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***Abstract*—When ChatGPT became openly available in November 2022, higher education actors grappled with managing student use of generative AI (GAI). For instructors there were few policy resources on which to draw. Higher education actors were forced to be reactionary, sometimes responding independently of other stakeholders. While faculty waited on larger GAI policy frameworks to inform their teaching practice, some implemented localized policies of their own. This paper presents the case of a course-level policy. It reports on how student use of GAI, effective academic year 2023-2024, is managed in the capstone course of a BSc in Electrical and Computer Engineering. The paper outlines the course policy and procedure for student use of GAI; defines responsible GAI use; and shares the teaching scaffolds used to support responsible GAI use. Most noteworthy, this paper operationalizes responsible GAI use. Such use must be permitted; attributed; and critical.**

Keywords— academic integrity; attributing use of generative AI; artificial intelligence; electrical and computer engineering; generative AI; norms of GAI use; responsible GAI use

I. Introduction

The release of free-to-use generative artificial intelligences (GAI and GAIs) caught many unprepared for its impacts [1], including the higher education sector (HE) [2-5]. Most worrying among these is the threat to assessment integrity [4, 6-9]. When ChatGPT became openly available in November 2022, we, like colleagues elsewhere [3, 10], grappled with managing student use. ChatGPT was released in the middle of the 2022-2023 academic year and in the middle of a semester. It was practically and legally difficult, if not impossible, to impose regulations at that time.

Moreover, for instructors seeking guidance on how to manage student use of GAI there were precious few resources on which to draw. HE actors were forced to be reactionary [5], responding, more often than not, independently of other stakeholders. And while faculty waited on the formulation of larger GAI policy frameworks to inform their everyday teaching practice, some implemented localized policies of their own, at the levels of programs and courses (see for example [11]).

This paper reports on how student use of GAI, effective academic year 2023-2024, is managed in the capstone course of an undergraduate degree program in Electrical and Computer Engineering. This course-level policy was implemented independently of an institutional policy framework, which was at that time in train.

The study:

- outlines the course policy and procedure on student use of GAI;
- defines responsible use of GAI in the context of a capstone project; and
- describes teaching scaffolds used to support responsible use of GAI.

While this paper shares a single experience of delineating boundaries of honest academic use of GAI, it nonetheless contributes to the larger discussion on defining and engendering responsible use of GAI. It also adds to ongoing efforts to define norms of GAI use in academic contexts [12]. This case study takes on particular significance for four reasons.

Firstly, research has found that GAI policy guidelines tend to be generic, eliding discipline specificity [13]. In particular there is a dearth of policy guidance on using GAI in engineering [10]. This paper reports on responsible use of GAI as realized in an engineering capstone course.

Secondly, a comprehensive review of AI policy in 116 universities [10] reveals that policy implementation threatens to be burdensome, as many policies suggest radical changes to pedagogical practices with little enabling support and too few resources. So while this case study comes in a time of plenty—that is, there are many HE GAI policies—it is particularly valuable as it offers a practical low-resource approach to managing student use of GAI. Our policy and procedure leverages resources available to the course prior to the penetration of GAI.

Thirdly, policy on student use of GAI has tended to be at the institutional level (see for example [2, 5, 10, 13]). This case reports how policy and procedure have been realized at the course level.

And fourthly, the discussion on ethical AI has been dominated by the global north [1]. And even where the GAI policies have been implemented in the global south, these have tended to be at well-resourced universities [2]. Our case study emerges from a small regional university in the global south.

The paper is divided into five sections. In the next section, we describe our teaching context and the exigencies that led to our implementing a GAI-use policy at the level of a single course. The section that follows reviews sources of guidance that we drew on to devise our GAI course policy. Thereafter, we share our GAI policy, implementation procedure, and teaching scaffolds. Here we justify our policy decisions, drawing on accepted understandings of academic rigor, given that norms of GAI use are yet to emerge [4]. We conclude by reflecting on the

impact of the policy, suggesting how it may be strengthened in future course offerings.

II. TEACHING CONTEXT

Our BSc in Electrical and Computer Engineering is accredited by the UK-based Institution of Engineering and Technology (IET). Students are required to complete a year-long, individual senior capstone engineering project. The capstone course, ECNG 3020, is high-stakes as it contributes to 20% of the final weighted GPA.

In academic year 2023-2024, independent of national and institutional policies, the development of which were in train, we instituted a course-level policy on student use of GAI.

For the purposes of this paper, the following course roles and responsibilities must be defined:

- Project students each have an individual, unique project. At minimum, students are to maintain a log book; submit written and oral interim reports; submit a final project report; and deliver a project demonstration and a final oral report. Each project student has a project supervisor who by default is the first examiner.
- Project supervisors meet regularly with students, typically once per week at minimum. At meetings, supervisors review logbooks and monitor student progress. Functioning as the first examiner, supervisors check student submissions for academic rigor, reporting cheating to the university's disciplinary committee. And in the role of first examiner, the supervisor evaluates the student's submissions. This is done in conjunction with the second examiner,
- Second examiners, like project supervisors, are subject-matter experts. They evaluate the student's submissions in conjunction with the first examiner. As an external party to the everyday project work, they bring an independent perspective to the evaluation of the project.

We were prompted to institute a GAI course-level policy taking account of our various stakeholder commitments:

- Students need guidance on permissible use. They need clear boundaries within which to learn and demonstrate learning [5, 7, 14-17]. It would have been unconscionable to allow a state of anomie to prevail.
- The wider university community, the nation, and employers expect that our graduates have honestly earned their degrees. If we are to ensure assessment integrity, then it was impossible to ignore the threat of GAI to the integrity of our assessment practices.
- We are to account to our accreditors about our academic honesty practices. And given the threat of student misuse of GAI, we are obligated to put in place a supportable policy on using GAI.
- Finally, as part of our own philosophy and commitment to teaching quality we need to reign in irresponsible GAI use. Irresponsible use undermines our noblest goal as instructors, which is to produce competent, honest graduates.

III. POLICY ENVIRONMENT

The GAI policy for ECNG 3020 drew on two main resources: The United Nations Educational, Scientific and Cultural Organization (UNESCO) policies; and author guidance from the IEEE.

A. UNESCO's GAI Policies

UNESCO has arguably the widest policy impact given that 193 countries are members, including our own. The ECNG 3020 course policy, see Table I, drew on two UNESCO resources:

- *AI and Education Guidance for Policy-Makers* [18]*;* and
- *Beijing Consensus on Artificial Intelligence and Education [19]*

TABLE I. UNESCO AND ECNG 3020 GAI POLICY

Coopted Principles and Recommendations	***ECNG 3020 Policy Design***
Cultivate learner-centered use of AI to enhance learning and assessment [18]. While AI provides opportunities to support teachers in their educational and pedagogical responsibilities, human interaction and collaboration between teachers and learners must remain at the core of education. [19].	We allow students and supervisors to experiment with GAI to determine the best uses of the technology in the context of unique student projects.
Ensure that AI is used to empower teachers [18].	Examiners have the final determination in how GAI is to be used. Examiners have human-in-the-loop status, assessing whether GAI was used appropriately and responsibly.
AI should support the learning process without reducing cognitive abilities [18].	Use of GAI is only rewarded where such use is critical (See *Section B: Policy Statement*)

B. Publisher Guidance

Publishers are significant contributors to policies on academic honesty. They, through their publication policies, codify acceptable use of GAI. At the time of formulating ECNG 3020 GAI policy (in April 2023), we were uncertain about the academic norms of GAI use and attribution. We relied on the author guidance issued by the IEEE [20, 21]. The IEEE is a global leader in STEM research. And it is the preferred source of scholarly material for our students. The IEEE requires scholars, in the acknowledgments section of an article, to disclose any content generated by AI, including but not limited to text, figures, images, and code. Authors are to name the AI system; identify specific sections of the study which used AI-generated content; and explain how the AI system was used to generate the content. Therefore, ECNG 3020 students are required per use of GAI to:

- indicate where they have used GAI;
- identify the system used; and
- describe how GAI was used to generate the content.

Given that this use of GAI is in a learning context, we required more details than specified by the IEEE (see *Section IV Course Policy*). And given the need for more

details, the acknowledgment section of the student's final report was not deemed the best place to record the use of GAI. And so the place of attribution for an ECNG 3020 student differs from that of an IEEE author (see *Section IV Course Policy*).

IV. Course Policy

A. Overarching Philosopy

As it relates to ECNG 3020, our department:

- took the view that GAI can be used productively and responsibly in teaching and learning [7, 15, 16, 22, 23];
- was pragmatic, recognizing that banning the technology is impossible [6, 9]
- recognized that GAI is ubiquitous [12, 14, 24, 25].It is integrated into commonly used productivity software. Moreover, practicing engineers are using GAI [5, 17, 26]. Therefore GAI use would figure in the workplaces for which we are preparing students;
- seized the opportunity to provide leadership to our students [9, 14-16] on how to responsibly use GAI.

B. Policy Statement

Figure 1 captures the roles of the three main actors in realizing responsible GAI use. The main actors are students, project supervisors who are by default first examiners, and second examiners.

ECNG 3020 students are permitted to use GAI within well-defined parameters. The policy does not mandate that all project students use GAI. Rather, where a student and project supervisor have determined that the technology is helpful, the student may use GAI. The course permits such use where it is responsible. And ***responsible use*** is defined as that which is:

- sanctioned by examiners of the student;
- explicitly and accurately attributed in the appropriate artefact—final report including supplemental documentation; oral presentation; and logbook; and
- critical; mere regurgitated AI outputs shall not be rewarded. Only demonstrably verified outputs and justified use of the outputs would be rewarded.

C. Policy Procedure

Our staff-facing guidelines require:

- designated staff, including the writing instructor, to deliver teaching scaffolds on using GAI (see *Section D: Responsible Use Scaffolds*);
- supervisors to oversee and guide students as they experiment with GAI in the first semester of the course;
- first examiners and second examiners to define the final tasks for which the project student has permission to use GAI. This agreement is brokered at the interim reporting phase. This formal agreement is recorded and communicated to the student;
- supervisors to check student use of generative AI in final submissions. The supervisor is to check for attributions to generative AI and in-text links to full, verbatim AI outputs in appendices and logbooks.

The ECNG 3020 student-facing guidance on GAI use requires students to:

- record all use of GAI in logbooks, whether or not that output was eventually used in the final iteration of the project;
- declare actual use in the relevant artefact—report; supplemental documentation; and or oral presentation. This narrative account must identify the task for which AI was used, the prompt or prompts that were used, and how the output is used;
- provide in-text citations with corresponding entries in the reference list, indicating the generative AI tool and version that was used and the year of use;
- link narrative accounts of GAI use to an appendix which provides the complete, unedited AI output; and
- provide, in each appendix sharing GAI output, the generative AI used (including version); task; date of use; prompt or prompts; verbatim AI output.

	 **student**	 **supervisor & 1st examiner**	 **2nd examiner**
Semester 1	• experiments with GAI • captures detailed use in logbooks	• monitors GAI use at weekly meetings	
Interim Reporting	• declares use of GAI in interim written report and oral presentation	• based on interim reporting and in conjunction with the 2nd examiner, specifies the tasks for which student may use GAI	• based on interim reporting and in conjunction with the 1st examiner, specifies the tasks for which student may use GAI
Semester 2	• uses GAI as sanctioned by examiners • captures detailed use in logbooks	• monitors use at weekly meetings	
Final Submissions	• declares GAI use in written report; demonstration of project; oral presentation	• checks for attribution of GAI use • checks for approved use of GAI • rewards critical use of GAI	• rewards critical use of GAI

Fig. 1: ECNG 3020 Roles with respect to Using GAI

It was necessary to modify the author IEEE guidance on using GAI, which requires authors to declare use in the acknowledgements section of their paper. We felt that merely recording use in an acknowledgement section is inadequate as students need to demonstrate critical use and learning. Moreover, since GAI content is not stable nor can it be retrieved in the same way as a scholarly article there needs to be a transparent record of the initial GAI output. Against this raw output, examiners could then evaluate the degree to which the student used the output judiciously. They could then determine if the student used the AI output critically: whether the student vetted the accuracy, modified the

output with justification, or rejected the output with reason.

D. Responsible-Use Scaffolds

Outside of project-specific guidance provided by supervisors, all students benefit from a workshop on using GAI responsibly. At the end of the workshop students are expected to be:

- identify limitations of generative AI;
- use generative AI output critically; and
- attribute use of generative AI.

The first task of the workshop focusses on how GAI can generate inaccurate information, reinforcing the idea that the student needs to have the requisite knowledge to vet the AI's output. We use several cases for this objective. These are available upon request and could not be provided here because of space constraints.

The second task models how to use GAI output critically. This centers on a narrative account (see Fig 2.) of how the student demonstrates judgement in using the AI's output by evaluating the output and modifying output with explanation.

> A preliminary design of the XX module was generated using generative AI (***what the student did***) (ChatGPT V3, November 01, 2023) (***in-text citation***). See Appendix G. (***link to appendix***) This design was modified to include an ultrasonic transducer, taking account of previous successful designs (Venkataswami 2019) (***critical use; improvements on output; link with other scholarship***). The modified design, see Diagram 5, was then simulated…(***shares final output***)

Fig. 2 Model Narrative of Critical Use and Attribution of GAI

V. Conclusion

Of particular value to instructors elsewhere is how *responsible use* is operationalized and monitored. *Responsible use* is understood to have three dimensions:

- Examiners must provide explicit, written permission to use GAI for specified tasks
- Students must comprehensively document such use of GAI including the name of task completed by GAI, the GAI system used, the dates of use, the prompts, the raw output, and the output which is actually used in the project, whether modified or unmodified.
- Students must demonstrate *critical use* which is defined as explicit verification of and justification for using AI outputs.

Given the mandate to center GAI use around people and not the technology [18, 19], the ECNG 3020 GAI-use policy leverages the supervisor-project student relationship. Students are allowed to experiment with GAI for the first semester of the year-long ECNG 3020, while recording that use in the logbooks. This provides a transparent record which the supervisor reviews at weekly meetings.

Project supervisors and second examiners function as the humans-in-the-loop. Post the three-month period of supervised student experimentation, examiners specify the final tasks for which the student may use GAI.

And as part of our low-cost pragmatic approach to monitoring student use of GAI, we rely resources that were extant before the public release of free-to-use GAI. Recognizing that there is no single fool-proof method of detecting unauthorized use of GAI [9] we rely on two strategies: human detection, supported by detection software.

ECNG 3020 is by design as an ipsative assessment [27], allowing the supervisor to monitor student's progress closely [9]. Sudden leaps in student development or large sudden chunks of completed work may signal cheating as opposed to incremental progress that is reflected in logbooks and oral reporting at supervisory meetings.

A second dimension of monitoring student use of GAI relies on the supervisor, functioning as the first examiner. Prior the release of GAI, first examiners conducted academic honest checks. With the aid of plagiarism software they checked for plagiarism and incorrect referencing. As part of the ECNG 3020 procedure on GAI use, these checks now include looking for accuracy in GAI attribution and cross referencing between the final submitted artefacts (with final use of GAI outputs) against the logbook (with raw GAI outputs). Not only should these entries correspond to each other, but the student's critical use of the GAI outputs should be evident in the final artefacts.

Looking ahead, the department intends to strengthen its assessment strategies, particularly because GAIs are becoming increasingly sophisticated. At the institutional level we are investing in more robust software solutions for detecting unauthorized GAI content. And we are considering additional in-person viva voce examinations. But these have cost and time implications.

Overall, our intent is to normalize the use of GAI. We do not wish to create an atmosphere of fear and secrecy which can foster dishonesty. By being open and by modelling responsible use, the department hopes that students are forthcoming about their use of GAI. We commit through our GAI policy to rewarding transparent, critical use of the technology. Our fervent wish is that students learn that the successful use of GAI resides with them**.**

References

[1] D. Leslie and A. M. Perini, "Future Shock: Generative AI and the international AI policy and governance crisis," *Harvard Data Science Review,* no. Special Issue 5, 2024.

[2] Y. Jin, L. Yan, V. Echeverria, D. Gašević, and R. Martinez-Maldonado, "Generative AI in higher education: A global perspective of institutional adoption policies and guidelines," *Computers and Education: Artificial Intelligence,* vol. 8, p. 100348, 2025.

[3] A. Barrett and A. Pack, "Not quite eye to AI: Student and teacher perspectives on the use of generative artificial intelligence in the writing process," *International Journal of Educational Technology in Higher Education,* vol. 20, no. 1, p. 59, 2023.

[4] A. Dabis and C. Csáki, "AI and ethics: Investigating the first policy responses of higher education institutions to the challenge of generative AI," *Humanities and Social Sciences Communications,* vol. 11, no. 1, pp. 1-13, 2024.

[5] B. L. Moorhouse, M. A. Yeo, and Y. Wan, "Generative AI tools and assessment: Guidelines of the world's top-ranking

universities," *Computers and Education Open,* vol. 5, p. 100151, 2023.
[6] W. M. Lim, A. Gunasekara, J. L. Pallant, J. I. Pallant, and E. Pechenkina, "Generative AI and the future of education: Ragnarök or reformation? A paradoxical perspective from management educators," *The International Journal of Management Education,* vol. 21, no. 2, p. 100790, 2023.
[7] J. Crawford, M. Cowling, and K.-A. Allen, "Leadership is needed for ethical ChatGPT: Character, assessment, and learning using artificial intelligence (AI)," *Journal of University Teaching & Learning Practice,* vol. 20, no. 3, p. 02, 2023.
[8] D. O. Eke, "ChatGPT and the rise of generative AI: Threat to academic integrity?," 2023.
[9] C. Mohammed and S. Rocke, "WIP Post-Assessment Processes Given the Rise of Generative AI: Findings from the Literature," in *2024 IEEE Frontiers in Education*, Washington, D.C., 2024: IEEE, 2024.
[10] N. McDonald, A. Johri, A. Ali, and A. H. Collier, "Generative artificial intelligence in higher education: Evidence from an analysis of institutional policies and guidelines," *Computers in Human Behavior: Artificial Humans,* vol. 3, p. 100121, 2025.
[11] L. Eaton, "Syllabi Policies for AI Generative Tools," Crowd-sourced list of course policies on generative AI, 2025.
[12] A. Baronchelli, "Shaping New Norms for AI," *Philosophical Transactions of the Royal Society B,* vol. 379, no. 1897, 2024.
[13] H. Wang, A. Dang, Z. Wu, and S. Mac, "Generative AI in higher education: Seeing ChatGPT through universities' policies, resources, and guidelines," *Computers and Education: Artificial Intelligence,* vol. 7, p. 100326, 2024.
[14] A. Johri, A. S. Katz, J. Qadir, and A. Hingle, "Generative artificial intelligence and engineering education," *Journal of Engineering Education,* vol. 112, no. 3, 2023.
[15] C. Mohammed and W. Sarjusingh, "Productive uses of GAI: Preliminary findings from a capstone course," in *2024 IEEE Frontiers in Education*, Washington, D.C., 2024: IEEE, 2024.
[16] C. Mohammed, W. Sarjusingh, and S. Rocke, "Uses of Generative AI in Engineering, Technology, and Computing Classrooms: Findings from the IEEE FIE Conference Proceedings," in *Proceedings of the 2025 IEEE Global Engineering Education Conference*, London, UK, 2025: IEEE.
[17] A. Olechowski, P. M. Khanolkar, J. Lu, and A. Hurst, "Towards a Modern Canadian Engineering Design Curriculum: Balancing Artificial Intelligence and Human Cognition," 2022, Available: http://hdl.handle.net/1807/109985.
[18] UNESCO. (2021). *9231004476, AI and education: A guidance for policymakers*.
[19] UNESCO. (2019). *Beijing Consensus on Artificial Intelligence and Education*. Available: https://unesdoc.unesco.org/ark:/48223/pf0000368303
[20] IEEE, "IEEE publication services and products board operations manual," 2004, April 23, Available: https://pspb.ieee.org/images/files/PSPB/opsmanual.pdf.
[21] IEEE. (2004, April 23). *Submission and peer review policies*. Available: https://journals.ieeeauthorcenter.ieee.org/become-an-ieee-journal-author/publishing-ethics/guidelines-and-policies/submission-and-peer-review-policies/#ai-generated-text
[22] Z. Bahroun, C. Anane, V. Ahmed, and A. Zacca, "Transforming education: A comprehensive review of generative artificial intelligence in educational settings through bibliometric and content analysis," *Sustainability,* vol. 15, no. 17, p. 12983, 2023.
[23] C. K. Lo, "What is the impact of ChatGPT on education? A rapid review of the literature," *Education Sciences,* vol. 13, no. 4, p. 410, 2023.
[24] H. Crompton and D. Burke, "Artificial intelligence in higher education: the state of the field," *International Journal of Educational Technology in Higher Education,* vol. 20, no. 1, p. 22, 2023.
[25] X. Xie and S. Ding, "Opportunities, Challenges, Strategies, and Reforms for ChatGPT in Higher Education," in *International Conference on Educational Knowledge and Informatization (EKI),*, Guangzhou, China, 2023, pp. 14-18: IEEE.
[26] C. Mohammed, "Work in Progress: A Rapid Review of the Scholarship on Generative AI in Engineering Workplaces—Implications for Engineering Education," in *2025 IEEE Engineering Education World Conference (EDUNINE)*, 2025, pp. 1-4: IEEE.
[27] S. S. Vellanki, S. Mond, and Z. K. Khan, "Promoting Academic Integrity in Remote/Online Assessment-EFL Teachers' Perspectives," *TESL-EJ,* vol. 26, no. 4, 2023.