticipating the most likely sequence of words (Gent, 2023) – and therefore the most common or conventional. Without this human element of collaboration, then, it is a system designed to produce only clichés. The greater the expertise of the users, however, the more likely they are to be able to intervene at critical junctures in productive ways. It seems reasonable that such expertise could be delivered to Ecampus students, not only through instruction on creative writing but also about when and how to incorporate AI's considerable aptitude for divergent thinking and analysis.

Nobody needs this support more than Ecampus students, who might be the earliest adopters of ChatGPT (Drummond, 2023; Delf, 2023) and who cannot be steered away from it with the analogue classroom activities suggested by experts (Grobe, 2023; Scott, 2023; Heaven, 2023; Ceres 2023). Our research aims to advance our ability to provide such supports by determining how student creativity is affected by both the new technology and the proposed pedagogical intervention.

PROPOSED STUDY

This study aims to investigate the impact of generative Artificial Intelligence (AI), specifically the Large Language Model (LLM) ChatGPT, on the creative writing process. The proposed research will be conducted in Spring and Summer 2024, utilizing a within-subjects design.

Participant Recruitment

Participants for this research will be drawn from students enrolled in two Ecampus sections of WR 224 (Introduction to Fiction Writing), which will be taught by the principal investigators in Spring 2024. These courses typically enroll 25 students each, making a total of 50 subjects available for recruitment. In the first week of the term, we will announce the study and direct students to the consent form, instructing them to complete it both to provide or to withhold their consent. We will also offer class participation points commensurate with time and effort it requires of them.

OSU's School of Psychology has shown in previous studies that when the consent process is initiated at the start of the term on Canvas, it produces a consent rate of approximately 92% in on-campus courses and 70% in Ecampus courses (Goldman & Soicher, 2022). The lower number would generate 35 participants in our study, who would produce 105 writing samples over the three experimental conditions. Because of the high level of enthusiasm typical to students in fiction writing courses, along with the study's integration into the pedagogy, we expect a participation rate closer to 92%, which would produce 46 participants and 138 samples. At three pages per sample, this would create 414 pages for our coders, which is why the study should not involve more than two courses, keeping coding burdens feasible. If participation levels turn out to be unexpectedly low, however, we will run the research in additional courses in Summer 2024 to hit our target of 35-50 participants.

We are embedding the study within a pedagogical framework that will benefit all students regardless of whether or not they choose to release their creative output for our research. This ensures that the research does not disrupt the students' learning experience, nor create any additional burdens or opportunities for either group. Whether students consent to having their work included in the study or not, they will engage in identical coursework with the same academic stakes in the class. The normal incentives of the course stream should provide ample motivation, especially for the kinds of enthusiastic students this course usually enrolls. In the consent form, we will make clear that students do not need to complete any additional work to participate; their consent just allows their writing samples to be used for coding.

Students who choose to participate will have their writing outputs coded for creativity. Creativity scores will be used only in the context of our research; students won't be notified of the creativity score that coders assign to their work (see pp. 16-17 of the proposal for coding methodology).

Data Collection

Over the course of a ten-week term, each student will produce three fiction writing exercises. These exercises will be specifically designed to generate characterization, plotlines, scenes, and dialogue in literary short stories (see pp. 7-8 of the proposal). The content of these exercises will consist of both the students' original contributions without AI input, and with input from ChatGPT.

This study will utilize a within-subjects design, in which students will participate in all three experimental conditions. This design has an advantage of controlling for individual differences among students that might affect their baseline creative writing skills. There are three experimental conditions: (1) a baseline control condition in which students will be asked to produce a creative writing product without the use of Chat GPT; (2) an experimental condition in which students will be asked to use Chat GPT, but without any scaffolding from the instructor; and (3) an experimental condition in which students will be asked to use Chat GPT with prompt engineering support from the instructor. Table 1 below illustrates this design:

| Baseline Control Condition | Experimental Condition 1 | Experimental Condition 2 |
|---|---|---|
| Writing product without GPT (n = 30) | Writing product with GPT but no instructor scaffolding (n = 30) | Writing product with GPT with instructor scaffolding (n = 30) |

Evaluation Criteria

The research methodology incorporates Teresa Amabile's Consensual Assessment Technique (CAT) to code and evaluate the creativity of the students' written outputs. This technique involves experts evaluating creative output by providing numerical ratings based on creativity.

These two judges will first individually rate student creative writing exercises on creativity using a 1 - 7 Likert Scale, where "1" is not creative at all and "7" is highly creative. After this independent evaluation, the experts convene to discuss their assessments, aiming to reach a consensus. Through discussion and the exchange of perspectives, they align their ratings to collectively determine the creative quality of the output. This consensus rating reflects the pooled judgment, offering a more balanced and accurate evaluation of the creative work while minimizing individual biases, ultimately aiding in understanding and comparing the creativity of various outputs to gain insights into the impact of ChatGPT on creative writing quality. Each writing assignment will therefore receive a final creativity score (from 1 - 7) that is based on mutual agreement from the judges.

To assess the impact of generative AI on student creative writing output, we will employ two judges who are seasoned teachers of college-level creative writing and have advanced degrees in the field of fiction writing. None of the judges will be instructors of the course, removing possible bias due to knowledge of the students and knowledge of the experimental conditions. Prior to receiving the student exercises, each judge will create an individualized rubric. These rubrics will encompass the basic coding criteria. The judges will evaluate three writing exercises, each comprising three pages from every student participant. The judges will be blind to the experimental condition and to the students' identity. In other words, they will not know who wrote each writing product and what condition the writing product was produced from.

In addition to the evaluations by the judges, each student participant will complete a post-exercise survey prepared by the PIs (see Appendix A). This survey is intended to assess which writing exercise they believe best reflects their creativity, offering an additional perspective on the impact of generative AI on their creative output. It will not be cross-referenced with student creativity scores, but rather provide an overall student view about the process and outcome to complement the expert coders' view. The survey will run through Qualtrics, delivered only to students who participate in the study by our grad assistant to ensure participant anonymity.

Pedagogical Approach to Instructor Scaffolding of Students AI Use

Prior to the Spring 2024 term, PIs for this study will continue their extensive research on designing effective ChatGPT prompts for writing fiction. This will include carefully analyzing current textbooks, scholarly references, and reputable websites; consulting respected innovators in the use of LLMs as fiction writing tools such as Nova Leigh; and using their creative writing expertise to analyze novels written with AI such as *Death of an Author* by Aidan Marchine. In other courses prior to Spring 2024, the PIs will also pilot conversations, activities, and lessons about writing with ChatGPT to gauge student levels of awareness and preliminary instructional techniques. The PIs will then implement any necessary revisions to the exercise prompts and lessons described below, which students will use to produce their creative exercises.

The Principal Investigators will offer students organized guidance on Chat GPT Collaboration. This guidance will comprise written explanations, video lessons, practical demonstrations, discussion opportunities, and a brief quiz to confirm understanding of the learning materials. This will all occur after the Baseline Control Condition and before Experimental Condition 2 to create the research conditions described therein.

Baseline Control Condition: This will be a three-step process involving the use of scene writing prompts . Creative writing prompts provide a structured starting point, sparking imagination and encouraging the writer to think outside their usual patterns. Prompts can introduce new perspectives, genres, or themes, challenging writers to explore uncharted territory. They stimulate the creative mind, helping writers overcome writer's block, and encouraging them to experiment, innovate, and develop their unique voices in response to diverse scenarios, ultimately fostering creativity, originality, and the growth of storytelling skills.

1. Using one of the prompts below, create a three-page scene.

2. Revise the scene using the elements of literary craft and editing techniques we've discussed in class
3. Turn in a three-page revised final draft of the scene.

Fiction Scene Exercise Prompts:

1. Describe a chance encounter between two estranged childhood friends meeting in their old neighborhood, exploring the emotional complexities of their past.
2. Write a scene set in a retirement home, where an elderly resident recounts a bittersweet love story from their youth to a younger visitor.
3. Describe a scene in a hospital waiting room where a family grapples with the impending loss of a loved one, highlighting the dynamics of grief.
4. Set a scene in a bustling city park where a street musician forms an unexpected connection with a passerby, transcending social barriers.
5. Write a scene where a recently divorced character attends their first therapy session, delving into the complexities of their emotional journey.
6. Create a scene at a family dinner where simmering tensions rise to the surface, forcing the characters to confront their long-standing conflicts.
7. Set a scene at a neighborhood block party where a loner character unexpectedly opens up to their neighbors, challenging their self-imposed isolation.
8. Write a scene where a high school teacher grapples with ethical dilemmas in the classroom and faces the consequences of their choices.
9. Create a scene in a struggling family-owned business where the characters confront financial hardships and the potential loss of their livelihood.
10. Write a scene where a young adult character faces a moral dilemma in the workplace and grapples with the consequences of their choices.

Experimental Condition 1: This will be a four-step process.

1. In the ChatGPT prompt bar, paste the final revised draft story scene you wrote in the first exercise variation. Immediately afterward, use a prompt of your own design to have ChatGPT revise the scene.
2. After ChatGPT has generated your new scene, analyze and revise it to strengthen the story in ways we've discussed in this class.
3. In the ChatGPT prompt bar, use a prompt of your own design that asks ChatGPT to critique the scene.

4. After ChatGPT generates a critique, revise the scene a second time, based on that critique. This will be your final draft.

Experimental Condition 2: This will be a four-step process.

1. In the ChatGPT prompt bar, paste the revised story scene you wrote in the first exercise variation (without AI assistance.) Immediately following your summary, paste in ONE of the Fiction Scene Prompts listed below.

2. After ChatGPT has generated your scene, analyze and revise the scene to strengthen the story in ways we've discussed in this class.

3. In the ChatGPT prompt bar, type in the following prompt: "Critique this story in the following ways: Examine my story's structure and pacing; Assess the depth and development my characters; Evaluate how my setting contributes to the narrative; Identify my underlying themes and their effects on the story; Consider my prose, tone, and narrative voice for clarity and engagement." Immediately after this prompt, paste in the story you have revised.

4. After ChatGPT generates a critique, revise the scene a second time, based on that critique. This will be your final draft.

GPT Feedback Prompts. After entering your scene, add one of the following prompts:

"Use the setting to symbolize a character's emotional state or change within my story."

"Reveal a hidden aspect of my antagonist's personality through their dialogue and actions."

"Rewrite my scene from a different character's perspective, providing insights into their thoughts and feelings."

"Shift the narrative perspective to an omniscient viewpoint and explore the inner thoughts of multiple characters in my scene."

"Highlight my protagonist's internal struggle by having them engage in an internal monologue."

INTENDED OUTCOMES AND THEIR VALUE

We expect the proposed research to yield the following outcomes:

O1: Online pedagogical content about effective and ethical use of generative AI programs such as ChatGPT. Creating and piloting this content is a necessary and urgent first step toward exploring the new technological contexts of our educational systems, including OSU Ecampus. Though the materials will pertain specifically to creative

writing, they can also serve as a foundational model from which other disciplines, creative or not, can begin developing their own subject-specific content.

O2: Data showing how unregulated use of AI affects student creativity . This is the condition that most educators fear is already in place as students experiment with ChatGPT on their own. Our research will help chart this new frontier by measuring whether it inhibits or enhances student creativity, as compared to original human-only writing. The results should be applicable, and therefore valuable, not only to those interested in creative writing pedagogy but to those in any discipline whose students might be using generative AI to complete coursework.

O3: Data showing how supported use of AI affects student creativity . This is a condition that mostly remains shrouded in speculation or preliminary anecdotal attempts at understanding. Our research will offer groundbreaking measurements that reveal whether or not instructor intervention helps students harness the capabilities of ChatGPT to improve their creativity—as compared to both what students produce without AI and what they produce with unsupported AI use. This should help shape instruction for many years to come in Ecampus and beyond, as institutions worldwide grapple with what this new technology means for our educational models.

O4: Data evaluating the success of the online pedagogical content . Because very few models exist for instruction on how to use ChatGPT, it's important to know how successful our attempt at it turns out to be. A large jump in creativity scores after instructor support would indicate our model should be further developed. A low jump, equivalence, or drop in creativity could be similarly useful, demonstrating the need to generate fresh visions for what this kind of instruction might entail. This will be most useful in creative writing instruction but has clear applications in any discipline that involves writing.

ALIGNMENT WITH OSU STRATEGIC PLAN

OSU has released a new strategic plan for 2024-2030 (*Prosperity Widely Shared* , 2023), outlining a mission that our proposed research supports robustly:

Goal 1: *Big discoveries that drive big solutions*. This goal encourages the university to prioritize “opportunities to build a global reputation and exert extraordinary impact.” The language further emphasizes the need for “collaborative transdisciplinary discovery” to achieve these objectives. Our research, by reaching across disciplines as diverse as art, education, and computer science, positions OSU at the forefront of studying one of the most disruptive new technologies of our era, allowing opportunities to shape global conversations.

Goal 2: *Every student graduates* . This goal endorses “the highest quality in-person and online education programs” at a time when both are being reshaped by a novel and disruptive technology: generative AI. To provide the highest quality education, Ecampus instructors must better understand the effects of this tool on student creative processes and how to provide effective instruction about it. Our research will accomplish both.

Goal 3: *Fuel a thriving world in every direction* . Key to this goal is “continuously adapting to the future of work in how we teach and prepare graduates for careers.” As industries continue evolving around new technologies like generative AI (Brumfiel, 2023), we must prepare students to use it effectively not just in the classroom but in their professions. Our research provides a pathway to begin meeting that challenge effectively, offering instruction in AI prompt design and revealing the effects it has on user creativity.

DISSEMINATION PLAN

First, we will fulfill our duty to Ecampus by producing a white paper that reports the study results. We will also share them with our OSU colleagues through Ecampus faculty forums and panels within CLA and SWLF. But we believe the results will merit wider attention, and we’ll seek to publicize them through three avenues. One will be to propose presentations at academic conferences, such as The Association of Writers and Writing Programs. Another will be to submit articles to non-academic magazines such as *Poets & Writers* , *Writer’s Digest* , *The Writer’s Chronicle* , *The Chronicle of Higher Education* , and *Inside Higher Ed* , some of which our PIs have working relationships with. The third will be to work with OSU News and Research Communications staff to craft press releases for news outlets that have shown interest in AI’s impacts on society and education, such as *The New York Times* and NPR.

TIMELINE FOR COMPLETION

| Timeframe | Action |
|-------------------------|---|
| Fall 2023 & Winter 2024 | The PIs will pilot discussions and lessons about generative AI in other writing courses, seeking student feedback. |
| Winter 2024 | The PIs will apply for OSU IRB approval for the study and will begin designing Spring WR 224 classes for the study. |

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|--------------------------------------|--|
| <p>Spring 2024 & Summer 2024</p> | <p>PIs will recruit study participants from at least two WR 224 (Introduction to Fiction Writing) courses and assign the three study conditions to all students. All students will complete an exit survey on the writing exercises at the end of the term. The PIs will hire a graduate student from SWLF to collect and anonymize student exercises and surveys.</p> |
| <p>Summer 2024 & Fall 2024</p> | <p>Coders will judge samples to produce creativity data. The PIs will consult with the Statistics Department for data analysis.</p> |
| <p>Winter 2025</p> | <p>Based on the findings, the PIs will produce a white paper that reports the results of the research objectives.</p> |
| <p>Spring 2025</p> | <p>PIs will use the white paper as the basis for further dissemination through articles and press releases.</p> |

BUDGET

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PRINCIPAL INVESTIGATORS

J.T. Bushnell, Senior Instructor II, School of Writing, Literature, and Film

J.T. Bushnell is a novelist and short story writer who has taught creative writing, literature, rhetoric and argumentation, business writing, and grammar at OSU since 2007, with extensive experience designing, building, and teaching Ecampus curricula. His critical and craft essays have appeared in national magazines such as *Poets & Writers*, *The Writer's Chronicle*, *The Writer*, *Catapult*, and *Fiction Writers Review*, where he was a contributing editor; one is reprinted in *The Science of Story* from Bloomsbury Press. His short stories and creative

nonfiction have been published in *The Mississippi Review* , *Iron Horse Literary Review* , *Passages North* , *Meridian* , and many other literary journals. His novel, *The Step Back* , was released by Ooligan Press in 2021. He holds an MFA from University of Oregon.

Wayne Harrison, Senior Instructor, School of Writing, Literature, and Film

Wayne Harrison has taught creative writing at all undergrad levels, as well as literature and rhetoric and argument classes at Oregon State University since 2008. His debut novel, *The Spark and the Drive* , was published by St. Martin's Press. His short stories have appeared in *Best American Short Stories 2010*, *The Atlantic*, *Narrative Magazine*, *McSweeney's*, *Ploughshares*, *Crazyhorse*, *The Sun*, *Salon.com*, *Five Chapters*, *New Letters*, *Other Voices* and other magazines , and have been featured on NPR's *All Things Considered*. One story was Notable in *Best American 2009* and one received special mention in *Pushcart Prizes 2012*. His short story collection *Wrench* won runner-up for the Flannery O'Connor Award, was a finalist for the Spokane Prize and the Iowa Short Fiction Award, and won the New American Award. He is the recipient of a Maytag fellowship, an Oregon Literary fellowship and a Fishtrap Writing Fellowship. His book reviews appear in *The San Francisco Chronicle* and *The Miami Herald*.

REFERENCES

- Beaty, R. E., Cortes, R. A., Zeitlen, D. C., Weinberger, A. B., & Green, A. E. (2021). Functional Realignment of Frontoparietal Subnetworks during Divergent Creative Thinking. *Cerebral Cortex* , 31 (10). <https://doi.org/10.1093/cercor/bhab100>
- Brumfiel , G. (2023, October 12). *New proteins, better batteries: Scientists are using AI to speed up discoveries* . NPR.
<https://www.npr.org/sections/health-shots/2023/10/12/1205201928/artificial-intelligence-ai-scientific-discoveries-proteins-drugs-solar>
- Ceres, P. (2023, January 26). ChatGPT Is Coming for Classrooms. Don't Panic. *Wired*.
<https://www.wired.com/story/chatgpt-is-coming-for-classrooms-dont-panic/>
- Christensen P. R., Guilford J. P., Wilson R. C. (1957). Relations of creative responses to working time and instructions . *J. Exp. Psychol.* 53 , 82–88. 10.1037/h0045461
- Delf, L. (2023, September 20). Personal interview.
- Drago, V., & Heilman, K. M. (2012). Creativity. In V. S. Ramachandran (Ed.), *Encyclopedia of Human Behavior* (Second Edition) (pp. 606-617). Academic Press. ISBN 978-0080961804. <https://doi.org/10.1016/B978-0-12-375000-6.00112-9>
- Drummond, R. (2023, September 27). Personal interview.
- Florent Vinchon, Lubart, T., Bartolotta, S., Gironnay, V., Botella, M., Bourgeois-Bougrine, S., Burkhardt, J.-M., Bonnardel, N., Giovanni Emanuele Corazza, Vlad Petre Glaveanu,

- Michael Hanchett Hanson, Zorana Ivcevic, Karwowski, M., Kaufman, J. C., Okada, T., Reiter-Palmon, R., & Gaggioli, A. (2023). Artificial Intelligence & Creativity: A Manifesto for Collaboration. *Journal of Creative Behavior* .
<https://doi.org/10.1002/jocb.597>
- Gent, E. (2023, July 25). How does ChatGPT work and do AI-powered chatbots “think” like us? *New Scientist*.
<https://www.newscientist.com/article/2384030-how-does-chatgpt-work-and-do-ai-powered-chatbots-think-like-us/>
- Goldman, J., & Soicher, R. (2022). Using a Utility Value Intervention to Increase Student Academic Success in Online Statistics and Research Methods Courses. College of Liberal Arts: School of Psychological Science, Oregon State University. Retrieved from <https://ecampus.oregonstate.edu/research/wp-content/uploads/2.-Proposal.Goldman-Soicher.pdf>
- Grobe, C. (2023, January 20). Why I’m Not Scared of ChatGPT. *The Chronicle of Higher Education* . <https://www.chronicle.com/article/why-im-not-scared-of-chatgpt>
- Heaven, W. D. (2023, April 6). ChatGPT is going to change education, not destroy it. *MIT Technology Review* .
<https://www.technologyreview.com/2023/04/06/1071059/chatgpt-change-not-destroy-education-openai/>
- Hodges, T. 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* , 90 (4), 139–146.
<https://doi.org/10.1080/00098655.2017.1326228>
- Holden, O. L., Norris, M. E., & Kuhlmeier, V. A. (2021). Academic Integrity in Online Assessment: A Research Review. *Frontiers in Education* , 6, 639814.
<https://doi.org/10.3389/educ.2021.639814>
- Malik, A. A., Hassan, M., Rizwan, M., Mushtaque, I., Lak, T. A., & Hussain, M. (2023). Impact of academic cheating and perceived online learning effectiveness on academic performance during the COVID-19 pandemic among Pakistani students. *Frontiers in Psychology* , 14 . <https://doi.org/10.3389/fpsyg.2023.1124095>
- Marrone, R., Taddeo, V., & Hill, G. (2022). Creativity and Artificial Intelligence—A Student Perspective. *Journal of Intelligence* , 10 (3), 65.
<https://doi.org/10.3390/jintelligence10030065>
- Piezunka, H. Training with AI, Winning Against Humans – Evidence from Chess Computers (2021, January 31). *YouTube* .
<https://www.youtube.com/watch?v=EMzGSEDF1hU&t=2s>
- Prosperity Widely Shared: The Oregon State Plan* . (2023). Oregon State University.

https://leadership.oregonstate.edu/sites/leadership.oregonstate.edu/files/osu_strategic_plan_draft_8-29-23.pdf

Reiter-Palmon, R., & Robinson, E. J. (2009). Problem identification and construction: What do we know, what is the future? *Psychology of Aesthetics, Creativity, and the Arts*, 3 (1), 43–47. <https://doi.org/10.1037/a0014629>

Roose, K. (2023, August 24). How Schools Can Survive (and Maybe Even Thrive) With A.I. This Fall. *The New York Times* .
<https://www.nytimes.com/2023/08/24/technology/how-schools-can-survive-and-maybe-even-thrive-with-ai-this-fall.html>

Runco, M. A., & Jaeger, G. J. (2012). The Standard Definition of Creativity. *Creativity Research Journal* , 24 (1), 92–96. <https://doi.org/10.1080/10400419.2012.650092>

Schaffhauser, B. D., & 04/09/21. (2021, April 9). Report: Students Plagiarized More When Instruction Moved Online . *The Journal* .
<https://thejournal.com/articles/2021/04/09/report-students-plagiarized-more-when-instruction-moved-online.aspx#:~:text=Plagiarism%20among%20students%20jumped%20by>

Scott, I. (2023, April 18). Yes, We Are in a (ChatGPT) Crisis. *Inside Higher Ed*.
<https://www.insidehighered.com/opinion/views/2023/04/18/yes-we-are-chatgpt-crisis>

Taylor, M., Mottweiler, C. M., & Aguiar, N. R. (2018). Paracosms: The Imaginary Worlds of Middle Childhood. *Child Development* , 91(4). DOI:10.1111/cdev.13162

Weir, K. (2022). The Science Behind Creativity. *Monitor on Psychology* , 53(3), 40. American Psychological Association.

Woo, David & Guo, Kai. (2023). Exploring an AI-supported approach to creative writing: Effects on secondary school students' creativity. *ResearchGate* .
DOI: [10.13140/RG.2.2.24489.06247](https://doi.org/10.13140/RG.2.2.24489.06247)

Zielińska, A., Forthmann, B., Lebuda, I., & Karwowski, M. (2023). Self-regulation for creative activity: The same or different across domains? *Psychology of Aesthetics, Creativity, and the Arts*. Advance online publication. <https://doi.org/10.1037/aca0000540>

APPENDIX A

This exit will be distributed as a Qualtrics Survey that insures anonymity and presents questions in a random order. The survey is designed to improve our understanding of how students have been using Chat GPT in the course. The survey results will not be reviewed by evaluators or used to evaluate student creativity. Nonetheless, gaining insights into the student experience can support the progression of AI and creativity research.

Student Post-Exercise Survey

Please rate your creative output during the exercise without ChatGPT.

1 2 3 4 5

Please rate your creative output during the exercise with ChatGPT but no instructor support.

1 2 3 4 5

Please rate your creative output during the exercise with ChatGPT and instructor support.

1 2 3 4 5

Which exercise do you feel best reflected your most creative output? (Choose one)

- Without ChatGPT
- With ChatGPT but no instructor support
- With ChatGPT and instructor support

Which exercise do you feel best reflected your least creative output? (Choose one)

- Without ChatGPT
- With ChatGPT but no instructor support
- With ChatGPT and instructor support

How confident were you in your creative abilities during the exercise without ChatGPT?

- Not confident at all
- Slightly confident
- Somewhat confident
- Moderately confident
- Quite confident
- Very confident
- Extremely confident

How confident were you in your creative abilities during the exercise with ChatGPT but no instructor support? Not confident at all

- Slightly confident
- Somewhat confident
- Moderately confident
- Quite confident
- Very confident
- Extremely confident

How confident were you in your creative abilities during the exercise with ChatGPT and instructor support? Not confident at all

- Slightly confident
- Somewhat confident
- Moderately confident

- Quite confident
- Very confident
- Extremely confident

How important was the instructor's support in using ChatGPT effectively?

- Not important at all
- Slightly important
- Somewhat important
- Moderately important
- Quite important
- Very important
- Extremely important

How likely are you to use ChatGPT in your future creative writing endeavors?

- Very unlikely
- Unlikely
- Slightly unlikely
- Neutral
- Slightly likely
- Likely
- Very likely