



Generative AI, Possibilities, Promises, Perils, Practices, and Policy (GenAI-P5)

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Introduction

The *Generative AI, Possibilities, Promises, Perils, Practices, and Policy (genAI-P5)* strand at NTLS, led by Drs. Marie Heath and Punya Mishra, aimed to develop a set of questions for teacher educators and teacher preparation programs to use for inquiring into policy, practice, and research around generative AI. Participants explored the obvious and hidden impacts of large language models (LLMs) on education and our individual and social lives. Participants also applied technoskeptical (Krutka et al., 2022) and practice based questions (Mary Lou Fulton Teachers College, 2023) to identify gaps in theory, positionality, and approaches to AI in education. Finally, the strand participants developed a series of reflective questions to engage with when considering the use of LLMs in education.

To generate the questions, participants reviewed diverse literature on the design and impacts of LLMs (Bender et al., 2021) on education (Berkshire & Schneider, 2023; Heath & Krutka, 2023; Mishra et al., 2023; Trust, 2023; Williamson, 2023), indigeneity (Hendrix, 2023; Marx, 2023), the environment (Bender et al., 2021), and the social (Bender et al., 2021; Williamson, 2023). They engaged in a technological audit (Krutka et al., 2022) of the technology and analyzed and discussed the possibilities and perils. Next, the participants identified five important themes of generative AI around which teacher educators can build further inquiry and reflection: truth and verisimilitude; equity and justice; professional works, mindsets, tasks and skills; the broader context of teacher preparation programs; teaching *about Gen AI* and its impacts on society. Finally, participants brainstormed sub-topics and questions to ask about each theme.

Below are summaries of each theme and synthesis the participants' brainstorms, including a set of reflective questions for each theme.

Theme 1: Truth/Verisimilitude

Overview

The advent of generative AI, with its ability to craft realistic-looking synthetic media that can easily be mistaken for reality, poses profound challenges for society at large, and thus becomes relevant for educators. These technologies bring with them the potential for widespread misinformation, as they can manipulate narratives, prioritize certain perspectives over others, and even reshape our collective understanding of what we deem as truth, potentially altering our very perceptions of reality. Added to this is the complex interplay of socio-economic factors, like wealth and power which can influence the presentation and acceptance of algorithmically produced 'truths,' amplifying some narratives as "truth" while attempting to further marginalize others and exacerbating existing schisms and inequities in our world. This evolution in AI technology demands a heightened awareness and critical approach from educator preparation programs to prepare the next generation of educators.

Reflective Questions

1. *Does our curriculum/program help educators develop a critical understanding of the nature of Generative AI and its ability to blur the lines between truth and falsehood, subjective and objective truth?*
 - a. How does our curriculum address the technological intricacies of Generative AI that allow it to simulate reality?

The rapid technological changes of generative AI, coupled with a hasty implementation in education, may result in direct harm to already marginalized and minoritized students. How can we work toward just uses of generative AI in education?

Reflective Questions:

1. *How does generative AI currently and potentially intersect with systems of power in education?*
 - a. How are we preparing teachers to critically examine marginalized and minoritized people's lived experiences with generative AI?
 - b. How are we preparing teachers to identify systems of oppression which may be amplified by using generative AI?
2. *How does our TPP consider what facilitates and prevents access to generative AI in educational spaces?*
 - a. Are there tiered systems for access (free and paid)?
 - b. What other technology and resources are needed to access generative AI models?
3. *How do we evaluate whether generative AI is ethically designed for education use?*
 - a. How is data collected and stored?
 - b. What is the aim of generative AI?
4. *Does our curriculum/program emphasize the development of critical thinking skills to interrogate whose perspective and narratives are being prioritized or marginalized by AI-generated content?*
 - c. How does our curriculum guide educators in recognizing and understanding potential biases embedded within AI tools and outputs?
 - d. Are there discussions and exercises aimed at understanding the power dynamics at play when algorithms decide which narratives to prioritize?

Theme 3: Professional Works, Mindsets, Tasks and Skills

Overview

Generative AI is a protean and multidimensional technology, with a wide range of capabilities to produce complex, unique outputs across a range of domains (from programming to visual art, from poetry to science and more). That said, it works well only when steered by a knowledgeable human who brings their expertise both of domains and of working with AI to the table. These capabilities can be an immense boon to educators, allowing them to develop creative curricula and assessments and for their students to utilize them in creative ways to

support their own learning (Henriksen, Woo & Mishra, 2023). These tools offer quicker curriculum adjustments and the development of innovative pedagogical approaches and assessment techniques.

The importance of the human in learning cannot be overstated. Clarifying -- for both themselves and for the profession -- what learning *means* and what an educator's role is in the learning process, will be crucial for articulating when and how to use generative AI in education. Educators need to critically engage with AI-generated materials, discerning their relevance and application (Close, Warr, & Mishra, 2023). Educators need to develop a creative mindset that allows them to explore, play and understand the possibilities and challenges of bringing these technologies to educational contexts (Warr, Mishra, Henriksen, & Woo, 2023). They also need to be alert to the unintended consequence of AI in education, in particular a further deprofessionalization of the profession. Technology companies and financially strapped districts may point to the "efficiencies" of technology which they may argue -- as they have with older technologies -- that it is an equal substitute for teaching.

Reflective Questions

1. *Does our curriculum/program address how GenAI potentially reshapes the teaching profession and educators' roles?*
 - a. Does our curriculum/program offer strategies for educators to maintain their agency in the face of GenAI advancements?
 - b. Does our curriculum/program stress the importance of soft skills and human values to maintain human-centric pedagogies in the face of AI integration?
2. *Does our curriculum/program equip educators to effectively integrate and critically evaluate GenAI-generated content?*
 - a. Does our curriculum/program train teacher candidates to critically assess GenAI outputs for specific disciplines and educational contexts?
 - b. Does our curriculum/program impart essential skills or knowledge for educators to adapt and revise GenAI-generated content?
3. *Does our curriculum/program provide opportunities for educators to learn how to best work with GenAI in to develop and enact curricular goals?*
 - a. Does our curriculum/program explore how rapid prototyping with GenAI might lead to creative and innovative pedagogical strategies?
 - b. Does our curriculum/program guide educators developing new forms of assessment that truly get at student learning and cannot be subverted by generative AI?

Theme 4: Broader context of Teacher Preparation Programs

Overview

The integration of General Artificial Intelligence (GAI) into teacher preparation programs presents a transformative shift, influencing not only admissions and evaluation processes but also the transparency and support systems essential for pre-service teachers and instructors. As GAI technologies evolve and potentially become as commonplace as smartphones within the next five years, it's crucial to anticipate and strategically plan for their implications in teacher education. Key considerations include the impact of GAI on the admission of teacher recruits. This encompasses how AI might alter existing barriers, potentially streamlining the process or inadvertently creating new hurdles, particularly for diverse candidates. Furthermore, the role of AI in the ongoing evaluation of teachers during their training period is a vital aspect, raising questions about the fairness and inclusivity of such assessments.

Equity in AI-driven assessment systems is a paramount concern, particularly in addressing challenges related to language diversity, accents, multilingualism, and disabilities. It's essential to consider whether AI can effectively identify relevant capacities and dispositions in teacher candidates without reinforcing existing biases or inequities. Transparency in the deployment of these AI systems is critical, ensuring that all participants understand how their performance is being assessed and the basis of the feedback provided. Additionally, exploring key technological points of entry that allow for the integration of AI into the education system will be crucial in managing its impact on teacher training. This includes considering what data the AI requires and ensuring that the machine learning algorithms and advisory paths do not perpetuate structural inequities within teacher education and the broader landscape of higher education.

Reflective Questions

1. *How do we create equity in AI driven assessment systems?*
 - a. Will AI be used to admit students to the program? How might AI increase barriers for admission and how might it reduce unnecessary barriers to admission?
 - b. Will pre-service teachers be given feedback by AI systems? How will we ensure equity for all, including multilingual students, disabled students, and other students who may potentially be marginalized by the use of AI?
2. *Will we use AI to advise students throughout their programmatic experience?*
 - a. What data will the AI need?

- b. How do we ensure that the machine learning and advisory path devised by the AI will not reproduce structural inequities within teacher education and higher education?

Theme 5: Teaching *About* Generative AI and Its Impacts on Society

Overview

Not only will educators need to consider if and how they will incorporate generative AI in their teaching, but they will also need to prepare students to live in a world shaped by generative AI (Richardson, Oster, Henriksen, & Mishra, 2023). As young citizens engage with technologies in their daily lives, children deserve a curriculum that allows them to think about the impact of technology on themselves and their world. Technologies themselves can and should be contested, subject to reconstruction and democratic participation (Feenberg, 1991). Teachers can help students transition perspectives from passive users to active citizens who make informed decisions and take action for more just communities. The curriculum of generative AI which teacher preparation programs might consider implementing includes teaching *with*, *about*, and *against* technologies (Yadav & Lachey, 2022) and towards a civics of technology (Krutka & Heath, 2022) which helps students examine the force technology exerts on society and the ways that technologies extend biases of society.

Reflective Questions

1. Does your program equip teachers to address what K-12 students will need to be able to know and do in order to live within a world with pervasive LLMs?
 - a. What do students need to know about the specific technological workings of generative AI in order to make informed decisions about its presence and use in their lives?
 - b. What do students need to know about the ways that generative AI intersects with and amplifies societal biases?
 - c. What might constitute ethical uses of AI in students' daily, educational, and social lives?
2. Which disciplines and grades can include standards to build knowledge and skills about the social and ethical impacts of generative AI?
 - a. How can each of the disciplines bring their disciplinary lenses to a holistic understanding of AI in society?
 - b. What are age and developmentally appropriate ways to teach about, with, and against AI?

3. How can teacher preparation programs build these standards into their programmatic curricula?
 - a. What is an iterative process for incorporating this content into courses in teacher preparation programs?

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