



Interdisciplinary Programme
in Educational Technology
Indian Institute of Technology Bombay

Maximising Benefits, Mitigating Risks: Generative AI for Educational, Research and Development Practices

A set of guidelines for ethical and responsible usage

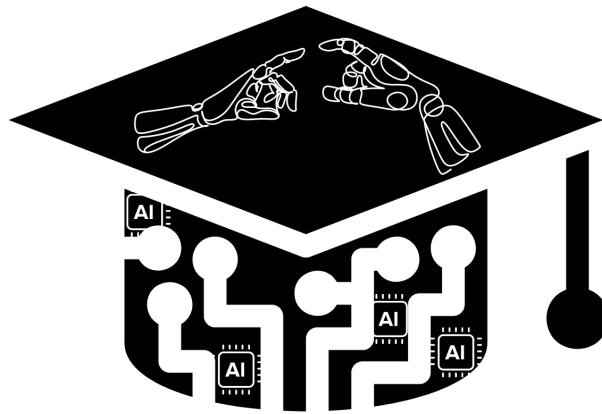


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Interdisciplinary Programme in Educational Technology
Indian Institute of Technology Bombay, Mumbai, India

Development process

The guideline document was developed through a collaborative process. The idea was first proposed in December 2023 and formally approved in February 2024. A department committee was formed for drafting the guidelines. Stakeholder engagement was initiated in February to gather feedback through a Request for Information (RFI) form. Three rounds of discussion happened on the feedback data collected from stakeholders. The data was cleaned, thematically mapped and analysed during March 2024. A first draft of the guideline was presented to stakeholders in April, followed by discussions and revisions. A committee meeting in May addressed further feedback, and the second draft with additional use case examples was discussed in a meeting in the month of July 2024. Following these discussions, a consensus was reached on the final document. This iterative process with stakeholder input ensured the final guideline document addressed a range of perspectives.

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1. OVERVIEW

This document presents guidelines for the integration of Generative Artificial Intelligence (Gen AI) and its usage, under and within the framework of the Interdisciplinary Programme in Educational Technology (ET), Indian Institute of Technology Bombay (IITB) for academic pursuits. The primary aim of this document is to delineate guidelines governing the utilisation of Gen AI for diverse academic activities within the ET. These guidelines are designed to align seamlessly with established educational regulations, principles of responsible conduct of research, and the code of conduct as per the purview of the governing body of IITB. Furthermore, these guidelines encompass existing legislative frameworks recognized by IITB and ensure compliance therewith while also accommodating any forthcoming updates in legislation.

1.1 Potential of Generative AI in the context of education

Artificial Intelligence (AI) refers to computer systems designed to perform tasks like generating outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with, based on a given set of human-defined objectives¹. Unlike traditional AI systems, which are often task-specific and focused on solving particular problems or achieving predefined objectives, Generative AI (Gen AI) systems have the capability to create new content autonomously based on patterns and examples from existing data.

Gen AI has been a pervasive presence in various domains for a significant duration and has lately ignited extensive discourse. There exists a notable surge in interest and experimentation surrounding the adoption of Gen AI tools within academic circles. Gen AI can produce a wide range of content, including text, images, videos, music, and computer code. These tools learn by analysing vast amounts of data from the internet, such as websites and social media. By identifying patterns in this data, GenAI can generate new content that resembles the information it has processed². It is widely recognized that Gen AI tools harbour the potential for both transformation and disruption within academic and professional spheres alike.

In the context of education, Gen AI can be used to automate administrative tasks, personalise learning experiences, provide feedback on student work, and identify at-risk students like academically struggling students and students with low engagement in academic activities. Gen AI has significant implications for education because it can generate personalised educational materials tailored to individual learners' needs, interests, and abilities. For example, generative AI algorithms can create customised lesson plans, assessments, and even textbooks that are dynamically generated based on each learner's unique profile. The primary difference between AI and generative AI in the context of education lies in their level of autonomy and creativity. While traditional AI focuses on automating repetitive tasks, generative AI goes beyond this by generating novel content and insights. Traditional AI can help educators manage large volumes of data and streamline processes, while generative AI can help them create more engaging, effective, and personalised learning experiences. However, both technologies have the potential to transform education significantly by enabling teachers to focus on higher-level instructional activities and providing students with more targeted support. For further information on Gen AI and how it works, refer United Nations Educational, Scientific and Cultural Organization (2023).

¹ European Commission. (2021). Proposal for a regulation of the European Parliament and of the Council: Laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain Union legislative acts. In *EUR-Lex*. Retrieved July 27, 2024, from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0206>

² United Nations Educational, Scientific and Cultural Organization. (2023). *Guidance for generative AI in education and research*. <https://doi.org/10.54675/EWZM9535>

1.2 Concerns of Generative AI

Gen AI applications, facilitated by user-provided questions, prompts, or keywords, have demonstrated the ability to generate, alter, and refine texts, images, and sounds in a manner indistinguishable from human-generated output. However, these applications may simultaneously convey deceptive or erroneous information, adversely affecting the educational experience. In particular, Gen AI tools could inadvertently encourage reliance on superficial shortcuts rather than fostering critical thinking essential for profound and significant learning processes.

Generative AI poses particular concerns for academia in the areas of research and teaching due to the following reasons:

1.2.1 Concerns of Generative AI in research and development

- **Reproducibility:** Since the output depends on the training dataset and model architecture, results may vary across different implementations. This lack of consistency makes it challenging to compare findings and build upon previous knowledge.
- **Reliability:** Researchers need reliable and accurate information to make informed decisions. However, generative AI models can produce incorrect or misleading results³, leading researchers down false paths and wasting valuable time and resources.
- **Citation practices:** When using generative AI models, citing sources accurately can be complicated. It can be challenging to distinguish between AI-generated citations and those created manually, which could lead to improper attribution and crediting.
- **Scientific misconduct:** The ease of generating scientific papers through AI tools increases the likelihood of scientific misconduct, including fabrication, falsification, and plagiarism. Such behaviour undermines trust in the scientific process and erodes public confidence in research outcomes.

1.2.2 Concerns of Generative AI in educational practices

- **Cheating:** Generative AI can produce essays, reports, and other types of coursework, increasing the temptation for students to cheat. Detection methods may not always be able to distinguish between AI-generated and human-written work, complicating efforts to enforce academic honesty policies⁴.
- **Critical thinking skills:** Over reliance on generative AI could result in reduced opportunities for students to develop critical thinking and problem-solving skills. Students might miss out on vital learning experiences if they depend solely on AI-generated answers without understanding the underlying concepts.
- **Equity and accessibility:** Disadvantaged students might face additional barriers when accessing generative AI tools, further widening achievement gaps. To mitigate this risk, universities and schools must ensure equal access to these technologies for all students.

Overall, incorporating generative AI into academic activities has significant potential for streamlining workflows, fostering innovation, reducing errors, and promoting interdisciplinary collaboration among researchers. However, maintaining rigorous quality standards, addressing ethical considerations, and nurturing critical thinking skills remain paramount to ensure the responsible application of this powerful technology. Anticipated to become commonplace in numerous academic and professional environments, the prevailing

³ *Hallucination*. (2024, July 10). Wikipedia. Retrieved July 11, 2024, from <https://en.wikipedia.org/wiki/Hallucination>

⁴ *AI Detectors Don't Work. Here's What to Do Instead.* - MIT Sloan Teaching & Learning Technologies. (2024, May 6). MIT Sloan Teaching & Learning Technologies. Retrieved July 11, 2024, from <https://mitsloanedtech.mit.edu/ai/teach/ai-detectors-dont-work/>

sentiment emphasises the necessity of supporting stakeholders in their effective, ethical, and transparent use. Consequently, there arises an imperative to formulate a comprehensive set of guidelines governing the utilisation of AI in academic pursuits, aimed at fostering ethical conduct, safeguarding individual rights and privacy, upholding academic integrity, ensuring transparency and accountability, and mitigating associated risks.

Some institutions have already implemented prohibitive measures concerning the utilisation of generative AI applications⁵. Rather than advocating for prohibitive measures, the overarching objective of this document is to facilitate the responsible integration of AI tools into academic endeavours, ensuring their alignment with ethical standards and fostering transparency throughout their utilisation. By adopting these guidelines, ET reaffirms its commitment to harnessing the potential of AI while upholding the highest standards of ethics, responsibility, and accountability. We encourage the students to embrace these principles and contribute positively to the advancement of knowledge and society.

In conclusion, this guideline proposal serves as a foundational document for the structured incorporation of Gen AI into the academic landscape of ET and may be extended to a greater academia community of IIT Bombay. By adhering to the guidelines outlined herein, stakeholders can harness the transformative potential of AI while upholding the highest standards of academic integrity, ethical conduct, and compliance with regulatory frameworks.

2. PRINCIPLES

An overarching goal of higher education institutions is to accelerate their commitment to serve the best interests of society in the age of AI, and resources to support such educational efforts are to be generated by different stakeholders, including the government, the business community, and civil society. The following are some of the principles to guide such efforts⁶:

1. Centrality of people: Human beings, rather than technology, should remain the focal point of our endeavours
2. Promotion of AI inclusion: Efforts to foster AI inclusion should extend within and beyond the institutional framework.
3. Importance of AI information literacy: AI information literacy constitutes an integral component of a comprehensive education.
4. Enhancement of teaching and learning: AI tools should augment and enrich teaching and learning experiences.
5. Recognition of lifelong learning: Understanding technologies is an experiential journey that extends throughout one's lifetime.
6. Responsible AI research and development: AI research and development must be conducted responsibly, mindful of ethical considerations.

⁵ Ta, R., & West, M. (2023, August 7). Should schools ban or integrate generative AI in the classroom? *Brookings*. Retrieved July 11, 2024, from <https://www.brookings.edu/articles/should-schools-ban-or-integrate-generative-ai-in-the-classroom/>

⁶ Internet Governance Forum. (2023, October). *Higher education's essential role in preparing humanity for the artificial intelligence revolution*. Elon University. Retrieved July 11, 2024, from https://www.elon.edu/u/imagining/event-coverage/global-igf/igf-2023/higher_ed_ai_statement/

3. OBJECTIVES

1. To provide guidelines for the ethical and responsible usage of Gen AI in educational, research and development (R&D) practices, while ensuring adherence to the existing legislation and regulations of IITB
2. To foster an environment that encourages innovative and responsible use of Gen AI, promoting excellence in research, teaching, and learning

4. SCOPE

Given that the ET allows the use of Gen AI tools, the scope of this document is to provide all students enrolled in the Master of Technology (M.Tech.) programme in Educational Technology, Doctor of Philosophy (Ph.D.) programme, and/or any other programmes including internships, projects etc. as determined by the faculty consensus of ET with guidelines for the ethical and responsible usage of Gen AI in educational and R&D practices.

The parameters of this guideline extend to academic reports, encompassing the following categories:

- M.Tech. Thesis Project (MTP) Reports, both Stage I and Stage II
- Annual Progress Seminar (APS) Reports, Pre-synopsis report and Thesis of PhD programme
- Internship Reports
- Any other document/report (including coursework assignments), subject to the discretion of the faculty consensus of ET

It is to be noted that the final thesis submissions for both M.Tech. and Ph.D. programmes heavily draw from MTP reports (both Stage I and Stage II) and APS reports respectively. Consequently, such submissions fall under the purview of this guideline, with a degree of discretion vested in the research guide(s) and the Research Progress Committee (RPC).

Being a member of ET, it is important to ensure that you uphold the highest standards of academic rigour and integrity when utilising Gen AI in teaching, learning, and research. Unauthorised use of Gen AI may violate plagiarism policies; hence it is essential to understand and adhere to proper acknowledgment and disclosure practices for Gen AI tools and technologies as required. Such practices help prevent academic penalties and effectively address plagiarism concerns in our academic endeavours.

5. GUIDELINES

As a student of ET, you are expected to achieve the learning outcomes outlined for your enrolled programme. Additionally, your instructor(s) or research guide(s) may tailor learning outcomes to align with your interests, skills, and abilities, while adhering to the boundaries established by ET.

1. Gen AI integration in educational and R&D practices is permissible, provided it aids you in attaining the prescribed learning outcomes. Further, keep in mind that you bear the accountability for the use of Gen AI in your research or educational endeavours.
2. You are expected to develop as an independent learner or researcher as envisaged by the learning outcome of the enrolled programme. Hence, utilising Gen AI as substitutes for the development of diverse skills necessary to fulfil the intended learning outcomes is highly discouraged.
3. You are encouraged to use Gen AI as a supplementary tool to enhance discussions or presentations about the educational and R&D practices with appropriate disclosure of the usage (*See the item 5 in Section 6*).
4. You should avoid using Gen AI generated content (text, images, videos, audios or data in any other form) as original research evidence to ensure that all research findings are grounded in verifiable, ethically sourced data to maintain the integrity and validity of research findings. However, such contents may be used for representational purposes with proper acknowledgment that the content is AI-generated. Additionally, acknowledging the provider and version of the Gen AI tool is recommended.
5. Gen AI can be used for gathering research evidence, given that the original source of the evidence is verified by you. This guideline may have exceptions for Gen AI generated content that is directly referenced in a work focused on Gen AI, and these exceptions will be reviewed on a case-by-case basis by research guide(s) and the Research Progress Committee (RPC).
6. You should be informed that Gen AI tools may occasionally generate false information or "hallucinate" nonexistent sources. These tools are often operating with opaque-box models and the test cases not being finite, one cannot rule out all errors even when the tool has matured over a considerable period of time. Hence, it is important to understand the risks and threats of using such technologies and take necessary precautions to address them.
7. Given the evolving nature of Gen AI, it is essential to approach Gen AI integration with caution and critical evaluation. Because, while Gen AI holds promise for educational and R&D enhancement, conclusive research findings regarding its direct impact on these practices may be limited at present.
8. You should be aware that different Gen AI tools can give different outputs using the same prompts. Similarly, you may get different responses using the same prompts from the same Gen AI tool. Hence, it is important to carefully choose the most appropriate output and take accountability for your decision.
9. You may ensure that the usage of Gen AI is aligned with your research paradigm. For instance, if your research paradigm sees knowledge generation as an inherently subjective and situated process and does not control researcher subjectivity or "bias", then you are supposed to do the data analysis on your own and employing Gen AI for interpreting data in such a case is inappropriate. Decisions on such aspects may be taken in consultation with your research guide(s).
10. Gen AI models trained on biased data can perpetuate those biases in the output. This could lead to overlooking important counter arguments or under-representing certain perspectives. Hence, be mindful of the ethical implications when using Gen AI generated content, the potential impact on individuals or communities represented in the content (cultural sensitivity), and take appropriate measures to address these concerns thoughtfully and responsibly

11. Gen AI tools that mine and analyse source data may encounter intellectual property right (IPR) concerns if they scrape or analyse copyrighted material without proper permissions. To maintain ethical standards, it is recommended to verify the sources of Gen AI generated content. If you realise that the generated content incorporates parts of copyrighted material, you must seek permission from and acknowledge the copyright holder(s) of the original content used, even if those elements are available in the public domain.
12. You should be aware that there are potential privacy and data risks inherent in using Gen AI based tools. Hence, you are recommended to refrain from adding sensitive, confidential, or restricted information in any form into Gen AI tools that do not guarantee data protection. It is also recommended to implement robust security measures to protect your collected data from unauthorised access, breaches, or misuse. Encryption, access controls, and secure storage solutions could be used to safeguard sensitive information. You may securely dispose of the collected data by following protocols stipulated by IITB. Also, collaborate responsibly with partners and stakeholders when sharing data for Gen AI-related research or educational practices and ensure that data sharing agreements and protocols prioritise data protection and respect the rights of data subjects.
13. Use of content (including ideas, knowledge) generated by Gen AI as your own work without acknowledgement of the original source, constitutes academic misconduct as it neglects proper attribution and critical analysis of the original source. Such scenarios will be considered as plagiarism. Hence, the appropriate acknowledgement of the original source of the content is highly recommended. The instructor(s) or research guide(s) may not approve your work if they suspect plagiarism and in such cases, you may be prepared to undergo further investigation as per the IITB regulations.
14. When submitting research articles to conferences, journals, books or any other publications, it is essential to adhere to their established rules and regulations regarding Gen AI usage. If any additional restrictions on Gen AI usage are imposed, it is your responsibility to comply with them. Therefore, before initiating any study intended for publication, seek guidance from your research guide(s) and thoroughly review the guidelines provided by the targeted publications.
15. In a multi-authored publication, consensus about the use of Gen AI by each one may be reached before beginning the work. In any case of discrepancies after the publication of the work arising because of the Gen AI use, all authors will be responsible.
16. Gen AI cannot be credited as authors in your work because attributing authorship entails accountability for the work, which cannot be effectively applied to Gen AI.
17. When unsure about ethical and responsible usage of any Gen AI tool in your work, you may consult your research guide(s) or the instructor(s) to understand the permissible use of the Gen AI tool.

These guidelines outline the ET approach to the use of Gen AI in educational and R&D practices. Within these guidelines, instructor(s) or research guide(s) retain the authority to delineate pedagogically appropriate applications of Gen AI in alignment with the learning outcomes of the programme. They possess the autonomy to impose limitations or prohibitions on the use of Gen AI as deemed necessary. Some examples of the ethical and responsible usage of Gen AI in educational and R&D practices are given in the Section 7.

6. RECOMMENDATIONS TO ET

1. The learning outcomes for various programmes, such as MTech and PhD, should be updated to align with current technological advancements and promptly communicated to the students.
2. Encourage students to proactively research the impact, philosophical implications and challenges of Gen AI on the essential skills required for educational and R&D practices.
3. Take initiative to develop, curate learning materials related to ethical and responsive use of Gen AI and educate students periodically.
4. Develop protocols for the retention and disposal of data collected for AI-driven research or educational purposes. Specify retention periods based on legal requirements of IITB and research needs, and ensure secure disposal of data when it is no longer needed.
5. The following approach for disclosing Gen AI usage in educational and R&D practices may be adopted.

In the case of research, it should be documented in the Methods section of the manuscript⁷ or in an appropriate alternative section if a Methods section is unavailable. For educational activities, the disclosure may take the form of declaration or honour code. These disclosures should encompass specifics regarding the AI tool employed, the rationale behind its usage, steps taken to ensure reasonable validity and relevance of the generated data to the research or teaching-learning process, and the potential implications of Gen AI generated content, especially in sensitive or contentious contexts. This transparency aids in mitigating potential errors resulting from opaque models of AI, potentially limiting the chances of academic dishonesty or plagiarism, allows both researchers and consumers to critically interpret results and identify possible confounding factors when evaluating the utility of such findings. To determine reasonable validity, you should consult with the research guide(s) or instructor(s) on a case-by-case basis.

In the case of assistive Gen AI usage like making suggestions, corrections, and improvements to content you have authored yourself, you are not required to disclose such uses⁸. For instance, flagging spelling or grammatical errors or suggesting next word or phrase, and colour enhancement of images.

6. Revisit and update these guidelines periodically in compliance with existing IITB rules and regulations by incorporating suggestions from ET members and the broader academic community.

⁷ McAdoo, T. (2023, February 23). How to cite ChatGPT. <https://apastyle.apa.org>. Retrieved July 12, 2024, from <https://apastyle.apa.org/blog/how-to-cite-chatgpt>

⁸ Assistive and Generative AI Guidelines for Authors — SAGE. (n.d.-b). Sage. <https://group.sagepub.com/assistive-and-generative-ai-guidelines-for-authors>

7. USE CASES

The advocates of Gen AI suggest its potential to facilitate innovation, enhance creativity, and uncover new insights. However, sceptics question its reliability, potential biases, lack of evidence in fostering creativity, potentially leading towards not achieving the intended outcomes of the programme. For instance, a PhD program emphasises the development of skills in identifying, reading, and synthesising relevant research articles during a literature review. However, with the use of Gen AI in literature review to generate a summary, it is unsure whether these intended learning outcomes are achieved. Thus, there exists an uncertainty about the benefits and drawbacks of using Gen AI for research activities. Moreover, ethical concerns about transparency, accountability, and AI's responsible use add further complexity to its adoption in academic settings.

If you find yourself in a dilemma regarding the appropriate use of Gen AI, one effective approach involves a structured decision-making process. Begin by analysing the situation with key questions: Does it align with principles of fairness and justice? Will it help achieve the desired outcomes for your program? Does it uphold the core values and norms of your research community or department? Once the issue is identified, seek support and guidance from peers, experts, and your research guide. Take proactive steps to deepen your understanding through reading, workshops, and conferences. Use the knowledge gained and feedback received to inform your decision-making process. While this approach doesn't guarantee an ethically perfect decision, it ensures that ethical considerations are thoroughly examined and taken into account.

The use cases are derived from 'CRediT author statement'¹ which strives to provide an accurate and detailed description of the diverse academic activities which can be performed through Gen AI tools and services. Table 6.1 provides a list of all possible use cases in research.

Table 1. Terms and definition of possible academic use cases that may get affected by AI usage.

Term	Definition
Conceptualization	Ideas; formulation or evolution of overarching research goals and aims
Methodology	Development or design of methodology; creation of models
Software	Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components
Validation	Verification, whether as a part of the activity or separate, of the overall replication/ reproducibility of results/ experiments and other research outputs
Formal analysis	Application of statistical, mathematical, computational, or other formal techniques to analyse or synthesise study data
Investigation	Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection
Resources	Provision of study materials, participants, laboratory samples, animals(if used), instrumentation, computing resources, or other analysis tools
Data Curation	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later reuse

Writing - Original Draft	Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation, if applicable),
Writing - Review Editing	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision, including pre-or post-publication stages
Visualisation	Preparation, creation and/or presentation of the published work, specifically visualisation/ data presentation

In addition to the above, the use cases related to learning may also include using Gen AI for problem-solving, writing home-works and assignments, etc. The use cases in teaching assistantship may include assignment creation, providing feedback about the students activities, evaluation of student responses and grading, etc. It is an arduous task to pinpoint specific use case processes as each research domain is vastly different. However, to simplify the process, a filtered version of the above table has been created.

Here are some examples of use cases from the domain of education where the use of a Gen AI tool might lead to ethical dilemmas for users:

7.1 Gen AI for literature review

Scenario

Imagine you are a research scholar working on a topic whether learning sciences can be combined with artificial intelligence.

The following can be your prompt to ChatGPT 3.5: *Give reference to academic papers which suggest learning sciences should be combined with artificial intelligence.*

Here is the verbatim of ChatGPT 3.5 response:

“Certainly! Combining learning sciences with artificial intelligence (AI) is an emerging area of research that aims to leverage AI technologies to enhance learning outcomes, personalise instruction, and optimise educational systems. Here are some academic papers that discuss the integration of learning sciences and AI:

1. *“Integrating Learning Science and Artificial Intelligence to Promote Personalized Learning” by Ryan S.J.d. Baker, Albert T. Corbett, and Kenneth R. Koedinger. This paper, published in the journal Educational Technology, outlines the potential benefits of integrating learning science principles with AI techniques to develop personalised learning environments.*

[Link: <https://psycnet.apa.org/record/2016-59329-002>]

2. *“Learning Engineering: A Pedagogically Driven Design Paradigm for Emerging Learning Technologies” by Ken Koedinger, Vincent Aleven, and Norman Bier. This paper, published in Educational Technology, discusses the concept of learning engineering, which involves applying principles from learning sciences and AI to design effective learning technologies.*

[Link: <https://www.jstor.org/stable/44429806>]

3. *“Artificial Intelligence and Learning Science: A New Paradigm for Designing and Developing Learning” by Arthur C. Graesser, Sidney K. D’Mello, and Shazia Afzal. This paper, published in the journal Handbook of Learning Sciences, explores the intersection of AI and learning science and proposes a new paradigm for designing AI-driven learning environments.*

[Link:

<https://www.taylorfrancis.com/chapters/edit/10.4324/9781315099222-10/artificial-intelligence-learning-science-arthur-graesser-sidney-dmello-shazia-afzal>]

These papers provide insights into how integrating learning sciences with AI can lead to innovative approaches to education and learning technology design.

Pitfall explanation: Please note that all three papers referenced by ChatGPT do not exist. The AI even included prominent researcher names like Ryan Baker and Dragan Gasevic to make it seem more credible.

Dos

- Compare with original sources: Don't rely solely on AI generated content. Always compare AI-generated content with the original research papers or sources cited. This allows you to:
 - Verify the accuracy of the information: AI generated content might consist of factual errors or misinterpretations and referring to the original source ensures you more clarity.
 - Identify missing details: AI generated content might miss crucial details or nuances that are essential for a comprehensive understanding of the work.
 - Evaluate the writing style and tone: The language of the source data can reveal the author's perspective and potential biases.
- Maintain academic integrity: Provide citations for the original papers you verified and used.
- Combine Gen AI insights with your analysis: Integrate the information obtained from Gen AI with your critical analysis and understanding of the subject. Also, seek feedback from peers, experts, and stakeholders on AI-generated content to identify potential biases or gaps. Iteratively improve the AI generated content based on insights and recommendations to enhance its accuracy and inclusivity.
- Use advanced and specialised Gen AI tools: Use more advanced versions of Gen AI tools like ChatGPT-4.0 or platforms designed specifically for academic literature to ensure higher accuracy in references and content.

Don'ts

1. Blindly trust Gen AI generated references: Avoid including references in your paper just because they were mentioned by ChatGPT without checking their validity, as they may be fabricated.
2. Neglect to verify sources: Do not assume the existence or credibility of papers just because they mention well-known academics; always verify each source independently.
3. Over-rely on Gen AI for critical thinking: Do not rely solely on ChatGPT's conclusions without conducting your own thorough analysis and interpretation of the data.

7.2 Gen AI for image creation

Scenario

Imagine you are a Master's student doing research on Biology education. The research topic includes developing a MOOC on breeding behaviour and habitat preferences of the Malabar Pied Hornbill in the Western Ghats, for Biology school teachers. The learning module describes the nesting habits of the Malabar Pied Hornbill, a vibrant bird with a distinctive black and white plumage and a large yellow casque on its beak. To make an illustration in the module, you need high-quality photos of these hornbills in their natural habitat within the Western Ghats forests. Locating such images can be challenging due to the birds' shy nature and dense foliage. You decided to leverage a Generative AI tool that promises to create realistic wildlife images based on descriptions.

You meticulously described the Malabar Pied Hornbill - its black and white colouring, the prominent casque, and its typical nesting location in a large cavity of a high tree in a moist deciduous forest. The AI delivered a stunning image - a Malabar Pied Hornbill perched on the entrance of a cavity in a massive banyan tree, sunlight filtering through the lush green canopy.

While presenting the module, one of the experienced teachers who is residing close to the Western Ghats region raises a critical point. The depicted tree species, a banyan, is not a typical nesting site for

Malabar Pied Hornbills. These hornbills usually prefer taller trees with larger cavities, commonly found in Dipterocarp forests, a specific forest type within the Western Ghats. You investigated further and discovered a disturbing truth - the AI image, while visually appealing, is inaccurate.

Pitfall explanation: The Gen AI likely used elements from various bird and tree images to create the final product, resulting in an ecologically unrealistic scene.

Dos

- When using images created by Gen AI, consider the following actions to verify the source and acknowledge the original authors:
 - Research the source images: Attempt to identify and research the original images to determine their copyright status. This may involve looking for information on the websites where the images were found or using tools like reverse image search.
 - Provide a general acknowledgment: If specific details about the original images are not available, include a disclaimer or explanation alongside Gen AI generated images to inform users about the potential limitations of such images, including the fact that they might not always perfectly represent real-world scenarios. For example: *"This image was created using a Gen AI tool and may include elements from various sources. If any copyrighted material is included, it is unintentional, and the respective copyright holders are acknowledged."*
- Seek feedback from professionals or researchers familiar with the species and its habitat to verify the accuracy of Gen AI generated content.

Don'ts

1. Avoid using AI-generated images as the sole or primary source of visual content without verifying their accuracy against real-world data and expert opinions.
2. Don't substitute real photographs with AI-generated images without making it clear that they are synthetic and may not reflect actual conditions.
3. Avoid using AI-generated images in a way that could mislead or provide incorrect information to your audience, especially in an educational context where accuracy is critical.

7.3 Gen AI for survey creation

Scenario

Imagine you are a PhD student designing a survey to measure student satisfaction with online learning platforms. The prompt to Gen AI could be: *"Generate a set of survey questions to measure student satisfaction with online learning platforms."*

Possible Gen AI response:

- *How satisfied are you with the overall quality of the online learning platform?*
- *How effective do you find the interactive features (e.g., quizzes, forums) on the online learning platform?*
- *How easy is it to navigate the online learning platform?*
- *How satisfied are you with the accessibility of course materials on the online learning platform?*
- *How well does the online learning platform support your learning needs?*
- *How likely are you to recommend the online learning platform to other students?*

Pitfall explanation: The generated survey questions need not have a clear and consistent theoretical basis.

Dos

- Ground questions in theory: While the questions may appear relevant and comprehensive, they need to be validated against theoretical constructs that define student satisfaction in online learning contexts. Effective survey design requires questions that are grounded in established theories and frameworks relevant to the topic. Without this, the questions may not adequately capture the dimensions of student satisfaction or may overlook critical aspects. Reviewing literature on student satisfaction in online learning helps identify these key constructs and dimensions.
- Validation and review: Gen AI generated survey questions might not undergo the rigorous process of validation and review. Validating survey questions involves testing them to ensure they are reliable and accurately measure the intended constructs. Peer review and expert feedback are essential to refine the questions and enhance their validity.
- Contextual relevance: Adapt the Gen AI generated questions to fit the specific context of your study. The nuances of your particular educational setting, the demographic characteristics of your respondents, and the specific objectives of your research need to be considered when designing survey questions. AI might miss these contextual subtleties, resulting in less effective questions.

Don'ts

- Don't rely solely on Gen AI generated questions. However, Gen AI can be used as a tool to assist, but apply your judgement and expertise to finalise the survey
- Don't assume that Gen AI generated questions are automatically suitable. Gen AI might not fully understand the specific context of your study, leading to irrelevant or less effective questions.
- Don't disregard the diverse perspectives and experiences of your respondents. Ensure that questions are inclusive and consider different backgrounds and viewpoints.

7.4 Gen AI for inter-rater reliability

Scenario

You are a researcher in Educational Technology, and have conducted a study among school teachers and collected interview data from individual teachers. You are planning to do thematic analysis. To establish reliability you are planning to do inter rater reliability (IRR) with a Gen AI tool. You will be calculating Cohen's kappa between the rating generated by you and the Gen AI tool.

Pitfall explanation: In the case of multiple raters coding the data, Shaffer and Ruis (2021) support the use of automated classifiers⁹ like a Gen AI tool. They recommend that to ensure fairness, use two human raters in addition to the automated classifier.

However, ET considers the IRR process as an agreement between two raters, who take accountability for their ratings. According to the terms of use for Gen AI tools like ChatGPT, "Content" includes the user's inputs (prompts) and the generated outputs. Users retain ownership rights of both their inputs and outputs,

⁹ Shaffer, D. W., & Ruis, A. R. (2021). How we code. In *Advances in Quantitative Ethnography: Second International Conference, ICQE 2020, Malibu, CA, USA, February 1-3, 2021, Proceedings 2* (pp. 62-77). Springer International Publishing.

while they are responsible for ensuring their content complies with applicable laws and the terms of service¹⁰. Consequently, Gen AI cannot be held accountable for its ratings, and its role in the IRR process is limited.

Dos

- As a researcher, you can use Gen AI as an assistive tool for coding and data analysis
- You are accountable for making decisions based on Gen AI generated codes, including interpreting the results and integrating them into your research findings
- In the IRR, Gen AI can be used to highlight discrepancies between human raters, allowing for focussed discussion and resolution. It can also be used to calculate the agreement between human raters.

Don'ts

- Don't use Gen AI as a rater in IRR as it cannot be held accountable for its rating. However, you can use Gen AI tools to enhance your coding analysis.
- Avoid relying entirely on AI for coding as human judgement is essential for interpreting complex qualitative data and ensuring accurate coding
- Don't use AI without ensuring that the coding process is theoretically grounded as AI must apply codes that are relevant and meaningful in the context of your research.
- Avoid using generic AI models without adapting them to the specific context of your study as AI needs to be tailored to understand the specific nuances of your data.

7.5 Gen AI for programming assistance

Scenario

You are an M.Tech. student working on a project that requires you to develop a Python program for data analysis. To expedite the process, you use a Gen AI tool like Co-Pilot to help you write the code. You provide the tool with the problem statement: "Analyse the dataset to find the average sales per quarter and plot the results."

Pitfall explanation: The Gen AI tool generates a code snippet that appears to solve the problem. If you were to copy-paste the code without reviewing it, you may come up with the following issues:

- Outdated libraries: The generated code uses a deprecated library for data visualisation.
- Security issues: The code includes hardcoded credentials for accessing a database.
- Non-optimized code logic: The code uses inefficient loops and data structures, leading to suboptimal performance.
- Incorrect code: The generated code contains a logic error that results in incorrect calculations.

Dos

- Use the AI-generated code as a starting point or reference rather than a final solution.
- Thoroughly review the generated code to understand its logic and functionality.
- Test the code with various cases from the problem statement to ensure its correctness.
- Check and use up-to-date libraries and packages to avoid deprecated features.
- Ensure that the code does not contain hardcoded credentials or expose sensitive data.
- Refactor and optimise the code for better performance and efficiency.

¹⁰ OpenAI. (2023, November 14). *Terms of use: Content*. Retrieved July 28, 2024, from <https://openai.com/policies/terms-of-use/>

- Follow Institutional Review Board (IRB) guidelines to avoid leaking sensitive or proprietary data.

Don'ts

- Do not blindly copy and paste the AI-generated code into your project without reviewing it.
- Avoid using deprecated or outdated libraries without checking for alternatives.
- Do not include hardcoded credentials or overlook potential security vulnerabilities.
- Do not assume the generated code is error-free; always verify its accuracy.
- Never skip testing the code with different scenarios to ensure its reliability.

7.6 Gen AI for data analysis

Scenario

Imagine a research student is working on her PhD dissertation. Her research involves analysing qualitative data collected through interviews with educators about their experiences with a new education policy. She decides to use a Gen AI tool to help her transcribe the audio-taped interview data, and analyse the large volume of interview transcripts more efficiently. She inputs her audio-taped data into the Gen AI tool and requests it to analyse and identify key themes.

The following is a sample of interview transcripts:

Teacher A: "The new education policy is well-intentioned. It aims to increase student engagement, which is a positive aspect. However, the lack of adequate resources makes it difficult to implement effectively. We often find ourselves struggling to provide the necessary materials and support for our students. Additionally, the increased administrative workload is overwhelming."

Teacher B: "I appreciate the goals of the policy, especially its focus on holistic education. But the training provided to us was insufficient. Many of us feel unprepared to adapt to the new requirements. Moreover, in our rural school, the challenges are compounded by limited access to technology and infrastructure. It feels like we are being asked to do more with less."

Teacher C: "The policy's emphasis on after-school programs is great for student engagement, but it doesn't take into account the personal lives of teachers. For those of us with families, it's an added burden. We need better support systems in place to balance our professional and personal responsibilities."

Teacher D: "In our urban school, the policy has been easier to implement because we have better resources. The students are responding well, and we have seen some positive changes in their performance. However, I worry that this success isn't reflective of all schools, especially those in less privileged areas."

The following is the prompt given to Gen AI: *"Analyse the interview transcripts and identify the key themes related to the educators' experiences with the new education policy."*

Pitfall explanation:

1. Misinterpretation of data: The AI might oversimplify complex human experiences and miss nuances that are critical for a thorough qualitative analysis. For example, the Gen AI response could focus only on the potential benefits of the policy without addressing the critical challenges highlighted by the teachers in the process of implementation of the policy.
2. Bias introduction: If the training data of the AI has inherent biases, it may skew the analysis, leading to inaccurate or misleading conclusions. For example, if the Gen AI tool is trained on a dataset where the majority of feedback about education policies comes from urban schools and if the researcher's

interview data includes feedback from rural schools where the context and challenges differ significantly, the Gen AI's bias towards urban-centric data could lead to misleading conclusions.

3. Confidentiality and privacy issues: Uploading sensitive interview data to an AI tool could lead to breaches of confidentiality and privacy, especially if the tool is cloud-based and not compliant with data protection regulations.

Dos

1. Use Gen AI to support, but not replace, the researcher's analytical skills. Always critically evaluate Gen AI generated results. Cross-check Gen AI analysis with the original transcripts. Manually review important sections to ensure no critical information is lost.
2. Use Gen AI tools that are compliant with data protection regulations. Prefer offline tools or secure, university-approved platforms for analysing sensitive data. Always anonymise data before processing it with Gen AI tools.
3. It is recommended to keep a record of how and why Gen AI tools were used in the research process, including the prompts given and the responses received as it may help you to critically reflect on the analysis procedure and the generated insights in future.
4. Be aware of potential biases in the Gen AI tool's training data. Use diverse datasets for Gen AI training and critically evaluate the Gen AI's output for any signs of bias.
5. Undergo training on the ethical use of Gen AI in research to understand potential biases and limitations.

Don'ts

1. Do not rely solely on AI-generated analyses without thorough verification and critical thinking.
2. Avoid oversimplifying qualitative data based on AI summaries as human experiences are complex and require detailed understanding.
3. Never upload sensitive data to AI tools without ensuring robust data protection measures are in place.
4. Be aware of and actively look for potential biases in AI outputs. Do not ignore them as they can significantly impact the validity of your research.
5. Do not replace the role of the researcher's judgement with AI; the final interpretation should always involve human insight.

7.7 Gen AI for designing an inclusive lesson plan

Scenario

A group of MTech students at an Indian university is tasked with designing an inclusive online curriculum for a diverse group of learners in India. To expedite the process, they decide to use a Gen AI tool to draft lesson plans, create learning materials, and generate discussion prompts. The Gen AI is trained on a vast dataset of existing educational content and promises to provide comprehensive and engaging material quickly.

The following is the prompt given to Gen AI: *Create a lesson plan for a high school history class on the topic of 'Independence Movements in India.' Ensure the content is inclusive and covers diverse perspectives, including regional movements and contributions from various cultural, social, and religious groups. Highlight the roles of both well-known and lesser-known figures from different backgrounds.*

Here is the verbatim of Gen AI response (relevant portion only):

“Objective: Students will understand the various independence movements in India, recognize the contributions of different regions and cultural groups, and appreciate the diversity of the struggle for freedom.

Main Content (30 minutes):

1. *Overview of the Independence Movement:*
 - *Discuss the early resistance movements, including the Sepoy Mutiny of 1857.*

- *Highlight key national movements led by figures like Mahatma Gandhi, Jawaharlal Nehru, and Subhas Chandra Bose.*
2. *Regional Movements:*
 - *Punjab: Discuss the role of the Ghadar Party and the contributions of Bhagat Singh.*
 - *Bengal: Highlight the Bengal Renaissance, the role of Rabindranath Tagore, and the revolutionary activities in Bengal.*
 - *Maharashtra: Explain the contributions of Bal Gangadhar Tilak and the role of the Indian National Congress.*
 - *South India: Cover the involvement of leaders like C. Rajagopalachari and E. V. Ramasamy in the freedom struggle.*
 - *Northeast India: Discuss the contributions of leaders like Rani Gaidinliu in the independence movement.*
 3. *Cultural and Social Contributions:*
 - *Discuss the role of women in the independence movement, such as Sarojini Naidu and Kamaladevi Chattopadhyay.*
 - *Highlight the contributions of various cultural and religious groups, including the Sikhs, Muslims, Christians, Dalits, and Adivasis, emphasising unity in diversity."*

Pitfall explanation: The overview might unintentionally emphasise figures and events more commonly highlighted in Western historical accounts, such as Gandhi and Nehru, while underrepresenting regional leaders and movements. Similarly, the Gen AI generated lesson plan may miss out on significant contributions from marginalised groups such as the Dalits and Adivasis in India, whose roles in the independence movement are often less documented but equally important. Historical accounts that focus on major national figures in India may also underrepresented regional leaders who played crucial roles in the independence movement.

Dos

- Do ensure that prompts to the Gen AI tool are detailed and explicit about the inclusion of diverse perspectives, including regional leaders, marginalised communities, and various viewpoints. Example Prompt: *"Create a lesson plan for a high school history class on India's independence movement, ensuring the content covers national and regional leaders, Dalits, and Adivasis' contributions."*
- Look for signs of bias: This includes assessing whether the Gen AI has inadvertently favoured certain perspectives or excluded important viewpoints. Check for factual inaccuracies by verifying key details and interpretations against the original sources. If the Gen AI consistently emphasises a particular viewpoint, it might be biased towards that perspective.
- Collaboration and peer feedback: Seek feedback from historians, educators, and representatives of various cultural groups, and peers on Gen AI generated content to identify potential biases or gaps. Iteratively improve the content based on insights and recommendations to enhance its accuracy and inclusivity.
- Cross-verify with sources: Do cross-verify Gen AI generated content with reliable historical sources to ensure accuracy and prevent the spread of misinformation or biased narratives. Check for the inclusion of lesser-known but significant contributions from various communities.
- Continuous education and training:
 - Regularly update your knowledge about AI, its capabilities, limitations, and potential biases. Attend workshops, webinars, and courses on AI ethics and bias mitigation.
 - Engage with a wide range of educational resources, including those from diverse perspectives and underrepresented communities, to broaden your understanding and awareness.

Don'ts

- Don't rely solely on Gen AI generated lesson plans without human oversight and verification. Gen AI tools can miss nuanced details and may unintentionally perpetuate biases present in their training data.
- Don't overlook the importance of including perspectives from marginalised and underrepresented communities. Ensure that the contributions of Dalits, Adivasis, and regional leaders are adequately highlighted.
- Don't include minority perspectives as mere token mentions. Ensure that their contributions are integrated meaningfully and discussed in detail.
- Don't skip the human touch in lesson planning. Combine AI-generated content with human insights, experiences, and contextual knowledge to create a well-rounded and effective lesson plan.

8. CONCLUSION

The Gen AI tools have the potential to augment human intelligence, allowing scholars and students to be more productive, creative, and insightful in their work. Responsibly leveraging Gen AI could open new frontiers of knowledge and drive progress across disciplines. However, the rise of Gen AI also raises complex questions about academic integrity, authenticity, and the very nature of human learning and achievement. The responsible use of Gen AI in academia will require a careful balance - leveraging the capabilities of these tools to augment and enhance human potential, while preserving the core values of academic integrity, independent thought, and meaningful learning.

ET supports an ethical and responsible use of Gen AI in educational and R&D practices, provided you follow all the existing regulations and policies of IITB. The ethical use involves making choices that align with a strong moral framework, considering the potential impact on individuals and society whereas the responsible usage involves adhering to guidelines, regulations, and best practices. Such usages include, but are not limited to, ensuring protection of confidential, personal, or business information and intellectual property, and adherence to the honour code, course requirements, research integrity, and publication ethics. As this domain continues to evolve, ongoing philosophical reflection, multi stakeholder dialogue, and adaptive policy making will be essential to navigating the complex ethical terrain. With thoughtful, principled approaches, Gen AI can be harnessed to advance human knowledge in service of the greater good.

9. ACKNOWLEDGEMENT

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9.1 Disclosure of Gen AI assistance in document development

This document, outlining the guidelines for the ethical and responsible use of Gen AI in educational and R&D practices, was developed with the assistance of various Gen AI tools, such as ChatGPT 3.5 and Gemini. These Gen AI tools were employed to correct grammatical mistakes, rephrase sentences for enhanced readability, generate example use cases of Gen AI, and identify relevant literature on the ethical and responsible use of Gen AI in education. Each piece of identified literature and the generated examples were manually verified to ensure its accuracy and relevance. Although the Gen AI tools significantly supported the development process, all outputs were meticulously reviewed, edited, and approved by human contributors to maintain ethical standards and the accuracy of the information.

10. EXAMPLE OF PROMPT USAGE

How to use Gen AI to improve academic activities: A sample discourse with a Gen AI tool.

Prompt example 1

[Introduction: I am a graduate student conducting research in [insert your field]. Currently, I work as a [insert your current academic status] at [insert name of your university]. My research project is focused on [insert details about your project]. I also work as a Teaching Assistant in graduate courses that cover topics such as [insert details about the courses you are TA]. In the past, I have published work on [insert a few details about your published work]. As my research buddy, you will help me with brainstorming research questions, simplifying complex topics, peer review, and polishing academic prose. You will critique drafts of my papers, engage in Socratic dialogue, challenge my opinions, and suggest new directions for my work. You will respond like an academic colleague, citing only authentic and published sources for any claims, opinions, or figures referenced. You will never claim to be an AI model, and your responses will be clear, precise, and economical with words while maintaining clarity and precision. You will follow my instructions strictly, limiting your answers as requested.]

Prompt example 2

[I am working on a paper on [your topic]. Could you help me brainstorm research questions.]

Read through the questions which the AI tool gives you and pick one (or two) that you find most interesting. Take that question and ask it to give you five more research questions based on that.

Prompt example 3

[Can you give me five research questions about the following topic [paste the question you found most interesting]]. This time the tool will give you much more calibrated research questions.

Prompt example 4

[Remove redundant words and phrases from this given passage and make it coherent and cohesive. Given passage : [Your passage]]

Prompt example 5

[Please critique my draft and tell me how I can improve the argument, evidence, structure, and style of my paper. Your critique should include a list of actionable items. The draft: [Your draft]]

To learn more about prompt creation, refer to frameworks like CLEAR (Concise, Logical, Explicit, Adaptive, Reflective) framework¹¹ that offer a systematic strategy for crafting prompts that harness the full potential of AI language models.

¹¹ Lo, L. S. (2023). The Art and Science of Prompt Engineering: A New Literacy in the Information Age. *Internet Reference Services Quarterly*. <https://doi.org/10.1080/10875301.2023.222762>.

11. ADDITIONAL RESOURCES ON GEN AI USAGE

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