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ChatGPT and academic work: new psychological phenomena

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Abstract

This study describes the impact of ChatGPT use on the nature of work from the perspective of academics and educators. We elucidate six phenomena: (1) the cognitive workload associated with conducting Turing tests to determine if ChatGPT has been involved in work productions; (2) the ethical void and alienation that result from recondite ChatGPT use; (3) insights into the motives of individuals who fail to disclose their ChatGPT use, while, at the same time, the recipient does not reveal their awareness of that use; (4) the sense of ennui as the meanings of texts dissipate and no longer reveal the sender's state of understanding; (5) a redefinition of utility, wherein certain texts show redundancy with patterns already embedded in the base model, while physical measurements and personal observations are considered as unique and novel; (6) a power dynamic between sender and recipient, inadvertently leaving non-participants as disadvantaged third parties. This paper makes clear that the introduction of AI tools into society has far-reaching effects, initially most prominent in text-related fields, such as academia. Whether these implementations represent beneficial innovations for human prosperity, or a rather different line of social evolution, represents the pith of our present discussion.

Keywords ChatGPT · Ethics · Authenticity · Alienation · Power dynamics

1 Introduction

ChatGPT has established itself as a highly popular tool. In February 2023, just two months after its public release, the chatbot had already attracted more than 100 million unique users (Hu 2023). Google Trends shows that the number of users has continued to increase since that time (Fig. 1).

In light of such developments, the present work examines a number of phenomena that we, as faculty from technical universities, have recognized as impactful influences on the totality of the academy. Each observation pertains not only to the use of ChatGPT by students but also by scientific and professional colleagues in their deliverables and communications with us and others. It has already been established that certain terms that are often produced by ChatGPT now appear disproportionately in student work and in the output

of academic publishers such as Elsevier's ScienceDirect, with the word 'delves', for example, now appearing much more frequently compared to the pre-ChatGPT-era (Astarita et al. 2024; De Winter et al. 2023; Kobak et al. 2024; Matsui 2024).

The work of faculty consists largely of assessing scientific submissions, but also processing various sorts of communications. The latter range from emails, chat messages, job application letters, progress reports, and other informational materials. It is becoming increasingly common to encounter texts which raise strong suspicions that they were written with, at least, the help of ChatGPT, if not in total by this application. It should be noted that, from the author's perspective, there may be various degrees of intensity in ChatGPT usage, ranging from light grammatical editing to outright copy-paste of the output from the ChatGPT chat window (e.g., Chemaya & Martin 2024; Grothe-Hammer et al. 2025). However, the impression on the recipient's side is typically binary: the received text is either authentic (i.e., not contaminated by ChatGPT) or fake (ChatGPT has clearly been used). In this context, even a relatively small portion can be enough to label the entire received text as suspect.

This suspicion of ChatGPT usage arises when a received text or message seems overly verbose and contains 'filler'

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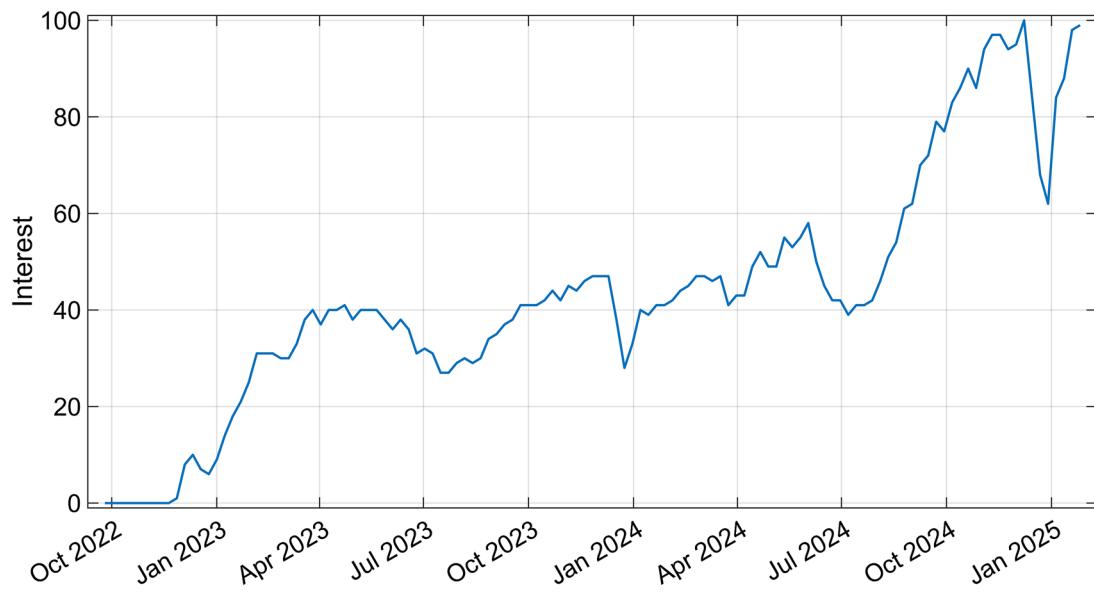


Fig. 1 Google Trends output of the keyword ‘ChatGPT’ as search term, worldwide, for the time period between October 1, 2022, and January 24, 2025. The y-axis shows the search interest on a scale

from 0 to 100, where 100 represents the peak frequency of searches within the selected timeframe

words, supplementary phrases in sentences, or ‘suspicious’ terms, such as ‘thrilled’, ‘adept’, ‘leveraging’, ‘fostering’, ‘ultimately’, or ‘balancing’. This suspicion is further substantiated by the excessive use of em dashes, inconsistent apostrophe styles (e.g., curly versus straight, or with punctuation within versus outside quotation marks), and, in more extreme cases, obvious giveaways, such as references in the bibliography that do not actually exist. At the same time, these texts also lack a certain sharpness and readily appear detached from the actual topic and/or research content or activities in which the author ought to have been engaged. Such communications are often also characterized by a certain lack of (human) clumsiness that we normally recognize in texts written by students. Such suspicions are reinforced when it is known that the sender normally does not, for example, speak fluent English or has limited knowledge about a certain topic. Notwithstanding the latter shortfalls, they still send a fluent and cogent text, or an arid but factually correct explanation of a complex subject.

Below, we identify the psychological phenomena associated with these propensities. We note that these phenomena are, *pro tem*, predominantly subjective and so have yet to be thoroughly empirically substantiated. Hence, this preparatory work features such dimensions, rather than an empirical study. However, research that immediately follows may well be able to substantiate the precise quantitative effect of the phenomena we now proceed to describe.

2 Point 1: allocating cognitive capacity

Since the arrival of ChatGPT, faculty now spend a substantial proportion of their mental effort to determine whether the texts they receive are generated either with the help of, or solely by, ChatGPT. Faculty’s problem here becomes analogous to a repeating Turing Test, that is, directed toward determining whether a text was generated by a computer or by a human (Turing 1950). This process relies on past experience with ChatGPT and knowledge of its working mechanisms (De Winter et al. 2023; Tabone & De Winter 2023) as well as experience with human creation of target texts. The initial judgment as to whether a text has been generated by ChatGPT can happen rather rapidly and intuitively, similar to a chess player who immediately senses a position or sees a tactic (cf. De Groot et al. 1996 and see Gladwell 2005). Much of the associated cognitive effort is not spent on the decision itself (‘Yes, ChatGPT has been used’ vs. ‘No, ChatGPT has not been used’), but on subsequent reflection as to the accuracy of the assessment. Questions that arise include: how serious is such use? Were the learning objectives still being pursued and achieved? Is this action allowed? Does the other party actually understand the topic?, and so forth.

There are many cases where a recipient is strongly convinced that the sender has used ChatGPT. Other cases are less certain. However, in the latter, there still remains a clear suspicion, since the person in question normally submits texts of lesser quality or has a markedly different writing style.

The sender can employ various techniques to escape detection. In particular, a deception should not be too perfect, as this itself can arouse suspicion (Hancock 2015). Of course, the sender must also ensure that obvious giveaways, such as citing non-existent references, do not immediately reveal the deception. The inclusion of human-like idiosyncrasies in the text increases the likelihood that the recipient will not realize that the text has been generated by ChatGPT. Furthermore, an effective deception is not one-way but takes into account the recipient's own desires (Hancock 2015). In the case of ChatGPT-generated text, the sender has an increased likelihood of misleading the recipient if tapping into the desire (or greed) of the recipient, for example, when the recipient is eager to submit the work to a scientific journal.

Such cognitive analysis, i.e., determining whether ChatGPT has played a role in the generation of the text, and reflection on possible risks and consequences of this, has become a new and ever-growing facet of scientific evaluation. Additional cognitive resources have then to be allocated to advising others as to how to write their texts in such a manner that they do not resemble ChatGPT, thus making sure they themselves will not be (falsely) accused by other readers. Proving one's 'innocence' will become progressively more difficult here (Gorichanaz 2023). A coping mechanism for the recipient is to be willingly seduced into believing that the sender wrote the text him/herself. This approach is convenient when it is believed to be sufficiently defensible to others, such as peer reviewers, that the text was indeed written by a human.

3 Point 2: disillusionment and the ethical void

From current understanding, it appears that senders rarely acknowledge that they have employed ChatGPT. While some do include explicit statements such as "This email was generated by ChatGPT" or "I made use of a large language model in drafting my paper," such acknowledgments seem to be rare or exceptional. However, students and colleagues generally admit to such use upon direct inquiry, or when relevant conversations specifically concern ChatGPT.

The general lack of prior acknowledgment is confirmed by an analysis of published academic papers. Thus, a search query of Elsevier's ScienceDirect showed that certain 'target words' (see De Winter et al. 2023), such as 'crucial', in combination with 'comprehensive', are used in a high frequency (as of January 24, 2025: these numbers were 63,391 times in 2022, 96,987 times in 2023, and 241,600 times in 2024). Such an increasing frequency suggests that ChatGPT has been consulted in at least tens of thousands of articles. At the same time, only a small proportion of these works acknowledge the use of generative AI, despite the fact that the major

publishers do require such acknowledged identification (see [Appendix](#) for an overview). Elsevier's required statement, for example, namely "full responsibility for the content of the publication", yields only 878 hits for publications from 2023, and 7,406 hits for publications from 2024 (as of January 24, 2025, using ScienceDirect).

This difference between what is the ostensible, actual rate of usage versus that of required reporting or acknowledgment can well lead to a wider disillusionment about the standards of all scientific communication. It is perplexing that ChatGPT is being used on a large scale and that this occurs in some form of collective secret that few openly acknowledge. Many academics apparently do not (find it necessary to) report the use of ChatGPT, not for grammar corrections, but often not even for more extensive rewrites of certain paragraphs (Chemaya & Martin 2024; Glynn 2024; Kousha 2024). However, we do not immediately consider authors immoral for doing so. Indeed, the use of ChatGPT and other forms of AI assistance does not necessarily undermine the quality of content or the achievement of learning objectives but can rather support them and facilitate a deeper understanding (Bialystok 2024; Grothe-Hammer et al. 2025; Tossell et al. 2024). What we are endeavoring to highlight is the cognitive dissonance that arises between the fact of use and the potential for, at best, apathy and, at worst, large-scale deception of each other.

Publishers play a dual and problematically dubious role in this matter: Those disseminating open-access journals benefit financially from the increasing numbers of publications, since they are paid on a per article basis. It can therefore be questioned whether publishers would genuinely want to discourage ChatGPT use, considering particularly that ChatGPT can serve to increase writers' productivity (Noy & Zhang 2023) and so massively increase the number of profit-generated units (papers) that they purvey. Further elaboration on the fact that ChatGPT and related large language models (LLMs) can lead to a proliferation of papers, without necessarily an increase in the quality of those papers, is provided by, among others, Kendall and Teixeira da Silva (2024) and Guersenzvaig and Sánchez-Monedero (2024).

4 Point 3: secrecy and insight into motives

A new dynamic of secrecy and deception might be emerging when we, as recipients of any text or communication, then suspect that the sender has used ChatGPT or any allied or comparative aid. The sender may feel strengthened by having delivered a fluent text, but also experience some fear and anxiety of being discovered. In earlier research among a total of 1,975 respondents, it was found that 14.5% agreed with the statement "*I am worried that others will discover that I have used ChatGPT*" (De Winter et al. 2024a). The

emotional stress linked to undisclosed ChatGPT use has also been documented by others (Gorichanaz 2023; Zhang et al. 2024).

On the recipient's side, there is an awareness that the sender has taken a 'shortcut' and apparently wanted thereby to gain some form of advantage. This perception informs the recipient's insight into the personality and motivation of the sender, without the sender necessarily realizing it. For example, the recipient might now believe that the sender, despite being a skilled writer, felt insecure enough about their communication skills to incorporate at least parts of their text from ChatGPT. Or, it may be that the sender, who is insistent about securing immediate feedback on their text, should not really need to be taken very seriously, because the text is generated by ChatGPT. That is, the sender apparently did not wish to conform with traditional expectations of the effort associated with information creation. It might also be that technical writers view this technology as a legitimate tool in facilitating the transfer of knowledge, somewhat in the same way that other tools facilitate other forms of work (and see Hancock & Volante 2020). In sum, although the sender may deliver better-quality texts, the recipient has gained potentially prejudicial insight into the motives of that sender.

How can we resolve this emerging dissonance concerning a sender's use of ChatGPT? Direct confrontation almost inevitably causes stress, at the least for the sender. It may result in a commitment to not use ChatGPT on future occasions. However, this also implies that the sender will, most likely, deliver texts that are lower in quantity and quality than previously communicated. This outcome is not in the best interest of either party. Thus, it seems there is a dilemma, in which ChatGPT use creates a sense of secrecy, but non-use disadvantages the collective because of not having access to generative AI.

At the moment, there is no clear solution to this dilemma other than to break the silence. Over time, students have spontaneously confessed to having used ChatGPT, but whether they accompany this admission with a rationalization or qualification seems to depend on the nature of the conversation. In more judgment-free discussions, ChatGPT users may be more forthcoming, while in situations of confrontation, they may frame their use more cautiously (e.g., 'I only used it to check some things or refine my wording' or 'I didn't use ChatGPT directly, but my vocabulary has been enriched by previous insightful interactions with it'). The latent interest in this topic is further evident from the relatively large number of people who attend faculty lectures or presentations on ChatGPT and other large language models. This suggests that, while authors may hesitate to disclose their use of ChatGPT upfront, they are willing to engage in discussions about it, often leading to candid conversations once the ice is broken.

5 Point 4: feeling of meaninglessness and fluidity

Another phenomenon paralleling the rise of ChatGPT is an increasing sense of meaninglessness. Prior to ChatGPT, text had intrinsic value. Writing directly and uniquely reflected the thoughts and understanding of the individual sender about their own work. For example, a written summary, a skill that is tested in Dutch examinations for high school students, provided direct insight into the writer's thought process. The mind's communication via this production was unique and singular (and see Hancock et al. 2009).

Summaries generated through ChatGPT lose much of this meaning. Although the quality of the summary generated by ChatGPT is often at a 'good' level, the summary—especially when the recipient is convinced that the text is not human-generated—conveys a sense of near meaninglessness, because the summary is simply and soullessly the result of a computer algorithm. The summary no longer provides insight into the struggle, the degree of comprehension, or the intellectual insight of the sender. Literature reviews, reports, brochures, or flyers can be rendered virtually useless as a personal communication device. We find that the 'Inflation of words' is a reasonable term for this phenomenon. It forces us to consider the full panoply of communication and the varying functionality it supports.

A comparison can be made here with playing chess against a computer. While a modern chess engine can play at a level that far surpasses that of the human world champion, and thus, at least in theory, can provide a highly informative experience, human players often do not find it meaningful to compete against a chess engine. Reasons for this include the psychological element, such as mind-reading skills and social cognition, as well as emotional investment, i.e., factors that make chess engaging and meaningful (Kulikov 2020). Similarly, ChatGPT-generated texts, even when they are informative, often fail to captivate, engage, and stimulate the reader.

Furthermore, before the arrival of ChatGPT, differing texts produced by humans, such as a book or dissertation, but also an individual quote, statement, or term, had a fixed meaning 'an sich', grounded in the author's original intent and the context of its dissemination. Such productions were unaffected by the interpretative capabilities of AI. Other authors could then refer to that specific work, or build upon it, by means of which the perception of cumulative knowledge acquisition and progress arose. It made sense to, for example, comment on the piece, in the expectation that it could set further thoughts in motion. These steps could lead to fruitful debates or even initiate paradigm shifts. Chomsky's commentary on behaviorism is an outstanding example of a text that brought about further insight and an effervescent and insightful revolution (Chomsky 1959).

At the same time, ChatGPT makes it clear that any notion of fixedness in human texts may be an illusion. ChatGPT illustrates a clear confirmation of the *butterfly effect*: Small variations in initial conditions (i.e., small variations in the phrasing of the prompt, or small updates of the language model) yield vastly different outputs. This occurs even if ChatGPT is tasked to operate nearly deterministically by setting its temperature parameter to 0 (Chen et al. 2024; De Winter 2023). Sensitivity to initial conditions is not a criticism of how large language models, such as ChatGPT, have been designed. ChatGPT has simply made clear that human output can be simulated and that the way humans generate words may occur in a manner equivalent to how ChatGPT achieves this same goal. That is, through successive probabilistic selections of tokens from the dictionary. For academics, the act of reading texts has become an ever more nihilistic endeavor, as products are seen more as arid patterns or viewed as texts being now almost devoid of meaning.

In a ChatGPT-dominant world, words do not retain their fixed meanings anymore. Rather, they actually become a product of patterns in the neural network. Rich vocabulary (exemplified by the Shakespeare authorship controversy; Shapiro 2010) can aid in differentiating between texts authored by humans and those generated by AI like ChatGPT. By quantitatively analyzing the diversity of word use, researchers may be able to establish criteria that potentially distinguish human from AI textual output. However, across time, even this technique is liable to fail as the LLMs absorb all new and thus innovative communications.

6 Point 5: new understanding of utility and information-value

Meaninglessness, as discussed above, refers to the phenomenological experience and emotional response in which an interaction with a counterpart feels inauthentic. While related, the concept of utility operates at a higher cognitive level. Utility concerns the value of insights gained, specifically, distinguishing between new and informative content versus redundant information. For example, when receiving a writing extract that is presumably generated by ChatGPT but even when not generated by ChatGPT, the question arises: “*Could ChatGPT have also produced this. That is, is the same information already present in the ‘base model’?*” In many cases, the answer is: “*Yes; this is already enclosed in the base model of GPT and thus redundant with existing data on the internet.*”

A similar phenomenon is described by Lindemann (2024). She stated that the current use of LLMs, especially when these LLMs are integrated into search engines such as Bing, results in ‘sealing of knowledges’, where the plurality of the problem and unique or alternative perspectives

are inadequately expressed, and the already dominant narrative is simply repeated and reinforced. As time goes on, this propensity increases.

At the same time, there is a parallel realization that data obtained through physical measuring equipment in novel experiments are, by definition, new and have not yet been absorbed by the model. Non-digital sources, and data related to daily news events or even personal everyday experiences, now gain in value for the reason that the base model has a cut-off date, having been trained on existing data from the internet. Thus, the overall situation remains fluid, dynamic, and a rapidly evolving melange of value and redundancy. The information-value is in proportion to the way that the future does, or does not, resemble the past.

However, it is the case that ChatGPT can still answer questions by simulating physical systems (e.g., with the prompt: “*What is likely to come from this experiment?*”) or by simulating people (via personas) (De Winter et al. 2024c). In short, through ChatGPT, the terms utility and value have taken on new and near meanings. A positive side of this development is that, hopefully, fewer resources will need to be spent on research whose answers can already be reliably predicted via AI.

7 Point 6: power play

ChatGPT is impacting the balance of power between the information sender and its recipient. ChatGPT provides the sender progressively greater power. Strengthened by the tool, the sender is now able to deliver quality work efficiently, thereby outperforming colleagues who do not use the tool. The record is indicating that students are increasingly able to deliver superior texts and are able to communicate their complex thoughts in a clearer fashion. ChatGPT thus leads to a form of democratization in science, enabling researchers, especially from countries where English is not the native language, to produce fluent narratives. It is a leveling-up capacity of communication but not necessarily of innovation or insight. It also reconciles the quantity and quality of manuscripts submitted to scientific journals (which currently exhibit long waiting periods for peer review; Hancock 2024), but also on pre-print servers like ArXiv.

It is not only senders but also recipients that have gained a degree of power. Provided that recipients are sufficiently discriminating, they can recognize what senders have done. This provides increased power, since each recipient can then confront the sender with this fact. The recipient has also gained insight into the expressed and latent motives of the sender. Differentials in the balance of power, in turn, create tension and uncertainty in the sender.

The latter must navigate between quality and productivity, as compared to the still-unclear social and formal guidelines regarding the use of generative AI. The enhanced capacity re-casts the notion of ‘productivity’, something that will radically change with the AI-augmented tool.

There are still many who remain unfamiliar with ChatGPT and do not use it. In scientific work, we interact with diverse groups of people, such as support staff and older generations of researchers, who do not use ChatGPT or know of its capabilities. These colleagues prototypically describe ChatGPT as hype or a capacity they cannot or do not employ within their own institutions. They often refer to issues such as ethics, copyright, validity, source citation, and knowledge security, to buttress their progressively less tenable position. The impression that arises is that such non-users are being naive and so suffer from disadvantages such as a productivity lag. This could well cost them their status or position in the long term compared to ChatGPT users. We may indeed create differential categories for AI-augmented vs. AI-nonaugmented productions. The trends herein described are consistent with the observations of Navarro and Osiurak (2017), who stated that the use of tools is evolutionarily ingrained to gain an advantage, it being possible that tool existence preceded even the differentiation of the human species (Navarro & Hancock 2023). We anticipate that the accelerating capacities of AI will lead to ever-widening discrepancies between people able to wield the full capabilities of technological power and those people who will only be subjected to it.

Although we indicated above that non-ChatGPT users are at a disadvantage compared to users, at least in terms of academic productivity, we also recognize a trend where non-use can serve as a marker of quality. This has been particularly noticeable in application processes for new PhD positions. Many of the submitted cover letters are easily recognizable to experienced academics as being ChatGPT-assisted. When reading dozens of such letters, a kind of ChatGPT fatigue quickly sets in, where we are not looking for a perfectly crafted letter but rather for the person behind the text. Non-users, especially when they include personal or idiographic details and still produce a well-structured letter without spelling mistakes, tend to stand out more easily and are more likely to be invited for an interview. In other words, especially now that it appears texts distorted by ChatGPT are becoming more common than those fully generated by humans, human-generated text is perceived as more valuable, i.e., the human uniqueness and effort demonstrated by not using ChatGPT can be seen as a unique asset, a communication signal, or a source of pride and self-validation (Grothe-Hammer et al. 2025).

8 Conclusion

The present commentary provides phenomenological insights into how the introduction of an AI tool, specifically ChatGPT, profoundly impacts the form and structure of modern work and, most especially, the scientific enterprise. The use of ChatGPT is now clearly identifiable in published texts (De Winter et al. 2023; Kobak et al. 2024), and such usage affects both the psychological and methodological dimensions of work processes. We have described these phenomena based on contemporary educational experiences at disparate universities, environments where ChatGPT is now widely in use.

The associated psychological phenomena are identified as follows:

- (1) Cognitive effort and the associated time spent assessing whether a text is written by ChatGPT, as well as contemplating the resulting consequences, evidently increase the workload for all readers, particularly faculty.
- (2) Disillusionment, as represented in the feeling of disappointment and ethical ambiguity, is increasing due, at least in part, to the lack of openness about ChatGPT usage rates.
- (3) Dynamics of mutual secrecy and insight gained into private motivations of text senders: The lesson drawn from this is that people are susceptible to the exigencies of pragmatism. The emerging mantra agrees that it no longer matters if we do things ourselves. That the work is being done is considered sufficient motivation and justification.
- (4) Feelings of meaninglessness: Texts generated by AI now often lack any individual personal input and are the result of a stochastic token-picking algorithm. This largely leads to a feeling of pointlessness in the reader when trying to anchor or critically appraise such texts.
- (5) Redefinition of utility and value: There is a shift in the perception of what is now considered of value. Non-digital sources, or even personal experiences, become more appreciated but ever more sparse.
- (6) Power dynamics: ChatGPT creates emerging profiles of power differential between sender and recipient. Above all, ChatGPT strengthens the position of users compared to their agnostic and non-user peers. At the same time, we are moving toward a situation in which human-written text is becoming a valuable asset, something that is increasingly noticeable in hiring processes.

Although we have raised numerous critical issues, much remains to be investigated concerning these psychological phenomena. For example, this can be enacted through

interviews with users and non-users, as well as the development of accurate ChatGPT use detectors. The challenge lies in finding a compromise between exploiting the benefits of AI tools while still maintaining and promoting human creativity and originality. The future of (academic) writing could move toward a hybrid model, wherein AI and human input are both acknowledged and employed to advance knowledge. And what applies to scientific writing is equally applicable to all human communication, such as entertainment, history, travelogues, etc.

In recent months, a new class of large language models has emerged that can reason and reflect before generating an output. Examples include OpenAI's o1-class (De Winter et al. 2024b; Zhong et al. 2024) and, more recently, Deep-Seek R1 (Guo et al. 2025). These tools are highly powerful for tasks such as mathematics, as well as structuring and analyzing texts or research papers. As a result, beyond the inflation of words we described earlier, we also foresee a situation where papers are no longer even read but instead analyzed in batches. The human researcher, in this scenario, would function more as a supervisor, while the actual reading is delegated to AI.

A further scenario may well be that ChatGPT, and related forms of generative AI, will quickly result even in hyper-inflation of scientific output. It is conceivable that students will use personal virtual assistants that explain and solve problems for them. This step will result in the

marginalization of teachers (cf. Stephenson 1995). The teacher then effectively has a progressively diminishing role, excepting perhaps process facilitation, mentoring, and accrediting diplomas. Related to this, it is conceivable that actual knowledge development will itself increasingly take place at the largest Big Tech companies, where new insights are generated in large data centers and cloud computing servers instead of at universities. White-collar workers who do not recognize, acknowledge, or use ChatGPT will eventually become redundant. We strongly advise early, strategic, and rational consideration of these potentially de-humanizing eventualities (Hancock 2017).

Finally, we aver that introspective and philosophical approaches to thinking, as exemplified here, as opposed to purely empirical and mathematical forms of analysis, can enable us to maintain meaningful control over AI. Whether profit-driven strategies override human-centered philosophies will determine the direction and balance of that future.

Appendix

The policies of different scientific publishers regarding the disclosure of AI usage can be found in Table 1, with corresponding source references in Table 2.

Table 1 Publishers' policies with respect to the use of AI tools

Publisher	Policy
American Chemical Society (2023)	The use of AI tools for text or image generation should be disclosed in the manuscript within the Acknowledgment section with a description of when and how the tools were used. For more substantial use cases or descriptions of AI tool use, authors should provide full details within the Methods or other appropriate section of the manuscript
American Physical Society (2023)	Authors and Referees may use ChatGPT and similar AI-based writing tools exclusively to polish, condense, or otherwise lightly edit their writing....Authors should disclose the use of AI tools to editors in their Cover Letter and (if desired) within the paper itself. Referees should disclose the use of AI tools to editors when submitting a report
American Psychological Association (2023)	When a generative AI model is used in the drafting of a manuscript for an APA publication, the use of AI must be disclosed in the methods section and cited....When AI is cited in an APA scholarly publication, the author must employ the software citation template, which includes specifying in the methods section how, when, and to what extent AI was used. Authors in APA publications are required to upload the full output of the AI as supplemental material
Association for Computing Machinery (2023)	The use of generative AI tools and technologies to create content is permitted but must be fully disclosed in the Work. For example, the authors could include the following statement in the Acknowledgements section of the Work: ChatGPT was utilized to generate sections of this Work, including text, tables, graphs, code, data, citations, etc..... Basic word processing systems that recommend and insert replacement text, perform spelling or grammar checks and corrections, or systems that do language translations are to be considered exceptions to this disclosure requirement and are generally permitted and need not be disclosed in the Work
Cambridge University Press (2023)	AI use must be declared and clearly explained in publications such as research papers, just as we expect scholars to do with other software, tools, and methodologies

Table 1 (continued)

Publisher	Policy
Elsevier (2023); Sample (2023)	<p>...to improve the readability and language of the research article, but not to replace key tasks that should be done by the authors, such as interpreting data or drawing scientific conclusions</p> <p>Where authors use generative AI and AI-assisted technologies in the writing process, these technologies should only be used to improve readability and language of the work and not to replace key authoring tasks such as producing scientific, pedagogic, or medical insights, drawing scientific conclusions, or providing clinical recommendations. Applying the technology should be done with human oversight and control and all work should be reviewed and edited carefully, because AI can generate authoritative-sounding output that can be incorrect, incomplete, or biased. The authors are ultimately responsible and accountable for the contents of the work.</p> <p>Authors should disclose in their manuscript the use of generative AI and AI-assisted technologies and a statement will appear in the published work.</p> <p><i>Statement: During the preparation of this work the author(s) used [NAME TOOL / SERVICE] in order to [REA-SON]. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication</i></p>
Emerald Publishing (2023)	any use of AI tools within the development of an Emerald publication must be flagged by the author(s) within the paper, chapter or case study
Frontiers (2023)	<p>If the author of a submitted manuscript has used written or visual content produced by or edited using a generative AI technology, such use must be acknowledged in the acknowledgements section of the manuscript and the methods section if applicable. This explanation must list the name, version, model, and source of the generative AI technology.</p> <p>We encourage authors to upload all input prompts provided to a generative AI technology and outputs received from a generative AI technology in the supplementary files for the manuscript</p>
IEEE (2023)	The use of content generated by artificial intelligence (AI) in an article (including but not limited to text, figures, images, and code) shall be disclosed in the acknowledgments section of any article submitted to an IEEE publication
Institute of Physics (2024)	<p>There are many responsible and appropriate uses for generative AI within scholarly research and we support authors using it in this manner. When doing so, authors are encouraged to be transparent about their use of any generative AI tools in either the research or the drafting of the manuscript. Authors are also encouraged to maintain records of previous drafts, as well as any prompts used in the editing or generation of material within their manuscript.</p> <p>Authors are responsible for ensuring that any written or visual content produced by or edited using a generative AI technology meets all IOP Publishing's guidelines and policies. All AI-generated content must be checked to ensure it is accurate and free from plagiarism. Generative AI tools cannot be used to create, alter or manipulate original research data and results such as blots or measurements. Any generative AI tools used to create figures from data, such as graphs or charts, should be listed in the figure caption</p> <p>In cases where text in a manuscript has been generated, authors must ensure that they have critically revised this work for important intellectual content...</p>
Karger (2023)	If a Large Language Model (LLM), or other generative AI-based tool (e.g., chatbots or image creators), has been used as part of a study or manuscript, the use must be clearly declared in the manuscript Methods or Acknowledgements section, if the article type does not include a Methods section... The manuscript must include detail on how the accuracy of any generative AI-based output was verified. Authors are encouraged to include the original input prompts and outputs from the tools used as supplementary material
MDPI (2023, 2024)	<p>[Earlier statement] In situations where AI or AI-assisted tools have been used in the preparation of a manuscript, this must be appropriately declared with sufficient details at submission via the cover letter. Furthermore, authors are required to be transparent about the use of these tools and disclose details of how the AI tool was used within the “Materials and Methods” section, in addition to providing the AI tool’s product details within the “Acknowledgments” section</p> <p>Where GenAI has been used for purposes such as generating text, data, graphics, study design, or data collection, analysis, or interpretation of data, authors are required to declare this during the submission process. Furthermore, for transparency, authors are required to disclose details of how the GenAI tool was used in the “Materials and Methods” section, and provide the GenAI tool’s product details in the “Acknowledgments” section.</p> <p>Recommended acknowledgement statement:</p> <p>“During the preparation of this manuscript/study, the author(s) used [tool name, version information] for the purposes of [description of use]. The authors have reviewed and edited the output and take full responsibility for the content of this publication.”</p>
MIT (2023)	<p>Authors who use AI tools to produce text or images/graphics, or to collect data, must inform their editors of this use and be transparent about it in their manuscripts so that readers understand the role of these tools in the development of the work</p> <p>Authors are fully responsible for the content of their manuscripts, including any portions produced by AI tools, and are liable for any ethical breaches that may result from the use of such content</p>

Table 1 (continued)

Publisher	Policy
Oxford University Press (2023)	The use of AI (for example, to help generate content or images, write code, process data, or for translation) must be disclosed both in cover letters to editors and in the Methods or Acknowledgements section of manuscripts
PLOS ONE (2023)	Contributions by artificial intelligence (AI) tools and technologies to a study or to an article's contents must be clearly reported in a dedicated section of the Methods, or in the Acknowledgements section for article types lacking a Methods section. This section should include the name(s) of any tools used, a description of how the authors used the tool(s) and evaluated the validity of the tool's outputs, and a clear statement of which aspects of the study, article contents, data, or supporting files were affected/generated by AI tool usage
PNAS (2023a, b)	According to PNAS and PNAS Nexus policies, if AI software such as ChatGPT has been used to help generate any part of the work it must be clearly acknowledged; it must be noted in the Materials and Methods section (or Acknowledgments, if no Materials and Methods section is available) on submission
Royal Society (2023a, 2023b)	Use of AI and generative AI software, such as Large Language Models or ChatGPT, for manuscript preparation, including drafting or editing text, must be disclosed in the Materials and Methods section (or Acknowledgments, if no Materials and Methods section is available) of the manuscript and may not be listed as an author. Authors are solely accountable for, and must thoroughly fact-check, outputs created with the help of generative AI software. AI tools for creating images or graphics are not permitted to be used unless the software is the subject of the work under consideration. Accordingly, PNAS does not allow the use of AI in cover art submissions
Sage (2023)	You will be asked to declare whether you have used AI technologies in the preparation of your paper. If you have, please provide a statement about how you have used this—the statement will be published in the final article
Science (2023); Thorp (2023)	Authors must disclose in the manuscript their [Artificial intelligence (AI), AI-assisted technologies, and Machine learning] use and a statement will be required in the published work. The statement should provide detail of which elements of the work were generated by AI and AI assisted technologies. Editors and reviewers will judge if its use is appropriate
Springer Nature (2023a, 2023b)	Clearly indicate the use of language models in the manuscript, including which model was used and for what purpose. Please use the methods or acknowledgements section, as appropriate
Taylor & Francis (2023a, 2023b, 2024)	... we are now updating our license and Editorial Policies to specify that text generated by ChatGPT (or any other AI tools) cannot be used in the work, nor can figures, images, or graphics be the products of such tools
Thieme (2023)	... researchers using LLM tools should document this use in the methods or acknowledgements sections. If a paper does not include these sections, the introduction or another appropriate section can be used to document the use of the LLM
Wiley (2023)	Authors who use AI-assisted technologies as components of their research study or as aids in the writing or presentation of the manuscript should note this in the cover letter and in the acknowledgments section of the manuscript. Detailed information should be provided in the methods section: The full prompt used in the production of the work, as well as the AI tool and its version, should be disclosed
Wolters Kluwer (2024)	Use of an LLM should be properly documented in the Methods section (and if a Methods section is not available, in a suitable alternative part) of the manuscript
	Where AI tools are used in content generation, they must be acknowledged and documented appropriately in the authored work
	[Earlier statement:] Any assistance from AI tools for content generation (e.g. large language models) and other similar types of technical tools which generate article content, must be clearly acknowledged within the article
	Authors must clearly acknowledge within the article or book any use of Generative AI tools through a statement which includes: the full name of the tool used (with version number), how it was used, and the reason for use
	GenAI use must be transparently documented in the Acknowledgements or Material and Methods sections (see Disclosure and Transparency paragraph)
	If an author has used a GenAI tool to develop any portion of a manuscript, its use must be described, transparently and in detail, in the Methods section (or via a disclosure or within the Acknowledgements section, as applicable)
	The use of AI and AI-assisted technologies (hereafter AI) is permitted in the pre-writing (research) process; • The use of AI in the writing process is only permitted to enhance readability and language of the work; • The use of AI may not replace the intellectual exercise of the author such as reasoning, recommendations, conclusions, etc.; • Authors should be transparent about the use of AI and disclose what type(s) of AI has (have) been used in the creative process

Table 2 Sources per publisher corresponding to Table 1

Publisher	Sources
American Chemical Society (2023)	https://researcher-resources.acs.org/publish/authorship_guidance_policies Based on a time period-specific Google search: 16 March 2023 (https://www.google.com/search?q=%22American+Chemical+Society%22+%22artificial+intelligence%28AI%29+tools+do+not+qualify+for+authorship%22&tbs=cdr:1,cd_min:10/31/2022,cd_max:03/16/2023)
American Physical Society (2023)	https://journals.aps.org/authors/ai-based-writing-tools Based on a time period-specific Google search: 23 May 2023 (https://www.google.com/search?q=aps+%22Authors+and+Referees+may+use+ChatGPT+and+similar+AI-based+writing+tools+exclusively+to+polish%2C+condense%2C+or+otherwise+lightly+edit%22&tbs=cdr:1,cd_min:11/30/2022,cd_max:12/24/2023) First capture in web.archive: 24 May 2023 (https://web.archive.org/web/20230524042932/https://journals.aps.org/authors/ai-based-writing-tools)
American Psychological Association (2023)	https://www.apa.org/pubs/journals/resources/publishing-tips/policy-generative-ai Based on a time period-specific Google search: 27 November 2023 (https://www.google.com/search?q=apa+%22When+a+generative+AI+model+is+used+in+the+drafting+of+a+manuscript+for+an+APA%22&tbs=cdr:1,cd_min:11/30/2022,cd_max:12/24/2023)
Association for Computing Machinery (2023)	https://www.acm.org/publications/policies/new-acm-policy-on-authorship Dated: 30 April 2023 First capture in web.archive.org: 20 May 2023 (https://web.archive.org/web/20230520083805/https://www.acm.org/publications/policies/new-acm-policy-on-authorship)
Cambridge University Press (2023)	https://www.cambridge.org/core/services/authors/publishing-ethics/research-publishing-ethics-guidelines-for-journals/authorship-and-contributorship Based on a time period-specific Google search: 13 March 2023 (https://www.google.com/search?q=%22cambridge+university+press%22+%22AI+use+must+be+declared+and+clearly+explained+in+publications+such+as+research+papers%2C%22&tbs=cdr:1,cd_min:11/30/2022,cd_max:12/24/2023) First capture in web.archive: 14 March 2023 (https://web.archive.org/web/20230314072342/https://www.cambridge.org/core/services/authors/publishing-ethics/research-publishing-ethics-guidelines-for-journals/authorship-and-contributorship)
Elsevier (2023); Sample (2023)	News item https://www.theguardian.com/science/2023/jan/26/science-journals-ban-listing-of-chatgpt-as-co-author-on-papers Dated: 26 January 2023 https://www.elsevier.com/about/policies-and-standards/the-use-of-generative-ai-and-ai-assisted-technologies-in-writing-for-elsevier First capture in web.archive.org: 8 February 2023 (https://web.archive.org/web/20230208025327/https://www.elsevier.com/about/policies-and-standards/the-use-of-generative-ai-and-ai-assisted-technologies-in-writing-for-elsevier)
Emerald Publishing (2023)	https://www.emeraldgroupublishing.com/news-and-press-releases/emerald-publishings-stance-ai-tools-and-authorship First capture in web.archive.org: 7 March 2023 (https://web.archive.org/web/20230307004534/https://www.emeraldgroupublishing.com/news-and-press-releases/emerald-publishings-stance-ai-tools-and-authorship)
Frontiers (2023)	https://www.frontiersin.org/guidelines/author-guidelines First capture in web.archive.org: 10 June 2023 (https://web.archive.org/web/20230610155355/https://www.frontiersin.org/guidelines/author-guidelines)
IEEE (2023)	https://journals.ieeeauthorcenter.ieee.org/become-an-ieee-journal-author/publishing-ethics/guidelines-and-policies/submission-and-peer-review-policies First capture in web.archive.org: 28 March 2023 (https://web.archive.org/web/20230328144453/https://journals.ieeeauthorcenter.ieee.org/become-an-ieee-journal-author/publishing-ethics/guidelines-and-policies/submission-and-peer-review-policies ; note that there are no captures between 8 December 2022 and 28 March 2023)

Table 2 (continued)

Publisher	Sources
Institute of Physics (2024)	https://publishingsupport.iopscience.iop.org/questions/generative-ai-tools Based on a time period-specific Google search: 15 March 2024 (https://www.google.com/search?q=iop+%22There+are+many+responsible+and+appropriate+uses+for+generative+AI+within+scholarly+research+and+we+support+authors+using+it+in+this+manner.%22&tbs=cdr:1,cd_min:10/2/2023,cd_max:5/1/2024)
Karger (2023)	https://karger.com/pages/publication-ethics First capture in web.archive.org: 2 June 2023 (https://web.archive.org/web/20230602165102/https://karger.com/pages/publication-ethics ; note that there are no captures between 19 May and 2 June 2023)
MDPI (2023, 2024)	https://www.mdpi.com/ethics#_bookmark3 First capture in web.archive.org: 18 November 2024 (https://web.archive.org/web/20230807195838/https://www.mdpi.com/ethics) [Earlier statement] First capture in web.archive.org: 11 June 2023 (https://web.archive.org/web/20230611183757/https://www.mdpi.com/ethics#_bookmark3)
MIT (2023)	https://mitpress.mit.edu/for-authors First capture in web.archive.org: 14 May 2023 (https://web.archive.org/web/20230514193010/https://mitpress.mit.edu/for-authors)
Oxford University Press (2023)	https://academic.oup.com/pages/authoring/journals/preparing_your_manuscript/ethics We could not retrieve the first appearance of the policy, but we found a post mentioning it on 28 February 2023 (https://academia.stackexchange.com/questions/192077/are-there-examples-of-journals-with-an-explicit-policy-on-gpt-3-and-equivalent-1)
PLOS ONE (2023)	https://journals.plos.org/plosone/s/ethical-publishing-practice#loc-artificial-intelligence-tools-and-technologies First capture in web.archive.org: 12 April 2023 (https://web.archive.org/web/20230412050609/https://journals.plos.org/plosone/s/ethical-publishing-practice#loc-artificial-intelligence-tools-and-technologies ; note that there are no captures between 15 March and 12 April 2023)
PNAS (2023a, 2023b)	PNAS updates https://www.pnas.org/post/update/pnas-policy-for-chatgpt-generative-ai Dated: 21 February 2023 https://www.pnas.org/author-center/editorial-and-journal-policies#authorship-and-contributions First capture in web.archive.org: 27 November 2023 (https://web.archive.org/web/2023112714414/https://www.pnas.org/author-center/editorial-and-journal-policies#authorship-and-contributions)
Royal Society (2023a, 2023b)	https://royalsociety.org/journals/authors/author-guidelines We could not retrieve the first appearance of the policy but it should be after 8 June 2023, based on a webpage in web.archive without mentioning of AI (https://web.archive.org/web/20230608021720/https://royalsociety.org/journals/authors/author-guidelines) https://royalsociety.org/journals/ethics-policies/openness/#ai We could not retrieve the first appearance of the policy but it should be after 8 June 2023, based on a webpage in web.archive without mentioning of AI (https://web.archive.org/web/20230609202340/https://royalsociety.org/journals/ethics-policies/openness)
Sage (2023)	https://uk.sagepub.com/en-gb/eur/chatgpt-and-generative-ai-0 Based on a time period-specific Google search: 31 July 2023 (https://www.google.com/search?q=sage+%22The+use+of+AI+tools+that+can+produce+content+such+as+generating+references%2C+text%2C+images%22&tbs=cdr:1,cd_min:11/30/2022,cd_max:12/31/2023)
Science (2023); Thorp (2023)	Editorial: ChatGPT is fun, but not an author https://doi.org/10.1126/science.adg7879 Dated: 26 January 2023 https://www.science.org/content/page/science-journals-editorial-policies First capture in web.archive.org: 16 November 2023 (https://web.archive.org/web/20231116213909/https://www.science.org/content/page/science-journals-editorial-policies)

Table 2 (continued)

Publisher	Sources
Springer Nature (2023a, 2023b)	Editorial: Tools such as ChatGPT threaten transparent science; here are our ground rules for their use https://doi.org/10.1038/d41586-023-00191-1 Dated: 24 January 2023 https://www.nature.com/nature-portfolio/editorial-policies/ai First capture in web.archive.org: 7 June 2023 (https://web.archive.org/web/20230607175302/https://www.nature.com/nature-portfolio/editorial-policies/ai)
Taylor & Francis (2023a, 2023b, 2024)	Taylor & Francis news https://newsroom.taylorandfrancisgroup.com/taylor-francis-clarifies-the-responsible-use-of-ai-tools-in-academic-content-creation Dated: 17 February 2023 https://authorservices.taylorandfrancis.com/editorial-policies/defining-authorship-research-paper First capture in web.archive.org: 18 May 2023 (https://web.archive.org/web/20230518014851/https://authorservices.taylorandfrancis.com/editorial-policies/defining-authorship-research-paper ; note that there are no captures between 8 February 2023 and 18 May 2023) https://taylorandfrancis.com/our-policies/ai-policy First capture in web.archive.org: 12 June 2024 (https://web.archive.org/web/20240612141648/https://taylorandfrancis.com/our-policies/ai-policy)
Thieme (2023)	https://www.thieme.com/en-us/journal-policies First capture in web.archive.org: 11 June 2023 (https://web.archive.org/web/20230611041024/https://www.thieme.com/en-us/journal-policies)
Wiley (2023)	https://authorservices.wiley.com/ethics-guidelines/index.html First capture in web.archive.org: 11 March 2023 (https://web.archive.org/web/20230311111141/https://authorservices.wiley.com/ethics-guidelines/index.html)
Wolters Kluwer (2024)	https://assets.contenthub.wolterskluwer.com/api/public/content/5e3ae601ecb64e088dad05e4a90fd861 Based on a time period-specific Google search: 7 March 2024 (https://www.google.com/search?q=wolters+kluwer+%22the+use+of+ai+and+ai+assisted+technologies%28hereafter+ai%29%22&tbs=cdr:1,cd_min:12/31/2023,cd_max:12/31/2024)

Data availability The article has no associated data.

Declarations

Conflict of interests The authors have no competing interests to declare that are relevant to the content of this article.

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