

WIP: Diverging Views on AI Ethics Among Biomedical Engineering Faculty and Students

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Introduction

Artificial intelligence (AI) is rapidly reshaping engineering practice, higher education, and society, producing both remarkable opportunities and significant ethical challenges. As AI becomes increasingly integrated into professional workflows, engineers must be equipped not only with technical competencies but also with the ethical awareness needed to recognize issues such as transparency, fairness, privacy, and responsibility [1], [2]. However, ethics education in engineering remains inconsistently implemented and often undervalued, creating gaps in ethical preparation just as AI intensifies the stakes of engineering decision-making [3], [4], [5].

Within biomedical engineering (BME), these challenges are uniquely amplified due to the discipline's close connection to human health, patient data, medical device development, and regulatory oversight. The BMES Code of Ethics emphasizes that BME practitioners must employ "the utmost care" when developing or applying AI-driven tools, ensuring appropriate validation, transparency, and clarity around limitations [6]. Faculty across BME programs have expressed both interest in integrating AI competencies and uncertainty about addressing accompanying ethical responsibilities, reflecting broader variability in faculty preparedness, beliefs, and prior ethics training [7], [8], [9]. At the same time, students increasingly use AI tools with limited guidance, raising concerns about accuracy, bias, academic integrity, and responsible decision-making [10], [11].

Despite the growing presence of AI in engineering education, little research has directly compared how BME students and faculty understand the ethical implications of AI or what responsibilities they associate with its use. Student perspectives on AI education have received growing attention [12], [13], [14], yet faculty perspectives remain underexplored [15], [16], [17]. For faculty to effectively lead instruction related to AI ethics and responsibility, we need to understand both student and faculty perspectives on these topics. This study therefore aims to investigate two guiding research questions: **(1) *What ethical concerns and perceived responsibilities do BME students and faculty associate with the use of AI in their academic and professional work?***; and **(2) *How do perspectives of BME students and faculty compare in their views on the ethical implications and responsibilities of AI use?*** By illuminating points of convergence and divergence between these groups, this study aims to inform ethically grounded, context-specific approaches for integrating responsible AI use across BME education.

Methods

To investigate the proposed research questions, we administered confidential surveys to BME faculty [n=21] and students in a lower-level BME course [n=24]. These surveys included open-ended questions about participant views on AI use and ethical responsibilities (Appendix A). The analysis in this work-in-progress focused on questions 3 and 4, related to AI and ethics. This study was determined to be exempt by the Ohio State University Institutional Review Board (IRB) (STUDY20251662). All data were collected following the approved IRB protocol, and consent was obtained from all participants.

An inductive thematic approach [18] was utilized to identify patterns emerging from participants' survey responses. First, the researcher reviewed the data to gain foundational familiarization, documenting any initial thoughts. Next, using an open coding approach, the text was broken into smaller, meaningful segments and assigned a unique code. These codes were refined through an

iterative process as the researcher revisited the data and developed a deeper understanding of the responses. The second coding cycle utilized axial coding, which involved grouping related codes into broader categories. Lastly, focused coding was used to identify central themes that emerged from these categories, representing underlying patterns within the data.

Results

Students and faculty identified overlapping ethical concerns regarding AI use, centering on academic integrity, the reliability of AI outputs, and the impact of AI on learning. As summarized in Table 1 (Appendix B), students primarily emphasized concerns about producing non-original work, the potential for plagiarism, and becoming overly dependent on AI, as well as fears that inaccurate outputs could lead them to learn incorrect information. Faculty echoed concerns about AI hallucinations and misinformation but framed them within broader scholarly and institutional contexts, such as grant writing and publication policies. Both groups also noted ethical implications related to authorship, fairness, and environmental impact, though faculty more strongly highlighted privacy risks and the misuse of sensitive data.

In terms of responsibility, students described a necessary standard expectation to verify AI outputs. They also described the importance of using AI as a learning tool and needing to cite AI usage appropriately. Faculty emphasized that verification should be done through non-AI sources, maintaining human-led reasoning and ethical rigor, as well as being transparent about when AI contributed to work.

Students and faculty shared many of the same concerns about AI but differed in emphasis and depth. Both groups identified the need for critical evaluation of AI outputs, yet students described this as checking for correctness, whereas faculty highlighted potential for misinformation, hallucinated citations, and the need to verify information using non-AI sources. Academic integrity was a shared theme, but students framed it around cheating on assignments, while faculty extended this to include authorship, manuscript preparation, and compliance with grant agencies and publisher restrictions.

Responsibilities also diverged between groups. Students emphasized learning-oriented responsibilities such as using AI as a tool rather than a replacement for learning, maintaining personal understanding of material, and citing AI use. Faculty, however, highlighted professional obligations such as transparency, preserving authentic human intellectual contribution, maintaining scholarly rigor, and protecting sensitive information.

Overall, students' perspectives reflected individual academic concerns, while faculty perspectives reflected broader professional, ethical, and institutional responsibilities.

Discussion and Future Work

Findings from this study demonstrate that BME students and faculty share several core ethical concerns about AI, particularly around accuracy, academic integrity, and appropriate attribution, but differ notably in how they frame the stakes and responsibilities associated with AI use. Students tend to focus on immediate academic implications, such as avoiding plagiarism, ensuring they learn correct information, and using AI as a tool without undermining their own understanding. Faculty, however, drew from broader professional and institutional contexts, expressing concerns about misinformation, the erosion of critical thinking, compliance with grant and publication policies, and the ethical risks associated with handling sensitive data.

These differences reflect developmental distinctions in professional identity formation and align with prior work showing that faculty bring varied ethics preparation and disciplinary expectations to AI use, resulting in uneven guidance for students. The contrast between student-centered and profession-centered perspectives underscores the need for intentional curricular structures that clarify expectations and help students understand the ethical standards that govern AI use in clinical, research, and engineering environments.

Looking ahead, this study highlights multiple opportunities for deeper investigation and curricular development. An additional student group was surveyed of upper-division/graduate students. In future work, ethical perspectives will be compared across stages of student training, which could inform scaffolding of AI ethics instruction within the BME curriculum. Future research will also integrate the AI Ethical Reflection framework [19], using its dimensions of awareness, critical evaluation, and social good to more systematically analyze student and faculty reasoning and identify areas of underdeveloped ethical competence. Additional qualitative inquiry, such as interviews or focus groups, would provide richer insight into the nuances of ethical decision-making and help uncover contextual factors shaping participants' views. Ultimately, bridging the gap between student and faculty perspectives will be essential for cultivating ethically responsible engineers equipped to handle the rapidly evolving landscape of AI-enabled biomedical technologies.

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Appendix A

Survey Questions

1. How do you use AI tools in your professional or academic work?
2. How do you use AI tools in your personal life?
3. What ethical concerns come to mind when you think about using AI in your work or studies?
4. What responsibilities do engineers have when using AI tools in their work?

Appendix B

Table 1: Ethical concerns about AI usage expressed by students and faculty.

Theme	Student – AI Ethical Concerns	Faculty – AI Ethical Concerns
Critical Evaluation: Verifying Accuracy	Inability to know the accuracy of AI-generated information <i>“AI might give me wrong answers sometimes but I might not realize it and learn incorrect things.”</i> <i>“How accurate is the data, and when AI is used to generate its own responses, what considerations does it take.”</i>	AI cannot be used as a reliable source because of knowledge that it fabricates, i.e., citations <i>“I think the biggest issue is hallucinations or inaccurate facts an AI generates is the biggest issue. I need to be triple sure whatever I am using it for I am not spreading wrong information.”</i> <i>“Lack of verification could lead to propagation of misinformation.”</i>
Academic Integrity	Concerned AI use is considered cheating on assignments <i>“Am I cheating am i using it as a tool to help me study or am I relying on it too much?”</i> <i>“I am less challenged in school because as soon as I start to struggle I turn to AI. It is not good for my educational development.”</i>	Concern about integrity in proposals, manuscripts, and academic policy violations <i>“Death of critical thinking; bad personal / societal outcomes.”</i> <i>“Transparency about when it is used. Using it appropriately (defining situations when it should or should not be used).”</i>
Attributions: Credit and Citations	AI should be cited when used <i>“To cite it so everything can be traced back to its source.”</i> <i>“They must use AI wisely and source it when it is needed.”</i>	AI use should be disclosed but should not be cited as a source <i>“AI used without a cross-check could lead to erroneous information. Hallucinations (making up citations and content) are common.”</i>
Workforce Preparation: Impact on Learning	Concerns they are not learning enough and will not be prepared for jobs <i>“I think about people using it to get passing grades and then not being fully equipped for their job.”</i> <i>“Some people may use them to pass a class without doing actual</i>	Concern AI is degrading students’ critical thinking, rigor, and independent reasoning <i>“The main thrust of effort must come from the engineer. AI tools can really improve, refine, correct, and reshape, but not overtake the initial human effort.”</i>

	<i>studying, it's concerning especially in a major that is closely linked to healthcare or working with the lives of others."</i>	<i>"Learn how to use them properly and ethically to advance their careers."</i>
Privacy and IP	Occasional mention of data-ownership	Consistent emphasis on protecting sensitive data and IP <i>"Privacy. I'm worried about how much info about my students I need to give the system. I will filter out names when possible."</i> <i>"Unethical use can come about from ... inputting sensitive data into AI tools."</i>
Environmental Impact	Concerned about the impact on the environment and use of natural resources due to AI use <i>"I think about how it may generate work that is not my own as well as how it is not good for the environment."</i> <i>"The general population is uneducated on the environmental impact regarding AI usage."</i>	Faculty did not comment on the environmental impact.

Table 1 summarizes the respective ethical concerns and responsibilities expressed by students and faculty when responding to the open-ended survey questions, "What ethical concerns come to mind when you think about using AI in your work or studies?" and "What responsibilities do engineers have when using AI tools in their work?." Direct quotes from students or faculty in italics.