

# From the Editor-in-Chief



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## When Not to Use AI

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■ **LARGE LANGUAGE MODELS** (LLMs) have emerged as a disruptive force. While artificial intelligence (AI)-generated responses can include text, images, code, and other materials, here, we largely focus on the challenges posed by text generation in educational settings and the workplace.

### What are large language models good for anyway?

In many contexts, these language models seem like a solution looking for a problem, as skillfully explored by my predecessor here [1]. While AI-generated responses can initially seem impressive, these texts suffer from multiple risks, including hallucination and inaccuracy [2]. The rise of AI tools impacts student learning, the practice of teaching and research, and a host of white-collar jobs.

Incorporating AI tools in human labor faces a number of challenges. Among them are three interconnected concerns: the extent to which AI tools can replace human workers, the data on which

algorithms are trained, and whether these tools improve human working conditions. The issues are related to the technology itself as well as the choices made in deploying these technologies.

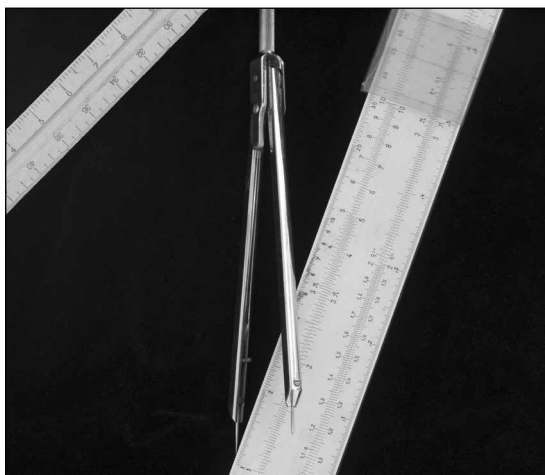


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### Functionality and choices

LLMs utilized in Generative AI tools such as Generative Pre-trained Transformer 3 (GPT-3), GPT4, GPTo, BLOOM, and others are sophisticated deep-learning algorithms. These algorithms have been trained on vast datasets sourced from the internet, employing mechanisms such as attention masks and deep-learning techniques. Put more simply, these machine learning algorithms are sets of mathematical models that predict relationships between words based on factors such as context, word order, and style. Where the training data for these algorithms comes from and who provides it are key to understanding how well AI tools can function, how they impact people, and the overall costs of these solutions.

The ability of AI-generated responses to replace human workers or improve human working conditions depends both on the functionality of the

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algorithms and the choices made by organizations on how to treat their human workers and the human owners of the training material.

In this piece, we will review the aspects of generative AI tools necessary to replace human workers and explore the underlying technology and situations in which human labor can be replaced. We will also discuss the long-term risks to human labor and the policy and collective solutions necessary to counter those risks. The technical performance needed to replace human workers includes generated responses that are consistently accurate and comprehensible, as well as reliable, relevant, and able to adapt to diverse contexts and tasks. These are considerable constraints and present more challenges in some context than others.

## Can AI technologies replace human workers?

It is a little hard to understand why we need AI tools in the first place. To begin thinking about the “why” question, let us consider there are two classes of AI tools: open-domain and closed-domain models.

### Closed-domain models

Closed-domain models are specific to a particular problem or context and can also be referred to as goal-driven dialog systems. Within a specific application or context, these tools can function quite well. For example, customer service chatbots can handle a range of public-facing communication roles, including account service and level 1 service jobs which serve as the initial point of contact and include answering basic questions found in a text or frequently asked questions (FAQs). In most cases, human intervention is still needed to make decisions or changes and to respond to specific inquiries or provide additional assistance. Closed-domain text-generation systems could reduce the number of human workers, particularly in level 1 service jobs. Early customer experience indicates that these tools have the potential to increase the quality of service customers receive. Given that customer service call center jobs frequently involve abusive customers and are subject to high levels of turnover [3], having a mixed system that involves AI tools may be beneficial to human workers. Current evidence on the impact of AI tools on customer service jobs is mixed—some companies have switched to AI-only systems [4], but most retain a mixture of humans

and AI [5]. Consumers seem most comfortable having access to both types of systems, and it is possible that automated systems can help improve the quality of life for both workers and customers [6].

### Open-domain models

Chat GPT and other generative AI tools have made us familiar with open-domain system models. These generate responses without a specified domain. Developing generative AI tools with an open domain is generally considered to be more challenging, particularly in generating relevant and accurate results. The breakthroughs necessary for GPT-3, BLOOM, and other LLMs are truly revolutionary from a technical perspective. But the *why* question is another matter.

Studio and media executives of large corporations had hoped that these models might allow them to eliminate or vastly reduce the number of creative employees needed to create content [7]. For the moment, the true creativity needed to develop scripts, stories, and novels, and the critical thinking required for rigorous reporting and in-depth stories mean that AI-generated work will not equal human-generated content. While AI developers are working hard to make these tools equal to human creativity, open-domain AI models do not yet have the performance and reliability to do this well.

## Who owns that training data?

LLMs do not work on their own. These technical breakthroughs are made possible through access to huge quantities of information, and LLMs work well only when this training is extensive and is performed on massive amounts of data. However, any discussion of the data implicates the employer’s choices in deploying the technology. Often, LLM training has been performed on copyrighted work. Therefore, much of the legal discussion around what data is used revolves around the concept of “fair use.” “Fair use” means that some use of copyrighted material is allowed [8]. In the United States and elsewhere, fair use includes the right to quote a small amount of text and use short video or audio clips. Apart from fair use, content creators, including authors and artists, are taking steps to prevent the use of their work to train AI tools [9]. However, OpenAI has said that creating text-generation algorithms would be impossible without free access to copyrighted material [10]. Since copyright stands in the way of training

LLMs, some suggest that it should be abandoned altogether. In response to a finding that published authors earn \$2000 on average per year, one well-known AI researcher suggested that authors should consider publishing their work without compensation.<sup>1</sup> These suggestions relate to the often-quoted techno-optimist conception that AI tools will lead to a universal basic income (UBI) [11]. Sam Altman, founder of OpenAI, suggested a wealth and land tax to cover UBI [12]. However, a range of critics have pointed out that UBI proposals without other structural changes will not be sufficient to blunt the concentrated power in tech companies [13]. Moreover, there is no clear path for achieving UBI when the companies currently profiting from AI also resist taxation and policy instruments that could provide income support. We will return to UBI when we discuss potential solutions.

Real gains have been made in the technical performance of LLMs, particularly for closed-domain models, but these have relatively narrow applications. Open-domain applications create content that mimics human intelligence, but they produce far more difficulties than they solve. These challenges become particularly vexing in academia. So far, we have established that LLMs have a limited ability to replace people and that generative AI tools require training data that developers have so far refused to pay for. The last question to explore is: how do current AI tools impact human workers? Having established that customer service workers may experience job loss or improved work experience using closed-domain models, we next consider academic labor as an example of open-domain models.

## Generative AI and the professoriate

Academic workers are profoundly impacted by AI tools. The ability of students to use AI-generated responses can feel like an existential threat and has made me personally question the purpose of having students write essays or complete final projects. Both these tasks are essential to developing critical thinking, but trying to prevent students from using AI tools is exhausting and fraught. The challenges related to the emergence of AI tools come as our resources for grading have dried up and demands on our teaching time have increased. There are excellent solutions for continuing to teach students good writing and

research skills—such as spreading out activities into in-class sessions that help students work through idea generation, development, scoping, and editing—but these solutions require far more time and grading resources.

## Budgets in crisis

Such additional teaching resources are necessary at a time when they are likely to be unavailable. University budgets are said to be under strain with universities across the United States, Canada, and the United Kingdom reporting deficits.<sup>2</sup> While the reasons behind these deficits vary—from cuts to government funding, policy changes, and reduced willingness of international students to live and pay tuition in these countries—universities widely report they have fewer resources to pay faculty. Budget crises are often named as a reason that faculty salaries have failed to keep up with inflation; professors in the United States lost on average 2.4% of their salaries in 2023. In fact, these losses stretch back at least a decade [14]. In response to budget crises, universities often opt to hire lower-paid sessional instructors. Rather than suffering gradual pay losses over time due to inflation, part-time instructors have seen their earnings plummet per course [15]. These instructors are often paid less than \$3500 per course and live at or below the poverty line [16]. Part-time instructors often have limited advance notice of when or which classes they will teach, so that they have even less time to implement time-intensive solutions to avoid AI-generated text.

## Perverse incentives for tenure-track faculty

The hours that full-time, tenure-track, and tenured professors devote to teaching have also, always, been limited by the perverse incentives that reward research productivity [17] and are at best indifferent to teaching efforts or quality. This research productivity, of course, is measured by a number of publications, h-indices, and impact factors [18]. These measures are ripe for various kinds of tampering,

<sup>2</sup>Announced deficits include University of Arizona (<https://www.nytimes.com/2024/02/21/us/university-arizona-budget-deficit.html>), West Virginia University and DePaul (<https://www.forbes.com/sites/michaelmetzel/2023/04/19/depaul-west-virginia-university-latest-large-institutions-to-face-major-budget-deficits/?sh=7de6b2157fc4>), nearly 50% of Universities in Ontario ([https://www.thestar.com/politics/provincial/almost-half-of-ontario-universities-are-running-deficits-putting-student-services-at-risk-council-says/article\\_639ebdc-af31-11ee-bdce-47e37d4e1808.html](https://www.thestar.com/politics/provincial/almost-half-of-ontario-universities-are-running-deficits-putting-student-services-at-risk-council-says/article_639ebdc-af31-11ee-bdce-47e37d4e1808.html)), and a wide swath of universities in the United Kingdom, where budget deficits were specifically tied to a lack of salary increase and the need to penalize professors from taking labor action (<https://www.ucea.ac.uk/news-releases/4may23/>).

<sup>1</sup><https://twitter.com/ylecun/status/1741708146530226285?s=20>

both from AI tools and more traditional academic misconduct, which incidentally appears to be on the rise [19]. AI has not caused salary losses, nor does AI cause academic misconduct—either from faculty members or students. But AI does have the potential to exacerbate both.

### Administrative bloat

Academics face new threats to their time, both in research and teaching. As universities increasingly work to recreate corporate work environments, faculty are subject to greater reporting requirements and time-wasting efforts as universities offload administrative tasks onto permanent teaching staff [20]. Again, budget crises are often given as the proximal reason given offloading these tasks.

### Falling wages for faculty, skyrocketing salaries for administrators

Let us look at those budget crises again. Professors have seen salary stagnation or reduction. But do higher-level university administrators share those losses? In a word, no. Comprehensive Canadian data is somewhat scarce, but reported university president salaries range from \$400–\$800K per year.<sup>3</sup> In the United States, university presidents' salaries rival CEOs in extravagant pay packages [21], making Canadian university president's salaries look quaint by comparison. The president of Thomas Jefferson University had the highest reported U.S. president salary of nearly \$8.5 million in total compensation. Moreover, the number of high-paid upper-administrative positions in universities has increased dramatically as well [22]. At the 50 highest-ranked universities in the United States, nonacademic employees outnumber faculty by a ratio of three to one, and at a few administrators actually outnumber students [23]. Increasing administrative load is reflected in budgets, with a mere 25% of budgets at public U.S. universities allocated for education [24].

<sup>3</sup>Macleans published a number of damning stories on president and provost pay, but stopped somewhere around 2012 (<https://macleans.ca/tag/university-president-salaries/>). Without journalism, published evidence is scant but reported university president salaries in 2021 include \$860,971 for McGill's, \$484,000 for Memorial University of Newfoundland (MUN) and \$466,882 for Concordia University – incidentally a 10% pay increase while faculty members received 2.6% for that same year. The president's salary at the University of Alberta triggered province-wide limits on university salaries, but these did not stop his earnings from topping out at \$829,994 in 2019 (<https://www.cbc.ca/news/canada/newfoundland-labrador/mun-president-beefy-contract-1.5453984>; <https://thelinknewspaper.ca/article/concordia-president-received-10-per-cent-salary-increase>; <https://www.ualberta.ca/human-resources-health-safety-environment/benefits-and-pay/pay-and-tax/compensation-disclosure/compensation-disclosure-list.html>).

No wonder there is not much money left for teaching resources, much less keeping faculty salaries steady with inflation. Budgets tell the truth of the modern university: education is not the primary focus.

These increasing gaps in salary—between the people who do the labor of the university and those who lead it—have everything to do with the actual case for LLM applications in AI. A Boston University Dean suggested that AI tools could be used to do the jobs of graduate student teaching assistants during a strike [25]. AI grading is being widely deployed at the secondary and university levels [26]. Beyond important discussions on the quality of this grading or about the example it sets for students lies a renegotiation over what academic labor means.

### Replaceable labor?

Falling salaries for professors paired with increasing salaries for upper administrators and huge increases in the number of administrators tell a story of labor that is not valued. AI tools—from their development to deployment—are used to further the narrative that academic labor—from our writing, knowledge production, and teaching—are ultimately replaceable and not valuable. It is a painful message that we hear repeated from our leaders both in the academy and beyond. It has also never been more untrue. Humanity faces dual crises of climate change and vast and intensifying income and wealth inequality [27]. Facing these threats requires our real, human creativity and critical analysis, our ability to collaborate to solve problems, and to view the world and each other through a compassionate lens. The collective responses to the climate crisis and inequality also require a well-educated population from different disciplinary backgrounds. AI tools may help identify solutions to our crises, but the solutions themselves will be created and implemented by humans. The idea that the current batch of AI tools is capable of replacing human intellect is manifestly untrue.

In fact, any claims of intelligence do not make sense from the architecture of the tools themselves. In the case of AI text generation, learning techniques can accurately predict the next sentences in generated text based on huge corpora of data. For narrow applications, AI tools can help users identify solutions quickly. But much of the architecture of LLMs is based on predictions that are, more or

less, conditional probability statements. Most current LLMs use a transformer-based mechanism that involves recurrent neural networks to incorporate an attention mechanism in predicting the next “token” which could be a word, punctuation, or phrase. But in simple terms, our most sophisticated LLMs are very good guesses based on averages. This is not an insult! AI tools render impressive imitations of human knowledge production. However, these generated responses are often only impressive if the observer does not think or look very hard at what LLMs produce. This mismatch—machine knowledge production that can sound right but is not really—lies at the heart of the misunderstanding of intellectual labor and the exceedingly silly claim that human minds are currently replaceable.

Incidentally, claims that our academic labor is replaceable and not valuable are not new. Attacks on the humanities within academia are longstanding. The classic joke of my university years about humanities students had the punchline—“Do you want fries with that?” This is a neat trick of minimizing the value of both traditionally understood untrained labor and the hard-won degrees of scholars in the humanities. We were told that only STEM degrees would get us ahead, employed, or make us valuable. And we were told by extension that only the discoveries made in the lab and only the breakthroughs made with computers really mattered or could change the world.

Undervaluing humanities puts those majors and departments on the chopping block during budget crises. The belief that the humanities do not matter drives administrators and governments to eliminate, underfund, and undermine those departments. Recent examples include West Virginia University’s decision to eliminate 9% of majors (including all foreign language departments) and 7% of faculty members in response to a \$45-million-dollar budget shortfall [28]. This pattern of eliminating humanities departments reaches back years and is vexing not just because studying humanities is critical to developing educated citizens and critical thinkers, but also because humanities programs are actually cheaper to run [29]. Even though these programs are less expensive for universities to offer, Australia doubled tuition fees for humanities scholars in 2020, mirroring a proposal for tuition hikes in Florida nearly a decade earlier [30], [31].

The reality of employment outcome differentials is somewhat subtler. First, to take on the joke: humanities

majors earn more than those without degrees and as much or more than those with degrees in other non-STEM majors [32]. While both humanities and social science graduates often struggle to find their first job, they end up in satisfying careers [33]. Although lifetime earnings are generally higher for STEM graduates [34], some critics point to lower employment outcomes for STEM graduates with a bachelor’s degree only [35]. These findings underscore the high levels of uncertainty in assessing employment outcomes; the choice of an educational program is the start of a career, and what students make of it is much more important than the degree itself. This bolsters my long-held view that young people should let their interests (and hopefully passion) guide their educational decisions. This is scary advice to give, especially when higher education is so expensive and graduates are often faced with crushing debt.

These questions—Is higher education a good choice for students? Will student’s eventual earnings make their debt worthwhile?—turn our focus as academics into utilitarian considerations that are at once ethically vital and a sad commodification of our collective passion for our research and teaching while minimizing the vital role education plays in society. But turning to a utilitarian and economic perspective on education also absolves our institutions of their role in accelerating tuition cost hikes and student debt. A punchy headline from a MacLeans article in 2008 reads “Hey, where did my tuition money go? It was spent on the senior administration” [36]. This headline acknowledges the role of administrative bloat in driving up the cost of education, as highlighted in these pieces [20], [22], [23], [24], and especially in this excellent commentary [37]. AI can be used to further reduce the educational portion of university budgets to an even lower proportion than the 25 cents on the dollar that public universities in the United States currently spend on education. When universities reallocate their spending to administrative roles, it hurts students and the public good.

## What then?

Just like universities funding administrative jobs rather than devoting funding toward education, the changes to job prospects and income related to AI are not inevitable. Policy and regulation can blunt or prevent negative impacts of technology, but only if they are adopted and enforced. So what can be done?

Software companies that train on copyrighted works must pay the authors for their work. An even better solution would be to delete models trained on texts without the author's permission.

Forcing firms to pay for the data they trained on is an important start, but not sufficient to prevent job loss. While open-domain AI tools are not terribly reliable or accurate, they are already being routinely deployed to write news copy and perform editorial tasks [38], [39]. In other words, AI tools are already replacing human labor despite inadequate performance.

### UBI: A key tenet of AI boosters

A key tenet of AI boosters is that AI will usher in an era of prosperity and free time under universal basic income (UBI) [40]. While some AI boosters have proposed policy instruments to achieve UBI, these same people resist taxation and regulation, which are essential ingredients to a UBI.

While important research gaps exist, the literature demonstrates that UBI is quite successful in eliminating poverty, improving education and health outcomes, and has negligible impacts on the availability of labor [40]. UBI scholars would caution that no true “universal” condition has yet been met in a UBI experiment. The experiments currently covered in the literature have been subject to some conditions or limitations. Still, the biggest barrier to UBI is not the state of the literature but the cost and political will.

Support for UBI is increasing, with 71% of Americans [41] and 59% of Canadians [42] in favor of some level of UBI. Critically, this support is linked to increasing taxes on the wealthy [43]. Implementing a UBI requires both support for the policy itself and for the levels of government revenue that would be necessary to support it. Even a modest UBI would cost between \$5 and \$9 billion in Canada [43].

Political will may be increasing as well. A boycott is now underway against Loblaw's [44], a grocery firm that controls 29% of the Canadian grocery market [45]. This firm is owned by Galen Weston, a billionaire who has been implicated in two separate offshoring scandals to avoid taxes [46]. If consumers and voters are willing to hold tax-cheating billionaires responsible for their behavior, policy change is possible.

Taxation is one option to pay for UBI, but so are substantial penalties for offshoring wealth to avoid

taxation. Other options are a targeted tax on firms that adopt AI to eliminate jobs, or eliminating government incentives and tax breaks for companies that use AI [47]. Regardless of the source of funds, adopting UBI is an urgently needed long-term goal.

### Greedflation and corporate power

Complementary regulation is needed to mitigate the harms related to the loss of jobs to AI and other types of damaging outsourcing. The flip side of stagnating or falling wages is increasing prices. Research on greedflation—the practice of corporations to increase prices far beyond the increase in costs—suggests that firms with outsize market share are most able to manipulate and sustain price increases [48]. Grocery stores worldwide report record profits since the pandemic, with large chains profiting more than smaller, independent stores [49]. Grocery store profits in Canada doubled [50]. Staggering price increases on food and fuel are part of the harm that has come with stagnating wages both in the professoriate and for all workers. More regulation on corporations and their outsize influence on prices is needed to reduce the harm when wage losses occur.

### Collective action and limits on AI

The more immediate lessons on regulation probably lie with the possibilities of collective action to achieve limits on AI. The Screen Actors Guild and American Federation of Television and Radio Artists (SAG/AFTRAS) recently ended a strike which has been broadly referred to as “historic,” both for the gains in compensation, reversals to streaming losses for actors and writers, and for the purposes of this article, definitions on the use of AI for content creation. The contribution of the SAG/AFTRA to collective action for AI limits was to define creative roles as human and to require compensation and consent for replicating human voices [51].

In the short term, all workers—including high-paid professionals and professors—need to organize their labor and demand that AI is not used to replace them. Paying humans to do the tasks that LLMs do “for free” not only ensures better quality products (or any quality product) but also makes a livable future where people retain the ability to work, eat, live, and make intentional decisions using their human brains. The SAG/AFTRA strike is an inspiring example of what organizing around policy can achieve. Members of the professoriate should pay attention.

**AI MIGHT NOT** be smart enough to replace human labor yet. But there is no good reason to act like AI will not eventually be able to replace most of our jobs. We need to think now about how to ensure human labor and human well-being are prioritized. Our best chance to achieve protection is to act collectively in the now when we still have jobs and can use our labor as leverage. ■

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