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Original Contribution

COGNITIVE AND ETHICAL FAILURES IN AI-BASED SCIENTIFIC REVIEWING

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ABSTRACT: *The paper explores the ethical and cognitive implications of using artificial intelligence in the scientific peer-review process. It analyzes a real case of a hastily conducted pseudo-review, revealing inconsistencies and methodological errors that arise when automation replaces human judgment. International publishing standards from IEEE, Elsevier, Springer Nature, Wiley, and Cambridge University Press are examined to highlight the inadmissibility of AI-generated reviews and the importance of human responsibility in scientific evaluation. The study further discusses the educational context of applying AI and CAD software in teaching solid geometry, emphasizing that technology should assist, not replace, human thinking. Based on the observed deficiencies, the article proposes the development of an improved cognitive platform for independent AI-assisted reviewing, supported by expert human oversight to preserve integrity and trust in scientific communication.*

KEY WORDS: *Artificial intelligence, Peer review ethics, Cognitive systems, CAD education, Academic integrity, Automation in science, Human judgment, Ethical standards.*

1. Introduction

In the contemporary scientific environment, the role of the human in the process of creating, evaluating, and publishing knowledge has acquired particular significance. The development of artificial intelligence has introduced new opportunities to support research activities, but at the same time, it has raised a number of ethical and methodological questions. When technologies enter domains that require critical thinking and professional judgment – such as

peer review – there arises a risk of replacing human evaluation with automated algorithms.

The present study examines this issue through the analysis of a real case in which signs of hasty and possibly automated reviewing of a scientific article are observed. The text provides an overview of international requirements for the ethical use of artificial intelligence, formulated by leading publishers and academic organizations, and compares them with specific instances of noncompliance in peer-review practice. The approach is entirely analytical and aims to emphasize the need for human responsibility and expert involvement in the evaluation of scientific works [3,10,13].

2. Ethical requirements for the use of artificial intelligence and its inadmissibility in the review process

In recent years, artificial intelligence has begun to make an increasingly tangible impact in the scientific sphere. Many researchers use it as an auxiliary tool – for language editing, data organization, or clearer formulation of conclusions. For this reason, leading scientific publishers worldwide – Elsevier, Springer Nature, IEEE, Wiley, and Cambridge University Press – have adopted clear rules that define the boundaries between acceptable and unacceptable uses of AI in science.

All of them are unequivocal on one key issue – artificial intelligence has no place in the peer-review process. A review is not merely a formal evaluation but a process in which a human read, thinks, compares, and judges. This requires experience, understanding, and professional intuition – qualities that cannot be replaced by an algorithm. According to international ethical standards, when a review is produced through an automated program, the process ceases to be scientific and becomes a mechanical act that may lead to erroneous or even disastrous assessments.

Publishers such as Elsevier and Springer Nature emphasize that AI may be used only for language editing or improving readability – but not for generating ideas, conclusions, or opinions. Any other use of such tools, including in the peer-review process, is considered a violation of ethical norms. Springer Nature explicitly prohibits reviewers from uploading manuscripts into AI systems, as this breaches confidentiality and may expose personal data and the authors' intellectual property to risk.

According to IEEE – the world's largest organization in the fields of electronics and computer science – any use of AI in a paper or review must be transparently disclosed. The author or reviewer must clearly state which tool was used, for what purpose, and to what extent it contributed to the final text. The absence of such a declaration is regarded as a violation of ethical standards, as it creates the false impression of human authorship where none actually exists [16,17,18,19].

Wiley adopts a similar position, requiring full transparency regarding the use of generative models such as ChatGPT. Any text created or edited with AI must be reviewed and approved by the author, who bears full personal responsibility for its content. Cambridge University Press, for its part, defines the automatic generation of texts or reviews as a form of deception and even as a potential variant of plagiarism, since such practices lack genuine human contribution.

The overall direction of these international policies is clear – the human being, with their intellect, experience, and critical thinking, must remain at the center of the scientific process. Artificial intelligence can serve as an assistant, but it can never replace the professional responsibility and moral conscience of the scholar. This is especially important in peer review, where every word and every evaluation can influence another researcher's career and reputation.

When such ethical principles are ignored and automated systems are used to produce reviews, the results can be misleading and unjust. The present study will demonstrate how such a violation – committed within the framework of a formal peer-review process – can lead to erroneous conclusions that undermine trust in the academic community and in the scientific process itself [1,2,6].

3. Improving students' spatial perception through the use of CAD software and artificial intelligence

The present text introduces the content of another article, written earlier this year, dedicated to exploring ways of improving students' spatial perception through the use of CAD software and artificial intelligence in the study of solid geometry. During its review, an obvious lapse was made – most likely as a result of a hastily conducted so-called pseudo–double-blind review process, in which the text was apparently not read in full. Despite this, the paper itself has a clear methodological focus and reflects genuine observations from educational practice.

The main emphasis is placed on the issue of students insufficiently developed spatial thinking. In school practice, it is often observed that most students are unable to visualize a figure in three-dimensional space, and their approach to solving stereometry problems tends to be largely intuitive. Sometimes they arrive at the correct result without being able to clearly explain how they reached it, which indicates the absence of a conscious process of reasoning [4,8,11].

The article notes that the use of CAD programs plays an important role in developing visual perception, but it cannot replace the mental activity that arises during independent drawing (Fig. 1). The very act of constructing the figure requires the student to think, analyze, and imagine its structure. It is precisely this active engagement that develops spatial orientation and logical thinking – skills that are missing when the image is pre-made and provided externally.

The author points out that using artificial intelligence in this process is more complex than it may appear. To obtain an accurate image, one needs knowledge of geometry, precise parameters, and correctly defined relationships between elements. Generating a figure through AI may seem easy, but in most cases, it requires more precision than manual drawing. Moreover, this approach leaves the student as a passive observer – seeing the result without understanding the process.

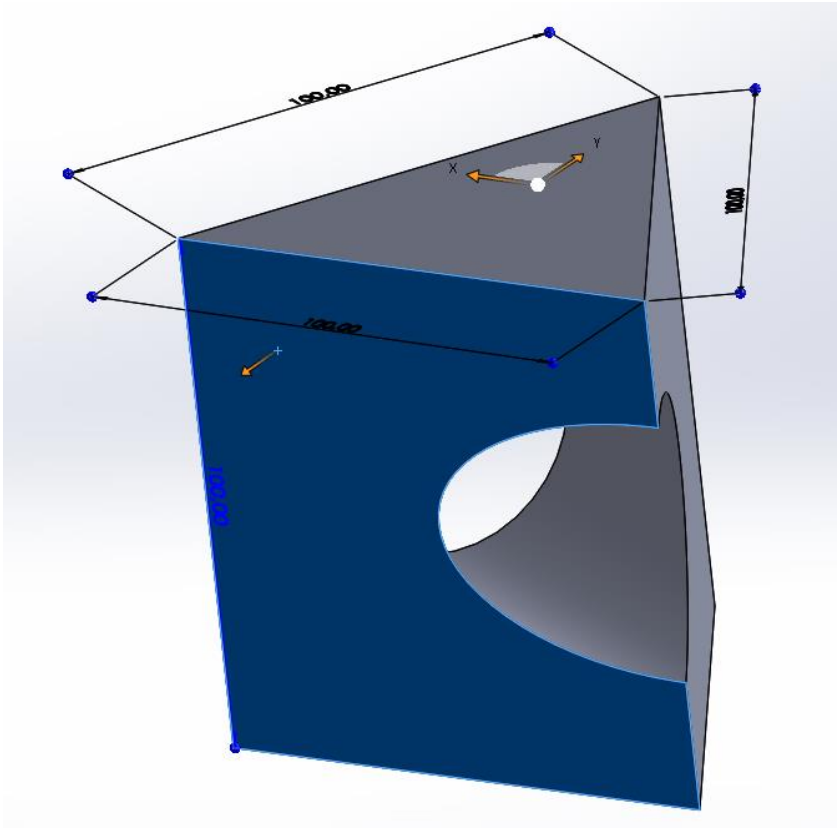

Fig. 1. Example of a three-dimensional visualization of a geometric body created by a student using CAD software

The article also presents specific examples showing how automatically generated images can be misleading. Some models appear correct at first glance but contain structural errors – missing edges, incorrect angles, or geometrically impossible intersections. Such discrepancies have educational value, as they help students recognize the difference between visual appearance and geometric truth (Fig. 2) [9,12,15].

This leads to the main conclusion: applying artificial intelligence in education is not an easier, but often a more challenging process than manual drawing. For AI to be truly beneficial, it must be used consciously – as a tool for analysis rather than a substitute for thinking. Students should first construct the figure on their own, then compare their result with the computer-generated

model and analyze the differences. This sequence develops observation skills, critical thinking, and a genuine understanding of spatial relationships.

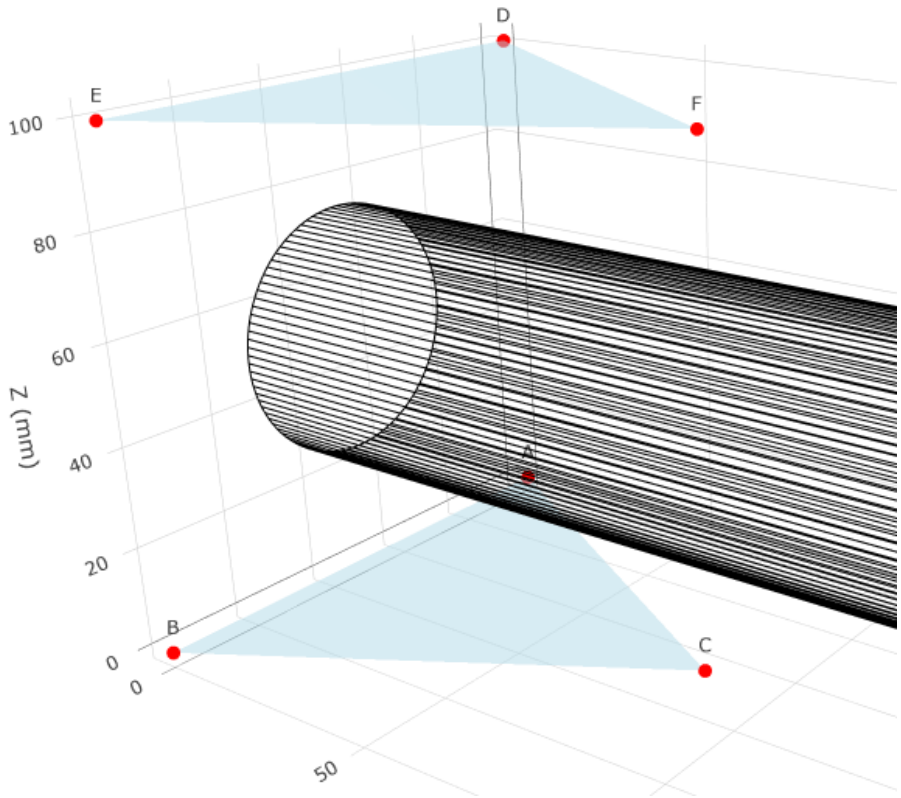

Fig. 2. Example of an incorrectly generated geometric object created by artificial intelligence

In conclusion, the article emphasizes that the goal of education is not to simplify mental work through technology, but to strengthen it. Artificial intelligence can support the visualization process, but it cannot replace human understanding. The true value of the learning process lies in the student's personal journey from thought to image – becoming aware of each step along the way. Only then do technologies gain real meaning – not as a replacement, but as a tool for developing thinking and building lasting spatial perception.

4. Cognitive Deficits and Methodological Inconsistencies in the Peer-Review Evaluation

An examination of the reviews submitted for the presented scientific report reveals significant discrepancies between the content of the text and the critical remarks made. A calm and careful comparison shows that the reviewers did not engage with the main idea or the internal logic of the study. Some of their comments are overly general, while others address elements that are not part of the article at all. This creates the impression of a superficial reading – or even the use of pre-set templates during the preparation of the reviews [3,9,12].

The most frequent criticisms concern the included figures. According to the reviewers, these did not illustrate tasks typical of solid geometry and were not directly related to the teaching process. Such a statement, however, does not correspond to the content of the manuscript. The article clearly states that the figures are not presented as descriptive geometry problems but as demonstrations of the capabilities of CAD software for visualizing three-dimensional objects. Their purpose is to show how digital tools help students conceptualize spatial forms and relationships. This is a pedagogical, not a technical, approach. Therefore, remarks such as "missing problem statements" or "no contours marked" are irrelevant to the study's aim. They reflect a misunderstanding of the idea that the article analyzes how technology supports learning, rather than demonstrating the solution of a specific engineering task.

Comments such as "no axonometric cross," "edges not visible," and "no visible result" are typical of purely technical thinking. In the context of a pedagogical publication, such observations are misplaced, as the discussion does not concern precise technical drawings but methodological approaches and cognitive processes. The purpose of the article is to show that visualization – even when imperfect – has educational value when used consciously and with pedagogical intent. This is a fundamentally different perspective, one that requires reviewers to have experience not only in geometry but also in teaching methodology [1,5,13].

The second review repeats familiar phrases such as "overly declarative exposition," "unclear objective," and "lack of methodology," without citing a single specific sentence to substantiate these claims. Such expressions are common in template-based reviews written without depth. In fact, the article's objective is clearly formulated – to analyze the role of CAD systems in developing spatial thinking and to demonstrate how technological tools can enhance the effectiveness of teaching. The text also provides specific examples of lessons, methods, and assessment strategies, which refute the accusation of declarative exposition.

Particularly revealing is the comment that the title contains a "logical error," because solid geometry is supposedly a subfield of geometry. This statement would only be correct under a strictly theoretical consideration of mathematics as a science. In pedagogical practice, however, the term "geometry and solid geometry" is entirely appropriate – it denotes two distinct areas of study taught with different scope and objectives. This is well known to anyone familiar with the Bulgarian school curriculum. Evidently, the cognitive system that assisted the review process was unaware of the specifics of our educational system and failed to distinguish between subjects as they are actually taught. As a result, a completely incorrect comment was produced – one that ignores the educational context in which the article was written.

Equally telling is the way the so-called "double-blind review" was conducted. Officially, the procedure was completed within approximately two hours – during which suitable reviewers were supposedly identified, all technical steps completed, and independent evaluations submitted. Such a timeline is unrealistic, as even the administrative and technical stages of finding, sending, and receiving materials require more time. All of this leads to the conclusion that the process was merely formal – carried out for record-keeping rather than with genuine engagement. The style of the reviews themselves suggests that the text was not read carefully; the focus is almost entirely on the figures, with no understanding of their pedagogical function. Several comments indicate that the reviewers failed to comprehend the content and responded only to the visual elements. In this way, the review process becomes a pseudo-procedure – performed in form but devoid of scientific substance and critical judgment [4,11,15].

From the analysis, it is clear that the remarks do not correspond to the topic or character of the scientific report. They address issues not discussed in the paper and overlook its central ideas. Instead of evaluating the pedagogical value and innovative aspects of using CAD technologies in education, the reviewers focused on technical details of no real relevance. Therefore, it is entirely justified to conclude that the review process should be re-evaluated by a specialist familiar with the specifics of geometry education and the pedagogical applications of modern technologies.

5. Conclusion

The analysis shows that when artificial intelligence is used without human oversight in the peer-review process, the evaluation loses its depth of meaning. A review is not merely a formal check – it is an act of reflection, interpretation, and assessment that requires a human presence. A machine can organize text, verify language or data, but it cannot grasp the idea, the underlying message, or the personal experience that shapes a piece of research [2,6,7].

When reviews are produced mechanically, without genuine reading and understanding, the outcome inevitably becomes superficial. This undermines trust not only in the specific publication but in the entire academic environment. Therefore, the rules governing the peer-review process must be updated. They should clearly delineate the boundary between technological assistance and human responsibility.

Until such changes are implemented, a constructive step would be the creation of a new platform built upon a cognitive system with deeper domain knowledge – one trained specifically for the purpose of peer review. This system should be capable of understanding content, not merely "reading" it. For true independence, a second, separately developed cognitive system could serve as a parallel reviewer. When their assessments diverge – as often happens between

human reviewers – the process should not proceed automatically, but instead involve experts who can provide a human judgment. In this way, technology would not replace the human, but rather support them. Ultimately, the essence of science lies not in speed, but in the pursuit of truth through reason and responsibility [8,10,14].

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