

Ethical reflections on the use of Generative Artificial Intelligence in the academic sphere: writing and authorship

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***Abstract.** Generative Artificial Intelligence (GenAI) is emerging as a promising tool in academic production, offering the potential to help with literature reviews, content creation and idea generation. However, the use of AI raises ethical debates related to authorship, plagiarism and intellectual property. Therefore, regulating the use of AI in the academic sphere is necessary, through a dialog between the academic community, companies and governments that defines guidelines that consider principles such as transparency, justice, equity, responsibility and beneficence. The future of academic production will depend on the integration of AI with human expertise and judgment. Thus, this article is a comprehensive review of the existing literature on Generative Artificial Intelligence, ethics and intellectual property, synthesizing a solid knowledge base for discussing the use of these intelligent mechanisms within academic production.*

1. Introduction

Artificial Intelligence (AI) is acquiring considerable recognition today, as computer technologies are being used to improve human activities, both in terms of their social impact and, above all, in the academic sphere, as reported in scientific papers in the United States, China and some European nations [Gontijo 2020].

There are many examples of the use of intelligent mechanisms reported in academic literature: in publishing and books, in the production of journalistic and political content [Araujo 2017]; in the special education [Santos Junior et al. 2019]; moderating online content on video platforms [Silva and Cesar 2023] and other purposes of capital and the entertainment industry [Garcia 2020]. All of these examples have one characteristic in common, in terms of their remarkable ability to generate content beyond the existing range of themes: the use of Generative Artificial Intelligence (GenAI). According to the IEEE, GenAI is a branch of AI that allows machines to learn patterns and use this knowledge to create new content [Strickland 2024].

Among the various forms of GenAI, chatbots - computer programs capable of answering user questions - of the generative type are made up of so-called large language models (LLM, PLN, ML), which are AI models trained on large amounts of data and capable of generating cohesive and complex information [d'Alte and d'Alte 2023].

However, the use of GenAI for academic purposes raises ethical issues for users of such tools. The lack of transparency in the use of AI, authorial implications due to the lack of moderation in the use of GenAI utilities, possible difficulties for human evaluators of the content produced, as well as malpractice in either improper training or lack of validation of the tools are some of the problems related to this context.

The aim of this work is to contribute to discussions on the use of GenAI in the academic-scientific sphere, specifically scientific papers, highlighting specific cases of the use of these intelligent mechanisms in academic production and writing and their relationship with ethical parameters analyzed based on a survey of the literature on the subject in question. This essay is made up of: 1) an analysis of the work carried out on the presence and potential of GenAI in the academic sphere - authorship and the role of the human being - as well as related ethical challenges; 2) a discussion on the prospects for intellectual production using GenAI and; 3) points towards normative guidelines on GAI in the academic sphere as a result of this production.

2. Methodology

As this is a work in progress, the nature of this study is interpretative and it is structured as an essay. Even though it is an interpretative essay, a survey of publications was carried out in electronic bibliographies in the area of Science and Technology (SBC-Online, BRAPCI and SCIELO), using terms related to "Artificial Intelligence" and "Ethics" as a search strategy. From a search, 15 papers adhering to the topic of interest were selected ad hoc, in order to focus this analysis on productions dealing with GenAI in the context of academic production and writing. In addition, other theoretical references within the areas of Science and Technology were also used to make the necessary contributions to the discussions.

3. Analysis

3.1. The presence of Generative Artificial Intelligence (GenAI) and its possibilities

The use of Artificial Intelligence utilities in the production of technical and scientific knowledge is increasingly present in literature review and text writing procedures, since they are directly related to methodological approaches and, consequently, to the development of knowledge in academic work [Araujo 2017; Lopezosa 2023].

The importance of using artificial intelligence for research, collection and processing of academic-scientific data on a large scale is notorious, since it can, at quantitative levels, surpass human capabilities for such purposes [Araujo 2017; Souza, Schirru and Alvarenga 2020]. For example, with the SARS-CoV-2 Pandemic and the consequent Social Isolation, the generation of data on the most varied topics has become even greater, and GenAI is an extremely important tool for these activities [Souza, Schirru and Alvarenga 2020].

Studies have shown that the use of ChatGPT as a tool for writing academic texts was reproduced in a coherent and structured manner and could be equated with human authorship [d'Alte and d'Alte 2023; Peres 2024]. It was also noted that it was possible to suggest switching between languages (in this specific case, English) for this purpose, with the aim of having a wider range of data to process [Peres 2024].

As they are improved, intelligent mechanisms can combine the elementary techniques of academic research (summaries, compilations, and systematization of organized notes) and the association of concepts with certain authors, even if, for the time being, they are unable to perform a "chain of ideas" similar to a human researcher [Araujo 2017]. Still from this perspective, considering that it is humanly impossible to carry out a literature review of millions of documents in a conventional way, the use of intelligent mechanisms can, by "reading" all the existing literature on a specific topic, develop a process of generating "original hypotheses" on a given research problem [Araujo 2017].

3.2. The role of the human being in the era of academic GenAI

Despite the significant approximations perceived during the content analysis, generative chatbots incur inaccuracies and inconsistencies, which therefore suggests that the use of intelligent mechanisms should be done in a way that complements human productions, which guarantees better quality and academic relevance in the content required [d'Alte and d'Alte, 2023].

Although the issue in favor of the use of utilities is centred on the practicality of processing large amounts of data, a necessary reflection to be carried out is on the issue of the "integrity of the knowledge generated", whether in the sense of the reliability of the content generated by the intelligent utility, or the inherently ethical issues that concern the attribution of the real authorship of the content [Peres 2024]. This being said, the concept of "original hypothesis" - the process of stipulating the original idea or set of ideas and rearranging them within a methodology compatible with a theoretical scope - should be recalled as an important object of discussion on original authorship [Araujo 2017].

As a problematic example, an evaluation by a group of human reviewers was decisive in changing the editorial policy of a scientific journal [Peres 2024]. The analysis in question detected more than 60 per cent evidence of fraud in ChatGPT abstracts, prompting the journal's editorial board to tighten its policy, where it now both classifies the use of AI-generated content as plagiarism and bans the possibility of indicating GenAI utilities/tools as co-authors of papers [Peres 2024]. In the same vein, there is a need to rethink or change criteria for evaluating work, since the presence of AI in the academic sphere in recent years has a direct impact on scientific and philosophical production, from the conception of originals to their review and evaluation [Araujo 2017].

In this sense, the need for quantitative presentation of work ("academic productivism") is an object for raising critical questions, since it can be a factor that drives the indiscriminate use of GenAI utilities to "speed up" the number of productions, which can disadvantage the quality aspect and, eventually, the structural conceptions of evaluation and academic production by the academic body itself (especially teachers) [Peres 2024].

3.3. Academic GenAI and questions about authorship and intellectual property

Although intelligent utilities, depending on their level of improvement, result in the large-scale production of content, the discussion about the authorship of these "intellectual" products arises, where, on the one hand, intelligent mechanisms have the

ability to collect, analyze, select and reproduce information in a kind of improved imitation of a human researcher, on the other hand, the notion of the "authority" of the activities of this "artificial intelligence" must be considered [Araujo 2017].

In this sense, ethical and academic integrity concerns stand out, such as plagiarism and lack of originality in science due to the use of AI in the academic sphere [Avello-Sáez and Estrada-Palavecino 2023]. Other studies have also drawn attention to similar problems in the use of AIG: an experience report on the preparation of an academic paper entirely through chatGPT, which was publicized through a social network, highlighted the risks of plagiarism [Sibagatulina 2023]; the possibilities of misconduct in the professional and academic spheres, especially plagiarism, in the use of generative chatbots [Peres 2024]; the development of a plagiarism detection system which uses the structure of academic writing as a reference (model) [Lopezosa 2023].

The examples cited also draw attention to the aspect of the formation of the academic's intellectual capacities and the use of intelligent generative mechanisms for the purposes of academic production, which reinforce the tendency for academics not to develop the essential skills necessary for their field of study when using GenAI [Sibagatulina 2023; Peres 2024]. Despite the processing of the mass of information by AI mechanisms, the concept of "original hypothesis" must be taken up again to reinforce that the construction of the researcher's intellectual competences is directly related to the process of assimilation of information by the individual, without which it does not configure the real ability in the respective intended knowledge [Araujo 2017].

Finally, there are still discussions between violations of copyright versus the public interest in access to information, in the context of freedom of scientific research and knowledge production. For example, although the training and use of artificial intelligences to access data from private research into Covid-19 and help combat the pandemic is of benefit to global health, this could have implications for intellectual property law, given that such private research comes from corporations that own the copyright on that data [Souza, Schirru and Alvarenga 2020].

3.4. The challenges for ethical normativity in AI

This discussion can begin with a survey of the literature on ethical parameters in AI, from the conception of principles to the creation of AIs based on these parameters, where there is a tendency on the part of society as a whole - from large companies to citizens - to look for guidelines that seek to promote ethics in Artificial Intelligence [Cerqueira, Tives and Canedo 2021]. Other works highlight the possibilities for governmental, intergovernmental, academic-scientific and business initiatives in the ethical-normative field of AI [Garcia 2020; Jesus 2023; Peres 2024].

Although I also agree that governments and research centers can contribute to making AI systems increasingly ethical, there is a certain skepticism about the role of business in relation to ethical-normative responsibilities in the field of AI, since the guiding principles of conduct that exist in the organizational/business culture are centred much more on marketing visions than on humanistic reasons [Piedra Alegria 2023]. However, there is an effort on the part of large companies to not only think about which ethical principles to follow, but how to implement them within Artificial Intelligence [Cerqueira, Tives and Canedo 2021]. Thus, checklists of ethical principles that have already been implemented stand out, as do impact assessment tools for monitoring and testing, as well as tools and frameworks that act as a process for

achieving the ethical principles desired by the various parties involved, all aimed at creating AI systems.

With regard to existing models and proposals for a guiding scheme for ethical decision-making in the field of computing, it is plausible to question the ethical limits imposed in the technical sphere [Carvalho, Oliveira and Santoro 2021]. In principle, just like any social activity, the development of AI systems is inserted in a socially complex environment - where there are contexts, dynamics and conflicts of interest of the most diverse nature [Jesus 2022].

There are 11 ethical principles that can be applied to the development of AI approaches: Transparency; Justice and Equity; Non-Maleficence; Responsibility; Privacy; Beneficence; Freedom and Autonomy; Trust; Sustainability; Dignity; Solidarity [Cerqueira, Tives and Canedo 2021]. Another study highlights normative documents on the ethical issues surrounding the development of AI systems and, based on critical-reflexive principles, correlates them with competences in responsible and transformative actions in the social context [Jesus 2022]. Finally, another study emphasizes that ethical guidelines in the field of AI should have, in addition to clear and concise regulations, human rights as a reference base [Piedra Alegria 2023].

4. Discussion

4.1. Perspectives on written production in GenAI

In the field of scientific communication, *searching*, *collecting*, *selecting*, *analyzing*, *understanding* and *reproducing* information are all stages without which technical-scientific production would not be consolidated as such in social reality, in the constitution of the framework of science and, in general, of knowledge.

Information as a social product constructed in the historical, cultural and social context of the individual is directly related to the generation of knowledge - where a generator/source of information, through a common system, transfers the information to a conditioned receiver (individual), who internalizes it and assimilates it as knowledge [Barreto 2008]. Assimilation - the correlation between the information object and the mental structures of the individual who apprehends it - has the direct consequence of transforming information into knowledge. Understanding the nature of the relationship between information and knowledge and its assimilation initiated the studies of Cognitivism [Barreto 2008].

That said, there are two points that need to be highlighted: *plagiarism* and *non-cognition*. These two mishaps represent a major problem in a researcher's development, which, if not avoided, can peremptorily jeopardize their entire academic journey and even raise delicate questions such as what separates the "*human-author*" from the "*machine-author*?" The indiscriminate use of GenAI tends to make it difficult for the user-researcher to discern not only whether they are using automaton material appropriately, but whether they are really experiencing cognitive processes to the full, with the risk of alienating themselves from their own formation and construction as an intellectualized individual. If, on the one hand, the use of Artificial Intelligence utilities for reviewing literature and preparing academic content is feasible, on the other hand, important issues such as authorship, quality, intellectual development and their eventual evaluation once again emphasize the importance of the human being as a non-passive agent in the current technological context.

That said, even though they can be a great help in academic productivity, it is really necessary to rethink GenAI mechanisms as a tool with greater operational potential (*search, collection and selection*), but with less intellectual implications (*analysis, comprehension and reproduction*) so that the automation of information systematization processes (in this case, scientific information) cannot overpower the assimilation and, in a way, cognition stages of the human individual who wants to achieve academic excellence, yet still trains and operates GenAI.

Although the human presence in the context of GenAI represents a counterbalance in academic production issues, it still leaves gaps regarding doubts about the attribution of real authorship and the reproduction of academic content from the appropriation by intelligent utilities of content available in cyberspace. Some questions remain, such as *the limits of freedom of information and the guarantee of intellectual property rights*. However, there is the undeniable benefit of the rapid and accessible production and dissemination of knowledge by intelligent mechanisms, since it would meet specific demands that would not be subject only to the cost and benefit logic of the market, as in the case reported in some examples [Araujo 2017; Souza, Schirru and Alvarenga 2020].

5. Results

5.1. Notes on normative guidelines for GenAI

However, beyond the pragmatic or marketing aspects of using GenAI, there is a need for guidelines made up of principles that show how GenAI should be developed, pointing to an ethical path to be followed. The question must therefore be asked: *what are the ethical parameters that can be established within the scope of GenAI?* In an attempt to clarify this and many of the previous questions, we have put together, albeit in a non-exhaustive way, some guidelines that can be starting points for the use of GenAI within the academic sphere.

5.2. Assent

The use of Artificial Intelligence mechanisms is already becoming more and more present both in common use and in the academic world; examples range from use for domestic and everyday purposes to academic production. It is necessary for the scientific community as a whole to accept this reality and consider the inclusion of GenAI tools in their respective know-how which, according to real and appropriate needs, help with the processing, generation and management of information.

5.3. Protagonism

The human being is the final word in this new paradigm. Individuals need to play a leading role, empowering themselves with the knowledge necessary to select the GenAI utilities best suited to their needs, as well as other related information competences in Artificial Intelligence. In the academic sphere, it is essential that the human agent is a protagonist in all stages of knowledge production, in the sense of evaluating, reviewing and validating all content produced by GenAI, with the aim of achieving the desired knowledge, while not abnegating the construction of their own intellectual capacities.

5.4. Standardization

Although subject to current trends and increasingly complex, society is organically in favour of an ethical approach to the use of technologies. To this end, within the

framework of GenAI, consideration must always be given to existing mechanisms in all spheres (political, educational, institutional, corporate, transnational) to provide normative guidelines for the promotion of safe digital environments.

5.5. Institutionalization

This involves incorporating the guiding principles of the new paradigm in GenAI into the academic sphere at higher education institutions. Institutionalization involves actions ranging from the reformulation of information and educational strategies to consider GenAI as a feasible tool, to the redesign of assessment criteria by teaching staff (taking into account, in particular, the construction of students' intellectual capacities). Institutionalization would involve drawing up specific guiding policies for the comprehensible use of AI and GenAI within academic institutions.

5.6. Constructionism

The use of GenAI must always be aimed at benefiting the public interest, with technical-scientific productions reflecting the informational and educational needs and interests of society, avoiding the distancing of the academy from the rest of society.

6. Conclusion

This work emphasizes that the use of GenAI is a promising tool in technical-scientific production in the current context, while highlighting the need to develop policies for the use of AI in the academic sphere. However, it is necessary to consider reflections on the use and evaluation of relationships between academic users and possible evaluators, in order to make the academic production process more in line with the new reality, and more transparent in terms of both the use of technologies and the evaluation of productions that have used them. Future work is therefore needed to address and discuss how these guidelines could be drawn up in detail or effectively implemented, delving into various pertinent points that could discuss specific problems with GenAI algorithms in the academic environment, and how these can be resolved.

Finally, at this time of changing paradigms, the role of human supervision is inexorable, above all, in order to aim for productions that are more focused on quality, despite the current quantitative impetus in academic production.

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