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Sparking Students' Ecocritical Awareness of Generative Artificial Intelligence

Nate Turcotte, Florida Gulf Coast University.

Overview

This lesson encourages learners to critically evaluate the environmental impacts of popular Generative Artificial Intelligence (GenAI) platforms. Leveraging a technoskeptical approach (Krutka et al., 2019), learners engage in a series of activities that interrogate the relationship between GenAI and environmental sustainability. More specifically, this article describes a sequence of lessons where undergraduates discuss and review research on the environmental demands of GenAI and demonstrate their understanding through a public service announcement and reflection.

Topics: GenAI, Sustainability, Technoethics

Time: Approximately 4, 75-minute class sessions.

Materials

- Internet-enabled computer
- Canva account
- Suggested Reading List
- Ecocritical Analysis Activity

Setup

This article describes a learning activity leveraged in an undergraduate *Introduction to Technology* course that examines the use of technologies for teaching and learning from a sociotechnical perspective.

Context-at-a-Glance

Setting
An undergraduate education course that explores technology in teaching and learning settings at a large southeastern university.

Modality
Face-to-face.

Class Structure
Twice weekly for 75 minutes.

Organizational Norms
This course attracts a range of majors and interests due to its focus on the use of technology in teaching and learning environments. Additionally, the course is identified with a "Sustainability Course Graduation Attribute" (SCGR), which students are required to earn before graduation.

Learner Characteristics
This is an elective course that attracts a diversity of majors, although education majors make up 75% of the enrollment, on average. Class size is typically 35 students.

Instructor Characteristics
The instructor has a background in critical approaches to education and technology.

Development Rationale
A core element of the university is a strategic emphasis on environmental sustainability. As such, students are required to take and successfully complete an SCGR course. This course requires significant emphasis on sustainability and an appropriate project.

Design Framework
Technoskepticism (Krutka et al., 2019); Skills forward pedagogy.

Standards

This learning experience follows standards and objectives that were developed from the ISTE Standards (International Society for Technology in Education, 2024) and the UN Sustainable Development Goals (United Nations Sustainable Development Goals, 2023). Specifically:

ISTE Educator Standards

2.3.b Foster digital literacy by encouraging curiosity, reflection, and the critical evaluation of digital resources (ISTE, 2024).

2.3.c Mentor students in safe, legal, and ethical practices with digital tools and content (ISTE, 2024).

UN Sustainable Development Goal

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation (UN, 2023)

Context and Setting

Course Design

The learning experiences described in this article overview an activity in an undergraduate course at a large southeastern university. Significantly, there are two university-wide goals and two course goals that frame the design of this course and the learning activity described in this article.

Design Element 1: Sustainability Focus

First, one of the core tenets of the university is a focus on environmental sustainability, which is reflected in its strategic plan and a university-wide requirement that all undergraduate students must successfully complete at least one course that has been labeled with a “Sustainability Course Graduation Attribute” (SCGR). To earn this attribute, a course must go through a rigorous review process that includes a review of the course curriculum and a demonstration of how the course exposes students to sustainability concepts throughout the semester.

The majority of students who enroll in this course are pre-service education majors interested in learning more about teaching and learning with technology. However, since the course was recently approved for the SCGR attribute, a variety of disciplines have begun to enroll in the course, including those in business and marketing, entrepreneurship, and even construction management majors, among others. In turn, the course’s exploration of GenAI provides opportunities for the sharing of rich and diverse experiences and perspectives on the topic. For example, education majors frequently discuss the utility of GenAI for lesson planning and brainstorming assessment activities, while students with majors outside of education consider the broad impact of GenAI on their discipline, including labor and business practices.

Among all the majors, these initial perspectives of GenAI tend to be limited to concerns about labor displacement, cognitive offloading, and the devaluation of specific skills (e.g., critical thinking, communication), leaving ample room for students to consider new perspectives and expand their understanding of this technology. I continue to find that, regardless of the major, students are interested and surprised by GenAI’s relation to environmental systems, which my conversations with students lead me to believe is a byproduct of the university’s focus on sustainability and students’ growing concern for planetary sustainability.

Design Element 2: Transferable Skills

The university has recently initiated an emphasis on developing students’ transferable skills (e.g., critical thinking) for career readiness to help them identify how such skills can be applied across careers and disciplines. To achieve this goal, the university has developed ten digital badges reflective of skills identified by the National Association of Colleges and Employers (n.d.) that align with career readiness. To earn these badges, students must submit at least three artifacts from their coursework, each accompanied by a reflective essay describing the skill and process they engaged in. The artifacts are then reviewed by an external reviewer to determine if a student has adequately demonstrated the skill.

Given this emphasis, the university has encouraged faculty to engage in Skills Forward Pedagogy. That is, a pedagogical approach that prioritizes "transparency" in the learning process (i.e., why students do specific course assignments), the scaffolding of skill development, and authentic assessment (Breslow, 2015).

Design Element 3: Active Learning

To foster an active learning experience, this course employs design characteristics often associated with a flipped classroom (Lee et al., 2016). As such, students are required to engage with content, including readings, notes, videos, and podcasts, before coming to class. In turn, class time can be spent engaging in discussions and collaborative activities.

Design Element 4: Technoskepticism

Further, this course embraces a technoskeptical approach to technology (Krutka et al., 2019), which encourages considering more than just the utility of emerging technologies and adopting a critical review of those technologies. While technoskepticism does not advocate for the outright rejection of technologies in teaching and learning settings, it encourages thoughtful interrogations to uncover problematic characteristics (e.g., data bias, surveillance), and in this specific case, the often-invisible environmental impacts posed by GenAI platforms.

Pre-Learning Activity Context

While the focus of the learning representation is a public service announcement that students complete, the learning experience described in this article typically takes place near the end of the semester and over the course of two weeks. The primary goal of this project is for students to interrogate the ethics of GenAI through an environmental sustainability lens.

By this point in the semester, students have been introduced to emerging technologies, such as GenAI platforms, sustainable frameworks (e.g., the UN Sustainable Development Goals), and critical frameworks for investigating EdTech. As part of the requirements of the SCGR attribute, the students have already accomplished a series of goals and objectives related to emerging technology and sustainability as required by the university, including:

Goal A: Learners demonstrate fundamental knowledge of issues, concepts, and/or processes related to sustainability.

Goal B: Learners demonstrate the ability to apply knowledge of sustainability issues, concepts, or processes to various contexts.

Goal C: Learners demonstrate the ability to critique, investigate, and connect the relevance, interdependence, and dynamics of environmental, social, and economic systems.

To accomplish these goals, a considerable amount of class time and course content has been devoted to building knowledge about the relationship between emerging technologies and their impacts on environmental sustainability. In turn, students demonstrate that knowledge by designing interventions (i.e., more sustainable practices and/or platforms) and mapping the development of GenAI platforms to environmental, economic, educational, and social systems, all of which are provocative topics in EdTech. For example, there is significant research focusing on the hype promoted by EdTech venture capitalism and its harms across systems (Bender & Hanna, 2025; Komljemovic et al., 2023).

The learning representation illustrates how learners partially accomplish the final goal for the SCGR attribute. This project requires learners to demonstrate their ability to assess the challenges of GenAI to environmental sustainability and work with others to develop solutions.

Furthermore, at this point in the semester, students are aware and tend to be increasingly concerned about how their use of GenAI has planetary consequences. As such, I do not require that students use AI in their work, particularly if a student believes that AI presents more harm than benefit. However, given the availability of platforms with AI-embedded features like Canva, students are free to use it for their projects. To date, I find that the majority of students opt to start with a template or from scratch, and avoid leveraging AI functionality to jump-start their project.

Learning Representation

In the following, I describe the series of lessons and activities that culminate in an ecocritical investigation of GenAI. The central question that frames this series of lessons is: *What do we want our relationship with GenAI to be like?*

Pre-Project: Establishing Critical EdTech Thinking

While the course introduces students to a variety of technologies that are commonly associated with education and PK-16 learning environments, the specific technologies and topic areas are greatly influenced by current trends and students' experiences. As a result, GenAI has been a major focal point of this course over the last two years, and students have been introduced to relevant GenAI systems, research, and concepts throughout the semester. For instance, to build students' understanding, early class sessions describe and explore how algorithms and large language models (LLMs) are leveraged in emerging technologies, such as GenAI. In subsequent classes, students are introduced to relevant concerns prompted by emerging technologies, such as the concept of technology "neutrality," or concerns related to bias in training data, and data privacy and security.

Additionally, students who are unfamiliar with GenAI have opportunities to engage with supplementary tutorials, such as the AI Pedagogy Project (AI Pedagogy Project, n.d.), to build their understanding of how Generative AI functions. Students engage with these tutorials outside of class and in preparation for class discussions. For example, students who are interested in, or have limited knowledge of, LLMs can complete the "AI Starter" and "Explore LLMs" tutorials. Due to the popularity of GenAI platforms, I have increasingly found that not as many students engage with these tutorials. However, if needed, these early efforts can provide students with basic knowledge of how LLMs function.

Notably, the unearthing of prevalent sociotechnical concerns related to emerging technology (e.g., data bias) foregrounds the technoskeptical approach students adopt toward GenAI. Even more, specific course readings (e.g., Robert et al., 2025) and discussions are designed to direct learners' attention to both the opportunities and challenges posed by GenAI. Further, learners are introduced to scholarship that confronts techno-solutionist views of technology (Logan, 2024; Selwyn, 2024; Werse, 2023). In turn, this framing offers a theoretical approach to emerging technology integration and practical strategies.

Following Krutka and colleagues' (2019) work, students put technoskepticism into practice by analyzing emerging and popular educational technologies. For example, inspired by other technoskeptical accounts (e.g., Krutka et al., 2021), I have students conduct a techno-ethical audit of popular EdTech products like ClassDojo (Turcotte et al., 2024) or MagicSchool AI by asking five critical questions:

1. What does society give up for the benefit of technology?
2. Who is harmed and who benefits from technology?
3. What does the technology need?
4. What are the unintended or unexpected changes caused by the technology? And,
5. Why is it difficult to imagine our world without the technology?

These technoskeptical practices orient students' thinking about popular technology and encourage students to reexamine their regular use of technology and digital media, from Canva to Snapchat to ChatGPT. There is a wealth of curriculum resources provided by the Civics of Technology group (Civics of Technology, n.d.) that can be adapted and repurposed for similar exercises.

Conducting an Ecocritical Analysis

As students build their understanding of GenAI throughout the semester, their technoskeptical perspective is primarily developed through course readings that explore topics such as the invisible labor, materials, and processes used to create and power GenAI platforms. While it is not possible to list every reading that learners engage with here, they spend several weeks investigating resources (peer-reviewed articles, journalism, popular media) that are dedicated to tracing the environmental impacts of GenAI, from the resources needed to sustain GenAI systems to how much electricity and water these systems use (see Supplementary Reading and Resources list).

Class Sessions 1 & 2

Following the flipped classroom approach, students engage with resources and write a reflection blog post before coming to class. While I have students pick two readings from the *Against AI and Its Environmental Harms* reading list (see suggested readings and resources) and listen to Husain et al., (2024) podcast episode on the ecological footprint of emerging technologies to support their post. These resources should not be seen as the only resources that can be used to support this activity. Indeed, as GenAI continues to evolve and more critical research is completed in this area, these resources can be exchanged for more current work, including journalism, media, and peer-reviewed studies. In their blog, I encourage students to write about what they know and understand about GenAI's impact on environmental sustainability. Even more, I encourage students to consider: how (and if) the material has influenced their uses of GenAI or their perceptions of how GenAI should be used, and what advice they would provide to family members, friends, and/or teachers who are interested in, or facing pressures to, use GenAI as part of their routine practices.

Class time is spent with learners sharing their findings from the readings, along with their perception of how AI technologies are framed by society, and how (and if) GenAI should be a technology leveraged in educational settings. Additionally, I spend class time introducing issues related to E-waste and planned obsolescence to extend students' thinking about sustainability and their use of "everyday" technology.

Following the first class, our next session is spent contextualizing the environmental concerns in teaching and learning practices. Students work together in groups of 4 to 5 to conduct a "mini" SWOT (i.e., Strengths, Weaknesses, Opportunities, Threats) analysis of a popular GenAI platform (ChatGPT, Claude, etc.) and their impact on society, education, and environmental systems. This activity helps students brainstorm their ideas related to GenAI. Moreover, students are encouraged to document at least five claims for each category (i.e., strengths, weaknesses, opportunities, and threats).

To conduct the SWOT analysis, students can use Padlet or another tool of their choice (e.g., Google Docs) to collaboratively document their findings and perceptions. If students use Padlet, I encourage them to set their wall up using a "column" or "row" layout and enable the grouping of posts.

In the collaborative resource, students identify strengths and weaknesses for teachers and students, and opportunities and threats for education and environmental systems (Figure 1). Importantly, these findings are based on the students' perceptions more than actual research. As such, for strengths and weaknesses, students typically list using GenAI to brainstorm lesson plans and assessments while drawing attention to concerns regarding academic integrity and cognitive offloading, respectively. For opportunities and threats, which encourage students to think more about the "systems-level," students might note AI's use for monitoring and predicting climate change as well as information access, while issuing concerns regarding the energy and organic material required to support data centers and reductionist views of education and teaching autonomy, respectively.

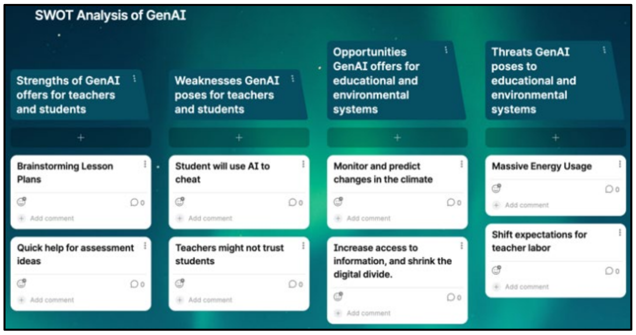

Figure 1. Example of initial student SWOT analysis.

Students return to a similar discussion at the end of class session 4, after they have conducted more purposeful research on the environmental impacts of GenAI. Further, finding inspiration in Logan and Vakil's (n.d.) technoethical audit of ChatGPT, I then have students discuss whether their chosen GenAI products should be implemented into PK-12 educational settings. These discussions are typically lively and full of passion as students consider the range of possibilities (and harms) that their chosen platform may have in PK-12. In general, the goal of this discussion is for students to broadly consider the ethical and moral dimensions of GenAI and its implications for teaching and learning practices, from helping with brainstorming to shifting expectations for teachers.

After discussing their SWOT results, preparation for the following week includes a dive into ecocritical approaches to EdTech. In turn, students read Werse's (2023) call for an ecocritical approach. Significantly, an ecocritical approach to EdTech mirrors the goals of technoskepticism in that it is both a critical exploration of technology and an attempt to unearth the inherent (and unintended) tradeoffs that are made for the technology. While technoskepticism grounds the students' exploration and discussion of technology in this course broadly, an ecocritical awareness directs students' criticality on the ecological impacts of a technology during its lifespan, from production to disposal (Werse, 2023).

Class Sessions 3 & 4

Students can complete the research aspect of this project either individually or in groups of 2-3. However, students are responsible for creating their own final product, a public service announcement (PSA) that raises awareness of the often "invisible" environmental harms posed by GenAI. For this PSA, students need to locate at least 10 resources that will support a total of at least five findings that users of GenAI should be aware of. While I recommend that students create their PSA using Canva, they are free to use any graphic and/or image maker of their choice.

Typically, at least the first half of class 3 is spent introducing and discussing PSAs, including how to design a graphic for optimal viewing and ease of information awareness. During this discussion, I share examples of public service announcements found online, and, as a result, we collaboratively develop standards for creating a coherent and well-designed graphic. For example, students often suggest that the graphic should:

- Clearly identify a theme or central point.
- Be easy to read and understand.
- Use images, graphs, and maps to display information.
- Be grounded in research.

Throughout the remainder of the class, students start working on their project. Students are encouraged to identify an environmental aspect they are interested in (e.g., GenAI water consumption, materials used to create technological components, such as lithium) and locate research through peer-reviewed sources or popular media (e.g., Against AI and Its Environmental Harms, see suggested reading list) that can support the design of their PSA. On average, students require 5-6 hours for research and the completion of their public service announcement (Figure 2).

During the final class of this series, students present and discuss their PSAs to each other, identifying "what they found really interesting," "what challenged their thinking," "what they will do differently now, if anything," and "what alternative solutions might exist." Additionally, students return to their earlier SWOT analysis about GenAI in education and contextualize their initial perceptions in their ecocritical analysis. Further, I encourage students to consider how their views may have shifted, along with how their advice for educators, school leaders, and policymakers has changed.

A final reflection paper complements the students' PSAs. In this paper, students reflect on their research process, expand on their research findings, and discuss how the project demonstrated their critical thinking. Since students are expected to submit their PSA for the Critical Thinking Digital Badge, students reflect on how both their content knowledge and their artifact demonstrate their skills development.

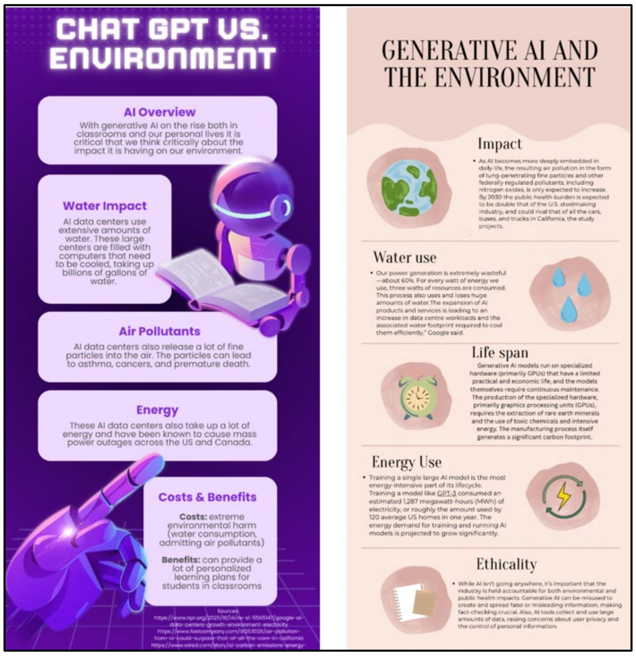

Figure 2. Student PSA Examples

Critical Reflection

This learning representation was implemented in both the spring 2025 and fall 2025 semesters, across four course sections. While the learning representation has evolved over those four sections to meet the goals of the university (e.g., Transferable Skills, learning about sustainability across disciplines), the core focus of the activity has remained the same. That is, while the logistics of how the activity was implemented in each semester shifted depending on class size and students' interests and knowledge of material, the activity outcomes remained the same. For example, as students become increasingly aware of the environmental impacts of GenAI (e.g., the resource-intensiveness of data centers), I have been able to spend less class time introducing and identifying these characteristics through readings and class discussions. Based on my experience, I highlight three elements that I believe have contributed to, or can contribute to, more meaningful class discussions, student learning, and student projects.

When I originally implemented the SWOT analysis activity and the following discussion of findings, I provided very little framing for how students should discuss their perspective. While the discussion of whether GenAI should be implemented into schools was always relevant and engaging, I often found that students were overwhelmingly hesitant to the idea of incorporating it into K-12 settings, and for the most part, suggested that schools should avoid the technology. Across the four course sections, there have been one or two students who dissent from the majority opinion, but their ideas, whether they are justified or not, tend to be overlooked because of the lack of clear support from their peers. I sense that other students share similar views, especially among the majors outside of education. So, in an attempt to encourage a deeper dialogue and potentially offer a safer environment to share ideas, I plan on shifting this discussion to a debate format. For this, I plan to assign debate teams, and I will assess whether this process will enable the sharing of more contrasting opinions without the fear of being judged, since students are *assigned* to share a specific perspective.

Second, while I have enjoyed the infographics that students create, this activity could be expanded to accept different types of artifacts (e.g., Op-Eds/News articles, video-based interviews or stories, class presentations) depending on how much class time is available. I have yet to require projects such as these due to the additional amount of time that would be required of the students. Since this project typically occurs at the end of the semester, and they complete multiple other projects in my class, I have opted not to require a more technical or demanding project. Relatedly, I could also add an opportunity for students to review and critique their peers' PSAs in an effort to help alleviate some of the feedback that I offer on their final artifact. While this would also take additional time, it could help streamline the Digital Badge submission process for students and reassure them of the quality of their artifact.

Third, I have provided a lot of flexibility with how the learning representation is structured on purpose. That is, students can choose to work together, they can choose to use class time to work on their project, and they can choose different areas of focus for their ecocritical analysis. The first time I implemented this project, the audience for the PSAs was schools, administrators, and teachers. However, due to the diversity of the course's enrollment, that is, not all students are education majors, students now create a PSA for an audience of their choosing. The only caveat is that the PSA must connect with elements of environmental sustainability and awareness.

Furthermore, while I have suggested using approximately five hours of class time for this activity, the learning representation could be condensed or expanded depending on the expertise level of the students. The majority of students enrolled in this course are first and second-year students, and very few have taken a previous course on emerging technologies or environmental sustainability. As such, students' knowledge of these two systems could greatly impact how much time is needed to complete the learning representation.

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About the Author

Nate Turcotte (He/Him) is an Associate Professor of Teacher Education and Learning Sciences at Florida Gulf Coast University. He studies technology-rich forms of teaching and learning across formal and informal learning settings. He teaches undergraduate pre-service educators how to examine and evaluate technology for educational purposes. He also teaches graduate courses in educational technology and design.

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