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Generative artificial intelligence in education: Initial principles developed from practitioner reflexive research

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ABSTRACT

This paper explores the use of Generative Artificial Intelligence (GAI) with chat-like functionality (CLF) in education, focusing on the secondary history classroom in an Australian context. It presents a reflexive iterative cycle of professional practice as the methodology for developing strategies using GAI, based on the author's experience and literature review. It proposes three principles for the effective and ethical use of GAI in education: teach students how to use GAI tools, teach to promote discernment and critical thinking, and teach for the whole human. It demonstrates how GAI can foster student capabilities across the curriculum, aligned with the *Australian Curriculum* General Capabilities as a means of contributing to the fast-changing conversation about the use of GAI tools in educational settings.

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Introduction

Generative Artificial Intelligence (GAI) using "chat-like functionality" (CLF)¹ has rapidly become available to secondary schools with potential to transform learning by cultivating holistic development in learners. There is no universally accepted definition of 'chatbot' but Furze suggests "a typically text-based (but increasingly multimodal) application built on top of a GAI model [which] has been trained...to respond conversationally" (Furze, 2023a).

The power of GAI and pace of its development and adoption are significantly greater than previous technological waves such as calculators and personal computers (Lodge et al., 2023). Suleyman and Bhaskar note that "never before have we witnessed technologies with such transformative potential, promising to reshape our world in ways that are both awe-inspiring and daunting" (Suleyman & Bhaskar, 2023, p. 3). They suggest that exponential growth in GAI is challenging because human "brains are terrible at making sense of the rapid scaling of an exponential" (Suleyman & Bhaskar, 2023, p. 67).

One notable characteristic of GAI has been its speed of adoption. Since the November 2022 release of OpenAI's ChatGPT (https://chatgpt.com), Large Language Model (LLM) software has been widely adopted at unprecedented pace. In February 2023, the growth in ChatGPT users had eclipsed the previous record by TikTok (Chow, 2023).

As GAI becomes ubiquitous, educators must reexamine the goals underpinning subject-specific pedagogies, illuminate values guiding the use of technology for learning, and articulate principles guiding GAI use, rather than adopting it without a clear educative purpose. While some educators have embraced the challenges of GAI (Wieck, 2023), others perceive it as a threat (Hattie et al., 2023). Despite these challenges (Bauschard, 2023), incorporating GAI into the secondary classroom opens many learning opportunities for students. Rightly or wrongly, chatbots are already being used in schools around the world: "like any tool, AI offers both new capabilities and new risks" (Mollick & Mollick, 2023c).

GAI is not simply "like any tool". Lodge et al. rightly remind educators that "in many respects, generative AI is not just a tool for learning in and of itself" (Lodge et al., 2023). GAI provides opportunities to engage students in new ways, boost creativity, encourage the development of critical thinking skills, and enhance civic engagement (Cailey, 2023). It is more than "a tool" in that it "opens up infinite possibilities for creating other tools" (Lodge et al., 2023, p. 123) and has potential benefits for learning beyond a single subject. ISTE points out that generative technologies "further the opportunity to rethink and redesign learning" (ISTE, 2024).

As developing GAI is being adopted in schools these questions arise:

- 1. How are educators responding to the advent of GAI technologies?
- 2. How can GAI support learner growth and development?
- 3. What principles can guide teacher engagement with GAI in their practice?

This paper presents background on key concepts related to GAI in education and reflects upon one teacher's

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experience of using GAI within the context of an Australian secondary school history classroom. It demonstrates how GAI can foster student capabilities across the curriculum and argues that many of the educational goals expressed in documents such as the *Australian Curriculum* General Capabilities can be realized using GAI. This article contributes to ongoing academic discussion of GAI use in classrooms by offering three principles to guide the effective and ethical use of GAI for learning.

Background

Generative AI

Crawford indicates that the meaning of "artificial intelligence" varies with context (Crawford, 2021). This paper draws upon the definition of Generative AI offered by UNESCO: "an Artificial Intelligence (AI) technology that automatically generates content in response to prompts written in natural language conversational interfaces" (Miao & Holmes, 2023, p. 8). Generated content is not limited to text but may extend to images, music, code and other formats.

This paper does not explore the technicalities of GAI; however, it is worth noting that AI systems are not truly "autonomous" or "rational" but depend on human guidance (Crawford, 2021, p. 8). These technologies are unable to "discern anything without extensive, computationally intensive training with large datasets or predefined rules and rewards" (Crawford, 2021, p. 8). The GAI tools entering classrooms are both powerful and flawed (Hattie et al., 2023), offering great affordances to teachers and students but not a panacea for every classroom challenge. They should be used with intentionality and care to enhance student learning, not compromise it (Wall, 2023).

School administrators need awareness of the technology and understanding of licensing arrangements if they intend staff and students to use GAIs (Furze, 2023a). GAI terms of use are evolving and schools must be aware of implications for student use (Furze, 2023b). Educational institutions internationally, including in Australia, are beginning to support the use of GAI (Smith, 2023). The quality of relevant policy and guidelines varies but should address issues including ethics, acceptable use, data privacy and security, professional development, and assessment (Furze, 2023a). Creation of school policy responsive to GAI and consistent with existing academic integrity approaches is vital to supporting teacher innovation alongside student academic integrity and learning success.

Ubiquity

Despite claims that "AI panic is spreading in education", teachers have generally responded calmly (Mollick, 2022). A national survey of K-12 teachers, parents, students and others in the United States found that 40% of teachers reported using ChatGPT at least once a week and 84% reported that AI had "positively impacted their classes" (Toppo, 2023). This rapid uptake suggests that it is important to "consider how having the ability to quickly and cooperatively generate content can be used to boost pedagogy, even as it threatens old methods" (Mollick, 2022).

Numerous studies note that rapid innovation in the use of AI within educational context requires careful alignment with "sound pedagogical practice" (Hu et al., 2025, p. 2). Among some of the traditional pedagogical methods at risk are those centered on student-led inquiry, critical reading, and dialogic learning, which depend heavily on active cognitive engagement. While noting positive affordances such as "writing support capabilities" and the ability to support "self-directed and personalised learning", Stahl cautions that an over-reliance on AI may lead to potential diminishment of learners' "human thinking processes and decision-making abilities" (Stahl, 2025, p. 104). These critical thinking and problem-solving capacities are core to numerous pedagogical approaches. In a tone similar to Stahl, Hu et al. (2025, p. 6) warn that AI tools should be used within "robust pedagogy" so as to be instrumental in "creating diverse representations of knowledge" and to "avoid becoming mere information dispensers". They remind us that "technology alone does not suffice to drive authentic learning experiences" (Hu et al., 2025, p. 6). If generative systems begin to supplant rather than support human reasoning, core pedagogical goals - such as fostering independent analysis and reflective judgment - may be undermined.

Regardless of such concerns, the rapid advance of GAI means that it would be a disservice to students not to support them engaging appropriately with GAI. Australia's leading universities have conceded that AI tools seem unavoidable in education and will likely become an employability skill, asserting that AI is already a "part of our collective future" and will be "playing an important role in future workplaces and, most likely, our daily lives" (Evans, 2023). Luckin (2023) sees an opportunity for educators to begin "radically rethinking what education is for, and what success means". Her appeal to teachers is powerful:

We are capable of sophisticated, high-level thinking, yet the school curriculum ... takes a rigid approach to learning, prioritising the memorising of facts, rather than creative thinking ... we need humans to excel at what AI *cannot* do, so any workplace automation complements and enriches our lives and our intelligence. (Luckin 2023)

Wyatt-Smith et al. acknowledge that digital disruption shapes classroom learning, impacting upon:

modes of communication, news media, the economy, industry, workforce, health sectors, work of governments, practices of citizenship, research and development in universities, and schooling. There have also been significant digital impacts in how individuals experience their lives, make civic and community contributions, experience leisure, communicate locally and globally and construct their identities. (Wyatt-Smith et al. 2021, p. 222)

Such observations have implications for schools and necessitate the articulation of guiding principles for classroom use of GAI.

Context

Digital technology and one-to-one learning in the classroom

Hill and Barber (2014) noted that "personalised learning" has been written about by educators for decades but has "become a realisable dream in recent years, thanks to the advent of new digital technologies" (pp. 56–57). This refers

obliquely to the work of Bloom who noted that Anania and Burke's three different sets of learning conditions could be best described as: conventional (one teacher to 30 students), a specific set of "mastery" conditions (also one to thirty), and one-to-one tutoring (Bloom, 1984). Bloom noted that one-to-one tutored students' achievement in Higher Mental Processes (HMP) was 2.0 sigma above the control students, meaning that the "average tutored student was above 98% of the control group" for HMP (Bloom 1984, p. 13). Bloom's statement of his "2 sigma problem" directly challenged educational researchers to "find methods as effective as one-toone tutoring" (Bloom 1984, p. 15). While Bloom saw the potential of one-on-one tutoring to enhance students' learning through personalization and mastery approaches, four decades later, Mollick and Mollick recognize the potential of GAI to provide one-on-one tutoring, effectively solving Bloom's 2 sigma problem:

Generative AI, if fed deliberately designed and structured prompts, has the potential to give every student a personalized tutoring experience on any topic ... With expert guidance and vetting from instructors, AI has the potential to increase student learning in ways that were impossible before. (Mollick & Mollick, 2023b)

The potential of GAI for students' learning experience is clear. Lévesque exhorts teachers to embed the use of digital technology within historical inquiry, believing that "rich technological open learning environments" are well-placed to "support inquiry-based learning because of the types of resources and opportunities they offer to learners" (Levesque, 2014, p. 45). For Lévesque, "the question should no longer be about whether to use digital technology but rather how to use it to further the acquisition and development of expertise in domains of knowledge" (Levesque, 2014, p. 44). Since 2023, GAI has become part of the rich technological learning environments that Lévesque refers to. Kee and Graham (2014) echo this in discussing subject-specific historical pedagogy. They assert that students "require" the incorporation of digital technology into their history learning processes (Kee et al. 2014, p. 270). Lucey and Meyer present the case that there is an "imperative" to teach young people the skills to negotiate civic, community and online spaces, "to engage in meaningful social dialogue if they are to become critically thinking participants of a democratic society" (Lucey & Meyer, 2013, p. 462). Thus, there is an imperative for educators to articulate guiding principles for classroom use of GAI.

Such guiding principles for what happens inside the classroom should be set against the foundational ethics established in documents such as UNESCO's *Guidance for generative AI in education and research* which emphasize a "human-centre approach to AI" in education (Miao & Holmes, 2023, p. 18). Nguyen et al. (2023, pp. 4225–4235) articulate that human-centredness is one of seven key ethical principles of note to educators. The remaining six of these ethical approaches include stances on governance, transparency, sustainability, privacy, security, and inclusivity.

It is worth noting that core to these foundational ethics in a classroom situation are efforts to ensure "personal privacy" (Nguyen et al., 2023, p. 4231). Developers and educators should embed transparency and visibility to AIED-related threats while explaining potential ramifications to students' learning, careers, and social lives. The objective is to cultivate trust among learners and provide them with insights to leverage their skills across contexts while maintaining control of their respective data and digital identities. (Nguyen et al., 2023, p. 4231)

Finally, any articulation of guiding principles should be developed in ways consistent with ongoing conversations regarding the how to "unleash the potential" and "mitigate the downsides" of AI tools such as those discussed in UNESCO's *AI and education: guidance for policy-makers* (Miao et al., 2021, p. 24).

Theoretical framework

This paper deliberately foregrounds the *Australian Curriculum*'s General Capabilities as a guiding framework, as they articulate broad educational priorities rather than prescriptive content or discipline-specific skills. Their focus on transferable dispositions and ways of thinking - across subject area disciplines - provides a valuable lens through which to consider how emerging technologies like GAI might support, challenge, or reframe the purposes of education in a rapidly evolving digital landscape.

The Australian Curriculum V9 aims to ensure "all young Australians become confident and creative individuals, successful lifelong learners, and active and informed members of the community" (Australian Education Council, 2019). The need for a broad and flexible skillset is recognized by the General Capabilities: critical and creative thinking, digital literacy, ethical understanding, intercultural understanding, personal and social capability, literacy, and numeracy (ACARA, 2024b).

This paper used Schön's concept of reflective practice to gather data (Schön, 1983). At a technical level, reflection entails forming "a thought or idea as a consequence of meditation" (Carrington & Selva, 2010, p. 45). Reflective practice is how professionals become aware of their implicit knowledge base and learn from experience (Schön, 1983).

For Schön, teachers' reflective practice starts with their expert knowledge (Shah, 2022). It involves "reflection-in-action" and "reflection-on-action" (Schön, 1983, p. 49). Reflection-in-action is where the teacher reflects on behavior as it happens. For instance, the teacher notices that students are not understanding a mathematical problem, wonders why the students do not understand, and changes how they are teaching in response. Reflection-on-action is reflecting after the event-to review, analyze, and evaluate the situation. For example, the teacher might reflect on what values, assumptions, planning, or teaching resulted in students misunderstanding the concept then determine action for the next lesson. By engaging in reflection-in-action and reflection-on-action, teachers develop their "professional identities", as "cycles of reflection, including reflection in action and reflection on action, make explicit tacit knowledge, which forms the basis of teachers' daily practices" (DeLuca et al., 2023, p. 5).

As reflective practitioners, teachers need to become aware of and question their "tacit" knowledge (Schön, 1983, p. 49).

They question "events and assertions in relation to other experiences", which can lead "to new meanings and forms of practice" (DeLuca et al., 2023, p. 6). Teachers engage in reflective practice continuously and deliberately to uncover their underlying thoughts, beliefs, and biases. They might use a reflective journal to assist reflection (Bursaw et al., 2015; Carrington & Selva, 2010). In this sense, reflective practice can be not only a technical activity but also an essential component of a socially critical pedagogy (Bursaw et al., 2015; Carrington & Selva, 2010; Shah, 2022).

From this perspective, drawing on Vygotsky and Mezirow, reflective practice can be a social as well as an individual practice (Bursaw et al., 2015; Carrington & Kimber, 2017; Mezirow, 2003; Shah, 2022). This interpretation draws on Vygotsky's sociocultural theory, which positions reflection as a "social practice"-a socially mediated process shaped by language and interaction - rather than solely as an individual cognitive activity (Shah, 2022, p.309). Such an understanding is evident in use of the "4Rs" - report and respond, relate, reason, and reconstruct - in reflective practice and transformative learning (Carrington & Kimber, 2017; Mezirow, 2000, 2003). In "reporting", a teacher states what has happened and identifies the relevance of the issue. By "responding", they observe, express their view, and question. In "relating", a teacher connects the issue to their skills, experiences, and specialized knowledges, leading to "reasoning" as the teacher interrogates the issue and connects with theory. They consider the issue from multiple "perspectives" such as the student, the parent, other students, and their peers. Literature is used to support the teacher's "reasoning". Finally, the teacher reconstructs their practice (Bain et al., 1999). Transformative learning theory involves action and critical reflection to change students' "fixed assumptions and expectations", with the aim of students becoming "more inclusive, discriminating, open, reflective, and emotionally able to change" (Mezirow, 2003). In initial teacher education these theories can be seen in pedagogies such as service-learning, where critically reflective practice deepens preservice teachers' understanding of inclusion and stimulates "perspective transformation", growing critical thinking and professional identity (Carrington & Kimber, 2017; Mezirow, 2000, 2003; Mezirow & Marsick, 1978). In the context of this study, these theoretical ideas were incorporated into practice through a structured process of teacher reflection designed to support action, critical analysis, and transformation of practice.

Methods

This study was conducted over a six-month period in 2023 across four history classes at a metropolitan all-girls secondary school in Australia, including two Year 9 classes (n=47), one Year 10 class (n=25), and one Year 12 class (n=18). Students ranged in age from 13 to 18. While the school identifies as single-sex, it is acknowledged that some students may have identified differently. The cohort was relatively homogenous in terms of socio-cultural background. As practitioner-researcher, the lead author integrated generative AI tools - primarily ChatGPT, Microsoft Bing Chat (now Copilot), and Google Bard (now Gemini) - into alongside classroom activities, limited trials of teacher-developed chatbots which were developed using Poe and Playlab.AI. Observations were documented through reflective journaling and field notes. These records captured significant student interactions, the emergent classroom dynamics, and the lead author's iterative changes in teaching strategies. These records formed the primary data set for analysis. Data was examined thematically through an iterative, interpretive process involving reading, annotating, and collaborative discussion. This pragmatic and "recursive" process was consistent with the participatory action approach described by Creswell (2008, p. 11). Following Braun and Clarke's (2006) qualitative framework for thematic analysis, reflections were coded and synthesized to identify recurring patterns, particularly in relation to pedagogical decision-making, student engagement, and ethical tensions.

One of the benefits of thematic analysis is its flexibility... Through its theoretical freedom, thematic analysis provides a flexible and useful research tool, which can potentially provide a rich and detailed, yet complex, account of data. (Braun and Clarke, 2006, p. 78)

Through the recursive analysis, connections were drawn between classroom experiences and the broader aims of the Australian Curriculum General Capabilities. This process enabled an articulation of a range of practice-informed principles for the use of GAI in school contexts.

This study applied teacher reflection iteratively. The proposed curriculum alignment and principles were developed through the lead author's research-informed pedagogical practice. Initial readings in epistemology, ontology, inquiry-based pedagogy, historical thinking, and applications of educational technology informed further reading around teacher experience of GAI. This reading directed his classroom practice and subsequent reflections and iterations in the use of GAI, building a broad and flexible pedagogical frame contextualizing educators' shared experiences in using GAI. The lead author's longstanding interest in technology for history education informed his exploration with students of chatbots 'built on top of' GAI such as ChatGPT and Claude. Using a blog, he reflected critically on his own role and biases and jointly with the coauthors in an iterative process to articulate principles for educational use of GAI. While student perspectives were considered in the context of classroom interactions and reflections, they were not the direct focus of this phase of the research. This study forms part of a broader research project, with targeted data collection from students currently underway. Alignment of the principles with the Australian Curriculum General Capabilities became evident, and they are used as a framework for discussing teacher practice.

Results and discussion

We present three principles for teachers as they engage with rapidly developing GAI:

- 1. Teach students how to use GAI tools
- 2. Teach to promote discernment and critical thinking
- 3. Teach for the whole human

These principles rest upon the premise that "generative AI systems work in conjunction with human learners to promote both cognitive and metacognitive aspects of learning" (Lodge et al., 2023, p. 6). They are platform agnostic that is to say, they are applicable regardless of the specific generative AI tool used in the classroom. They are not tied to any specific generative AI product or interface; whether teachers use ChatGPT, Gemini, Claude or Copilot, the same principles apply. Further the relevance of these principles across learning areas is underscored by their alignment with the Australian Curriculum's General Capabilities, which include critical and creative thinking, ethical understanding, and digital literacy. These capabilities are designed to be integrated across all subject disciplines, providing a unifying framework through which the principles can be enacted in diverse educational contexts.

Principle 1: Teach students how to use GAI tools

Teachers must explicitly teach students about GAI tools and how to use them ethically, consistent with the General Capabilities of 'digital literacy' and 'ethical understanding'. Rapid development of GAI makes it imperative for students to develop digital literacy skills to enable evolving patterns of use (ACARA, 2024a).

Students are confident users of some digital technologies but benefit from instruction on how to use them practically and ethically. When the lead author introduced GAI in his secondary History classes in February 2023, most students had limited awareness of OpenAI's release of ChatGPT. Some were excited by the potential of 'using AI', but few had experimented with GAI. In conversation, it became clear that these few often discovered GAI tools simultaneously with older 'early adopter' family members. Few, if any, could articulate strategies for effective use of GAI or had considered issues around 'hallucinations' and in-built biases within GAI or the broader ethical issues posed by GAI other than concerns about "cheating" and "plagiarism" as reported in the media. None had considered that they might be surrendering their own voice and agency through non-reflective adoption of GAI output. Thus, the need for students to gain a deeper understanding of how GAI works and their role as users emerged as a first step in teaching about GAI.

Digital Literacy

These experiences suggested that it is important for students to develop understanding of GAI and its limitations. Student experiences create opportunities for educators to foster a 'trust but verify' approach to GAI and to engage students in lateral reading for fact-checking (Wineburg & McGrew, 2019). Establishing the importance of verifying information generated by GAI is a vital step for digital literacy and ethical practice.

ACARA emphasizes that students' learning must "make the most of the digital technologies available to them" (ACARA, n.d.). Hence, teachers should provide opportunities to adapt "to new ways of doing things as technologies evolve" while helping students to "limit risks to themselves and others in a digital environment" (ACARA, n.d.). Thus it is important to encourage students to see themselves as directing GAI rather than as passive recipients of its product. Human users need a mindset that they are 'driving the chat' or 'bossing the bot' (Wall 2023). Students must see GAI as a tool, rather than a source of inherently reliable information.

'Bossing the bot' became the catchphrase of classes as the lead researcher trialed GAI. Thus, students were taught to recognize and exercise human agency, give primacy to their own voice, and see themselves 'in charge'. Given the power of GAI and its unfamiliarity, it was necessary to articulate that they were active participants in their interactions with the GAI.

Students were encouraged to 'put the chat in ChatGPT'. As a result of the lead author's iterative and reflexive professional practice, students were routinely encouraged to challenge any perceived errors or shortcomings in responses from GAI, consistent with best practices articulated by Mollick and Mollick (2023a). Students need to recognize that GAI affords an opportunity to enter an exchange with, and interrogation of, its responses.

The catchphrase, 'put the chat into ChatGPT', raises a further digital literacy consideration because the conversational nature of GAI may lead students to anthropomorphize their experience (Spatola et al., 2022). ACARA emphasizes the need to "limit [students'] risks to themselves and others in a digital environment" (ACARA, n.d.). Early literature about adolescents and GAI is noting that the anthropomorphizing effect poses a wellbeing risk for some students. For example, Nelson notes that GAI might encourage an "artificial intimacy" and possible emergent concerns that "children ascribe human characteristics to AI products ... and establish bonds that might surpass their human relationships" (Nelson, 2023). Such concerns reflect the findings of Müller et al., who indicated that "a felt decrease in distinctiveness between humans and machines would be the reason that participants feel a potential damage to their identity" (Müller et al., 2021, p. 691). While further research is required, educators must note that this first principle seeks to ensure students' understanding of GAI as inherently artificial. Early commentary by Nelson articulates the risk of anthropomorphism in blunt terms: Anthropomorphizing GAI "represents a significant problem, however, because the child may come to rely on AI and not learn to navigate complex human relationships" (Nelson, 2023). As Mollick and Mollick (2023a) point out, students may be well-served by teachers emphasizing that "AI is not a person, but it can act like one. It's very easy to read human intent into AI responses, but AI is not a real person responding to you".

Central to 'bossing the bot' is the development of prompts, a core skill in using GAI. The development and implementation of age-appropriate thinking routines to support prompt creation requires attention. This proved especially important for lower secondary students who developed prompts through a teacher mediated process of peer-to-peer collaboration. Collaborative prompt creation has been highly effective within the iterative practitioner research underpinning this paper. Hattie supports such observations noting that "when learning with technology, it is important for discussions to be emphasised and for each student to work with a peer to articulate, explain, and understand a variety of hypotheses and solutions" (Hattie, 2023, p. 397). These findings are applicable to using GAI within secondary classrooms.

While Cummings' and Mollick and Mollick's work on effective prompt writing addresses an older audience, their key ideas were helpful in supporting students to develop effective prompts for GAI (Cummings, 2023; Mollick & Mollick, 2023b). The lead author encourages novice students using GAI to, firstly, develop simple prompts directing the GAI *via* clear articulation of a persona, audience/purpose, and direction. This he describes as two I-statements and a Verb—'2 eyes and a vee'. He then directs students to engage with the GAI generated response through a chat described as "bossing the bot". Finally, students are called upon to "call out the BS" that may be generated by the tool (Wall, 2023).

Overall, in supporting students to develop as digitally literate users of GAI, the most effective strategies were found to be ensuring they understood the nature of GAI, the inherent need to verify the information produced, and strategies for prompting quality responses.

Ethical understanding

The 'ethical understanding' General Capability refers to "knowledge and skills students require to identify ethical concepts, understand different ethical perspectives and apply ethical thinking in response to issues" (ACARA, 2024b). A core purpose of Australian education is to ensure that students become "successful lifelong learners, and active and informed members of the community" (Australian Education Council, 2019). Hence, it is incumbent on teachers to offer students meaningful opportunities to examine and question the "structures of power" GAI serves (Crawford, 2021).

There are concerns around the ethics of GAI, ranging from environmental impacts to the ownership of information upon which GAI builds responses. Crawford points to a concerning blurring of boundaries between the private and the corporate, as well as the corporate and the state when it comes to the use of AI (Crawford, 2021). Crawford's concern about the emergence of a "surveillance armoury" - in which generative AI contributes to the mass collection, sorting, and deployment of metadata - raises important questions about how such technological systems consolidate power and shape civic life. Related to this is an immediate threat which directly connects to the lived experience of the lead author's students. The misuse of GAI to produce deepfake imagery, often targeting young women, presents a growing wellbeing concern in school contexts. Together, these examples underscore the ethical imperative for students to critically engage with how AI technologies are developed and deployed, and to consider their responsibilities in ensuring these tools are used to support, rather than undermine, human dignity. Hence, teachers need to be cognizant of the ethics surrounding the use of GAI and present opportunities for students to consider and develop the skills they need to cope with a "radical redrawing of civic life, where the centres of power are strengthened by tools that see with the logistics of capital, policing, and militarization" (Crawford, 2021, p. 223). According to ACARA, the development of ethical understandings "involves students building a strong personal and socially oriented" outlook and the "awareness of the influence that their values and behaviour have on others" (ACARA, 2024b). Therefore, development of ethical understandings is a core aspect of the first principle in educational use of GAI.

Student engagement with GAI creates opportunities to consider how AI replicates biases from its dataset. Studies have revealed that AI tends to replicate "politics of gender and race" that are "harmful" (Crawford, 2021, p. 144). As GAI replicates the potentially racist, sexist or otherwise discriminatory biases of its dataset, it tends to perpetuate unethical thinking and behavior: "dangerously reductive categorisations are widely used across many human-classifying training sets and have been part of the AI production pipelines for years" (Crawford, 2021, pp. 144–145).

Mollick and Mollick urge teachers to make "students responsible for getting the facts correct in their AI output" (Mollick and Mollick 2023a, p. 3) ACARA requires that teachers "include approaches that address the role of consequences on ethical actions; approaches that deal with issues of duty, justice and fairness; and approaches that focus on virtues in the ethical decision-making process" (ACARA, 2024b). An increasing body of research examines the need for student ethical considerations when using GAI to complete assessment to ensure they maintain academic integrity. The lead author's experiences suggest that teachers should encourage students to document interactions with GAI, keeping track of information received and any fact-checking processes.

Teachers should develop classroom cultures of transparency, trust, and collaboration around the use of GAI, encouraging a culture that prizes a student voice reflecting the growth of the "strong personal and socially oriented ethical outlook" emphasized in ACARA's General Capabilities. Paterson and Gavrin argue that:

Student voice is a critical component of democratic approaches in schools... Effective student voice grows students' responsibility for their learning... An emphasis on critical thinking and more independent, informed decision-making for students better equips young people to engage thoughtfully and actively in democracy as adults. (Paterson et al. 2022, p.106)

Building a culture of student voice when using GAI is about empowering students to co-create their learning. Evidence gathered while developing this paper indicates that using GAI with the intention of enhancing student voice can benefit students by increasing their engagement, motivation, confidence, and sense of belonging. Students can and will make mistakes as they learn to use GAI. School cultures of transparency which prize student voice will help in that journey.

As the lead author's reflections on his 'year with GAI' made evident, students need to be explicitly taught to use

GAI successfully. This involves not only developing their digital literacy in understanding how GAI works and strategies for maintaining agency and voice through 'bossing the bot' and verifying responses through lateral reading (Wineburg & McGrew, 2019), but also creation of a school culture which values ethical conduct, in selecting and using digital tools, and ensuring appropriate use, particularly when assessment modes have been slower to adapt.

Principle 2: Teach to promote discernment and critical thinking

Proliferation of misinformation is a major challenge in our information-saturated world (Chesney & Citron, 2018). Publication, in print or online, is no longer a marker of accuracy or veracity.

Generative AI programs like ChatGPT don't have a clear sense of the boundary between fact and fiction. They're also prone to making things up as they try to satisfy human users' inquiries... Misinformation can flow into AI models as well as from them. (Gold & Fischer, 2023)

Thus, students, as future citizens, need skills to locate and critically evaluate the quality of information and the ability to represent their understandings creatively (Wineburg, 2018). Hattie believes the technological revolution will bear greatest fruit when teachers see "technology as an aid to teaching for enhanced knowledge production" (Hattie, 2023, p. 394). Therefore, the second principle is to use GAI to foster students' critical and creative thinking as discerning consumers and creators of information.

Critical and creative thinking

The General Capability of Critical and Creative Thinking includes four interrelated elements: inquiring, generating, analyzing, and reflecting (ACARA, 2024b). Research hints that GAI may be more useful creatively than many users appreciate. One study, "found no qualitative difference between AI and human-generated creativity, although there are differences in how ideas are generated" (Haase & Hanel, 2023, p. 1). Haase and Hanel point out that "exposure to other people's creative ideas can stimulate cognitive activity and enhance creativity" (Haase & Hanel, 2023, p. 10). They argue that "anecdotal evidence" indicates the possibility of generating creative output in combination with GAI. They point to potential for GAI to "properly support human (creative) work" but argue that ethical issues must be front of mind and that critical thinking must be employed:

We recommend avoiding viewing GAI chatbots as omnipotent tools that may replace human performance. Instead, they can be valuable assistants in reviewing thoughts and ideas. The extensive knowledge base they build upon can be very useful in expanding one's ideas. The more our (working) lives are automated, and the more authority automation acquires, the more important the human role with its creative abilities becomes (Haase & Hanel, 2023, p. 10).

Perhaps it is Bowen and Watson (Bowen, 2024) who offer the most insight balanced insight into the impacts that GAI may have on creativity. While there are many voices that explore the disruption and/or threat generative AI poses to human creativity in different contexts (De Cremer et al., 2023; Salim & Khan, 2024; Shackell, 2023), Bowen and Watson anticipate that there may be a "shift in the skills we used to associate with 'creativity'''(2024, p. 76).

Creation of effective prompts for GAI is an example of enhancing students' creative thinking, but research is suggestive of more. Burridge and Buchanan note that students need support to build the "critical thinking skills, creativity and resilience" required to meet "the challenges they will face in the decades to come" (Burridge & Buchanan, 2022, p. 83). Bowen and Watson (2024, pp. 62-77), citing numerous papers, acknowledge that while AI tools can enhance creativity by offering diverse perspectives and breaking conventional thought patterns, there is a risk that students might become overly reliant on AI-generated content, potentially diminishing their own creative efforts. They therefore emphasize the importance of educators guiding students to use AI as a collaborative partner rather than a substitute for original thinking, ensuring that human creativity remains central in the learning process.

Traditionally, peers or teachers have been this helper, but similarly, AI is becoming a new, powerful partner... AI can help humans clarify their thoughts, explore new ideas, increase divergent thinking, and perhaps even become more creative. The potential for more creative humans and better thinking is the promise of this new partnership: it is in the iteration, the reflection, the backand forth, and the refined questions that thinking and creativity happen. It is the job of educators to help students become better thinkers. Our new job is to help them become even better thinkers with AI. (Bowen & Watson, 2024, p. 77)

GAI is best viewed as requiring steering by humans. It responds to the critical thinking, discerning decisions, and creative inputs and prompts of the user. The teacher's function is to develop students' capacities for exercising these skills. For every GAI output students must discern the efficacy of their prompts and create subsequent interactions. Students are involved in a reflexive interplay of creation, reflection, discernment, and generation that develops "inquisitiveness [and] intellectual flexibility" (ACARA, 2024b).

Another approach to fostering critical thinking is engaging students as 'fact-checkers'. GAI is not a 'research engine' but school-aged users tend to use it as one. A useful 'fact-checking' routine for students' exchanges with GAI entails a pattern of discernment, reflection, responsiveness, and repetition. Calls for teaching to promote fact-checking and questioning as routine teaching processes are not new. Postman and Weingartner's call for developing student "crap detection" skills in 1969 are one early articulation of these concepts (Postman & Weingartner, 1971, p. 218). They emphasized a "questing-questioning, meaning-making process that can be called 'learning how to learn", well-suited to developing critical thinking and discernment in students. Their ideas provided a base from which the lead author worked when engaging students with GAI:

'Learning how to learn' [provides] a posture of stability from which to deal fruitfully with change. The purpose is to help all students develop built-in, shockproof crap detectors as basic equipment in their survival kits. (Postman & Weingartner, 1971, p. 218)

Figure 1 models a 'crap detection' routine used during classroom research. Students are taught to critically reflect and discerningly engage at each step of their inquiry, entering a 'back and forth' exchange with the GAI. They 'put the chat into the ChatGPT' which acted as one-on-one tutor and was interrogated by students. Students were encouraged to not necessarily accept the first GAI response. Critical reflection and information verification using lateral reading was encouraged at every stage.

This routine promotes critical thinking and development of research skills, vital to history study. The lateral reading processes developed by Wineburg and McGrew (2019) can be adapted for teaching students how to fact-check AI-generated information. Lateral reading is a "strategy for investigating who's behind an unfamiliar online source by leaving the webpage and opening a new browser tab to see what trusted websites say about the unknown source" (Stanford History Education Group, n.d.). This fact-checking approach proved valuable and aligns with the work of Mollick and Mollick (2023a) who emphasize that requiring US college students to fact-check and interrogate sources challenged them to remain the "human in the loop". They argue that:

[N]ot only are students responsible for their own work but they should actively oversee the AIs output, check with reliable sources, and complement any AI output with their unique perspectives and insights. Our aim is to encourage students to critically assess and interrogate AI outputs, rather than passively accept them. This approach helps to sharpen their skills while having the AI serve as a supportive tool for their work, not a replacement. (Mollick & Mollick, 2023a, p. 3)

When using GAI in secondary schools, it is important to encourage students to periodically 'leave' the GAI and cross-check GAI sourced information *via* triangulation using other trusted sources. Lateral reading is explored at length in Wineburg and McGrew (2019) and Kozyreva et al. (2023). These approaches can be adapted to encourage students to critique online information provided by GAI and call out errant, biased, or misleading outputs. In this manner, using GAI is structured into a teaching and learning process promoting student voice, discernment, and critical thinking; a



Figure 1. A Fact-Checking Routine for students using GAI in research.

process that "promotes active engagement with, rather than passive acquisition" of content (Kelly, 2013, p. 12).

The routine outlined in Figure 1 cements important aspects of using GAI to support development of students' critical and creative thinking skills. It aligns with the 'traditional' inquiry cycle of disciplinary history, and with other areas using an inquiry approach (such as the sciences). The creation and iteration of research questions and the verification of sources are core steps in historical (and scientific) inquiry and as Figure 1 suggests, GAI can be used to develop questions and test initial hypotheses and sources. Students can build upon these exchanges through lateral reading and the use of non-AI information sources, both on- and off-line. Thus, Principle 2 can be seen as the logical outcome of the focus of Principle 1 on developing students as active and ethical users of GAI who think critically in their engagement with the tool and its responses.

Principle 3: Teach for the whole human

Article 26 of the Universal Declaration of Human Rights emphasizes "full development of the human personality" as a global educational goal (United Nations, 1948). This view has been supported in a range of literature including Seery who points out that:

Education has long been associated with the project of the formation of individuals or 'self'. The production or development of stable dispositions of character and action is of obvious personal, social and political importance, and education is an important public arena and instrument, through cultural interaction and linguistic shaping, in the realisation of this project. In this important reading of the term, education is a change process by which 'self' and identity are realised. (Seery, 2010, p. 63)

Australia's national curriculum explicitly aims to help "all young Australians become confident and creative individuals, successful lifelong learners, and active and informed members of the community" (Australian Education Council, 2019). Discussions of GAI use with students must be grounded in such goals and conscious of the attributes of "the kinds of people we will need to deal effectively with a future full of drastic change" (Postman & Weingartner, 1971, p. 218). In another time of rapid change, Postman and Weingartner called for a "new education" directed to the fullness of humanity. Their manifesto for change has resonance today:

[We need to develop students with an] actively inquiring, flexible, creative, innovative, tolerant, liberal personality who can face uncertainty and ambiguity without disorientation, who can formulate viable new meanings to meet changes in the environment which threaten individual and mutual survival. (Postman & Weingartner, 1971, p. 218)

Such views are supported by Poquet and De Laat who emphasize that AI is changing the "context of learning" to such a degree that notions of lifelong learning must be revisited in ways that even consider aspects of human development such as "self-fulfilment" and "mindful" approaches to learning (Poquet & De Laat, 2021, p. 1703). They posit that:

The advancement of artificial intelligence (AI) and its integration into everyday technologies influences how people are exposed to information, interact, learn and make decisions. We argue that technology, data and evolving AI applications affect how humans enact and experience life and work, changing the context for learning... [T]he current notion of lifelong learning needs a revisit to embrace technology at its foundation. To bring freely chosen goals and ownership in one's learning to the fore, in the context of the coming AI age, we argue for the telos of learning to shift from human capital to human development, with the spotlight on capabilities. (Poquet & De Laat, 2021, p. 1695)

The Australian Curriculum's General Capabilities encapsulate these goals. While critical and creative thinking, digital literacy, and ethical understanding are addressed in the first two principles above, the third principle explores how GAI can develop personal and social capability and intercultural understanding (ACARA, 2024b, 2024c).

Personal and social capability

It is vital to preface discussion of personal and social capability by recalling that the A in GAI is for 'Artificial'. As GAI becomes ubiquitous, humanity must remain at the heart of teaching. While GAI may allow a human-like veneer to interactions with information, the humanity of students is core to education. The novelty of GAI should not distract from an established goal of education—the development of the human personal and social capability.

Personal and Social capability provides a foundation for students to understand themselves and others, and navigate their relationships, lives, work and learning. Students with well-developed social and emotional skills find it easier to manage themselves, relate to others, collaborate, develop empathy, set goals and resolve conflict. They feel positive about themselves and the world around them. ... This ability assists students to effectively engage with new ways of thinking, knowing and doing in an increasingly demanding and diverse global society (ACARA, 2024d).

Engagement with technology is often, but not necessarily, solitary. Hattie emphasizes the "critical importance of developing skills to work in and contribute to groups" and provides evidence supporting his claim that "when learning using technology, it is important for discussions to be emphasised and for each student to work with a peer to articulate, explain and understand" (Hattie et al. 2023, pp. 382, 397). Classroom experience indicates that students can work collaboratively to develop and use GAI prompts, fact-check responses, and evaluate sources. It is incumbent on teachers to create opportunities for students to find and share their voice and develop personal and social capabilities while working with GAI.

Students need teachers to lead in a world where GAI is likely be significant. Teachers can create opportunities for students to examine the findings of AI, express their own insights, and connect their experiences with their wider world. Far from dehumanizing, GAI offers opportunities for history teachers to foster enriched collaborative, inclusive learning environments. Developing the personal and social capabilities of students is much more important than mastering one aspect of technology. Teachers must teach for the development of the "full human". By ensuring students are digitally literate, thinking ethically and critically, and sharing ideas through collaboration and connection with their peers, we can leverage the 'artificial' of GAI to promote students' personal and social growth.

Intercultural understanding

ACARA defines this capability as encompassing "the behaviours and dispositions that students need to understand what happens and what to do when cultures intersect" (ACARA, 2024d), arguing that this capability focuses on the development of empathy, sensitivity, respect for diversity, inclusivity, and an awareness of perspective-taking within themselves and by others (ACARA, 2024d). This paper contends that GAI can play a role in developing this understanding. As Suleyman and Bhaskar (2023, p. 70) point out, existing artificial intelligence models "clearly have the potential to be as toxic as they are powerful", but exposure of this 'toxicity' can work to broaden students' intercultural understandings and empathy, both through explicit teaching and ongoing improvements in the technology itself:

Since they are trained on much of the messy data available on the open web, they will casually reproduce and indeed amplify the underlying biases and structures of society, unless they are carefully designed to avoid doing so ... But the positive news is that many of these issues are being improved with larger and more powerful models (Suleyman & Bhaskar, 2023, p. 70).

Using the chat-like functionality of GAI creates possibilities for students to reflect upon the relationships between cultures and identities, examine cultural perspectives and world views, and explore the influence of cultures on interpersonal interactions. Because much of the information upon which GAI models draw comes "from unvetted sources and lacks conventional indicators of trustworthiness", student GAI use must be intentional, critical and ethical (Kozyreva et al., 2023, p. 81).

The classroom research for this paper directed GAI to assume roles of diverse historical characters reflecting diverse experiences and cultures that students would not have otherwise engaged with. In another experience, students used a prompt engaging a simulated 'choose your own adventure' experience which positioned students safely and ethically into culturally unfamiliar roles. Such activities allowed for exploration of perspectives and development of empathy. Both activities were supplemented by technology-free learning experiences such as yarning circles (New South Wales Department of Education, n.d.), that required students to "discuss their own cultural identities and draw connections with those of others," to "consider representation and acknowledge that multiple perspectives exist for any given issue," and to "reflect on their thoughts and feelings when taking on a range of perspectives" (ACARA, 2024d). GAI allowed for creation of representations of cultures of the past, while providing opportunities to consider and critique these representations.

As Bedford and Kerby (2024) argue, exposing students to diverse historical perspectives - including those that disrupt dominant or monocultural narratives - can foster pluralistic thinking and strengthen democratic dispositions. society saturated with fake news and online echo chambers which amplify misinformation. Ensuring students can not only locate a range of perspectives, but evaluate their reliability is a curriculum expectation. (Bedford & Kerby, 2024, p. 470)

This aligns with ACARA's emphasis on students learning to "empathise with others and appreciate diverse perspectives" as part of developing intercultural understanding (ACARA, 2024b). In classroom practice, students used GAI to generate alternative viewpoints on contested historical events, prompting critical conversations about bias, voice, and historical interpretation - discussions that helped them move beyond surface-level representations and engage with cultural complexity.

This third principle focuses on the development of the student's own social capacity, while offering opportunities for them to reflect, with teacher support, upon the often-problematic constructions of non-dominant cultures offered by GAI tools. Thus, students' understandings of other cultures are broadened, and these representations can be discussed critically and empathetically.

Implications/recommendations, limitations, future research

GAI is not an end in itself but is an important addition to the tools available to teachers. When employed intentionally and reflectively within established subject-specific pedagogies, GAI has potential to help students to grow as active and ethical citizens.

This paper, based upon the lead author's own professional practice informed by an emerging body of academic and practitioner literature, is offered as a contribution to conversations about pedagogical applications of GAI.

Ongoing research is needed into pedagogical applications of GAI for different learning areas and purposes and into how students' use GAI affects their general capabilities.

Conclusion

This paper has explored the use of GAI in education, with a focus on the lead author's experiences in a secondary history classroom. It has proposed three practice-principles for the use of GAI in education:

- 1. Teach students how to use GAI tools by developing digital literacy, ethical use, and active prompting techniques;
- 2. Teach to promote discernment and critical thinking by embedding routines for fact-checking, lateral reading, and iterative inquiry; and
- 3. Teach for the whole human by aligning GAI use with broader educational goals such as empathy, collaboration, intercultural understanding, and student voice.

Each principle draws from the affordances and limitations of GAI, and from the lived reality of its use in the classroom. Together, they represent a values-based pedagogical

The relationship between historical thinking and the skills of effective democratic citizens is a vital one, particularly within a

response to this powerful and disruptive emerging technology. While the implementation of GAI in education is complex and evolving, applying these principles enables teachers to support students' learning in ways that align with the Australian Curriculum General Capabilities - helping students grow not just as learners, but as thoughtful, ethical, and capable citizens.

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References

- ACARA. (2024a). *Digital Literacy*. Australian Curriculum and Reporting Authority. https://v9.australiancurriculum.edu.au/teacher-resources/ understand-this-general-capability/digital-literacy
- ACARA. (2024b). *General Capabilities*. Australian Curriculum and Reporting Authority. https://v9.australiancurriculum.edu.au/f-10-curriculum/f-10-curriculum-overview/general-capabilities
- ACARA. (2024c). Intercultural Understanding. Australian Curriculum and Reporting Authority. https://v9.australiancurriculum.edu.au/f-10curriculum.html/general-capabilities/intercultural-understanding
- ACARA. (2024d). Personal and Social capability. Australian Curriculum and Reporting Authority. https://v9.australiancurriculum.edu.au/f-10curriculum.html/general-capabilities/personal-and-social-capability
- ACARA. (n.d.). Information and Communication Technology (ICT) Capability (Version 8.4). Australian Curriculum and Reporting Authority. https:// www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/ information-and-communication-technology-ict-capability/
- Australian Education Council. (2019). Alice Springs (Mparntwe) Education Declaration (978-1-76051-882-0). https://www.dese.gov.au/download/4816/ alice-springs-mparntwe-education-declaration/7180/document/pdf
- Bain, J. D., Ballantyne, R., Packer, J., & Mills, C. (1999). Using journal writing to enhance student teachers' reflectivity during field experience placements. *Teachers and Teaching*, 5(1), 51–73. https://doi. org/10.1080/1354060990050104
- Bauschard, S. (2023). Massive Disruption Now: What AI Means for Students, Educators, Administrators and Accreditation Boards. https:// stefanbauschard.substack.com/p/massive-disruption-now-what-ai-means
- Bedford, A., & Kerby, M. (2024). Australia's National(Ist) History Curriculum: History education as a site of attempted de-democratisation. *Curriculum Perspectives*, 44(4), 463–474. https:// doi.org/10.1007/s41297-024-00248-9
- Bloom, B. S. (1984). The 2 Sigma Problem: The search for methods of group instruction as effective as one-to-one tutoring. *Educational Researcher*, 13(6), 4–16. https://doi.org/10.3102/0013189X013006004
- Bowen, J. A., & Watson, C. E. (2024). Teaching with AI: A practical guide to a new era of human learning. Johns Hopkins University Press.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. https://doi.org/10. 1191/1478088706qp0630a
- Burridge, N., & Buchanan, J. (2022). Teachers as changemakers in an age of uncertainty. In K. Heggart & S. Kolber (Eds.), *Empowering teachers* and democratising schooling: Perspectives from Australia (pp. 81–100). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-4464-2_6
- Bursaw, J., Kimber, M., Mercer, L., & Carrington, S. (2015). Teaching reflection for service-learning. In M. E. Ryan (Ed.), *Teaching reflec*tive learning in higher education: A systematic approach using

pedagogic patterns (pp. 153-169). Springer International Publishing. https://doi.org/10.1007/978-3-319-09271-3_11

- Cailey, R. (2023). Prompt engineering: Cultivating curiosity in the age of AI. eSchool News. https://www.eschoolnews.com/digital-learning/2023/06/ 22/prompt-engineering-cultivating-curiosity-ai/
- Carrington, S., & Kimber, M. (2017). International service-learning: Preparing teachers for inclusion. In *Service-learning* (Vol. 12, pp. 21–37). Emerald Publishing Limited. https://doi.org/10.1108/S1479-363620170000012002
- Carrington, S., & Selva, G. (2010). Critical social theory and transformative learning: Evidence in pre-service teachers' service-learning reflection logs. *Higher Education Research & Development*, 29(1), 45–57. https://doi.org/10.1080/07294360903421384
- Chesney, R., & Citron, D. K. (2018). Disinformation on Steroids. Council on Foreign Relations. https://www.cfr.org/report/deep-fakedisinformation-steroids
- Chow, A. R. (2023). How ChatGPT Managed to Grow Faster Than TikTok or Instagram. *Time Magazine*. https://time.com/6253615/ chatgpt-fastest-growing/
- Crawford, K. (2021). Atlas of AI: Power, politics, and the planetary costs of artificial intelligence. Yale University Press.
- Creswell, J. W. (2008). Research design: Qualitative, quantitative, and mixed methods approaches. 2nd ed., [Nachdr.] Sage Publ.
- Cummings, L. (2023). Why AI Whispering is a Myth. *Cyborgs Writing*. https://www.isophist.com/p/the-anatomy-of-a-prompt
- De Cremer, D., Bianzino, N. M., & Falk, B. (2023). AI and machine learning: How generative AI could disrupt creative work. *Harvard Business Review* (blog), April 12 https://hbr.org/2023/04/how-generativ e-ai-could-disrupt-creative-work
- DeLuca, C., Willis, J., Dorji, K., & Sherman, A. (2023). Cultivating reflective teachers: Challenging power and promoting pedagogy of self-assessment in Australian, Bhutanese, and Canadian teacher education programs. *Power and Education*, 15(1), 5–22. https://doi. org/10.1177/17577438221108240
- Evans, J. (2023). Universities say AI cheats can't be beaten, moving away from attempts to block AI. Australian Broadcasting Corporation. https://www.abc.net.au/news/2023-07-28/university-ai-cheats-won t-be-stopped-move-away-from-bans/102655608
- Furze, L. (2023a). AI Principles to Practical Strategies: How Schools Can Apply the National AI Framework. https://leonfurze.com/2023/08/07/ ai-principles-to-practical-strategies-how-schools-can-apply-thenational-ai-framework/
- Furze, L. (2023b). Artificial Intelligence Policy in Secondary Schools. https://leonfurze.com/2023/02/23/artificial-intelligence-policy-insecondary-schools/
- Gold, A., & Fischer, S. (2023). Chatbots trigger next misinformation nightmare. Axios – Technology. https://www.axios.com/2023/02/21/ chatbots-misinformation-nightmare-chatgpt-ai
- Haase, J., & Hanel, P. H. P. (2023). Artificial muses: Generative artificial intelligence chatbots have risen to human-level creativity. *Journal of Creativity*, 33(3), 100066. https://doi.org/10.1016/j.yjoc.2023.100066
- Hattie, J. (2023). Visible learning: The Sequel A Synthesis of Over 2,100 Meta-Analyses Relating to Achievement. Routledge.
- Hattie, J., William, D., & Hamilton, A. (2023). The promise and peril of AI: Will machines make us more or less human? *The Educator*. https://www.theeducatoronline.com/k12/news/the-promise-and-peri l-of-ai-will-machines-make-us-more-or-less-human/283150
- Hill, P., & Barber, M. (2014). Preparing for a renaissance in assessment. Pearson.
- Hu, X., Xu, S., Tong, R., & Graesser, A. (2025). Generative AI in education: From foundational insights to the Socratic playground for learning. arXiv. https://arxiv.org/html/2501.06682v1
- ISTE. (2024). Artificial Intelligence in Education. International Society for Technology in Education. https://iste.org/ai
- Kee, K., & Graham, S. (2014). Teaching history in an age of pervasive computing: The case for games in the high school and undergraduate classroom. In K. Kee (Ed.), *Pastplay: Teaching and learning history with technology* (pp. 270–291). University of Michigan Press. https://doi.org/10.2307/ j.ctv65swr0.17
- Kelly, T. M. (2013). *Teaching history in the digital age*. University of Michigan Press.

- Kozyreva, A., Wineburg, S., Lewandowsky, S., & Hertwig, R. (2023). Critical ignoring as a core competence for digital citizens. *Current Directions in Psychological Science*, 32(1), 81–88. https://doi.org/10.1177/0963721422 1121570
- Levesque, S. (2014). Why can't you just tell us?" Learning Canadian History with the Virtual Historian. In K. Kee (Ed.), *Pastplay: Teaching and learning history with technology* (pp. 43–65). University of Michigan Press.
- Lodge, J. M., Yang, S., Furze, L., & Dawson, P. (2023). It's not like a calculator, so what is the relationship between learners and generative artificial intelligence? *Learning: Research and Practice*, 9(2), 117– 124. https://doi.org/10.1080/23735082.2023.2261106
- Lucey, T. A., & Meyer, B. B. (2013). Does social studies teaching uphold the citizenship values to which students should aspire? Survey findings from one state. Action in Teacher Education, 35(5-6), 462– 474. https://doi.org/10.1080/01626620.2013.846764
- Luckin, R. (2023). Yes, AI could profoundly disrupt education. But maybe that's not a bad thing. *The Guardian*. https://www.theguardian. com/commentisfree/2023/jul/14/ai-artificial-intelligen ce-disrupt-education-creativity-critical-thinking
- Mezirow, J. (2000). Learning as transformation: Critical perspectives on a theory in progress. Jossey-Bass.
- Mezirow, J. (2003). Transformative learning as discourse. Journal of Transformative Education, 1(1), 58–63. https://doi.org/10.1177/1541344 603252172
- Mezirow, J., & Marsick, V. (1978). Education for perspective transformation. Women's re-entry programs in community colleges. Columbia University Press.
- Miao, F., Holmes, W., Huang, R., & Zhang, H. (2021). AI and education: Guidance for policy-makers. UNESCO. https://doi.org/10.54675/ PCSP7350
- Miao, F., & Holmes, W. (2023). Guidance for generative AI in education and research. UNESCO. https://doi.org/10.54675/EWZM9535
- Mollick, E. (2022). How to... use AI to teach some of the hardest skills. *One Useful Thing*. https://www.oneusefulthing.org/p/how-to-use-ai-to-teach-some-of-the
- Mollick, E., & Mollick, L. (2023a). Assigning AI: Seven approaches for students, with prompts. The Wharton School Research Paper. https:// doi.org/10.2139/ssrn.4475995
- Mollick, E., & Mollick, L. (2023b). Part 2: AI as Personal Tutor. https:// hbsp.harvard.edu/inspiring-minds/ai-as-personal-tutor
- Mollick, E., & Mollick, L. (2023c). Student Use Cases for AI. https:// hbsp.harvard.edu/inspiring-minds/student-use-cases-for-ai
- Müller, B. C. N., Gao, X., Nijssen, S. R. R., & Damen, T. G. E. (2021). I, Robot: How human appearance and mind attribution relate to the perceived danger of robots. *International Journal of Social Robotics*, 13(4), 691–701. https://doi.org/10.1007/s12369-020-00663-8
- Nelson, J. (2023). How does AI affect kids? Psychologists weigh In. Emerge. https://decrypt.co/151434/ai-effects-on-kids-children
- New South Wales Department of Education. (n.d.). 8 Ways Creative and Productive Pedagogy Activities. https://www.8ways.online/8-way s-creative-and-productive-pedagogy-activities
- Nguyen, A., Ngo, H. N., Hong, Y., Dang, B., & Nguyen, B.-P. T. (2023). Ethical principles for artificial intelligence in education. *Education* and Information Technologies, 28(4), 4221–4241. https://doi. org/10.1007/s10639-022-11316-w
- Paterson, C., & Gavrin, M. (2022). Teaching for democracy. In K. Heggart & S. Kolber (Eds.), *Empowering teachers and democratising* schooling: Perspectives from Australia (pp. 101–110). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-4464-2_7

- Poquet, O., & De Laat, M. (2021). Developing capabilities: Lifelong learning in the age of AI. British Journal of Educational Technology, 52(4), 1695–1708. https://doi.org/10.1111/bjet.13123
- Postman, N., & Weingartner, C. (1971). Teaching as a subversive activity. Penguin Education.
- Salim, H., & Khan, R. (2024). Is AI the death of creativity or a blessing?: Exploring its influence on human creativity and health systems. In M. A. Qidwai (Ed.), Advances in Healthcare Information Systems and Administration (pp. 147–170). IGI Global. https://doi. org/10.4018/979-8-3693-7051-3.ch006
- Schön, D. (1983). The Reflective Practitioner: How professionals think in action. Routledge.
- Seery, A. (2010). Education, the Formation of Self and the World of Web 2.0. London Review of Education, 8(1), 79. https://doi. org/10.1080/14748460903557779
- Shackell, C. (2023). "Will AI Kill Our Creativity? It Could." The Conversation (blog), September 28 https://www.qut.edu.au/news/ realfocus/will-ai-kill-our-creativity
- Shah, M. A. (2022). Teachers as reflective practitioners: from individualism to vygotskian social constructivism. *Alberta Journal of Educational Research*, 68(3), 297–307. https://doi.org/10.11575/ajer.v68i3.68598
- Smith, P. (2023). Schools and business embrace AI, but do we know what they're doing? *Financial Review*. https://www.afr.com/ technology/schools-and-business-embrace-ai-but-do-we-know -what-we-re-doing-20230906-p5e2du
- Spatola, N., Marchesi, S., & Wykowska, A. (2022). Different models of anthropomorphism across cultures and ontological limits in current frameworks the integrative framework of anthropomorphism. *Frontiers in Robotics and AI*, 9, 863319. https://www.frontiersin.org/ journals/robotics-and-ai/articles/10.3389/frobt.2022.863319 https:// doi.org/10.3389/frobt.2022.863319
- Stahl, B. C. (2025). Locating the Ethics of ChatGPT Ethical issues as affordances in AI ecosystems. *Information*, 16(2), 104. https://doi. org/10.3390/info16020104
- Stanford History Education Group.). (n.d.). *Intro to lateral reading*. Civic Online Reasoning. https://cor.inquirygroup.org/curriculum/ lessons/intro-to-lateral-reading/
- Suleyman, M., & Bhaskar, M. (2023). The Coming Wave: AI, power and the twenty-first century's greatest dilemma. Penguin Random House.
- Toppo, G. (2023). National ChatGPT Survey: Teachers Accepting AI Into Classrooms & Workflow—Even More Than Students. *The74*. https://www.the74million.org/article/national-chatgpt-survey-teacher s-accepting-ai-into-classrooms-workflow-even-more-than-students/
- United Nations. (1948). Universal Declaration of Human Rights. https:// www.un.org/en/about-us/universal-declaration-of-human-rights
- Wall, V. (2023). My Historybuddy and I: Reflections of an early adopter er of AI for teaching history. *Teaching History* 57(3), 35–38. https:// search.informit.org/doi/10.3316/informit.323121633805888
- Wieck, L. P. (2023). Revising Historical Writing Using Generative AI: An editorial experiment. *Perspectives on History*. https://www. historians.org/perspectives-article/revising-historical-writing-using-ge nerative-ai-an-editorial-experiment-august-2023/
- Wineburg, S. (2018). Why Learn History (When It's Already on Your Phone). University of Chicago Press.
- Wineburg, S., & McGrew, S. (2019). Lateral reading and the nature of expertise: Reading less and learning more when evaluating digital information. *Teachers College Record: The Voice of Scholarship in Education*, 121(11), 1–40. https://doi.org/10.1177/016146811912101102
- Wyatt-Smith, C., Lingard, B., & Heck, E. (2021). Digital disruption in teaching and testing: Assessments, big data, and the transformation of schooling. Routledge.