## Baron 2020

(Baron, Alex. "why do students hate school." *education week*, https://www.edweek.org/education/opinion-why-do-students-hate-school/2020/08.) Alex Baron is resident assistant principal of E.L. Haynes Public Charter School in the District of Columbia. After starting his career as a preschool teacher at KIPP DC, Alex earned his Ph.D. at Oxford. He then returned to the classroom in the Denver public schools before taking up his current post. Alex will be diving into why students hate school, how to enhance student autonomy and curiosity without sacrificing order, and how COVID-induced innovations could actually help us achieve the kind of schooling that allows students to study what excites them.

It's tough to look into the eyes of a bored preschooler. On a pre-COVID school visit, I observed a kindergarten classroom during "writing-skills block"; it was even less fun than you might think.A boy glanced at me with the ineffective surreptitiousness of young children who are trying to hide something from you. The more he peeked at me, the more my interest piqued. When I asked to see his writing, he tottered backward to reveal a self-portrait of a frowning boy that said "I hat school."I smiled and asked why he hat(e)s school. He regarded me with his tiny furrowed brow, as if asking, "Could you really be so obtuse?" He replied with the refrain that unifies students across ages, socioeconomic classes, geographies, races, languages, and more: "School is boring."The "I hat school" story underscores an animating tension of schooling: Kids must acquire common knowledge (e.g., spelling "hate" instead of "hat"), but educators must somehow share that knowledge without boring kids into curiosity-crushing oblivion. In this post, I want to explore how schools bore kids. In the second post, I'll discuss ideas that show promise in increasing student engagement. This year, I've interviewed over 40 P-12 students about what they mean when they say "school is boring." In response, Michael, a 9th grader at my school, said, "You're forced to learn stuff that you don't get to pick. If we got to pick just some of it, we would actually be interested in it. We don't get to choose anything." Michael often doesn't pay attention in math; many days, he grapples with the teacher's Rubik's Cube and researches solutions on his phone. Similarly, Aniya, a 10th grader, says she loves beauty products but "hates science." She then said, "I know makeup is all about chemistry, but we don't ever talk about that or anything we like, so that's why I hate it."

# CARDED CASE

## AI LITERACY

### AI will define the future of work --- workers aren't ready.

**Avid 23** [No Author, 2023, "Preparing Students to Join the AI Workforce", AVID Open Access, https://avidopenaccess.org/resource/preparing-students-to-join-the-ai-workforce/] mac **date retrieved from latest hyperlinked source in article.

Students are already realizing that some of the jobs that were once available to them may soon be significantly changed or even replaced by artificial intelligence (AI).

In the Ed Week article, "What Skills Should Students Learn in an AI-Powered World?," Lauraine Langreo points out that "66 percent of teens are concerned they may not be able to find a good job as adults because of artificial intelligence."

Fortune Magazine calls attention to the findings of The World Economic Forum's Future of Jobs Report, which suggests that while AI might not directly replace a worker, a person who uses AI might.

In findings that might alleviate some student concerns, the report also anticipates that, despite some displacement of workers, AI will create a net gain of 13 million new jobs. Notably, the report suggests that these jobs will likely require some degree of skill in working with artificial intelligence.

The Future of Jobs Report also reveals that students are not alone in worrying about future employment opportunities. Fortune Magazine reports that very few employees in the labor market are ready for a transition to AI-powered jobs. It cites the Future of Jobs Report, writing, "The A.I. field has the biggest skills gap in the tech industry, meaning there are few qualified applicants for roles despite a rapidly growing need." In this light, graduating students and current employees will all likely need to develop new skills to effectively use AI on the job.

To fill this skills gap, schools and educators will need to **adapt and modify** how they prepare students for a future in this shifting occupational landscape. This will be both a challenge and an opportunity for schools to empower their students with the tools they need to succeed in this shifting work environment.

Teaching Students About AI

It's becoming increasingly clear that an important step in preparing students for their future workplace will be **introducing** them to AI. In fact, many leaders in technology and instructional technology are already sending this message and emphasizing the importance of AI education.

The International Society for Technology in Education (ISTE) sends this message loud and clear. In their introduction to Hands-On AI Projects for the Classroom: A Guide on Ethics and AI, they state emphatically, "We believe that, in order to be successful in school and in life, all K–12 students need a foundational understanding of what AI is, how it works, and how it impacts society. AI education is important across all subject areas, not just computer science classes." The authors add, "We are convinced that the language of future problem-solving will be the language of AI."

Alex Kotran, co-founder and CEO of aiEDU, thinks the need to teach AI is urgent. In a recent interview with The Hill, he said, "I would say if in three years, every single student in America doesn't learn about artificial intelligence while they're in school, we will have massively failed."

The logical implication for schools is that they need to integrate AI education into the existing curriculum and to do so as quickly as possible. This exposure will be an important and potentially critical first step in preparing students for a future with AI.

Understanding AI's Impact on Future Work

In addition to introducing students to AI, we must help them recognize the ways in which it will impact the skills needed for future employment. To help students see the future more clearly, educators themselves must gain an understanding of AI's potential impact on the labor market.

According to the World Economic Forum's Future of Jobs Report, "More than **75%** of companies are looking to adopt AI tech in the next **five years**."

The report also notes that the two biggest trends anticipated to drive business transformation in the next 5 years will be increased adoption of new and frontier technologies (86%) and broadening digital access (86%). With these changes, "44% of workers' core skills are expected to change."

The Future of Jobs Report also predicts that the impact of AI and related technologies will place new priorities on skills that will make employees more productive when using AI. Specifically noted are cognitive problem-solving, analytical thinking, and technology literacy skills.

Even though most students will probably not have jobs developing AI technology, many will likely have careers that are impacted in some way by AI or jobs infused with AI interactions.

Keith Farley, Senior Vice President at Aflac, agrees that AI will significantly impact future work environments. In the Forbes article Rise Of AI Also Raises Demand For Creative Skills, he says, "Tomorrow's workforce will leverage AI the way today's workforce leverages technologies like the **internet** that was **once futuristic and potentially intimidating**."

Anil Verma, a professor emeritus at the University of Toronto's Rotman School of Management, studies the impact of AI on employment. He says, "We will all be affected by AI. So to be successful is not so much to worry about your job being obsolete or replaced by a bot, but to figure out which AI those [sic] tools are relevant to my job, how I can learn to use them and use it to enhance my performance." He adds, "My advice to people is, look, if your work involves doing something very mundane and repetitious that can be easily replaced by a bot, then you should be learning new skills."

Even the United States National AI Advisory Committee has put forth a goal to "scale an AI capable federal workforce." Their report Includes plans to "develop an approach to train the current and future federal workforce for the AI era." and to "train a new generation of AI-skilled civil servants."

In all of this research and commentary, one theme is clear. Learning how to leverage AI and work with it productively will be essential.

Joseph South, ISTE Chief Learning Officer, echoes this sentiment in the ISTE Guide on Ethics and AI. He also raises concerns and writes that schools and educators need to do much more than they are doing right now to prepare for this shift. He says,

"We know that the jobs of the future will increasingly demand knowledge of how to leverage and collaborate with AI as a tool for problem solving. Unfortunately, most students today are not on a trajectory to fill those jobs. To prepare students, all educators need to understand the implications, applications, and creation methods behind AI. After all, teachers are the most important link in developing the new generation of AI-savvy learners, workers, and leaders. . . . We believe that, in order to be successful in school and in life, all K–12 students need a foundational understanding of what AI is, how it works, and how it impacts society. AI education is important across all subject areas, not just computer science classes."

The Ability to Change and Adapt

As companies race to get out in front of the AI revolution, it seems that a new breakthrough or application is announced nearly every day. With this rate of development, the work landscape is likely to shift rapidly, and our students will find themselves in the middle of it all.

To thrive in this type of ever-changing world, students will need to learn more than content area standards. They will need to learn how to be flexible and able to adapt to change.

UNESCO, in its publication AI and education: guidance for policy-makers, acknowledges this, saying, "The very nature of employment is likely to change." They note that because AI is much more efficient at certain tasks than humans, artificial intelligence will likely replace current jobs that focus on standardized, repetitive work. To remain relevant in an evolving workspace, people will likely need to retrain and upskill multiple times in their careers. In this type of work environment, we will all need to be lifelong learners, and it will be important that we prepare our students for this reality.

The consequences of not learning new technology and adapting to new demands can be significant. In fact, UNESCO's report warns that workers unable to work with new technologies will be increasingly **excluded** from the job market.

Peter Stone, professor of computer science at the University of Texas at Austin, also talks about the importance of adaptability. In the Education Week article Will Artificial Intelligence Help Teachers—or Replace Them?, he argues, "We shouldn't be educating our students to do a particular job. We now need to be educating our students to be able to be flexible, to be able to retrain themselves, to be able to learn how to learn. . . . because the nature of that job may change over the next few years. Or you may find that you need to be able to jump to a new career partway through."

Saadia Zahidi, World Economic Forum Managing Director, says, "Nearly half of the skills that people like you and I are using every single day in the workplace are going to have to change in the next 4 to 5 years alone."

In AI and education: guidance for policy-makers, UNESCO predicts the same trend. They write, "AI and other frontier technologies are increasing the range of high-skill jobs that require unique creative and analytical abilities and human interactions. In short, many workers' jobs might disappear, and they will need to develop new skill sets—upskilling or reskilling—to enable them to enter the new occupations made possible by AI."

If this scenario is even partially accurate, companies will be looking for adaptable employees who can change as new skills are required. Unsurprisingly, the World Economic Forum found that four of the top job skills likely to be sought in the next 5 years are self-efficacy skills workers will need to adapt to change: resilience, motivation, curiosity, and life-long learning. These are the skills that our students will need to develop to adapt to new technology and the shifts those changes bring.

Not surprisingly, companies are planning for this trend as well. Eighty-two percent of organizations are planning to invest in learning and training on the job, while 80% look to accelerate the automation of processes through the use of new technology.

Even if our students do not end up working in an AI field, they will almost certainly need to be prepared for jobs infused with AI technology and job skills that will continue to evolve regularly. In those conditions, the ability to work "with" AI will be increasingly important, as will the ability to adapt to change. Our students will need transferable, life-long skills that they can use to adapt and change along with continually evolving technology. And that almost certainly will include AI.

Arpan Chokshi, National Board Certified Teacher and instructional coach, sums this up nicely in his ASCD blog post Planning Professional Development on ChatGPT. He believes that everyone in education will need to review our practices through an AI lens. He points out,

"A child born today will graduate from high school in the year 2040. No one knows exactly what schools and society will look like then, but one thing is certain: our students will live, learn, and work in ways that will forever be changed by AI. While the pace of advancements in AI presents real challenges for educators, it's also an opportunity to create schools where each student leaves with the knowledge, skills, and disposition to adapt and thrive in a rapidly changing world."

With the right planning and mindset, we can prepare our students for success.

## AI in education solves --- it ensures adaptation.

**Schmelzer 24** [Ron Schmelzer, AI expert and writer @ Forbes, 5-28-2024, How AI Is Shaping The Future Of Education, Forbes, https://www.forbes.com/sites/ronschmelzer/2024/05/28/how-ai-is-shaping-the-future-of-education/] BZ

Today's workers are dealing with the reality that while AI might not necessarily come for their jobs, workers with AI skills will certainly be replacing workers without AI skills. Given the future workforce needs to be AI-ready, how is this going to impact education and learning? More importantly, how is the increasing use and adoption of AI impacting today's teachers and students?

The education ecosystem is already seeing profound and disruptive change with AI providing new tools not only for educators and school administrators, but also for students who leverage AI tools to assist with their work and also let them dive deeper into material they need to understand.

AI-Enabled Learning: Self-Directed, Self-Paced, and Self-Empowering

Honing in on this hot topic, Sal Khan, known for his breakthrough Khan Academy and education leadership, writes about how AI is going to revolutionize education in his new book "Brave New Words: How AI Will Revolutionize Education (and Why That's a Good Thing)". From Khan's positive perspective, he foresees that in the near future, AI will enable life-long learning by putting education access in the hands of anyone who wants to learn any topic. Students and educators will both use AI assistants that can educate and inform them on any topic at the required level of depth, and explain in a way that is most easily understood for each individual learner.

Furthering this idea, research firm Cognilytica writes about the concept of "Hyperpersonalized education" that will provide the lifelong learning we need from the moment we first learn how to speak and read, to the ongoing and continuous needs for education in our academic, work, and personal lives.

Indeed, we're already seeing the impact on AI from a learning perspective as people use Large Language Model (LLM) systems to answer questions and provide insights in a way that they used to do with web searching. As web searches have become polluted with search optimized results, clickbait articles, and too-long articles that most have no patience or attention to read, people are beginning to turn to AI-powered systems to provide direct, relevant, and context and level-appropriate responses to very specific needs. With this sort of power now in our hands, the current one-size-fits-all world of today's educational systems, online learning, videos, and online learning pales in comparison. For sure, the future of AI-enabled education is self-paced, self-directed, deeply responsive, and hyper personal to each learner's needs.

AI Challenges for Learning Institutions

Learning institutions from K-12 through higher education and beyond are grappling with both the opportunities of challenges with the expanding use of AI. When AI systems provide hyperpersonalized education at the fingertips of students, educators will need to rethink how they are ensuring that students retain material, learn critical life skills, and know how to apply those skills to a future in which AI is no doubt going to disrupt the workplace.

As a very reactionary approach, learning institutions have currently attempted to restrict or ban the use of AI on campuses and in learning environments. However this is an effort doomed to failure. With AI capabilities embedded on phones, devices, and in online and desktop applications of all sorts, even embedded in emerging operating systems, no doubt any attempts to ban the use of AI will simply backfire.

Rather than trying to stymie skills that today's students will need to learn in any case to survive in tomorrow's workforce, educators will need to embrace AI capabilities to create new forms of tailored educational content, provide AI-enhanced capabilities to make sure students are deeply engaged with the material and can apply that learning, as well as ensure that students are mastering critical AI skills that they can use in the future. Just as educators learned to embrace the Internet and web to enhance learning, so too will educators come to appreciate the necessary capabilities that AI brings to the table.

A Return of "Soft Skills"

Furthermore, as AI systems increasingly require human capabilities to extract more value, we'll see a resurgence in the value of so-called "soft skills" that are necessary to get full value from AI systems. To get value from generative AI prompts, people need to maximize their creativity, improve their critical thinking, increase collaboration with others, and improve their communication skills. These soft-skills have been put on the back burner over the past few decades as the "hard skills" of math, science, physics, biology, and

engineering-related skills took center stage. Interestingly, it's AI that's making the soft skills more of a necessity so that people can use AI to help with the harder skills.

All of these changes to education come at a precipitous time for higher education. Already many are rethinking the value that a very expensive higher education can offer, especially from schools that have been typically considered prestigious. With a changing future workplace, changing ways in which people can get educated, and changing values for expensive higher education degrees, no doubt AI is poised to accelerate many of the fundamental changes in education.

## Otherwise, employment tanks.

**SEO 24** [No Author, 12-2-2024, AI Replacing Jobs Statistics: The Impact on Employment in 2025, SEO.ai, https://seo.ai/blog/ai-replacing-jobs-statistics] BZ

The projection that approximately **45 million** American jobs might be overtaken by AI **by 2030** adds an extra layer of complexity to this narrative.

The Reality Check: Where Do We Stand Now?

In contrast to these colossal expectations, our current situation paints a more measured picture. 14% of workers have experienced job displacement due to AI, suggesting that the present impact is somewhat more restrained than the anticipation.

Half of businesses have indeed integrated AI into their operations, signifying the technology's growing presence.

However, the majority of businesses foresee computers replacing human tasks within 50 years, highlighting that while AI is a reality, it has not fully realized its potential for job replacement just yet.

Moreover, the influence of AI extends beyond employment statistics. It presents a formidable challenge in the context of pandemic recovery, potentially hindering the restoration of 42% of job losses incurred during these unprecedented times.

As we explore AI's impact on employment, we will delve deeper into the factors contributing to these dynamics and how individuals, industries, and economies adapt to the evolving landscape.

The 10 Most Impactful Statistics

Here's an overview of the ten statistics that impact human employment the most. These statistics provide insights into the current state of affairs regarding AI's influence on employment, spanning various industries, worker demographics, and societal concerns.

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In the next chapters we'll present all the details on the currently available statistics of the impact of AI on human employment.

The Current Impact of AI in the Workplace

1. AI Implementation in Businesses

According to IBM, a notable 77% of businesses are already integrating AI into their operations or actively exploring its implementation.

2. Addressing Job Replacement Concerns

A closer look reveals that concerns about AI replacing human jobs are not unfounded. A substantial 35% of businesses have already integrated AI, while an additional 42% are in the process of exploring its adoption.

While this doesn't necessarily equate to immediate job loss, the potential for workforce displacement becomes more significant as AI technology advances and becomes less dependent on human collaboration.

3. The Role of Business Size

IBM's data also shows that larger enterprises are twice as likely to embrace AI compared to their smaller counterparts.

The reason behind this discrepancy lies in the financial capacity of larger organizations, which can allocate resources to research and development, enabling them to readily adopt emerging technologies like AI.

However, it's worth noting that 41% of small businesses are actively devising AI strategies for their future endeavors.

4. Dominance of IT Professionals

Unsurprisingly, IT professionals stand at the forefront of AI utilization in the workplace, with a commanding 54% incorporating AI technologies into their daily tasks.

5. Wide Adoption Across Job Roles

Beyond IT professionals, the utilization of AI extends to various other roles. Data engineers account for 35%, developers and data scientists at 29%, security professionals at 26%, and customer service staff at 25%.

6. AI Adoption in Different Industries

When evaluating AI adoption within specific industries, it becomes evident that marketing and advertising lead the way with a notable 37% rate of Generative AI adoption, as per Statista's AI Adoption data.

7. Following Suit in Other Sectors

This trend is followed by the technology sector at 35%, consulting at 30%, teaching at 19%, accounting at 16%, and healthcare at 15%. These figures shed light on the diverse applications of AI across various professional domains.

8. Positive Perception of AI

A substantial 81% of office workers hold a favorable view of AI, per SnapLogic's findings. These employees believe AI positively affects their job performance and overall work experience.

9. Improving Efficiency and Decision-Making

Of the 400 office workers surveyed, 61% reported that AI enhances their efficiency and productivity, while 49% credited AI with improving their decision-making abilities.

10. Enhancing Work-Life Balance

Additionally, 51% of respondents expressed the belief that AI enables them to strike a better work-life balance, showcasing the multifaceted benefits of AI integration in the workplace.

The Reality of Job Displacement

Recent data from Socius reveals that 14% of workers have already experienced job displacement due to automation or AI.

While these figures indicate that current fears may exceed the actual impact, it's noteworthy that those affected often had higher expectations, with 47% suspecting job loss compared to 29% among those who hadn't experienced it.

However, the real cause for concern lies in the potential job losses anticipated.

11. AI's Contribution to Job Losses

In May 2023, a total of 3,900 job losses in the United States were directly attributed to AI, accounting for 5% of all job losses during that month. This placed AI as the seventh-largest contributor to job displacement.

The tech sector has seen a significant impact, with a staggering 136,831 job losses in the current year, marking the most substantial round of layoffs since 2001.

12. BT's Strategic Workforce Reduction

The renowned telecommunications company British Telecom (BT) has set forth an ambitious plan to reduce its staff by 10,000 employees over the next seven years, primarily utilizing AI and other automation strategies.

This decision is influenced, in part, by the expansion of AI-driven customer service technologies, such as chatbots, within the organization.

13. Wage Effects of Early AI and Automation

Evidence from sources like Business Insider and Forbes indicates that AI and automation have significantly impacted wages, causing up to 70% reductions since 1980. It's important to note that AI tends to level the playing field before replacing jobs, allowing individuals with varying skill levels to use AI to enhance their work quality. This, in turn, contributes to wage compression.

14. A Historical Perspective

This phenomenon has unfolded since 1980, with blue-collar workers experiencing wage decreases ranging from 50% to 70%, particularly those who were either replaced or had their roles diminished by early automation and rudimentary AI.

15. Shifting Impact on White-Collar Professionals

Contrasting with the historical impact on blue-collar workers, AI-driven job disruption focuses on educated, white-collar workers earning up to $80,000 annually.

This is primarily due to the automation of roles that involve programming and writing skills, a transformation exemplified by technologies like ChatGPT.

These developments signal a paradigm shift in the job market dynamics, with white-collar professionals now facing a new set of challenges posed by generative AI.

Perceptions of Job Replacement

In a comprehensive survey spanning 44 countries and territories, encompassing 52,000 participants, PwC reveals that nearly 30% of workers harbor concerns that their jobs might succumb to technological replacements, particularly from advancements like AI, in the upcoming three years.

16. Training and Skill Development Worries

Furthermore, the study highlights that 39% of respondents express apprehension regarding the adequacy of training provided by their employers in emerging digital and technology skills.

This concern underscores the critical need for upskilling and reskilling initiatives in the face of technological disruption.

17. AI Job Fear in India

Microsoft's 2023 Work Trend Index report unveils a stark scenario in India, where an overwhelming 74% of the workforce harbors deep-seated anxieties about AI's potential to replace their jobs.

Nevertheless, despite these apprehensions, 83% of Indian workers express willingness to delegate as much work as possible to AI to alleviate their workloads, reflecting a complex relationship between fear and acceptance of AI.

18. Divergent Views Across Age Groups

BMG Research findings indicate notable generational differences in concerns related to AI job displacement. A substantial 52% of individuals aged 18 to 24 express worries about the impact of AI on their future careers.

In contrast, older workers may not confront the full force of AI job disruption as they approach retirement.

19. Digital Marketing Industry's Perspective

Within the realm of the marketing industry, where AI adoption is notably high, anxiety about job displacement is palpable.

A striking 81.6% of digital marketers hold concerns about content writers losing their jobs due to AI's influence. This is particularly evident as AI-driven chatbots now compete with human content creators, capable of generating passable content from basic topic prompts.

20. OpenAI and the Grave Risks

It's not just workers who are sounding the alarm; notable figures in the AI community and beyond are raising their voices. CEOs of AI-focused firms, such as OpenAI, have joined forces in an open letter, cautioning against the profound risks posed by AI.

This coalition includes luminaries like Bill Gates, Sam Altman, CEO of OpenAI, Demis Hassabis, CEO of Google DeepMind, Emad Mostaque of Stability AI, and many others.

21. Global Priority for Risk Mitigation

The open letter emphasizes that addressing the risk of existential threats from AI should be elevated to a global priority, on par with other critical societal-scale risks like pandemics and nuclear warfare.

This unified statement underscores the gravity of the AI-related concerns held by prominent figures in the field.

## Don't Fear Change, Prepare For It

These statistics shed light on workers' and industries' current realities and concerns.

As we navigate this transformative journey, it's crucial to strike a balance between anticipation and adaptation, harnessing the potential of AI while addressing the genuine fears it engenders.

These numbers provide a compass to navigate the web of AI's impact on human jobs, illuminating both the present and the path ahead.

Stay informed, stay adaptable, and stay ready for the future of work in the age of AI.

### Adaptation is key to maintaining primacy.

**Allen 19** [John R. Allen, retired U.S. Marine Corps four-star general and former commander of the NATO International Security Assistance Force with expertise in emerging tech, 1-31-2019, Why we need to rethink education in the artificial intelligence age, Brookings, https://www.brookings.edu/articles/why-we-need-to-rethink-education-in-the-artificial-intelligence-age/] Bellaire MC + recut BZ

I've studied and written extensively about the effects of AI/ET on the evolving character of war toward a concept I've called hyperwar—or, a new era of warfare in which, through AI, the speed of decision-making is faster than anything that has come before. At a superficial level, this topic often devolves into a discussion of "killer robots," or at the very least, the impending use of AI in lethal autonomous weaponry. While those discussions are relevant and inextricably linked, they represent a narrow understanding of the greater issues at hand. The concern over AI's potential or theoretical military applications must not distract us from how far-reaching the impact of AI will be in nearly all other policy domains. Health care, education, agriculture, energy, finance, and yes, national security, will all be reshaped in some way by AI—with education being the pivot point around which the future of the United States revolves. This is not solely a matter of social redress, but, in fact, a larger national issue.

A future in which the United States is second in the race for AI technology would create a situation of national technological and digital/cyber inferiority, which could in turn result in national strategic subservience.

The way we use education to prepare our next-generation of leaders will directly determine whether the U.S. retains its leadership in critical fields of relevance in the emerging digital environment. Without a sufficiently educated population and workforce, the U.S. likely will slip behind other states for whom AI/ET is not only means for improved social organization, but for strategic superiority, and ultimately digital and physical conquest. A future in which the United States is second in the race for AI technology would create a situation of national technological and digital/cyber inferiority, which could in turn result in national strategic subservience—something simply unimaginable.

Many Americans grew up with the understanding that the American capacity to fight and win a nuclear war was defined by its superiority in the Strategic Triad, the three legs of our strategic deterrence: our missile squadrons, our bomber fleet, and our ballistic missile submarines. Behind that dizzying array of hardware was the undisputed power of U.S. intellectual and technical capabilities, and behind that was a near unlimited supply of talented engineers, each trained by a system of education undisputed in its excellence. That system was built from the ground up to produce crucial STEM (science, technology, engineering, and math) protégés in the quantities needed to ensure American strategic superiority, which contributed directly to the U.S. and its allies prevailing in the Cold War. For the health of our American way of life, our competitive advantage, and the strategic security of our nation, the basis for tomorrow's system of education must reflect a deliberately tuned and calibrated system that proactively emphasizes AI/ET, big data analytics, and super-computing.

Unfortunately, in both relative and absolute terms, the U.S. is falling behind in the race for superiority in these key technologies. Where the U.S. strategic advantage of the 20th Century was secured by American nuclear superiority, U.S. superiority in the 21st Century will likely be preserved, safeguarded, and sustained through a system of education that envisages the changes necessary and sufficient to embrace and apply relevant technologies. It will also be underwritten by educators who grasp the profound shifts in the pedagogical skills essential to the educational needs of the 21st Century.

The need to adapt is great—and for this system to be fully embraced it must come in the form of a comprehensive and national U.S. strategy for education in the digital age, to include the resources necessary to bring education into the digital classroom, and to educate and train entire generations of educators to be relevant in the 21st Century and beyond. The United States must at all costs preserve its position of primacy in AI, big data, and super-computing, and that can only be done through a highly educated population and derivative work force, and even-further through leaders who understand these issues on a fundamental level and have the political will to develop and resource a comprehensive plan for reimagining our national education efforts.

### Decline triggers lash out.

**Kim 19** [Min-Hyung Kim, Professor of Political Science at Kyung Hee University, 2-4-2019, A real driver of US–China trade conflict: The Sino–US competition for global hegemony and its implications for the future, International Trade Politics and Development, https://www.emerald.com/insight/content/doi/10.1108/itpd-02-2019-003/full/html#sec005, Willie T.]

China's rise and PTT

US hegemony over the last seven decades or so has **recently been challenged by China's rise**. Since the economic reforms launched in December 1978, China has achieved a remarkable economic development. China's real-Gross Domestic Product (GDP) growth rate over the last four decades is about 10 percent on average (World Bank, 2018; also see Kim, 2016b, p. 707). While the size of China's economy (in terms of GDP) is currently the number two in the world only after the USA, China already became the world's largest exporter in 2010. In 2011, China ranked as the world's first destination for inward foreign direct investment (FDI) and the world's first investor for outward FDI among developing countries[4]. Also, in 2013, China became the world's largest trading country in goods, overtaking the USA (Anderlini and Hornby, 2014). Moreover, measured on a purchasing power parity basis that adjusts for price differences, China ranked in 2017 as the world's number one (Central Intelligence Agency, 2018). Given that China's size of GDP on a PPP basis in 1980 was one-tenth that of the USA, China's economic growth is truly remarkable (International Monetary Fund, 2018).

China's rapid ascendance as an alternative hegemonic power poses a significant challenge to US hegemony in the world. As a matter of fact, competing with the USA in many areas, China has quickly strengthened its economic, technological and military power and as a consequence has started to threaten US global hegemony. Accordingly, many scholars now often talk about a **declining US hegemony and a forthcoming Chinese hegemony** (see, for instance, Layne 2018, 2012). Some of them even predict a hegemonic war between the USA and China during the hegemonic transition period (see, e.g., Liff and Ikenberry, 2014; Mearsheimer, 2014; Friedberg, 2005).

Underlying these arguments for an inevitable war between the two superpowers is PTT. PTT originally formulated by Organski (1958) posits that war is likely when the power of the dominant state in the international system (i.e. hegemon) is declining and that a dissatisfied rising challenger substantially reduces the power gap between the hegemon and itself. Unlike balance of power theory, PTT argues that the war is most likely when there is **near power parity** between a dominant state and a rising and dissatisfied challenger (Organski and Kugler, 1980, pp. 19-20)[5]. A rising power here is generally dissatisfied with the existing international order and initiates war against a declining hegemon in order to impose orders that are more favorable to itself (Organski 1958, pp. 364-367). Layne (2018, p. 110) put these power transition dynamics quite succinctly as follows: "Over time, however, the relative power of states changes, and eventually the international order no longer reflects the actual distribution of power between or among the leading Great Powers. When that happens, the legitimacy of the prevailing order is called into question, and it will be challenged by the rising power(s)." And when the balance of power between a dominant state and a rising challenger changes sufficiently, a new order replaces an old one typically by a hegemonic war (2018, p. 104). Paying close attention to the growing Sino–US competition over hegemony in the twenty-first century, therefore, Shirk (2007, p. 4), China specialist, argues that "History teaches us that rising powers are likely to provoke war."

On the other hand, scholars like Gilpin (1981) contend that the power transition war between great powers is **likely** to occur when a hegemonic state whose power is **declining** due to imperial overstretch[6] views "**preventive** war as the **most attractive means** of eliminating the threat posed by challengers" (Ned Lebow and Valentino, 2009, p. 391), although they do acknowledge that there might be some "ways to prolong the period of its power preponderance vis-a-vis the rising challenger, so that the rapidly rising power will not dare to challenge the hegemonic leadership"(Kim and Gates, 2015, p. 221). In this case, the initiator of war is a declining hegemon, rather than a rising challenger. The declining hegemon who fears a rising challenger's overtaking its power in the near future sees war as a better option than other options of maintaining its hegemony such as reducing its commitments abroad and appeasing a rising challenger.

China's challenges to US hegemony

In light of the power transition perspective, the three most recent examples of China's challenges to US hegemony in the world are the Belt and Road Initiative (BRI), the creation of the AIIB, and Beijing's plan for "Made in China 2025."

First of all, China's BRI, which is also called the "One Belt, One Road" Initiative or the Initiative of "the Silk Road Economic Belt and the 21st-Century Maritime Silk Road," is Chinese President Xi Jinping's signature project. The BRI was first announced in 2013 when Xi visited Central and Southeast Asia. It seeks to connect Asia, Africa and Europe to promote regional economic cooperation, infrastructure construction, and world peace. It was motivated by "the Silk Road Spirit" (i.e. peace and cooperation, openness and inclusiveness, mutual learning and mutual benefit) of more than two millennia ago that is, China claims, "a historic and cultural heritage shared by all countries around the world" (The State Council of the Republic of China, 2015). According to the "Action Plan on the Belt and Road Initiative" published jointly by the National Development and Reform Commission, the Ministry of Foreign Affairs, and the Ministry of Commerce (MOFCOM), accelerating the construction of the BRI "can help promote the economic prosperity of the countries along the Belt and Road and regional economic cooperation, strengthen exchanges and mutual learning between different civilizations, and promote world peace and development" (The State Council of the Republic of China, 2015). Hence, Beijing contends that BRI "is a great undertaking that will benefit people around the world" (The State Council of the Republic of China, 2015). The BRI currently includes about 70 countries that accounts for 70 percent of the world's population, 55 percent of the world's Gross National Product and 75 percent of global energy reserves (Cavanna, 2018). Many countries in the world (e.g. "from Panama to Madagascar, South Africa to New Zealand" (Kuo and Kommenda, 2018)) have officially pledged support for the BRI.

Second, the AIIB is a China-led multilateral development bank, which was originally launched by Chinese President Xi in 2003. Among others, Beijing's frustration with the slow reform process of economic governance in the aftermath of the global financial crisis in 2008, its intention to popularize the Renminbi (China's currency) as a global reserve currency, and its hope to increase its voice in global financial institutions were the important motivations of the creation of the AIIB. With $100bn of initial capital, the AIIB, headquartered in Beijing, officially came into operation in January 2016. The stated main goal of the AIIB was to "improve social and economic outcomes in Asia" (AIIB, 2018a) by providing finance to the various infrastructure projects of the region's developing countries. Beijing claims that AIIBfunded projects will better connect people, markets and services to promote sustainable growth, development, and prosperity (AIIB, 2018b). Along with the New Development Bank (NDB),[7] which is formally called the BRICS (Brazil, Russia, India, China, South Africa) Development Bank headquartered in Shanghai, and Chinese lending institutions such as the Silk Road Fund and Chinese policy banks, the launch of the AIIB represents China's major financial initiatives that could rival US-led multilateral institutions. As of October 2018, the AIIB has 87 approved members (68 members and 19 prospective members) around the world and its total investment amounts up to $6.4bn. As Tekdal (2017, p. 375) notes, although the AIIB has no official link to the BRI, a primary motivation of its creation was to fund projects in BRI partner countries. As an emerging economic hegemon, which is dissatisfied with the global economic governance in which its voting share in the existing multilateral institutions like the IMF, the World Bank, the Asian Development Bank does not match its economic power as the world's second largest economy and the world's biggest trading nation, China's initiatives of the BRI, the AIIB and the NDB demonstrate its long-term goal of reshaping the global economic order.

Third, "Made in China 2025" is Beijing's ten-year industrial development plan. First, announced and approved by China's State Council in 2015, it is "a blueprint for Beijing's plan to transform the country into a high-tech powerhouse that dominates advanced industries like robotics, advanced information technology, aviation, and new energy vehicles" (Laskai , 2018). By enhancing Chinese industries' competitiveness and innovation and reducing China's dependence on foreign technology through achieving 40 percent of domestically manufactured basic components and basic materials by 2020 and 70 percent of selfsufficiency in core components and basic materials in industries like aerospace equipment and telecommunication equipment by 2025 (Morrison, 2018, p. 47; Laskai, 2018), its goal is to make China a manufacturing superpower that dominates the world market in future hightech industries. Indeed, while the term "Made in China" has typically meant cheap products such as clothing, shoes and consumer electronics with low quality, "Made in China 2025" intends to turn China into an independent and cutting-edge technology-driven economy. Beijing believes that by moving toward higher value-added high-tech industries, they could escape the so-called "middle-income trap that has plagued many developing countries" (Hopewell, 2018) with the problems of increased wages and low productivity.

US efforts to prolong US hegemony China's initiatives of the BRI, the AIIB and Made in China 2025 certainly threaten the global hegemony of the USA, which is now over seven decades. Layne (2018, p. 96) points out that "Since the onset of the Great Recession,[8] China has successively taken top position in the world in exports (passing Germany); in trade (passing the USA); and in manufacturing (claiming a title the USA had held for a century)." Based on these facts, he argues that the Great Recession and the rapid rise of China as a leading economic power have demonstrated the reality of American decline – i.e. the end of the unipolar era or Pax Americana[9] (Layne, 2012, p. 204). Although China repeatedly claims that it does not seek to replace US hegemony in the world, its behavior revealed by the initiatives of the BRI, the AIIB and Made in China 2025 illustrates that its ultimate goal is to be a global hegemon[10]. This is not surprising because all the rising powers in history invariably sought to first dominate the region they are situated (Mearsheimer, 2011, 2014) and expand their power globally (Gilpin, 1981). Given that "It is more difficult for the leaders of a declining hegemon to accept the reality or prospect of their country's diminished influence and status"(Chan, 2008, p. 50), the USA has every reason to prolong its hegemony in the post-1945 world, which has served its own interests (Layne, 2018, p. 105). These efforts to maintain US hegemony are well observed in the case of American actions against China's initiatives of the BRI, the AIIB and Made in China 2025. First of all, despite China's claim that the BRI aims to promote world peace and development, many analysts in Washington view it as a Chinese version of Marshall Plan that seeks to boost Chinese investment around the world for global dominance. They think that as "a top-level design for which the central government has mobilized the country's political, diplomatic, intellectual, economic and financial resources" (Rolland, 2018), the BRI is Beijing's "attempt to remake global commerce on China's terms and project Chinese power far and wide" (Chellaney, 2018). As the BRI expands in scope, it could give China too much leverage and control over other countries, especially those that are small and poor (Kuo and Kommenda, 2018). Also, by making China a major hub of global investment, trade, and finance, the BRI contributes to build a Chinese version of hub-and-spoke network system. Thus, Harry Harris, head of US Pacific Command Admiral, argued in early 2018 that the BRI is "a concerted, strategic endeavor by China to gain a foothold and displace the USA and our allies and partners in the region" (Harris, 2018). Moreover, given "almost all the ports and other transport infrastructure being built can be dual-use for commercial and military purposes" the BRI is regarded not simply as China's plan to build roads and railways across Eurasia and Africa or the Indo-Pacific, but as Beijing's grand strategy for the next decades and its vehicle to write new rules that reflect Chinese interests (Kuo and Kommenda, 2018). Indeed, Beijing has made a link between the BRI and the concept of China's core national security interests. For example, Wei Fendge, China's Defense Minister, told Pakistan's Navy chief in 2018 that "China was ready to provide security guarantees for the One Belt, One Road project" (Smith, 2018). Therefore, Eisenman contends that with no exact definition of its scope and contents, the BRI is China's attempt to "create a new Sinocentric era of globalization using both traditional tools of Chinese statecraft as well as new types of economic incentives and debt financing arrangements" (Eisenman, 2018). In other words, the BRI reflects China's increasing relative power in the world as well as growing Beijing's ambitions to shape global economic governance (Tekdal, 2017, p. 378). It "exemplifies how China is flaunting its global

ambitions" (Chellaney, 2018). As the BRI is increasingly seen as a major source of China's political and economic influence of the world, US policy makers have expressed their concerns[11] and have begun to take some measures against it. For example, the USA, along with Japan and India, have discussed trilateral efforts to foster infrastructure development in the Indo-Pacific region since 2015. In particular, the Trump Administration has sought to create a development finance mechanism, which is designed to counter the negative effects of the BRI. It has also begun to explore ways to become more proactive in promoting regional connectivity and infrastructure initiatives in partnership with Japan. Moreover, reviving their Quadrilateral Strategic Dialogue in November 2017, the USA, together with Japan, Australia and India, discussed not only the need to foster a new vision for regional infrastructure but also the need to further support the Asian Development Bank and the World Bank in order to enhance lending for infrastructure projects in the region. Furthermore, the joint statement released after the meeting between the US President Trump and India's Prime Minister Modi at the White House in June 2017 made it clear that the two countries agreed to promote a vision for regional ties by strengthening "regional economic connectivity through the transparent development of infrastructure and the use of responsible debt financing practices, while ensuring respect for sovereignty and territorial integrity, the rule of law, and the environment" (The White House, 2017). This is, in fact, an announcement by the leaders of the two countries of the vision, which is completely at odds with the BRI. In addition, drawing careful attention to the "neo-colonialist characteristics"[12] of the BRI, the US–Japan Business Council and the US–India Business Council jointly launched in May 2018 a new private-sector initiative, called the Indo-Pacific Infrastructure Trilateral Forum, which aims to insulate sovereign states from external coercion, support good governance and liberty, promote market-based economics, and help support quality and sustainable infrastructure development in the Indo-Pacific region (Smith, 2018). Likewise, the USA sought hard to prevent the creation of the AIIB. Despite its stated goal of helping to finance the various infrastructure projects of the developing countries in Asia, the USA viewed the AIIB as China's efforts to weaken existing financial institutions such as the World Bank, the IMF and the Asian Development Bank, which are largely under the influence of the USA and its close ally, Japan (Kim, 2018, p. 618; Kim, 2016c, p. 69). Hence, the USA strongly lobbied against the creation of the AIIB. Washington even pressured its allies not to agree to the AIIB's creation. Although US opposition to the AIIB was reportedly due to US doubts that the AIIB would stick to the same level of transparency and governance structure as the IMF, the World Bank and the Asian Development Bank, the real reason was Washington's concerns about the shifting balance of power between the USA and China (Layne, 2018, p. 103). In any case, US efforts to prevent a China-led financial institution in Asia miserably failed. Indeed, despite USA's strong resistance and pressures, the AIIB was successfully launched and most US allies except Japan (e.g. Germany, Great Britain, France, Italy, Australia, Israel, South Korea, etc.) joined the AIIB as its founding members. In total, 57 countries all over the world participated in the AIIB as its founding members. After all, China's ability to attract widespread support for the creation of the AIIB was seen by Washington as a significant threat to America's global economic leadership (Layne, 2018, p. 102). By showing that Washington was not able to keep its allies onside in the face of Beijing's growing power, the establishment of the AIIB illustrated that US economic power in the world is declining whereas China's economic influence is increasing. To some observers, China's AIIB initiative and US failure to prevent its creation signaled that"the Sino-American balance of power now is tilting towards Beijing" (Layne, 2018, p. 103). By the same token, Washington views China's initiative of"Made in China 2025" as a very serious challenge to US hegemony in the world. Since Made in China 2025 calls for achieving China's self-sufficiency through technology substitution and aims to transform China into a high-tech powerhouse that dominates advanced industries, the USA views it as a real threat to US technological leadership in the world (Laskai, 2018). According to the US President Trump, the Made in China 2025 program unfairly disadvantages US companies because it involves Chinese government's subsidies and heavy investments in innovation and research as well as Beijing's policies to promote the forced technology transfer of US companies in exchange for obtaining access to the lucrative Chinese market (Hopewell, 2018). Therefore, he contends that "Made in China 2025" must be stopped (Landler, 2018). Although the Trump Administration's policy of imposing tariffs on foreign steel affects not only China but also US allies like South Korea, its main goal is to fight China's industrial policy in high-tech manufacturing sectors such as artificial intelligence, aerospace, robotics, and energy-saving vehicles. As China's persistent economic growth brings it into direct competition with the USA, Trump has explicitly stated that the proposed US tariffs are indeed designed to impede the program of Made in China 2025 (Hopewell, 2018). Seen from Beijing, this sort of US policy appears as if Washington aimed to "prevent China (from) moving into the industries of the future so as to ensure continued American dominance of the most profitable sectors of the global economy, and the most strategically-significant technologies" (Rachman, 2018). Given that China is the most serious competitor to the USA in the twenty-first century, the contest over future industries and technologies underscores the fact that the Sino–US trade rivalry has important strategic implications (Rachman, 2018).

Conclusion

Since the end of the Second World War, the USA has undoubtedly been a global hegemon. With its preponderant military and economic strength, it has created a liberal international economic order and maintained it by promoting global free trade. USA sudden turn to protectionism under the banner of "America First" in the Trump administration illustrates "US fear"that its hegemony or Pax Americana is declining **vis-a-vis China's growing power**. It also demonstrates that the USA now seeks to deter China from overtaking its hegemony so as to keep US hegemony as long as possible.

Currently, the USA and China are waging a trade war. What is important to note here is that the driving force of the trade war between the world's two largest economies is more political than economic. That is to say, as China's economic and political influence in the world vis-a-vis that of the USA increases, US fear about China's power also grows. Under these circumstances, Washington makes every effort to **assert its global dominance** by deterring China's challenge to its hegemony[13]. It is this sort of "US fear" about hegemonic power transition from Washington to Beijing that brought about US policies against the BRI, the AIIB, and Made in China 2025. The fear of hegemonic power transition is indeed a driving force for the US-launched trade war. Understood this way, the trade war between the USA and China may be a harbinger of a much larger-scale conflict between the two parties, since as PTT predicts, war is more likely to occur when the power gap between a **declining hegemon and a rising challenger** is getting closed.

As China's economic, technological, military and political rise continues down the road, the USA will try to contain it in order to maintain its global hegemony. The obvious consequence of this **seesaw** game is the intensification of the Sino–US competition over global hegemony. The USA and China, the two most powerful states in the world, appear as if they were on a **collision course**. What this means is that so long as US fear about China's overtaking US hegemony persists, a similar type of conflict between the two hegemonic powers is **likely** to occur in the future **even if the current trade war is over.**

## AND, AI jobs displacement causes economic decline.

**Ford 16** [Martin Ford is a futurist and the author of four books, including Rule of the Robots: How Artificial Intelligence Will Transform Everything (2021), the New York Times Bestselling Rise of the Robots: Technology and the Threat of a Jobless Future (winner of the 2015 Financial Times/McKinsey Business Book of the Year Award and translated into more than 20 languages), Architects of Intelligence: The truth about AI from the people building it (2018), and The Lights in the Tunnel: Automation, Accelerating Technology and the Economy of the Future (2009). He is also the founder of a Silicon Valley-based software development firm. January 1, 2016, "The Rise of the Robots: Technology and the Threat of Mass Unemployment," Basic Books, http://digamo.free.fr/marford15.pdf]

The alien invasion parable is admittedly extreme. Perhaps it would work as the plot for a really low-budget science fiction movie. Nonetheless, it captures the theoretical endpoint of a relentless progression toward automation—at least in the absence of policies designed to adapt to the situation (more on that in Chapter 10). The primary message this book has delivered so far is that **accelerating technology is likely to increasingly threaten jobs** across industries and at a wide range of skill levels**. If such a trend develops, it has important implications for the overall economy. As jobs** and incomes **are relentlessly automated away, the bulk of consumers may eventually come to lack the income** and purchasing power **necessary to drive the demand that is critical to sustained economic growth. Every product and service** produced by the economy **ultimately gets purchased** (consumed) by someone. **In economic terms, "demand" means a desire** or need for something, backed by the ability and willingness to pay for it. **There are only two entities that create final demand for products and services: individual people and governments**. Individual consumer spending is typically at least twothirds of GDP in the United States and roughly 60 percent or more in most other developed countries. The vast majority of individual Consumers, Limits to Growth . . . and Crisis? 197 consumers, of course, rely on employment for nearly all of their income. Jobs are the primary mechanism through which purchasing power is distributed. To be sure, **businesses also purchase things, but that is not final demand. Businesses buy inputs** that are **used to produce something else. They**

**may also buy things to make investments that will enable future production**. However, **if there is no demand** for what the business is producing**, it will shut down and stop buying inputs**. **A business may sell to another business**; but **somewhere down the line, that chain has to end at a person** (or a government) buying something just because they want it or need it. The essential point is that a worker is also a consumer (and may support other consumers). **These people drive final demand**. **When a worker is replaced by a machine**, **that machine does not go out and consume.** The machine may use energy and spare parts and require maintenance, but again, **those are business inputs, not final demand. If there is no one to buy what the machine is producing, it will ultimately be shut down.** An industrial robot in an auto manufacturing plant will not continue running if no one is buying the cars it is assembling.* So **if automation eliminates a substantial fraction of the jobs** that consumers rely on, **or if wages are driven so low** that very few people have significant discretionary income, **then it is difficult to see how a modern mass-market economy could continue to thrive**. Nearly * Not all robots are used in production, of course. There are also consumer robots. Suppose you someday own a personal robot, capable of doing things around the house. It may "consume" electricity and require repair and maintenance. However, in economic terms, you are the consumer—not the robot. You need a job/income or you won't be able to pay for the operating costs of your robot. **Robots don't drive final consumption—people do.** (Assuming, of course, that robots are not truly intelligent, sentient, and accorded the economic freedom that would be necessary for them to act as consumers. We'll consider that speculative possibility in the next chapter.) TS **all the major industries** that form the backbone of our economy (automobiles, financial services, consumer electronics, telecommunications services, health care, etc.) **are geared toward markets consisting of many millions of potential customers**. **Markets are driven not just by aggregate dollars but also by unit demand**. **A single very wealthy person may buy a very nice car**, or perhaps even a dozen such cars**. But he or she is not going to buy thousands of automobiles**. **The same is true for mobile phones, laptop computers, restaurant meals, cable TV subscriptions, mortgages, toothpaste, dental checkups, or any other consumer good or service you might imagine**. In a mass-market economy**, the distribution of purchasing power among consumers matters a great deal**. **Extreme income concentration among a tiny sliver of potential customers will ultimately threaten the viability of the markets that support these industries.**

### That causes great power war.

**Brands 21** [Hal Brands, professor @ John Hopkins University and senior fellow @ the American Enterprise Institute, 5-14-2017, China Is a Declining Power—and That's the Problem, Foreign Policy, https://foreignpolicy.com/2021/09/24/china-great-power-united-states/] tristan

Slowing growth makes it harder for leaders to **keep the public happy**. Economic underperformance **weakens the country against its rivals**. Fearing **upheaval**, leaders crack down on dissent. They maneuver **desperately** to keep geopolitical enemies at bay. **Expansion** seems like a solution—a way of grabbing economic **resources and markets**, making **nationalism** a crutch for a wounded regime, and beating back foreign threats. Many countries have followed this path. When the United States' long post-Civil War economic surge ended, Washington violently suppressed strikes and unrest at home, built a powerful blue-water Navy, and engaged in a fit of belligerence and **imperial expansion** during the 1890s. After a fast-rising imperial Russia fell into a **deep slump** at the turn of the 20th century, the tsarist government cracked down hard while also enlarging its military, seeking colonial gains in East Asia and sending around 170,000 soldiers to occupy Manchuria. These moves backfired spectacularly: They antagonized Japan, which beat Russia in the first great-power war of the 20th century. A century later, Russia became aggressive under similar circumstances. Facing a severe, post-2008 economic slowdown, Russian President Vladimir Putin **invaded two neighboring countries**, sought to create a new Eurasian economic bloc, staked Moscow's claim to a resource-rich Arctic, and steered Russia deeper into dictatorship. Even democratic France engaged in anxious aggrandizement after the end of its postwar economic expansion in the 1970s. It tried to rebuild its old sphere of influence in Africa, deploying 14,000 troops to its former colonies and **undertaking a dozen military interventions** over the next two decades. All of these cases were complicated, yet the pattern is clear. If a rapid rise gives countries the means to act boldly, the **fear** of decline serves up a powerful motive for rasher, more urgent expansion. The same thing often happens when fast-rising powers cause their own containment by a hostile coalition. In fact, some of history's most gruesome wars have come when revisionist powers concluded their **path to glory was about to be blocked**.

# EQUAL ACCESS

## Historically, access to education has been limited for students by financial barriers and systemic challenges

Katherine **Hogan**, 05-06-20**24**, "Tracing the History of Accessibility in Education", StoryMaps, https://storymaps.com/stories/18fb261ce5c54b179d3da728b652c928 [Katherine Hogan is an author at Storymaps] DOA: 2/24/2025 //RRM

Since then, landmark legislation has passed to provide better accessibility and quality of education. One of the most significant pieces of legislation that influenced accessibility was the case of Brown vs. Board of Education. The Supreme Court case overruled Plessy vs. Ferguson, the case that set the precedent for "separate but equal" public areas, including public schools. The court case ruled that "separate but equal" was a direct violation of the 14 Amendment that granted citizenship to born or naturalized citizens and granted everyone equal protection under the law. This legislation was one of the steps towards accessible education. Placing everyone, regardless of race, into the same schools, ensured that all were receiving the same resources. Since then, other monumental legislation has continued to be passed. Regarding individuals with disabilities, the Individuals with Disabilities Act, or IDEA, was passed in 1990 and has created a more inclusive environment for all with disabilities. The act states that "students with a disability are provided with a free appropriate public education that is tailored to their individual needs", according to Wikipedia. This act has resulted in the creation of Individual Education Plans, or IEPs, that provide structure to an individual's educational goals, services, and accommodations. IEPs are just one example of how legislation has resulted in a positive change in educational accessibility. In terms of gender equality, Title IX was released in 1972 under the Equal Rights Amendment Act. Title IX prohibits any discrimination based on sex in educational organizations, opportunities, and activities. In my opinion, these are the three biggest pieces of legislation that have increased accessibility to education and have had profound effects on how our education system is today. A lack of accessibility in education has been a result of various socioeconomic factors. **Income disparities and geographical disparities are three of the biggest socioeconomic factors that influence education. Income disparities are the differences in wealth, assets, income and their distribution across individuals or populations. An** example of income disparity is the gender wage gap, the difference between the earnings in men and women. In 2022, women typically made 82 cents for every dollar a man made. The main educational boundaries that income disparities create are a lack in resources and poor quality of schools. Families with higher incomes are more likely to have access to resources that can better their education. Examples being expensive, high-quality preschool, or expensive SAT and ACT test prep programs. Higher income families have access to tutoring and a variety of extracurricular activities, ones that are outside of what the public school system has to offer. It is not uncommon for lower income communities to suffer from poor quality schools in comparison to wealthier counties. **Lower income schools tend to be lower funded, and suffer from overcrowded classrooms, outdated resources, and fewer extracurriculars.** In a data collection study done by The Commonwealth Institute, high income and low-income schools are compared. The study looks schools that have at least 75% of their students on free and reduced lunch, and schools that have only 25% of students on the free and reduced lunch program. Free and reduced lunch is a national school lunch program that provides a nutritionally balanced, low cost or free, lunches to low-income families who struggle providing food for their family. High poverty schools in Virginia are 83% people of color, and the other 17% is white students. Teachers at these schools makes almost $11,000 less than schools with low poverty. In addition, the curriculum at high poverty schools tends to be substantially worse than those at lower poverty schools. Income disparity plays a huge role in accessibility to education, and it is not fair that students with lower income backgrounds may receive worse quality education than their high family income peers. Just as income influences education, geography does too. There are a variety of geological disparities that play a role in the quality of education students are receiving. For starters, rural vs. urban areas face huge discrepancies in how their education is funded. Rural areas are likely to not have access to as many schools as students in an urban area do and are more likely to have to travel farther to schools. This is due educational establishments being created based on population density, and with rural areas having lower populations, they have less access to schools. In comparison to urban areas, rural school districts tend to have lower taxes, results in lower state funding for schools. Likewise, rural areas are far more likely to have worse quality curriculums than urban areas. To have AP and IB classes, schools need to have the properly educated teachers to provide the curriculum. Likewise, the lack of advanced education courses can result in a lack of readiness for higher education or job opportunities or fail to challenge students academically. Just as high- and low-income impact educational accessibility, geography does too. Again, it is not fair for students to receive worse education based on their location. Legal frameworks, better known as all legislation, the Constitution, contracts, and regulations, have the most power to help, and hurt, educational accessibility. In the past century, legislation has been passed to improve educational accessibility. IDEA was a major step towards expanding education accessibility. Since then, the Americans with Disabilities Act has been passed, that prohibits discrimination by any federal or state funded public entities, ensuring than individuals with any physical, mental, or learning disabilities cannot be refused education. Every Student Succeeds Act supports the success and

growth for every single student. It calls on schools to be accountable and flexible when creating resources and opportunities for all students. Likewise, the Higher Education Opportunity Act makes higher education institutions responsible for providing accommodations and accessibility to students with disabilities to have the same opportunities as anyone else. However, this legal framework has not ruled out discrimination and prejudice for marginalized groups. Students of low income receive worse education. Students of color have higher suspension and expulsion rates and are more likely to be disciplined without additional education. This results in students of color spending less time in the classroom. Black students are almost 3 times more likely to receive referrals to law enforcement and be arrested in school. **Additionally, schools with 90% students of color spend almost $800 on resources less than schools with 90% white students. Th**ese are just a few examples of how people of color face challenges when it comes to receiving accessible and equitable education. Another minority group that lacks representation and resources when it comes to accessible education is the homeless and foster care population. Instability and a lack of stability in living or housing situations causes for a disrupt in education. Moving around results in the changing of schools and frequent absences from school. Without a stable guardian or adult to have responsibility over students, students tend to skip school and receive poor grades when they do not have an adult to hold them responsible. For many low-income students, they receive basic necessities and are feed through their school programs. When students are not consistently attending school, they are unable to receive the food and care that school provides the. Another thing that homeless and foster care students miss out on are relationships. They lack the relationships with adults, teachers, and counselors who can be checking up on them. They lack the foundational relationships with peers who make them into who they are. Public and private schools lack the options to aid these students who do not have consistent support systems and backgrounds. Lastly, LGBTQ+ students are affected tremendously by the lack of accessibility in education. Schools are not made to cater to some of the unique needs of LBGTQ+ students. There is a lack of resources that can meet specific needs, such as LGBTQ+ counseling and education. Additionally, there is a lack of anti-discrimination and bullying policies to help students facing harassment. There are challenges and gaps in legislation that fail to protect marginalized groups and provide them with the accessibility to education that others are provided with.

## Thankfully, AI is rectifying this in two ways

## 1]---curriculum planning – Generative AI provides students with curriculums tailored to their needs

**Amber Oliver, a managing director of Robin Hood Learning**, **2-12**-2025, "Embracing AI in Education Can Move Us Toward a New Era of Learning – Center on Reinventing Public Education", Center on Reinventing Public Education, https://crpe.org/embracing-ai-in-education-can-move-us-toward-a-new-era-of-learning/ [Amber is a writer for ASU and is a managing director at RobinHood] DOA: 2/24/2025 //RRM

For decades, students of color and those from low-income communities have faced persistent achievement gaps in our education system. Despite countless reform efforts, these students continue to encounter barriers to accessing high-quality, personalized instruction that builds critical thinking and problem-solving skills. **Now, the emergence of generative AI represents an unprecedented opportunity to transform this inequitable system into one that truly serves all students.** The traditional one-size-fits-all approach to education has consistently fallen short, particularly for underserved communities. While measuring learning outcomes remains essential, our current assessment methods often fail to capture true mastery and ignore the experiences of students in low-income communities. More importantly, these methods frequently miss the mark in developing the critical skills students need for economic mobility in today's rapidly-evolving world. For thousands of schools ready to embrace change, AI-enabled tools can help realize the vision of hands-on, student-centered learning that educators have long sought. Take, for example, a unit in CommonLit's sixth-grade curriculum called "Our Changing Oceans," currently used by millions of students. Instead of reading a textbook and answering multiple-choice questions, students imagine they work for an advertising team hired to create a commercial for an ocean conservation group. Students are introduced to new concepts but also given the agency to choose content that is of interest to them. Critically, students are assessed on their improvements not just in reading and writing but also in the science concepts and basic computational thinking practices (the ability to ask questions and solve problems with a computer) that are necessary in our digital world. To be fair, teachers, administrators, and families at hundreds of schools across the country have been adopting these practices for years. But legacy constraints, such as how we organize our school day into the "one teacher, 30 students" classroom model, lack of access to high-quality instructional materials with aligned professional learning, ineffective assessments, insufficient technology, and general fear of the unknown, have made scaling such reforms challenging. That's where generative AI can shine, making this kind of active, engaging, personalized, and inquiry-based learning a reality—especially for students of color or those living in poverty who are often left out of innovative advancements.

**For example, AI lesson-planning tools can make it possible for teachers to develop inquiry-based learning experiences tailored to each student's context and needs in minutes—and not just for one lesson, but for every lesson.** This would have previously taken hours, if not months, making it virtually impossible for educators. AI grading augmentation, like Project Toni created by teachers on Playlab.ai, can handle routine administrative tasks such as organizing assignments, tracking student progress, and providing basic feedback. Ultimately, AI grading augmentation saves teachers time and allows them to focus on giving more substantive, personalized feedback to students on individual lessons—a practice that has been shown to lead to significant achievement growth.[1] Without AI tools, giving this kind of personalized feedback is out of reach for teachers, many of whom support hundreds of students. But despite the possibilities, AI is also a cause for concern. According to Educators for Excellence's 2024 Voices from the Classroom Report, although most teachers understand AI's utility, they also have significant concerns about racially biased algorithms, inequitable access, and invasion of user privacy. They are worried they won't have the training to know how to use it properly, or, worse, that it will replace them. But as Greg Toppo reminds us in his article on tutoring, while AI can be a powerful tool to supplement and enhance learning, it falls short in replicating the deeply social and engaging aspects of human interaction that are crucial for effective education. **The key to unlocking the promise of AI is to tap into its potential to superpower our teachers, not replace them.** Local philanthropies have a crucial role to play in realizing AI's potential in education. The Robin Hood Learning + Technology Fund supports organizations that help schools implement AI and other technology-enabled learning solutions, with approaches tailored to each community's unique needs and circumstances. The Fund's grantmaking strategy recognizes that effective innovation must be rooted in a local context, from schools' existing technology capacity to community priorities and concerns. Beyond developing these context-driven solutions, we leverage our knowledge of the New York City public school system to invest in creating the local conditions required for success through family engagement, awareness building, and policy efforts. This deep focus on local context, combined with adaptable implementation models, has enabled our funded programs to effectively serve all K-8 NYC public school students while expanding to reach more than 10 million students nationally. There's no denying the challenges of such transformative change. **But by treating AI disruption as a catalyst rather than a threat, educators, students, and families may finally receive the support they need to make good on education's unfulfilled promise as the equalizing force.** By using AI to enable authentic, learning-centered models, we can work together to empower a generation with vital problem-solving, creative, and self-directed skills to break cycles of poverty. For millions of students, that would be nothing short of revolutionary. Amber Oliver is Managing Director of the Robin Hood Learning + Technology Fund, a collaboration between Robin Hood, Overdeck Family Foundation, and Siegel Family Endowment to transform learning for low-income students with technology. Previously, Amber was the COO of GripTape, where she helped build a strategy to put 1M youth in the driver's seat of their own learning

## 2]---Individualized learning – AI ensures all students learn to the best of their capacity

**The University of San Diego corroborates**, ND, "AI in Education: 39 Examples", University of San Diego Online Degrees, https://onlinedegrees.sandiego.edu/artificial-intelligence-education/ [This report on Artificial Intelligence in Education was developed by the University of San Diego's innovative, online Master of Science in Applied Artificial Intelligence program, an AI industry thought leader and education partner.] DOA: 2/24/2025

Artificial intelligence (AI) has rapidly transformed from a futuristic concept to an integral part of our daily lives, and education is no exception. In 2024, AI technologies are revolutionizing the academic landscape, offering unprecedented opportunities for personalized learning, administrative efficiency and improved educational outcomes. From intelligent tutoring systems to AI-driven classroom management, the impact of AI is profound and far-reaching. Educators and administrators can now leverage AI to analyze vast amounts of data, providing insights that drive informed decisions and strategies. Additionally, AI is breaking down education barriers thanks to tools that support students with diverse needs and learning styles. As AI evolves, its potential to transform education grows, setting the stage for a future where learning is more personalized, inclusive and effective. So, exactly how can AI be used in education? Keep reading as we explore the applications and advancements that make AI in teaching beneficial for modern learners. Learn More: 8 Essential Questions to Ask Before Choosing an AI Master's Program 9 Benefits of AI in Education Artificial intelligence is no longer just a promise for the future — it's actively enhancing education today. By integrating AI into classrooms, educators can personalize learning experiences, streamline administrative tasks and provide more effective support to students. Here are some of the specific benefits AI brings to the education sector: 1. Enhanced Personalized Learning **AI tailors educational content to each student's unique learning style and pace. For example, platforms like DreamBox and Smart Sparrow analyze student responses in real time to adapt lessons dynamically, enabling every student to master concepts at their own speed.** 2. Automated Administrative Tasks AI automates grading, scheduling and report generation, significantly reducing the workload on educators. Tools like Gradescope provide consistent and objective grading of assignments, while AI scheduling software helps optimize class timetables and resource allocation. 3. More Engaged Learners AI makes learning more interactive and engaging through gamified content and adaptive learning platforms. Programs like Kahoot! and

Minecraft: Education Edition use AI to create interactive quizzes and simulations that respond to student input, keeping learners motivated and involved. 4. Improved Accessibility AI-driven assistive technologies support students with disabilities, ensuring a more inclusive learning environment. Speech recognition software like Notta transcribes spoken words into text for hearing-impaired students, and AI-supported educational games provide personalized learning experiences for young children. 5. Actionable Insights AI analyzes vast amounts of educational data to provide educators with actionable insights. Platforms like Knewton Alta track student performance across various metrics, helping teachers identify learning gaps and adjust their instructional strategies accordingly. 6. More Efficient Classroom Management AI tools help teachers manage classroom behavior and engagement. For example, Classcraft uses AI to gamify classroom management, tracking student behavior and rewarding positive actions, which helps maintain a productive and motivated classroom environment. **7. Better Security and Assessment Integrity AI enhances the security and integrity of assessments through advanced proctoring and plagiarism detection. Tools like Turnitin check for originality in student submissions, and AI-supported proctoring systems monitor exam conditions to prevent cheating.** 8. Continuous Lifelong Learning and Professional Development AI supports continuous learning and professional development for educators by recommending personalized resources and courses. Platforms like Edthena provide tailored learning paths based on educators' career goals and teaching needs. 9. Greater Scalability AI enables the scaling of educational programs to accommodate more students without compromising quality. AI-based platforms can handle large volumes of data and provide personalized learning experiences to a growing number of learners, ensuring accessibility and consistency in education. 39 Examples of AI in Education Artificial intelligence is revolutionizing education with cutting-edge tools that enhance teaching and learning. From personalizing experiences to optimizing administrative tasks, here are 39 examples of how AI is transforming modern education: Adaptive Learning: AI-driven platforms assess students' skill levels in real time and tailor instructional content to meet individual needs. These systems adapt lessons dynamically based on student responses, providing customized pathways to help students master concepts at their own pace. Assistive Technology: Tools such as speech recognition software transcribe spoken words into text, helping students with disabilities such as hearing impairments or dyslexia to participate more fully in the classroom by converting speech to text and vice versa. Data and Learning Analytics: AI helps analyze data from online learning portals, classroom attendance and grades. This data provides insights into student performance, helping educators identify trends and tailor instruction to address gaps in understanding and performance. Classroom Management: Platforms use AI to gamify classroom management. AI tracks student behavior and engagement, rewarding positive actions with points and badges and providing teachers with insights into classroom dynamics to manage and motivate students. Intelligent Tutoring Systems: AI-powered tutoring systems such as Carnegie Learning provide personalized feedback and support, adapting to individual learning styles and needs to help students understand complex concepts and improve academic performance. Automated Grading and Assessment Tools: These tools use AI to evaluate assignments and provide detailed feedback, streamlining the grading process, ensuring consistency and saving teachers time. AI can also grade more abstract assessments like essays by analyzing the content for coherence and relevance. Chatbots and Virtual Assistants: AI-driven chatbots such as Mainstay provide students with immediate support and assistance outside classroom hours. These chatbots answer questions, remind students of deadlines and guide them through administrative processes, enhancing engagement and promoting independent learning. Curriculum Planning: AI helps educators plan curricula by analyzing educational data to identify trends and gaps. This ensures the curriculum remains relevant, comprehensive and aligned with learning objectives by suggesting updates based on the latest educational needs and standards. Interactive and Learning Games: AI enhances educational games by creating engaging and adaptive learning experiences. These games use AI to provide tasks and challenges that adapt to student responses, promoting active participation and understanding of complex subjects. Personalized Learning: AI learning platforms create customized learning experiences by adapting to the unique ways students understand concepts. This reduces cognitive load and ensures that each student receives instruction tailored to their learning style and pace. Task Automation: AI automates routine tasks such as homework assessment, test grading and report generation. This enables educators to focus on more meaningful instructional activities and student interactions. **Smart Content Creation: AI aids instructors in the creation of digital lessons and study materials. Tools like Magic School AI and Eduaide.AI simplify lesson planning, create assessments, write individualized education plans (IEPs), and much more to modernize learning and streamline instruction**. Proctoring: AI-powered proctoring systems monitor exams to prevent cheating and ensure academic integrity. These systems analyze students' behavior during exams, providing real-time alerts for suspicious activities and maintaining a secure testing environment. Language Learning: AI tools like Duolingo use adaptive algorithms to personalize language learning experiences. The AI adjusts the difficulty of exercises based on the user's progress, ensuring an optimal learning curve and enhancing language acquisition. Closing the Skill Gap: AI identifies skill gaps in students by analyzing their performance data and provides targeted resources to address these deficiencies. This helps learners achieve proficiency in various subjects and prepares them for future academic challenges. **Dyslexia Detection: AI tools such as Dysolve can detect dyslexia and other learning disabilities early on by analyzing reading patterns and errors. These tools provide tailored support and interventions to help affected students**

**succeed, such as specialized reading programs and exercises.** Edutainment and Gamification: AI integrates game elements into academic content, making learning fun and engaging. Platforms use AI to create interactive quizzes and games that promote deeper understanding and retention of educational material. Administrative Support: AI assists in administrative tasks such as scheduling, budgeting and resource allocation. Tools like Fetchy optimize educational operations by providing data-driven insights and recommendations, improving efficiency and reducing workload for educators. Virtual 3D Classrooms: The metaverse creates immersive virtual classrooms where students can interact with classmates and teachers. Platforms like Engage VR offer virtual environments that enhance the learning experience beyond traditional methods, providing opportunities for interactive and experiential learning. Digital Learning: AI enhances digital classrooms by providing immersive video content and interactive simulations. Tools like Nearpod use AI to deliver engaging and effective learning experiences through interactive lessons and real-time student feedback. Virtual Campus Activities: AI facilitates virtual extracurricular activities, allowing students to participate in clubs and events from anywhere in the world. Platforms like Remo use AI to create virtual spaces for networking and collaboration, enhancing student engagement beyond the classroom. Interdisciplinary Learning: AI breaks down barriers between subjects, promoting interdisciplinary learning. Tools like Wolfram Alpha use AI to demonstrate real-life applications of various theories, helping students understand the interconnectedness of different fields of study. Simulating Real-Life Situations: AI replicates real-life scenarios in virtual environments, allowing students to conduct experiments and learn through practical experience. Platforms like Labster offer virtual labs where students can safely explore and experiment with scientific concepts. Building Awareness: AI can teach students about social issues such as climate change and poverty. Tools like EarthSpeakr use AI to provide a deep emotional understanding alongside theoretical knowledge, promoting awareness and action on global challenges. Virtual Tours: AI-powered virtual tours enable students to explore different parts of the world from their classrooms. Platforms like Google Expeditions use AI to create immersive virtual field trips, broadening students' horizons and enhancing their cultural understanding. These can also be useful in facilitating virtual tours of colleges. Guest Speakers and Events: AI facilitates virtual events and guest lectures, allowing students to learn from prominent figures and experts in various fields. Tools like BigMarker use AI to organize and manage virtual conferences, enhancing the learning experience through expert insights. Predictive Analytics: AI algorithms in learning analytics help educators spot trends and predict student performance, enabling early intervention for students who might struggle. Parent-Teacher Communication: AI-powered tools like Remind facilitate seamless communication between parents and teachers, allowing for real-time updates on student progress and classroom activities, thereby enhancing parental engagement and support in the education process.

**Test Prep: AI platforms like Magoosh provide personalized test preparation by analyzing student performance and adapting practice questions and study plans to focus on areas where students need the most improvement, thereby increasing their chances of success.** Learning Management Systems (LMS): AI enhances LMS platforms by providing personalized learning paths, automating administrative tasks and offering data-driven insights into student performance and engagement. Professional Development: AI tools provide personalized professional development opportunities for educators by recommending courses and resources based on their career goals and teaching needs. Transportation: AI-powered systems optimize school bus routes, reducing travel time and improving safety. Tools like SafeStop use real-time data to track bus locations and provide parents with accurate arrival times, enhancing the overall efficiency of student transportation. Finance: AI assists educational institutions in managing their finances by analyzing spending patterns, predicting future expenses and identifying cost-saving opportunities. Tools like Allovue help schools allocate resources more effectively and improve financial planning. Cybersecurity: AI enhances the security of educational institutions by detecting and responding to cyber threats in real time. Tools like Darktrace use machine learning algorithms to identify unusual network activity, prevent data breaches and protect sensitive student information. Safety and Security: AI-powered surveillance systems monitor school premises for potential safety threats. Tools like Avigilon use AI to analyze video feeds and alert security personnel to suspicious activities, thereby enhancing the overall safety and security of the school environment. Plagiarism Detection: AI tools analyze student submissions for potential plagiarism by comparing them against a vast database of academic content, ensuring academic integrity and originality in student work. Enhanced Online Discussion Boards: AI enhances online discussion boards by moderating content, facilitating discussions and providing personalized feedback. Tools like Packback use AI to encourage critical thinking and engagement in online forums, creating a more dynamic and interactive learning environment. Academic Research: AI assists academic research by analyzing large datasets, identifying trends and generating insights. Tools like IBM Watson Discovery provide researchers with advanced analytics capabilities, helping them uncover new findings and accelerate the research process. Connected Campuses: AI integrates various campus systems to create a connected and efficient educational environment. Tools like Cisco Digital Network Architecture (DNA) use AI to manage and optimize campus infrastructure, enhancing connectivity and improving the overall campus experience. AI in Education: Inclusion and Universal Access Bernard Marr explains that AI tools can enhance inclusion and universal access to education in a number of ways, including: Helping to "make global classrooms available to all, including those who speak different languages or who might have visual or hearing impairments" Creating access for "students who might not be able to attend school due to illness" Better serving "students who require learning at a different level or on a particular subject that isn't available in their own school" Overall, it is hoped that AI will ultimately help educators make continued progress in addressing the broad range of physical, cognitive, academic, social and emotional factors that can affect student learning and ensure that all students have equal opportunity in education, regardless of their social class, race, gender, sexuality, ethnic background or physical and mental disabilities. AI in Education: Individualized Learning There is also considerable optimism around the idea that, as artificial intelligence becomes a more integral part of the classroom, teachers will be better equipped to offer an individualized learning experience for every student. According to an article in The Atlantic, ("Artificial Intelligence Promises a Personalized Education for All"), artificial intelligence holds the potential to "enhance human teachers' abilities to tailor lessons to each

student without knocking their class schedule off track," eliminating the need for educators to "teach to the middle," as often happens when their students have a range of skill levels and learning abilities. Rose Luckin, a professor of learning-centered design at University College London, is quoted as saying that, "The real power of artificial intelligence for education is in the way that we can use it to process vast amounts of data about learners, about teachers, about teaching and learning interactions." Ultimately, AI can "help teachers understand their students more accurately, more effectively."

## These both reduce dropout rates

**ODSC**, 11-18-20**24**, "AI Helps Reduce School Dropouts", Medium, https://odsc.medium.com/ai-helps-reduce-school-dropouts-7a0fb58e72e0 [Open Data Science Conference, a platform dedicated to sharing knowledge and fostering collaboration within the data science community by promoting open source software and innovative ideas related to AI and data science.] DOA: 3/4/2025 //RRM

The use of artificial intelligence (AI) in education is a contentious issue. While its usage by students carries plagiarism and ethical risks, it shows significant promise elsewhere. One of the most beneficial is reducing school dropout rates. In 2022 alone, 2.1 million students dropped out of school in the U.S. Not finishing their education could leave these individuals without valuable skills and knowledge to help them later in life, leading to broader socioeconomic problems. AI can help school systems prevent this from happening through a few different means. 1. Predict Failure Risks Some districts have started experimenting with machine learning models to predict when students are at risk of failing. By analyzing past cases, AI can learn to detect patterns often correlated with dropping out. The technology can then alert staff when a pupil showcases these early warning signs. **Catching red flags early can lead to prompt, more effective interventions. Teachers, counselors, and parents can adjust their approach to the student's education or ask them questions about unmet needs to improve their performance before it's too late.** Early warning systems are not perfect. Studies show they're most effective when a school's dropout rate is below 10% and it has enough resources for appropriate intervention. However, any improvement is beneficial, and these models will likely grow increasingly accurate with time and development. 2. Analyze Non-Academic Risk Factors Educational facilities can also use AI to discover and track non-academic dropout risk factors. People rarely drop out for one reason, and many reasons aren't reflected in grades. High schoolers with depression, for example, are over twice as likely to quit school than their peers. Machine learning can uncover such trends. Predictive models can analyze past dropout cases and monitor current students showing warning signs to find new, less obvious warnings. These may include certain social behaviors or socioeconomic backgrounds when other factors are also at play. As a result, schools can better understand what leads to dropouts. Increasing context leads to more reliable predictions and effective interventions. Being able to spot subtle trends human experts may miss is also crucial. 3. Personalize Learning Plans **AI can reduce dropout rates beyond predicting pupils at risk of quitting. It can also minimize the chances of reaching such a point by tailoring lessons to individual learners.** Studies show that personalized education leads to higher learning enjoyment in students of all backgrounds. That engagement, in turn, reduces turnover and improves academic performance. **While AI is not the only way to adapt lessons to individuals, it can make it easier by removing much of the repetitive labor from the teacher's workload.** AI can analyze each student's performance and behavior in different scenarios to find what works best for them. It can then alter lesson plans accordingly, leaving teachers to oversee the lesson and help pupils on a personal, human level as they work. Such a combination of tech-driven customization and human-centric support could dramatically affect school retention rates. Possible Challenges of Reducing Dropouts With AI As beneficial as AI can be in this context, it introduces unique concerns, too. The most prevalent are those concerning privacy. Machine learning requires considerable amounts of data to maintain accuracy. The types of models schools would need to prevent student turnover would likewise need much information on specific children. Some may argue that this level of monitoring is a breach of privacy, especially considering minors are involved.

## Continuing education reduces poverty in the short and long term

Harry A. **Patrinos**, 5-28-20**24**, "How effective education spending can reduce poverty and boost earnings", World Bank, https://blogs.worldbank.org/en/education/How-effective-education-spending-can-reduce-poverty-and-boost-earnings [Harry Anthony Patrinos is the Senior Adviser, Education, at the World Bank. He specializes

in the economics of education, especially school-based management, demand-side financing, and public-private partnerships] DOA: 3/4/2025 //RRM

The returns to education are high in most countries. **An additional year of schooling increases earnings by 10 percent a year. At the same time, education is one of the most powerful instruments for reducing poverty and inequality, as well as for laying the basis for sustained growth.** Many ideas on how to realize those returns have been put forward, but the question is how to finance it. It is estimated that global education expenditure was $4.6 trillion in 2012, rising to $5.4 trillion today. Public expenditure on education is significant; on average, countries spend about 3-5 percent of GDP on education, or 10- 20 percent of public expenditures. Given the returns to education, where should one invest the marginal dollar? Or in other words, given law of diminishing returns, what's the best value for the money spent? The case for investing in education Arguments for public subsidy of education have been made, even if it is not always considered a public good; the returns to schooling are largely private and students can be excluded through, for example, test requirements or limited class space. But rather than expect all students to invest the optimal amount in their own education, there are other considerations that make public involvement necessary. Investing in education pays dividends. Available data suggests that human capital is the primary factor driving the wealth disparity between high and low-income nations, eclipsing the contributions of both natural resources and physical assets. high and low-income nations, eclipsing the contributions of both natural resources and physical assets Source: World Bank 2018. Capital figures control for Purchasing Power Parity. Moreover, education is a basic human service, a human right, and optimal investment is often thwarted by market failures, differences in child and parent preferences, borrowing constraints, and youth perceptions**. Schooling is also as a mechanism for enhancing social cohesion and nation-building, and produces numerous externalities (productivity spillovers, crime reduction, citizenship).** But merely increasing spending may not necessarily improve outcomes – especially if that spending is misallocated and misaligned, and if it does not target what works. Evidence highlights key areas to improve efficiency: Prioritizing universal foundational learning and transversal skills, such as digital and socio-emotional skills. **Focusing on interventions that have the greatest impact on learning—for instance, teaching at the right level and providing teachers with lessons plans and coaching.** Using student assessments that provide diagnostic feedback. Implementing reforms to strengthen budget planning, financial management, procurement, and management capacity. Cost-effective strategies to boost returns It is essential to focus on cost-effective approaches to maximize the effectiveness of educational spending and enhance learning outcomes. One such approach is targeting instruction by students' learning levels rather than age or grade. Recent publications show that incorporating technology to support this tailored instruction for a period of one year can significantly boost learning outcomes,– by about a year's worth of schooling (or an increase of 0.27 standard deviations). This advancement not only has the potential to raise students' future earnings by approximately 5.5 percent **but also yields considerable long-term benefits, estimated at more than $1,700 in future benefits per beneficiary at a student cost per year of just $27.** Investing in youth skilling programs has also high economic returns. Recent analysis of multiple human capital investment programs indicates that the marginal value of public funds is high for investments targeting individuals between 15 and 25 years old. Since a significant share of unskilled youth is already out of the formal education system and will account for a large share of the workforce in the next decades, investments in youth skills and workforce development will render high economic returns. Improving education financing To realize the returns to education — and to reduce poverty and raise economic growth, while reaching the out of school population and raising the quality of education — there is a need to improve how it is financed. Assessing the effectiveness of education spending necessitates a comprehensive analytical framework. It is essential to acknowledge that a direct link between financial investment and education outcomes is not always present. The degree to which spending influences educational achievement is contingent upon three critical dimensions: the adequacy of funding, the efficiency with which resources are utilized, and the equity of their distribution. Key questions include: Is the level of provision of educational services adequate? Is the distribution of educational resources efficient? And how equitable is the distribution of educational resources?