



“Can we just Please slow it all Down?” School Leaders Take on ChatGPT

Jim Dunnigan¹ · Danah Henriksen¹ · Punya Mishra¹ · Robin Lake²

Accepted: 13 October 2023

© Association for Educational Communications & Technology 2023

Keywords Creativity · Schools · Learning technology · Education · Artificial intelligence · ChatGPT · School leadership · Generative AI

“Alice: Would you tell me, Please

Which way I ought to go from here?

The Cheshire Cat: That depends a good deal on where you want to get to.

Alice: I don't much care where.

The Cheshire Cat: Then it doesn't much matter which way you go.

Alice: ...So long as I get somewhere.

The Cheshire Cat: Oh

You're sure to do that

If only you walk long enough.”

~ Lewis Carroll in *Through the Looking Glass*

“I feel strongly that we need to have some strategy

Some intention

As it relates to teaching and learning.”

~ School Leader

“I think it opens possibilities for better differentiation and better teaching and I'm super curious about how we can leverage it in that direction.”

~ School Leader

Introduction

The intersection of creativity and technology is an ever-evolving landscape. Its shifting ground is further shaken when technologies with dramatically new capabilities emerge suddenly, as with the widespread availability of generative AI via ChatGPT last year. Although AI may expand the possibilities for new forms of creativity—it also creates, for schools, a tangle of complications and uncertainties, raising questions and possibly undermining conventional approaches or beliefs about learning, teaching, writing, thinking, curriculum development and schooling. Yet, we cannot ignore such technologies, nor can we wish them away. History shows us that powerful technological capabilities like generative AI do not disappear just because they complicate our existing structures and understandings. These conversations are not unlike prior educational technology concerns, such as fears about the use of calculators in math class or the advent of Wikipedia as being detrimental to student learning. With time though, educational systems responded to these technological advancements—finding ways to incorporate them in the lived experiences of students and teachers. Generative AI technologies, however, have the potential to be disruptive in ways no technology has ever been before (Mishra et al., 2023). Further, the rapid pace of advancement of this technology (with the release of new versions and new capabilities) and the supercharged nature of its spread (over 100 million users in less than three months), create further complications for educational organizations and systems still recovering from a global pandemic.

Over the past few years, this column series has focused on interviews with creativity scholars, with our most recent 2023 issues highlighting experts on creativity and generative AI in education (Henriksen et al., 2023). In this article, we shift to consider educational leaders who are trying to understand how generative AI, and Chat GPT specifically, impacts their schools and districts, and how they are responding to

✉ Danah Henriksen
danah.henriksen@asu.edu

Jim Dunnigan
james.dunnigan@asu.edu

Punya Mishra
punya.mishra@asu.edu

Robin Lake
robin.lake@asu.edu

¹ Mary Lou Fulton Teachers College, Arizona State University, Tempe, AZ, USA

² Center for the Reinvention of Public Education, Mary Lou Fulton Teachers College, Arizona State University, Tempe, AZ, USA

its challenges. In other words, how are educational leaders thinking about teaching and learning in an era where the technologies at hand can produce vast quantities of text information (and other media) with a simple prompt? We seek to answer this question by exploring the perspectives of a group of educational leaders, based on focus group data collected by a team from the Center for Reinventing Public Education (CRPE) and the Mary Lou Fulton Teachers College, at Arizona State University.

It is important to be aware of the perspectives of educational leaders (e.g., school or district leaders), both collectively and individually, if we are to understand the impact of real-world phenomena on schools (Grissom et al., 2021). No one is more aware of what is actually happening ‘on the ground’ in schools, classrooms and communities than those tasked with leading them. Superintendents and principals are at the forefront of designing, managing, and leading the settings that teachers and students work within. They are tasked with making decisions, choosing, and highlighting priorities, setting policy, solving problems, and creating the vision, direction, mission, and approach of education organizations (Leithwood et al., 2020). They interact with all the stakeholders in a school system (students, teachers, parents, community members, staff, etc.) and must consider different viewpoints on a complex array of issues (Day et al., 2020). We believe that their views on generative AI can help us understand its current reception in school systems, including the opportunities and challenges these new technologies present.

To gauge how school leaders are adapting to generative AI, we conducted two focus groups with education leaders, broadly around the incursion of ChatGPT into the education landscape. These focus groups, though not representative of all school leaders, did provide a snapshot of the current thinking on generative AI and its role in K12 education. The first focus group was composed of superintendents and school leaders from six school districts (over sixty schools) in Michigan, while the second focus groups included heads of schools from the Pacific Northwest representing four states and seven schools. In each case, we followed a loose script, structuring our conversations around topics concerning school policy around generative AI, the present use of AI in schools, the role (if any) of various stakeholders, planned teacher development initiatives, and visions for how generative AI might change teaching and learning (for better or for worse). Also, given the rapid rate of adoption and use of these technologies, and the pace at which they are evolving, these conversations capture a particular moment in time—a moment rife with ambiguity, potential and risk.

These leaders provided insightful responses, perceptions and insights that reveal certain challenges of new technological adaptation into a well-defined existing system. Our conversations covered themes such as: the need for more

direction about how to use AI tools, acceptable use policies, a lack of urgency to train teachers, and the problems of equity and access.

Generative AI Doesn’t Come with a User Manual

One of our first questions focused on how these leaders understood this technology. The responses indicated a lack of clarity on this issue. This is not surprising, given the newness of these tools. Educational technologies are often driven by promises of “efficiency” or “personalization” to lure school leaders into adopting these new tools (Burbules, 2018). In contrast, generative AI does not offer these traditional, tangible promises—perhaps because it is not a single tool directed at a single industry like education. It is a technological phenomenon (more akin to the internet) with varied possibilities across disciplines and industries. This makes it difficult for current school leaders to fully grasp what it means for education. In fact, the school leaders we talked to described generative AI as opaque and lacking clear benefits. One leader said:

If we could get something from college professors saying: this is how we are leveraging AI in our classes for our students...and have that trickle down from the university level to high schools, and so forth, that would be helpful.

AI in education is still in its infancy. While elements of AI have been integrated into everyday productivity tools in recent years, this has involved mostly specific features or modest improvements (e.g., improved grammar features or voice-to-text in Word or Google docs, etc.). Most people got their first glimpse of AI’s transformative potential when ChatGPT became open access—less than one year ago. These technologies are nascent, and education and academia need time to gather and disseminate knowledge. In that sense, more research and better understanding may be on the horizon. For instance, while no one had published anything about (let alone heard of) ChatGPT before late 2022, in just a matter of months, Google Scholar already has tens of thousands of publications that focus on or refer to the tool (though many of these publications may not be accessible to people outside of higher education).

Yet, the possibility of educational knowledge ever completely “catching up” to the pace of change may not be a practical expectation, given that the digital world accelerates with lightning speed (Bejinaru, 2019). Rather than catching up to the tools, it may be more feasible to support and develop teachers and students’ abilities to understand and evaluate the affordances of technologies (Henriksen et al., 2022)—even to see beyond the obvious affordances,

to devise their own uses. Technologies exist within a “zone of possibility” of alternate uses that allow users to think beyond the intended purposes (Dirkin & Mishra, 2010). In a case like ChatGPT, where the intended purposes are more open and unbounded, it becomes increasingly important to allow teachers to play and experiment with the tools, engaging creative and critical thinking to explore new uses and possibilities for learning (Mishra et al., 2023).

The school leaders also expressed their desire for more direction from those in the industry who are knowledgeable about AI, to help integrate these technologies into the classroom. One leader said: “I feel strongly that we need to have some strategy, some intention, as it relates to teaching and learning... and how it relates to the impact we want.” Many school leaders feel that generative AI has been dropped in their lap and they now need to figure out how to utilize this new technology. This sentiment was captured by one school leader who said:

I think the people that come up with these creative technology solutions need to be able to speak in human understandable terms about what's behind it. There has to be a sense of responsibility around it. If you're one of these people who creates this fantastic tool, then you need to also help educate around it.

That hope or expectation is understandable and reasonable—yet schools may be disappointed if they wait on Silicon Valley to extend a sense of responsibility or provide an understanding of the pedagogical possibilities. In the neoliberal landscape of big technology corporations there is a relentless press for innovation, which diverges from the more moderately-paced and humanistic goals of education (Mehta et al., 2020). Moreover, technology companies are driven by competition and profit and not the learning experiences of students.

Despite ambiguity about effective use of generative AI in the classroom, there are leaders who have a sense of excitement for the potential to use it to personalize and differentiate instruction and materials. As one leader said: “I'm most curious about it for neurodiverse learners. I think it opens possibilities for better differentiation and better teaching and I'm super curious about how we can leverage it in that direction.”

Schools and classrooms have traditionally had to structure and design learning around the presumption of an average student—making it hard for teachers to tailor learning to children who did not fit the expectation of that average. Yet, scholars have noted that the very notion of an ‘average learner’ is based on a myth—the “flaw of averages”—because learners vary widely along a range of variables and no individual fits the average perfectly (Rose, 2016). AI tools may support previously unmet needs around differentiating

learning for individual needs, particularly those with unique needs.

Generative AI can create endless ways to present text to students with different reading levels or interests, and ways to convey complex concepts with simple and relevant analogies. Based on conversations with these leaders, many saw potential positive benefits of using generative AI with their student populations. This also aligns with what some research shows about the surprisingly optimistic perception of many teachers to these new technologies (Kaplan-Rakowski et al., 2023).

Current Acceptable Use Policies Cover Generative AI

New technologies often require new policies (or revisions to old ones), but almost unanimously, with one exception, the school leaders in our groups have *not* instituted specific policies related to generative AI. In fact, most are resistant to enacting any generative AI specific policies believing their existing Acceptable Use Policy (AUP) adequately covers it. They also reported that most school boards are *not* advocating for new policies, nor is there a significant push from parents. In one case, a board *was* asking for a policy, but the school leader said: “I refuse to do it because I don't know what to put in it.”

This sense of uncertainty highlights how tricky the questions around academic integrity, authorship, and plagiarism are, when we factor in AI capabilities. For instance, ChatGPT can perform competently on most writing tasks (Scharth, 2022), including essays and creative writing, especially with skillful prompting. Early on, this led to headlines such as: “The College Essay Is Dead” (Marche, 2022), or “The End of High School English” (Herman, 2022), and “How ChatGPT and other AI systems may ruin the ability to write (and think)” (Geher, 2023). The flip side of this is that generative AI may help students' learning and development in writing; and employers will likely expect future graduates to know how to use such tools for their own productivity (Rowland, 2023).

So, while concerns about plagiarism are prevalent, these leaders have taken a more measured approach and not rushed to ban generative AI altogether. The prevailing feeling is one of resignation that the technology is here to stay. “It's a genie out of the bottle type of thing,” said one school leader. There is a need to understand it better before forming policy. Policies tend to be decisive creatures—statements about expectations/boundaries, practices, and repercussions—but it is difficult to be decisive or clear in a new, fuzzy, and rapidly changing area.

When asked what they would do with a magic wand to navigate through new AI tools, one leader responded: “I'd

like to just slow it all down.” Another suggested that the state should play a role: “I would hope that we could get some additional direction from our state department of education because they cut across all school districts.” Given the open space that is AI, school leaders are reluctant to set policy that can quickly become outdated. While most school leaders may not be feeling pressure from boards, or even themselves compelled to set new policy around generative AI, there are a few stakeholders who are beginning to inquire about how generative AI can be used (or not) in schools.

This is most probably because, unlike most technologies used in schools, which are somewhat obscure to the public, generative AI has received enormous media attention. Parents who have technical and professional jobs using AI are inquiring how it is being used in the schools because they see the benefits in their own work. This is particularly true in urban centers with concentrations of tech and professional workers who have children in schools. But parents are not the primary stakeholders pushing school leaders. Many school leaders said that the most vocal group for wanting clarity on the use of generative AI are teachers, particularly those teaching English Language Arts. They want guidance on mitigating or embracing generative AI tools in their approach to teaching the basic writing process. One head of school noted that, “We hear worries and fears from our teachers. Is this gonna replace me? How am I gonna know if my students are doing authentic work?”

This is particularly acute with elementary teachers who must teach students the fundamentals of writing and grammar. A school leader reported that some teachers began experimenting with ChatGPT early on, but with the lack of clear use policy they have since fallen silent, noting that: “They talked about it a lot upfront, and then it went quiet. I think they’re all quietly using it and just not wanting others to know.” Other research is already showing that many teachers feel optimistic about the potential for AI and are already experimenting with it—seeing how it might enhance their professional development and be valuable for student learning (Kaplan-Rakowski et al., 2023). While being cautious about policy development may make sense at present, before long, it will be essential that schools provide direction on generative AI use to ensure that stakeholders like teachers and students have support and grounds for using it thoughtfully and ethically.

No Immediate Urgency for Training Teachers on the use of AI

While much of Silicon Valley and technology pundits in the media are in a state of upheaval or excitement over generative AI, school leaders are still trying to grasp its implications. Many were quick to cite personal benefits from using

ChatGPT, such as assistance in writing letters and crafting speeches. However, the impact of generative AI on teaching and learning remains unclear in the context of schooling, leaving leaders in a state of uncertainty trying to predict the possible futures to decide how to act right now. Practically speaking, leaders are tasked with making decisions about how to prioritize a range of factors or needs within the school structure and community (Robinson & Gray, 2019). Schools are already under frequent pressures when it comes to a multitude of issues, including curriculum, resources, testing mandates, student wellbeing, and much more. Thus, generative AI training becomes one more problem that leaders are now tasked with figuring out, deciding where it fits and how much it matters when weighed against other demands. The packed schedules in the mandatory beginning-of-year staff training leaves little time for developing workshops around a technology that, although potentially transformative, is not well understood overall.

While generative AI is just one of many issues that leaders may be grappling with, there is interest and cautious optimism around it—which may lead to more attention or training opportunities in the future. Most school leaders we spoke with noted that they see potential for generative AI transforming their schools. In a poll conducted during both group sessions the superintendents had a relatively high level of excitement and low rate of concern regarding the impact of generative AI on teaching and learning. Heads of schools from independent schools in the second focus group were less enthusiastic but also less concerned about the coming changes.

In the schools represented in our data, there were a range of opinions with respect to how to respond to these new technologies. Some schools are forming teacher or student advisory groups to explore the uses of AI, while others have proposed a just-in-time training approach. Others have allocated time in faculty meetings or retreats to discuss the efficacy of generative AI. Some schools have teachers and technologists who are enthusiastically embracing AI, but they are not trying to push this on the whole faculty. One forward-thinking school technologist shared: “I do have a more formal workshop ready to go when that time is right, so we are just stepping in slowly”.

One factor affecting the uptake of new initiatives in schools may be a sense of change fatigue or change exhaustion (Al Mulhim, 2023; Stacey et al., 2023). Having gone through the upheavals created by the pandemic, schools are still recovering from the intense effort it took to adapt their curriculum and teaching methods to online spaces during that sudden, major, and disorienting shift. Having returned to the business of traditional schooling, many educators are wary about new transformative ventures. The sense of fatigue is palpable and has dampened leaders’ eagerness to take on another significant transformation. One school leader

said: “It’s a delicate subject, because at the beginning of the year you don’t want to overwhelm people. We just got through this Covid remote hybrid learning. Now, I gotta do AI?”.

To be fair, school leaders are not failing to pursue teacher training due to any rejection of generative AI. Rather, they simply do not have enough resources and information to jump in and begin making changes or dealing with an already unclear and confusing new phenomena. One school leader noted that they are considering developing asynchronous self-paced modules for their teachers that they can take at their convenience.

Another question that strikes at the heart of the generative AI debate is: do schools *have to* adjust and change or will this technology pass like so many before it, having some, but not significant impact on schooling? An observation from one school leader captured this sentiment well:

I think it goes directly to what a lot of us are about—competency-based education. With any new technology you have teachers who are always like, “Can I just keep doing what I’ve always been doing? Can I hold it off?”

Issues of Equity and Access are Barely Beginning to Emerge

As educators and leaders delve into the potential of generative AI, they also confront the issue of who will have access as these new tools emerge. One leader shared his experience collaborating with a high school student advisory board on AI. He said:

Some kids just didn’t understand it at all, and others were quite knowledgeable because they had paid versions of it. But this is one of those things that I think is going to grow exponentially once students get more familiar with the tools. But it also raises the issue of equity and access. Who’s going to have access to what? And what are our responsibilities as a school district to provide access?

The leaders in the focus group overwhelmingly agreed with this concern. However, there was not much further conversation about this topic. The issue of equity was raised by only one school leader in the focus groups we conducted, but it was not a dominant concern during the three hours of conversations. Those who understand the sources of the data used to train generative AI know full well that it contains biases, misinformation, inaccuracies, and a very strong English language, western culture orientation. These school leaders were not lacking in concern, but the problem for them, again, is that the technology is

so new and advancing so rapidly they cannot digest all the ramifications. The pace of human understanding, problem solving, and the adaptability of school practices/structures cannot keep pace with the rapid acceleration of AI’s technological capacity. The pace of change in the digital world, especially for AI, is exponential and powerful. So, as the field of education tries to wrap its collective mind around AI, issues of technology access and equity that have always been problematic could grow exponentially worse.

Lim et al. (2023) point out that generative AI is a paradox when it comes to equity. For instance, the mission of OpenAI, who developed tools like ChatGPT and DALL-E, has been to offer them freely, purportedly to benefit all humanity (OpenAI, 2023). Thus, ChatGPT was launched in 2022 as freely accessible to support the democratization of knowledge (Pavlik, 2023). In this, there was the potential to improve equity and access, helping educators access deep learning tools to curate knowledge. However, such tools could only be freely available for a limited period, and now include a more sophisticated paid subscription service. As Lim et al. (2023) noted about the trend toward paid subscription models in AI tools:

This not only stands against the democratization of knowledge but could also widen the impact of socio-economic gaps by reducing access for those who cannot afford the premium fee and prioritize access for those who can. Hence, the inherent paradox is that while Generative AI tools have the ability to democratize access to knowledge, the ability to access these tools may be limited based on available resources, thereby creating further equity and accessibility issues (p. 8)

Technology is one of the significant drivers of change in our world, and those without access will fall behind or miss out. This was obvious during the pandemic, when internet access became one of the biggest equity problems facing education (Henriksen et al., 2022). During the pandemic, families and communities with internet devices and reliable access had consistent opportunities for learning, while those that did not, suffered. The ripple effects of this disparity and the concomitant learning delays are still being felt by many students and families (Strunk et al., 2023). Generative AI has a wealth of information, task advantages, and skills to support school learners across varied subject matters and assignments. However, a situation where some kids have access to powerful tools and know how to use them, while others do not, is like giving an academic superpower to one group, and leaving the rest to hobble along. Since equity gaps (or voids) tend to widen when they go unaddressed, generative AI access is one more critical question for school leaders surrounding the technology.

Generative AI will continue to be a topic of great interest in schools in the coming years. It has the potential to radically change the process of writing and creativity in ways we could not have imagined a year ago. However, the way in which technology companies like Google, Microsoft, and Open AI market and monetize these products (by adding costly monthly subscriptions to access advanced features) will have a disproportionate negative impact on significant numbers of schools and students. We are seeing the opening of a new chasm in the digital divide. Without universal access to generative AI tools, or significantly better pricing models for education, we are destined to, once again, leave behind those students without the means or privilege to gain access to these transformative tools.

The Path Forward

Zhao and Frank (2003) offer a provocative metaphor for thinking about the potentially disruptive effects of new technologies as they enter educational systems. Taking an ecological view, they define schools as ecosystems, made up of many parts and relationships. These parts include teachers, students, parents, administrators, the local community and more, all working within specific contexts that are defined by both physical settings (buildings, classrooms etc.) as well as more abstract constructs such as school, district, state and national policies, cultural expectations and more. The introduction of new technology (such as generative AI) affects the equilibrium of the ecosystem and can have several possible consequences, which can be understood only by taking a systems-level view based on not just the parts but the interactions between them as well. The advent of a new “species” into the ecosystem is disruptive to these relationships and requires the evolution of a new equilibrium where the new and the old can co-exist. The urge to ignore this new technology, and to go back to how things were, is strong. But schools exist within a broader socio-techno-cultural matrix. These tools (and their future versions) are now part of society and cannot be banned or ignored. In fact, AI is rapidly being integrated into most productivity software tools, making them ubiquitous and unavoidable. Moreover, our responsibility as educators is to prepare students for the “real” world. If that world involves AI tools and technologies in our professional and personal lives, it behooves us to prepare our students to live in that world.

Clearly, AI will have profound impacts on our education system as we know it, not just as a new tool, but a new capacity or realm of technological power and thinking. Teachers will not only need to be proficient with AI literacy, but also knowledgeable on how to modify their instruction and assessment to address these technologies—a new form of teacher knowledge, or TPACK (Mishra et al., 2023).

Those responsible for training new teachers will also need to adapt curriculum to ensure graduates enter the workforce with the necessary skills to use AI effectively. Professional educator standards boards will need to develop new criteria and literacies for new teachers entering the workforce. At the state and federal governments level, new policies and guidance may be required to help educators, and the general public, manage the myriad of challenges that AI presents around copyright, privacy and ethical considerations.

At the forefront of these discussions and challenges are the leaders of our schools, districts, and educational systems. Thus, conversations with them provide us with a “here and now” perspective, allowing us as scholars and researchers to understand their needs. It is clear from our conversations that these leaders will need and would like to have more support and guidance from technology industries, state institutions, universities, and non-profits in order to take full advantage of the affordances of artificial intelligence, while avoiding possible pitfalls. This new technology presents many challenges and opportunities for schools as they try to integrate and embrace these technologies into their teaching and learning. Just like Alice in the quote that opened this piece, our leaders are looking for direction. Our sincere hope that the support and advice they receive will be more helpful than that given by the Cheshire Cat to Alice. Because their goal is not just to “get somewhere” merely by “walking long enough.” As dedicated educational leaders they know the stakes are much higher than that and that our students deserve better.

References

- Al Mulhim, E. N. (2023). Technology fatigue during the COVID-19 pandemic: The case of distance project-based learning environments. *Turkish Online Journal of Distance Education*, 24(1), 234–245. <https://doi.org/10.17718/tojde.1034006>
- Bejinaru, R. (2019). Impact of digitalization on education in the knowledge economy. *Management Dynamics in the Knowledge Economy*, 7(3), 367–380.
- Burbules, N. (2018). *Watch IT: The risks and promises of information technologies for education*. Routledge.
- Day, C., Sammons, P., & Gorgen, K. (2020). *Successful school leadership*. Education Development Trust (University of Nottingham). (ERIC No.: ED614324). <https://eric.ed.gov/?id=ED614324>. Accessed 18 Oct 2023.
- Dirkin, K. & Mishra, P. (2010). Values, beliefs, and perspectives: teaching online within the zone of possibility created by technology. In D. Gibson & B. Dodge (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2010*. Association for the Advancement of Computing in Education (AACE), Waynesville, NC, p 3811–3817.
- Geher, G. (2023, January 6). ChatGPT, Artificial Intelligence, and the Future of Writing: How ChatGPT and other AI systems may ruin the ability to write (and think). *Psychology Today*. <https://www.psychologytoday.com/au/blog/darwins-subterranean-world/202301/chatgpt-artificial-intelligence-and-the-future-of-writing>. Accessed 18 Oct 2023.

- Grissom, J. A., Egalite, A. J., & Lindsay, C. A. (2021). How principals affect students and schools. *Wallace Foundation*, 2(1), 30–41.
- Henriksen, D., Mishra, P., & Capurro, C. T. (2022). A *Sociocultural Perspective on Creativity and Technology: New Synergies for Education*. In *Creativity and Innovation* (327–346). Routledge.
- Henriksen, D., Woo, L. J., & Mishra, P. (2023). Creative uses of ChatGPT for education: A conversation with Ethan Mollick. *TechTrends*, 67(4), 595–600.
- Herman, D. (2022). The End of High-School English. The Atlantic. <https://www.theatlantic.com/technology/archive/2022/12/openai-chatgpt-writing-high-school-english-essay/672412/>. Accessed 18 Oct 2023.
- Kaplan-Rakowski, R., Grotewold, K., Hartwick, P., & Papin, K. (2023). Generative AI and Teachers' Perspectives on Its Implementation in Education. *Journal of Interactive Learning Research*, 34(2), 313–338.
- Leithwood, K., Harris, A., & Hopkins, D. (2020). Seven strong claims about successful school leadership revisited. *School Leadership & Management*, 40(1), 5–22.
- Lim, W. M., Gunasekara, A., Pallant, J. L., Pallant, J. I., & Pechenkina, E. (2023). Generative AI and the future of education: Ragnarök or reformation? A paradoxical perspective from management educators. *The International Journal of Management Education*, 21(2), 100790.
- Marche, S. (2022). The college essay is dead. The Atlantic. <https://www.theatlantic.com/technology/archive/2022/12/chatgpt-ai-writing-college-student-essays/672371/>. Accessed 18 Oct 2023
- Mehta, R., Creely, E., & Henriksen, D. (2020). A profitable education: Countering neoliberalism in 21st century skills discourses. In *Handbook of research on literacy and digital technology integration in teacher education* (pp. 359–381). IGI Global.
- Mishra, P., Warr, M., & Islam, R. (2023). TPACK in the age of ChatGPT and Generative AI. *Journal of Digital Learning in Teacher Education*, 39, 1–17.
- Pavlik, J. V. (2023). Collaborating with ChatGPT: Considering the implications of generative artificial intelligence for journalism and media education. *Journalism & Mass Communication Educator*, 78(1), 84–93.
- Robinson, V., & Gray, E. (2019). What difference does school leadership make to student outcomes? *Journal of the Royal Society of New Zealand*, 49(2), 171–187.
- Rose, T. (2016). *The end of average: How to succeed in a world that values sameness*. Penguin.
- Rowland, D. (2023). Two frameworks to guide discussions around levels of acceptable use of generative AI in student academic research and writing. *Journal of Academic Language and Learning*, 17(1), T31–T69.
- Scharth, M. (2022, December 6). The ChatGPT chatbot is blowing people away with its writing skills. An expert explains why it's so impressive. *The Conversation*. <https://theconversation.com/the-chatgpt-chatbot-is-blowing-people-away-with-its-writing-skills-an-expert-explains-why-its-so-impressive-195908>. Accessed 18 Oct 2023.
- Stacey, M., McGrath-Champ, S., & Wilson, R. (2023). Teacher attributions of workload increase in public sector schools: Reflections on change and policy development. *Journal of Educational Change*, 24, 1–23.
- Strunk, K. O., Hopkins, B. G., Kilbride, T., Imberman, S. A., & Yu, D. (2023). *The Path of Student Learning Delay During the COVID-19 Pandemic: Evidence from Michigan (w31188)*. National Bureau of Economic Research.
- Zhao, Y., & Frank, K. A. (2003). Factors affecting technology uses in schools: An ecological perspective. *American Educational Research Journal*, 40(4), 807–840. <https://doi-org.ezproxy1.lib.asu.edu/10.3102/00028312040004807>

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.