GENERATIVE AI IN EDUCATION: POTENTIALS, PERILS & POLICIES

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Key takeaways:

- Students should engage in developmentally appropriate, creative and critical learning experiences.
- Teachers should develop a creative yet techno-sceptical mindset grounded in technological pedagogical content knowledge (TPACK).
- Researchers should conduct humanistic, culturally responsive research with agile dissemination techniques that inform practice.
- Policymakers should implement flexible, values-driven policies with broader social and long-term consequences in mind.

Integrating artificial intelligence (AI) in education raises a series of complex tensions, possibilities and perils. Potential benefits to learners include the ability to provide personalised tutoring and natural language access to powerful tools such as programming and media generation on a range of subjects. At another level, these tools can also bring about greater efficiency to a range of educational tasks (e.g. summarising content, reframing ideas, generating feedback), and thus focus classroom time on deeper and richer discussions.

While the capacity of generative AI to make higher-order conceptual abstractions is what allows it to create new original content, this affordance also comes with serious risks. The fact that this tool generates content based just on the texts it is trained on, with no referent to the real world, means that generative AI can perpetuate biases and challenge notions of truth. They confidently confabulate and make up facts and thus can be used to generate reliable-looking fake content. In addition, introducing advanced agentic and social technologies to children may lead to them forming one-sided parasocial relationships with these tools. The consequences of such relationships on children who are still developing socially and emotionally are not fully understood, although the recent history of the negative effects of social media on youth mental health should serve as a warning.

Finally, it is important to acknowledge that these AI technologies and the corporations that run them are deeply embedded within inequitable socioeconomic systems that value profit over social good. This may lead to a push towards minimising the role of teachers and arguments for replacing them with AI-based tools. This could be particularly damaging for historically marginalised populations who often have less of a say in decision-making in these areas. Furthermore, AI in the public sphere could be used as a tool to exacerbate existing schisms and polarisations that could pose additional challenges to educational systems.

In this context, a key recommendation would be to leverage generative AI's advantages while protecting human-centred pedagogy focused on critical thinking and socioemotional development. Students and educators need to develop a better understanding of these technologies, their potential for enhancing deep disciplinary and interdisciplinary learning, how they work and how they fail, their hidden biases and, more importantly, our cognitive limitations. The integration of AI tools needs to be grounded in curricula that are appropriately focused on the developmental stages of the learner (e.g. critically focusing on information quality for younger learners while older students analyse more deeply algorithms and data to assess their impact on society and governance). Researchers need to move from a techno-centred to a more human-centred approach. Further, given the fast pace of change in this technology, researchers need to develop new models of how they share and publish their work. Policymakers, similarly, need to keep the bigger socio-technical factors in mind as they develop flexible yet humanistically grounded policies and frameworks.

Overall, generative AI offers transformative potential along with risks that demand nuanced policy responses to support educators in shaping their continued advancement for equitable outcomes. Generative AI systems' increasing agency as social participants rather than mere tools makes the ongoing cultivation of student critical thinking, teacher leadership and principled policymaking essential to positively guide these technologies.

Detailed takeaways

Students should engage in developmentally appropriate, creative and critical learning experiences by

- Participating in interdisciplinary learning experiences to explore and apply AI affordances and limitations in specific disciplines and real-world problems;
- Engaging in scaffolded learning experiences appropriate to their level that empower them to use AI in productive and creative ways and think critically about the challenges of working with agentic AI and its risks (confabulation, in-built biases etc.);
- Exploring developmentally appropriate, creative curricula to think critically about human relationships with evolving AI technologies and their influences on culture.

Teachers should develop a creative yet techno-sceptical mindset grounded in technological pedagogical content knowledge (TPACK) by

- Expanding AI competencies beyond technical knowledge, including making connections between AI and pedagogy, content and the broader social context;
- Authentically exploring general, disciplinary and interdisciplinary AI capabilities through guided trials that demystify technology (e.g. science teachers and students might choose to use AI to create visual simulations, while math teachers and students might conduct complex data analyses).

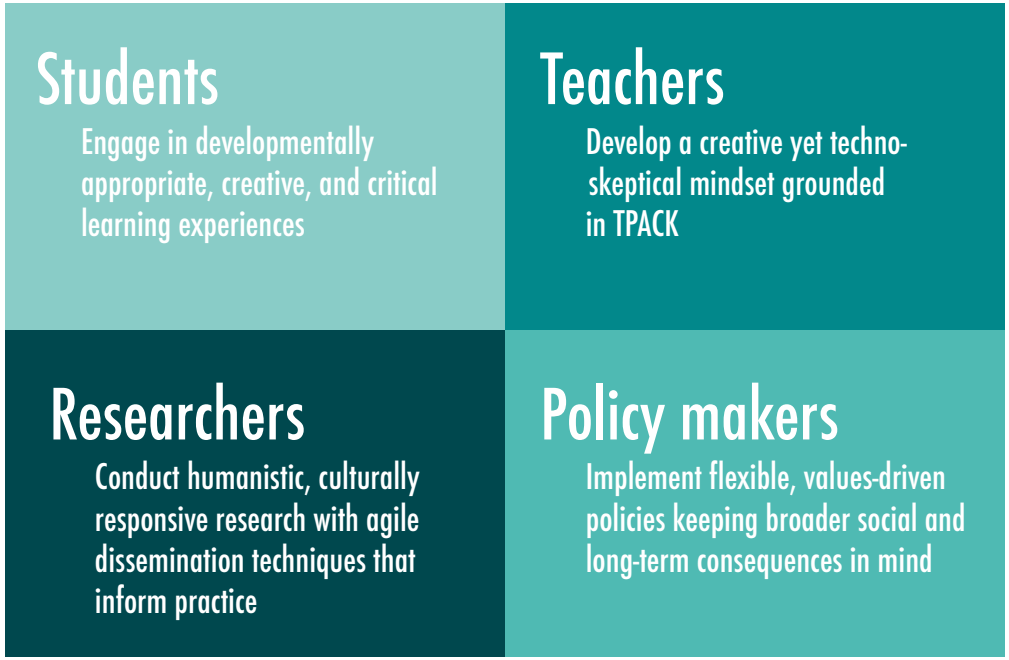
Researchers should conduct humanistic, culturally responsive research with agile dissemination techniques that inform practice by

- Funding research teams conducting interdisciplinary research on evaluating and creating context-specific trustworthy AI applications in education that empower equitable outcomes;
- Partnering with other researchers to develop new models of "rapid response" research and dissemination to inform practice.

Policymakers should implement flexible, values-driven policies with broader social and long-term consequences in mind by

- Respecting teacher and student agency when crafting policies around AI usage;
- Creating specialised ethical guidelines for curriculum development on AI for different developmental stages informed by dialogue with teachers, students and researchers;
- Avoiding reactionary policies that seek to curtail the use of these technologies or embrace them uncritically. Instead, develop policies that find the "middle path" of thoughtful, values-driven integration of these tools.

Figure 6
Recommendations for students, teachers, researchers and policymakers



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