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GenAI et al.: Cocreation, Authorship, Ownership, Academic Ethics and Integrity in a Time of Generative AI

EDITORIAL

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ABSTRACT

This paper investigates the complex interplay between generative artificial intelligence (AI) and human intellect in academic writing and publishing. It examines the 'organic versus synthetic' paradox, emphasizing the implications of using generative AI tools in educational and academic integrity contexts. The paper critiques the prevalent 'publish or perish' culture in academia, highlighting the need for systemic reevaluation due to generative AI's emerging role in academic writing and reporting. It delves into the legal and ethical challenges of authorship and ownership, especially in relation to copyright laws and AI-generated content. The paper discusses generative AI's diverse roles and advocates for transparent reporting to uphold academic integrity. Additionally, it calls for a broader examination of generative AI tools and stresses the need for new mechanisms to identify generative AI use and ensure adherence to academic integrity and ethics. The implications of generative AI are also explored, suggesting the need for innovative AI-inclusive strategies in academia. The paper concludes by emphasizing the significance of generative AI in various information-processing domains, highlighting the urgency to adapt and transform academic practices in an era of rapid generative AI-driven change.

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KEYWORDS:
Generative AI; GenAI; artificial intelligence; AI; AIEd; chatbots; conversational agents; education; teaching; learning; higher education; educational technology; GPT; generative pre-trained transformer; ChatGPT; large language models; LLMs; natural language processing; collaboration; cocreating; academic writing; transparency in research; authorship; ownership; ethics; academic integrity

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INTRODUCTION: A DISRUPTIVE TECHNOLOGY WAS BORN

"There is nothing permanent except change"
Heraclitus

We are moving towards a future of radical changes with the emergence of generative AI. The advent of generative AI, utilizing large language models (LLMs) and leveraging natural language processing (NLP), particularly the well-known version, ChatGPT, released by OpenAI on November 30, 2022, has ushered in a new era characterized by a blend of excitement, hype, hope, and speculation, especially in the context of educational processes and academic integrity (Ansari et al., 2023; Bozkurt, 2023a; Bozkurt et al., 2023; Concannon et al., 2023; Currie, 2023; Dempere et al., 2023; Dwivedi et al., 2023; Farrelly & Baker, 2023; Imran & Almusharraf, 2023; McGuire, 2023). This technological shift, signifing an AI-dominated age (Gates, 2023), is not just a transient trend but a symbol of the inescapable change Heraclitus spoke of, marking the onset of an AI-dominated age and initiating profound and inevitable shifts in our academic and educational paradigms (Bozkurt, 2023b).

Generative AI is considered a disruptive technology in many ways, but more importantly because of its ability to utilise the most sophisticated technology ever invented by humans, namely language (Bozkurt, 2023b; Harari, 2023). These generative AI systems, developed to analyze complex patterns and structures in human language, are primarily designed to comprehend and replicate it. Generative AI, when expertly trained, exemplifies a potent tool capable of learning, unlearning, and relearning which makes it a continually adapting to the evolving entity (Bozkurt, 2023b).

The proficiency of generative AI in skillfully utilizing human language and generating outputs from well-crafted prompts (Bozkurt & Sharma, 2023; Liu et al., 2023; Lo, 2023; Sharma & Bozkurt, 2024) requires us to critically reconsider concepts such as cocreation, ownership, and authorship in academic writing processes (Bozkurt, 2023c). This necessitates the adoption of new approaches towards academic integrity and transparency in various areas, including academic writing and reporting.

However, some critics argue that content created by generative AI may constitute fabrications or falsifications (Emsley, 2023), and others highlight inherent dilemmas in using such technology for academic purposes, sparking further discussion and inquiry (Ali & Djalilian, 2023; Bhatia & Kulkarni, 2023; Cotton et al., 2023; Eke, 2023; Kirwan, 2023). These concerns signify the need for responsible and transparent use of generative AI in academic settings (Currie, 2023; Eke, 2023; Jarrah et al., 2023). In this context, Eke (2023) wisely introduces several critical and thought-provoking perspectives. Accordingly;

> [Generative AI] is here and it is about to disrupt both the ontology and epistemology of academia, science and teaching. That means that academia is about to reconsider what constitutes knowledge and how it can be acquired. The challenge then becomes; how is this technology embraced and applied effectively, safely and responsibly? Whether [generative AI] is a morally neutral technology or an existential part of the normative moral order is not the focus of this commentary. This does not mean that [generative AI] does not raise other ethical issues beyond issues of academic integrity, or that these concerns do not matter. (Eke, 2023, p. 2)

In light of these considerations, this paper aims to undertake a critical examination of the use of generative AI in academic contexts. For this purpose, the paper delves into various aspects of generative AI's application, examining its implications and exploring the nuances of its integration, particularly within academic contexts.

COCREATION AND HUMAN-MACHINE INTERACTION

"The computer is incredibly fast, accurate, and stupid. Man is unbelievably slow, inaccurate, and brilliant. The marriage of the two is a force beyond calculation"
Leo M. Cherne

The capacity of generative AI to utilize human language calls for a more thorough examination of the generation of information, be it organic (created by humans) or synthetic (produced by

generative AI) (Bozkurt, 2023c). This inquiry extends to the field of cocreation, with a particular focus on the dynamics of human-machine interaction, emphasising collaborations between humans and generative AI technologies.

Historically, human civilization has evolved through the utilization of organic information, processed and interpreted by humans. Revisiting the data-wisdom continuum, we recognize that data is derived from research, creation, collection, and exploration, representing unstructured, unprocessed raw facts. Information, then, is the contextualized form of data, representing organized data structured for inference. Knowledge emerges from this process, shaped by contextualizing information through experience and diverse perspectives. Unlike the static nature of information, knowledge is dynamic, imbued with meaning. Wisdom, in this continuum, represents the zenith of understanding, a refined interpretation of knowledge.

The last century witnessed a significant increase in data processing capabilities, facilitated by advances in information, communication, and computing technologies. However, augmenting human capacity through *machine-processed* information and *machine-generated* information presents distinct considerations. This distinction suggests that human wisdom may now be influenced not only by organic information but also by synthetic information, as generative AI technologies become active stakeholders in the data-wisdom continuum. To comprehend this shift and appropriately position generative AI within this continuum, it becomes imperative to explore the issues of authorship and ownership in depth.

OWNERSHIP AND AUTHORSHIP: GEN AI IS THE NEW KID ON THE BLOCK

WHO OWNS WHAT?

> *"The Internet gave us access to everything; but it also gave everything access to us." — James Veitch*

Schroeder (2023) highlights a significant legal quandary, noting that "under the 1976 Copyright Law, which requires human authorship, AI-generated works are ineligible for registration. As far as the US Copyright Office is concerned, outputs from generative AI programs like ChatGPT or Stable Diffusion lack copyright protection and, barring any significant legal changes, will invariably enter the public domain immediately" (para. 10). This unique characteristic of generative AI, being non-human, suggests a potential for ownership-free educational content (Bozkurt, 2023c). Another perspective posits that, as only humans can bear legal responsibility for their creations, they should be the sole entities recognized as authors (Nature, 2023; Stokel-Walker, 2023). However, the fact that generative AI learns and produces responses based on pre-existing work introduces serious concerns about the ownership of such content, creating a grey area (Bakla, 2023; Eke, 2023).

CAN GENERATIVE AI BE CREDITED AS A CO-AUTHOR?

> *"We are the products of editing, rather than of authorship." — George Wald*

The debate extends to whether generative AI can be acknowledged as a co-author. Some have credited generative AI as a co-author (See O'Connor & ChatGPT, 2023; O'Connor, 2023). Some others argue that using generative AI does not diminish human responsibility (Dien, 2023) and point to the overlooked contributions of the unnamed/invisible authors who trained these AI algorithms (Dwivedi et al., 2023; Lund et al., 2023). In some instances, generative AI is treated as a ghost contributor, acknowledging a passive contribution in content creation (Rahimi & Talebi Bezmin Abadi, 2023; Teixeira da Silva & Tsigaris, 2023).

This paper advocates the viewpoint that generative AI should not be credited as a co-author, as justified by previous papers (Bakla, 2023; Ide et al., 2023; Kitamura, 2023; Lee, 2023; Nagarkar, 2023; Perera Molligoda Arachchige & Stomeo, 2023; Semrl et al., 2023; Siegerink et al., 2023; Stokel-Walker, 2022; Teixeira da Silva, 2023; Thorp, 2023). Authorship entails specific requirements (see Table 1) including credit for contributions and accountability for the content (Committee on Publication Ethics: COPE, 2023; Council of Science Editors: CSE, 2022; International Committee of Medical Journal Editors: ICMJE, 2022; World Association of Medical

Editors, see Zielinski et al., 2023). Beyond these issues, generative AI lacks human reasoning and characteristics such as guilt, shame, willingness to change, or remorse, which are foundational to addressing authorship-related conflicts (Teixeira da Silva & Tsigaris, 2023).

1.	Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND.
2.	Drafting the work or reviewing it critically for important intellectual content; AND.
3.	Final approval of the version to be published; AND.
4.	Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Table 1 The ICMJE's four criteria to claim authorship (ICMJE, 2024).

ACADEMIC INTEGRITY

"As an academic, what do you have? You have the quality of your work and the integrity with which you do it." — Ezekiel Emanuel

Academic integrity, as defined by the International Centre for Academic Integrity (2021), is the commitment to six fundamental values: honesty, trust, fairness, respect, responsibility, and courage. These principles form the pillars of ethical academic practices. With the advent of generative AI, there is growing concern that academic integrity may be at risk (Eke, 2023). While generative AI has the potential to enhance effectiveness and efficiency in academic endeavors, it also presents opportunities for misuse in the form of academic misconduct and plagiarism (Bin-Nashwan et al., 2023; Currie, 2023). This dual nature of generative AI calls for a balanced approach that leverages its benefits while vigilantly safeguarding against its potential misuse in academic contexts. The challenge lies in maintaining the integrity of academic work, ensuring that the use of AI aligns with the established values of honesty, trust, fairness, respect, responsibility, and courage.

HOW TO REPORT THE USE OF GENERATIVE AI

"A lack of transparency results in distrust and a deep sense of insecurity." — Dalai Lama

One of the primary concerns with generative AI is its ability and the degree to source ideas from unpublished online materials without proper attribution (Dien, 2023; Weissman, 2023). Currently, there appears to be no effective working solution to this issue (Dien, 2023). Another notable problem is the unedited use of AI-generated outputs as if they were the original work of the researcher (Bhatia & Kulkarni, 2023). Given the near-impossibility of avoiding the use of generative AI tools in education, owing to their ease of use and usefulness (Davis, 1989), banning these technologies is not considered as a viable solution (Eke, 2023; Kirwan, 2023). Therefore, the development of solutions that align with academic integrity principles seems to be imperative.

In response to these emerging challenges, and to maintain transparency and uphold academic integrity, numerous academic journals have updated their editorial policies. These updates guide authors on the conditions under which generative AI may be appropriately utilized or not (Rahimi & Talebi Bezmin Abadi, 2023; Tang, 2023a; Thorb, 2023). Though generative AI use can technically be detected (Herbold et al., 2023), the focus is on encouraging authors to be transparent about the extent of its use (Tang, 2023b). However, considering that academic writing is fundamentally a creative process aimed at producing original and authentic work (Bozkurt, 2023d), this creates a critical juncture. Therefore, there is a growing consensus on the necessity to verify human contribution, originality, and authenticity in academic outputs (Lee, 2023; Perera Molligoda Arachchige & Stomeo, 2023).

CONCLUSIONS AND SUGGESTIONS

"Ancora Imparo"
Michelangelo

We find ourselves in an 'organic versus synthetic' paradox, experiencing the dilemma of whether we are chatting, cheating, or cocreating when employing generative AI in academic

processes. Alongside the so-called 'organic' and original outputs produced by humans, we now confront synthetic outputs from generative AI, often referred to be fabrications, falsifications, hallucinations, or deepfakes. In such a context, a critical question in academia arises regarding the appropriate contexts for using generative AI. For instance, should authors employ generative AI in the discussion and conclusion sections of an article, which are crucial for demonstrating the authors' critical perspectives? This is a raw topic and open to further investigations, with different higher education institutions, journals, and editors potentially adopting varied stances. However, it is timely to initiate these conversations to establish a solid foundation for adapting our strategies as the capabilities of generative AI evolve.

In some cases, merely reporting the use of generative AI is inadequate. A more nuanced approach involves providing multilayered statements acknowledging and benchmarking the use of generative AI, specifying where, when, in which sections, and for what purposes it is employed. When necessary, authors should describe the prompts and parameters used to guide the generative AI, including any iterative refinement process.

Again, it must be emphasized that the primary responsibility for the content rests with the human author, though additional mechanisms to ensure academic integrity are advisable. Therefore, this paper proposes that a final human approval statement should be articulated. In this context, this paper suggests *Academic Integrity and Transparency in AI-assisted Research and Specification (aiTARAS) Framework* for acknowledging and disclosing the use of generative AI in scholarly writing, to maintain academic integrity, transparency and ethics:

- **Direct Contribution:** If a substantial portion of the content, ideas, or writing was generated by the GenAI: *"This paper includes sections [specify sections if necessary] where initial drafts were generated using [name of generative AI tool (Version as of Month Year)]. These sections were subsequently reviewed, critically edited, and validated by the human authors to ensure academic rigor and adherence to ethical standards. The authors also assessed and addressed potential biases inherent in the AI-generated content. The final content, conclusions, and assertions in this paper are the sole responsibility of the human authors."*
- **General Assistance:** If the GenAI played a more general role or if you're acknowledging its use in a broad sense: *"The authors acknowledge the use of [name of generative AI tool (Version as of Month Year)] in facilitating various stages of writing and ideation for this paper. All contributions from the AI were reviewed, critically edited, and validated by the human authors to ensure academic rigor and adherence to ethical standards. The authors also assessed and addressed potential biases inherent in the AI-generated content. The final content, conclusions, and assertions in this paper are the sole responsibility of the human authors."*
- **Specific Sections:** If only certain sections of the paper were aided by the GenAI: *"Sections [specify sections] of this paper were generated with the assistance of [name of generative AI tool (Version as of Month Year)] and later edited by human authors. These sections were subsequently reviewed, critically edited, and validated by the human authors to ensure academic rigor and adherence to ethical standards. The authors also assessed and addressed potential biases inherent in the AI-generated content. The final content in these sections is the sole responsibility of the human authors."*
- **Idea Development:** If you utilized the GenAI to develop or come up with ideas: *"The development of ideas and conceptual frameworks in this paper involved sessions assisted by [name of generative AI tool (Version as of Month Year)]. These concepts and frameworks were subsequently refined and finalized solely by the human authors, ensuring academic integrity and ethical compliance. The authors also assessed and addressed potential biases inherent in the AI-generated content. The final ideas and frameworks presented are the responsibility of the human authors."*
- **Editing and Reviewing:** If you used the GenAI for editing, proofreading, editing, or refining your ideas or content: *"This paper was reviewed, edited, and refined [modify the first part if necessary] with the assistance of [name of generative AI tool (Version as of Month Year)] , complementing the human editorial process. The human authors critically assessed and validated the content to maintain academic rigor. The authors also assessed and addressed potential biases inherent in the AI-generated content. The final version of the paper is the sole responsibility of the human authors."*

- **Language Translation and Localization:** If you used the GenAI to translate or localize the content: *"For the translation and localization of content, [name of generative AI tool (Version as of Month Year)] was employed. Human translators subsequently reviewed and adjusted the translations to ensure accuracy, cultural appropriateness, and contextual relevance. The final text was thoroughly reviewed and approved by the authors to ensure it accurately reflects the intended research outcomes and ethical standards. The authors also assessed and addressed potential biases inherent in the AI-generated content. The final version of the paper is the sole responsibility of the human authors."*
- **Data Analysis:** If the GenAI was used to analyze data: *"Data analysis in this work were assisted by [name of generative AI tool (Version as of Month Year)]. These analyses were later reviewed, revised, and finalized by the authors to accurately represent and report the research data. The authors take full responsibility for the integrity and accuracy of the reported data."*
- **Data Visualization:** If the GenAI was used to visualize data (e.g., graphs, charts, etc.): *"Data visualizations in this paper were initially created with the help of [name of generative AI tool (Version as of Month Year)]. These visualizations were later adjusted and finalized by the authors to accurately represent the research data and to ensure they meet academic standards. The final visualizations are the responsibility of the human authors."*
- **Code or Algorithms:** If GenAI was used to help generate or validate code or algorithms: *"Algorithms/code used in this paper were designed with the help of [name of generative AI tool (Version as of Month Year)]. The human authors critically reviewed and validated these algorithms/code to ensure they are accurate, reliable, and adhere to ethical guidelines. The final algorithms/code presented in this paper are the sole responsibility of the human authors."*

FINAL REMARKS

Beyond the scope of this paper, several critical issues warrant discussion in light of the rise of generative AI. With the emergence of generative AI, a significant concern has surfaced within the perspective of academic writing and publishing. The academic system, traditionally entrenched in a 'publish or perish' culture, is experiencing a paradigm shift. Publishing, a key mechanism of academia that was once an exclusively human endeavor, now recognizes generative AI as an influential stakeholder. This development is reshaping the dynamics of academic writing and reporting processes, compelling the academic community to reconsider and adapt to the roles and implications of AI-driven contributions. This situation is further an important sign that we need to reconsider the system that is based on the publish or perish culture and encourages publishing at all costs.

It is also crucial to acknowledge that the analyses of many papers examined predominantly focus on one generative AI tool, ChatGPT. Relying on a single example for generalization can be misleading and potentially misguide us. Given the broad spectrum of services provided by various generative AI tools, a more accurate approach would involve examining a wider array of examples to avoid sampling errors and so to refrain from an inaccurate generalisation.

Furthermore, another point to note is that the use of generative AI can be detected using similarity tools. However, these tools do not provide 100% accurate results and often produce false positive arguments. Therefore, it is a fact that there is a need for new mechanisms to identify the use of AI and whether there is a violation of academic ethics, as well as the reviewing mechanism that is employed to ensure the quality of content, particularly in peer-reviewed academic publications.

An additional point of consideration is the frequent assumption in discussions on academic ethics that English is the native language of all researchers. It is important to remember that researchers proficient in various native languages often utilize generative AI for translation, proofreading, or editing. However, the dilemma that arises here is the possibility of a situation that is not based on reality, such as the fact that all content is completely produced by generative AI in language editing processes with generative AI while the content in the mother language is original and authentic.

Lastly, many academic outputs, such as essays, are used for assessment and evaluation. The advent of generative AI necessitates a reimagining of assessment and evaluation processes

within academia. Beyond AI proof traditional methods such as oral exams, there is a need for innovative strategies that incorporate the controlled use of generative AI to accurately reflect student competencies. This situation demands more than just an adjustment of existing methods; it calls for a fundamental shift in our approach to assessing learning. With the ability of generative AI to produce sophisticated and seemingly authentic work, traditional forms of assessment, such as written essays or reports, may no longer be sufficient to gauge a student's true understanding or original thinking. To address the challenges posed by generative AI in academia, a blend of experiential and project-based assessments, along with the strategic use of technology, can be effective. These methods focus on practical applications and reflective components, requiring students to demonstrate real-world skills and thought processes, which are difficult for AI to mimic. The overarching goal should be to leverage AI's potential responsibly while preserving academic integrity and fostering genuine student creativity and innovation, thereby ensuring assessments accurately reflect the learners' true competencies, knowledge, and experiences in a tech-driven educational landscape.

In this rapidly evolving generative AI landscape, where language and information processing are being revolutionized, the skills of prompting and editing have become paramount. No longer is it just about creating content; the art lies in skillfully guiding AI to produce relevant, accurate, and ethical output. This shift demands a reconsideration of traditional roles and methodologies in academia and beyond, challenging us to adapt and excel in effectively harnessing generative AI's potential. As we embrace these changes, the mastery of AI prompting and nuanced editing emerges as the new cornerstone of intellectual and creative expression.

As a final word, the answer to the question of whether AI or humans will be the pioneer in the creation of academic content and which side will be "et al" in the continuation of this transformation process, as manifested in the title of this paper, will be determined by the decisions we will make today, as well as whether we interpret generative AI as a mean or an end.

DATA ACCESSIBILITY STATEMENT

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

ETHICS AND CONSENT

Because this study doesn't involve any living entities, an ethics review is not applicable.

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COMPETING INTERESTS

The author has no competing interests to declare.

AUTHOR CONTRIBUTIONS (CRediT)

Aras Bozkurt: Conceptualization, methodology, formal analysis, investigation, data curation, writing—original draft preparation, writing—review and editing. The author has read and agreed to the published version of the manuscript.

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This paper was proofread, edited, and refined with the assistance of OpenAI's GPT-4 (Version as of January 5, 2024), complementing the human editorial process. The human author critically assessed and validated the content to maintain academic rigor. The author also assessed and addressed potential biases inherent in the AI-generated content. The final version of the paper is the sole responsibility of the human author.

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