Rob Weil
Director of Research, Policy, and Field Programs
Educational Issues
American Federation of Teachers, USA

AFT Teachers
A Union of Professionals

Artificial Intelligence (AI):

A Few Basics

There is a reason they call it "Artificial Intelligence" and not "Artificial Work."

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Your Presenter!

I asked AI to use my picture in the invitation to make me a comic book hero.

"Since early 2017, I have been dedicated to exploring AI's impact on education and the future of work. I currently lead AFT's AI initiatives, including our partnerships with major tech companies. What began as a single workstream memo has grown into a portfolio encompassing dozens of concurrent projects."

Please note: There is no such thing as an AI expert. Even frontline AI developers do not know how and where AI will be used, or the effect of their work.

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The American Elections 2024

To win the American presidency, a candidate needs to secure at least 270 electoral college votes. In most elections, this hinges on the results in seven critical "battleground" states: Arizona, Georgia, Michigan, Nevada, North Carolina, Pennsylvania, and Wisconsin. In November, Donald Trump not only won all the battleground states but also secured the popular vote.

Presidential Results 2024
Kamala Harris: 226 votes (48.26%)
Donald Trump: 312 votes (49.94%)

Congressional Results 2024
U.S. House of Representatives:
R's = 220, D's = 215 (217 vs. 215)
U.S. Senate: R's = 53, D's = 47 (R's +1)

> ***What this implies***: With Trump's victory, America's future appears more uncertain than it has been in over 150 years. If his pre-election statements are any indication, there is a substantial chance that the American system of government could undergo significant changes.

Cheat sheet: U.S. House = Budget, U.S. Senate = Major Policy, U.S. President = Operations

About the AFT

AFT - 1.8+ million members:

1. Teachers (PreK-12 public and charter schools)
2. Paraprofessionals (support staff, administrative, and school services)
3. Healthcare* (Nurses, health professionals, doctors)
4. Higher Education* (Fully tenured, instructional staff, adjuncts)
5. Public Services (State-based professional staff to blue collar work)

AFT is the fastest growing major union in the United States. Today there are approximately 3,000 "locals" in all 50 states, Washington DC, and many U.S. territories.

*AFT's fastest growing sectors

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American K12 Education System (Oversimplified)

Two relevant parts of the American Constitution:
1. No federal provision for establishing a national system of schools
2. The "Separation of Church and State" doctrine

What these means:
1. Each state or territory must create its own system of schools
2. "Public" money cannot be used to fund private or religious schools (yet*)

All 50 states, Washington D.C., and the 16 U.S. territories each have their own distinct education systems. In most states, the legislatures has designated their school systems as under "local control." This means that local school districts have the authority to establish their own rules and policies.

*The President-elect and numerous cases before the U.S. Supreme Court would likely change this doctrine.

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American K12 Education System (Oversimplified)

✓ The most "state control" state is Hawaii
✓ The most "local control" state is California

The Numbers (K12 - Estimates):

- Students – 50 million (Avg. Dist. = 2,600, NYC – 1,000,000)
- School Districts – 13,500 (each one has its own rules, policies, and pay structures)
- Schools – 131,000 (Avg. Dist. = 5, NYC – 1,800)
- Teachers – 3,800,000 (Avg. Dist. = 170, NYC – 80,000)
- Traditional Public Schools – 83% (NYC – 74%)
- Public Charter Schools – 7% (NYC – 10%)
- Private K12 Schools – 10% (NYC - 16%)

However, there is wide disparity within states.

✓ Average teacher salary - $69,597
✓ Highest teacher salaries – California ($95,160 avg.)
✓ Lowest teacher salaries – West Virginia ($52,870 avg.)

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Collective Bargaining for Teachers

Even in the "green" states, there are numerous laws that limit the scope of bargaining. For example, in Florida, how salaries are bargained is severely limited; in DC, teachers cannot bargain their performance evaluations.

In the U.S., about 67% of public-school teachers are covered by a collective bargaining agreement. However, when you add all charter school or private school teachers, that percentage drops significantly.

STATUS OF K-12 PUBLIC SCHOOL TEACHER BARGAINING

- Bargaining laws covering K-12 teachers (34 + DC)
- No bargaining law but limited bargaining takes place (9)
- Bargaining is prohibited (6)
- Collaborative conferencing permitted (1)

NOTE: MO – Although there is no bargaining statute, the state Supreme Court ruled that all public employees have a constitutional right to bargain with their employer.

NOTE: MI – Emergency manager can modify, reject, or terminate a CBA.

NOTE: SC – Although bargaining is not statutorily prohibited, the state Supreme Court ruled that public employees do not have the right to bargain.

NEA COLLECTIVE BARGAINING AND MEMBER ADVOCACY (MAP CURRENT AS OF JULY 2021)

Before We Move On to AI

The AI tools and systems we interact with today, are the **least** advanced they will ever be.

It's essential to recognize that technology improves at an exceptional pace. The limitations we notice now—like occasional video inconsistencies or imperfect speech—are not permanent obstacles. <u>They are merely steps in AI's development</u>. Many people engage with AI and say, 'I can tell this was made by AI,' but this is temporary. As AI matures, the difference between human-made and AI-generated work will continue to blur.

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Not Questions of If or When

"Your scientists were so preoccupied with <u>whether or not they could, they didn't stop to think if they should</u>." – from Jurassic Park (1993)

AI is here and we need to learn to tame the technological beast.

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AI is More than LLMs, it is Video, Audio, and Images

AI's power to create and distribute misinformation, disinformation, and deepfakes is limitless.

This is a clip of a "fake" 15-minute podcast created using Google's Notebook LM. I simply dropped the PDF into the AI-based platform, and it created the entire podcast including the voices, extra text and all the commentary.

FAKE

This video took only 5 minutes to create

Are these challenges or opportunities?

Commonsense Guardrails for Using Advanced Technology in Schools

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Opening Thoughts - AI

The core premise of machine learning and generative AI is that they are tools to replace human thinking, creativity, and decision-making.

Whenever you or others talk about AI, machine learning, and advanced technology, please remember the core premise of this "revolution."

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Sobering Thoughts

<u>We are not going back</u>, and we must accept technology and AI as powerful forces that will shape the future of work. Workers and their unions must aggressively engage with tech developers and their employers in <u>advance</u> of the <u>procurement and adoption</u> of technology and AI—**<u>it is not a choice</u>.**

Replacing some labor and decision-making may not necessarily be a bad thing, but it must be done in partnership with employees and their representatives. **<u>The key will be who or what makes which decisions</u>.**

Focus Your Efforts Here!

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What is "Generative" AI?

In everyday Language

Generative AI is a form of artificial intelligence that uses vast amounts of data (lots of personal data), sophisticated algorithms (computer code), and advanced statistics (modern day Occam's Razor) to generate original results. Unlike previous forms of AI that are programmed to respond to user's inputs and respond with predetermined content (called narrow AI), generative AI creates new content (including audio and video) with each interaction.

When a request is entered into the "prompt," generative AI collects a massive amount of data on the topic, determines what data is most relevant, and uses statistics to calculate the most reasonable result—all in a matter of milliseconds. Moreover, generative AI "learns" from each interaction and is therefore able to generate different responses every time.

Update - OpenAI developed a new type of Generative AI that operates differently. This model includes advanced capabilities, using specialized "reasoning" algorithms to review and refine its outputs.

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"Good Enough"

The ability of AI to replace workers is not only a question of its capabilities, but also the public's acceptance of non-human work. The "decision rule" will not depend on whether AI can replace a human worker. But rather if what AI does is "good enough" to be accepted by the public?

Purposefully, the "rollout" of AI is controlled to prevent public resistance. This is an orchestrated strategy to guarantee long-term profit and user dependency.

Human nature plays a large role in AI adoption

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Point of Emphasis: Privacy

Generative AI presents a fundamental dichotomy that will shape the future of society over the next 5 to 10 years. AI offers the potential to personalize outcomes, enhancing various aspects of life and work. However, this potential is at odds with the critical need for data privacy and security. This tension will face challenges from all angles, including through regulatory frameworks and legislative efforts.

The way this dichotomy is navigated will not only influence the nature of work but also determine a country's standing in the global economy. Few nations are likely to forgo AI's advancements, risking being left behind in the new digital age.

The obsession for more personal data will continue to grow…

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As Predicted – U.S. Framing

"If you move too quickly on this, you may screw it up," Schumer said on a Washington Post panel.

Specifically, he noted that companies worried about the emerging EU AI Act throttling innovation and becoming a compliance headache. "The EU went very fast, and now they're backing off because they realize they made a lot of mistakes," Schumer said.

- From Politico, 10/26/23

Important Context: The last time the US Federal Government passed regulations on technology was "Section 230" in 1996. That was a decade before the first iPhone. The US does not move too "quickly" when it comes to regulation on business.

President-elect Trump stated that there would not be new federal "regulations" on AI in the U.S. However, state-level regulations are likely to expand.

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As Predicted – EU Framing

EU AI rules stifle innovation, Meta and Spotify CEOs warn

Zuckerberg and Ek's concerns highlight the need for balanced regulation of emerging technologies.

3353 Total views   3 Total shares   Listen to article   2:55

NEWS

Own this piece of crypto history   Collect this article as NFT →

This is the <u>least surprising</u> European news story about AI written this year.

The CEOs of Meta and Spotify have voiced their concerns over what they see as overly restrictive artificial intelligence regulations in the European Union.

Meta CEO Mark Zuckerberg and Spotify CEO Daniel Ek published joint statements on Friday, Aug. 24, criticizing the EU's approach to AI regulation, particularly regarding open-source AI development.

The crux of their argument is that the current regulatory environment in the EU is hindering innovation and progress in AI.

Both CEOs argue that the stringent privacy regulations surrounding AI, especially those concerning the use of public data, are slowing down the ability of European companies to compete globally.

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Where is AI Today?

Types of Artificial Intelligence

Based on Capabilities

- Narrow AI
  - weak
- General AI
  - strong
- Super AI

Today

Super AI surpasses human intelligence and can perform <u>any</u> task better than a human

"Singularity"

Based on Functionalities

Today

- Reactive Machine
- Limited Memory
- Theory of Mind
- Self-awareness

Limited Memory uses past data for a specific period, but they cannot add it to a library of their experiences

Theory of the Mind AI requires an understanding that the people and things within an environment can alter feelings and behaviors.

In just a few short years, capabilities and functionalities that were once considered "unlikely" are now almost assured.

Adapted From: Simplilearn

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Artificial Intelligence 2025

"Strawberry"

o1 OpenAI o1 preview	GPT4 Omni (Vision)	GPT4 Omni
ChatGPT-4	Llama-3.1	Grok-2
Gemini Advanced (Vision)	Gemini Advanced	Bing Copilot
Claude-3.5 Sonnet	Claude-3 Opus	Claude-3 Opus (Vision)
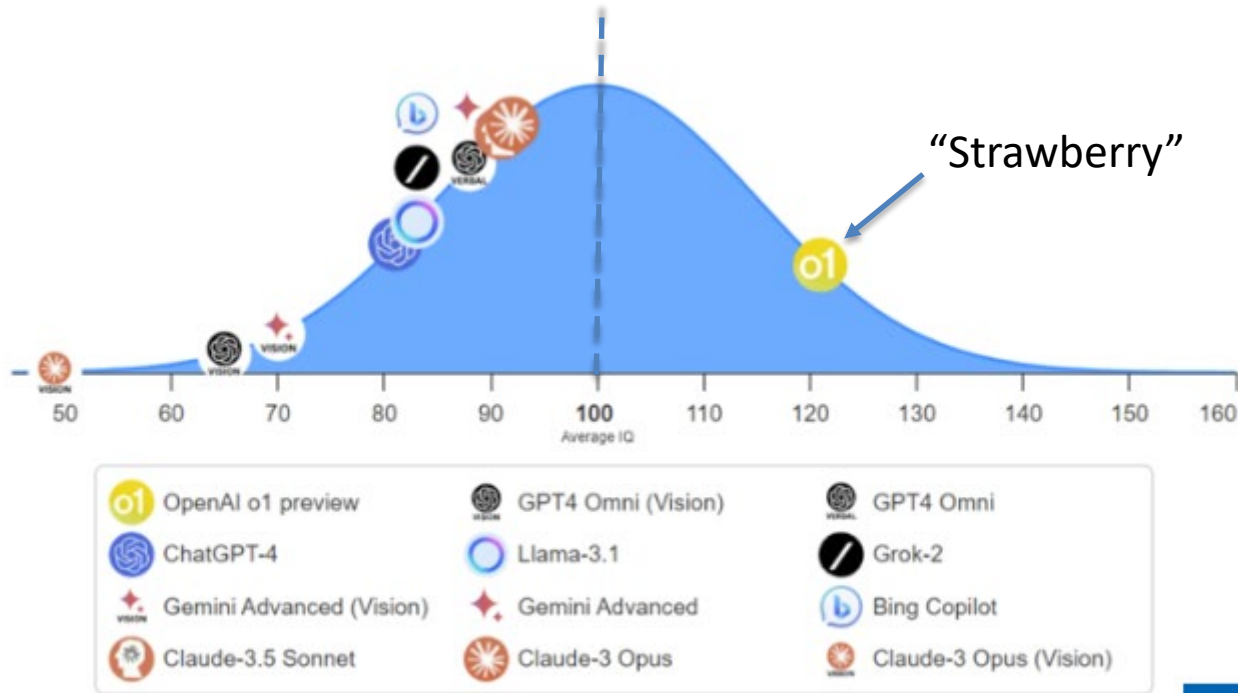
OpenAI Races Toward AGI with its New Breakthrough Model

Source: InvestorPlace (11/4/24)

The AI Skills Replacement Curve

Low-skilled Work   Mid-skilled Work   High-skilled Work

AI Developer: "We are not trying to replace the work of the gardener; we are trying to replace the work of the person who hires the gardener."

increasing levels of intellectual complexity
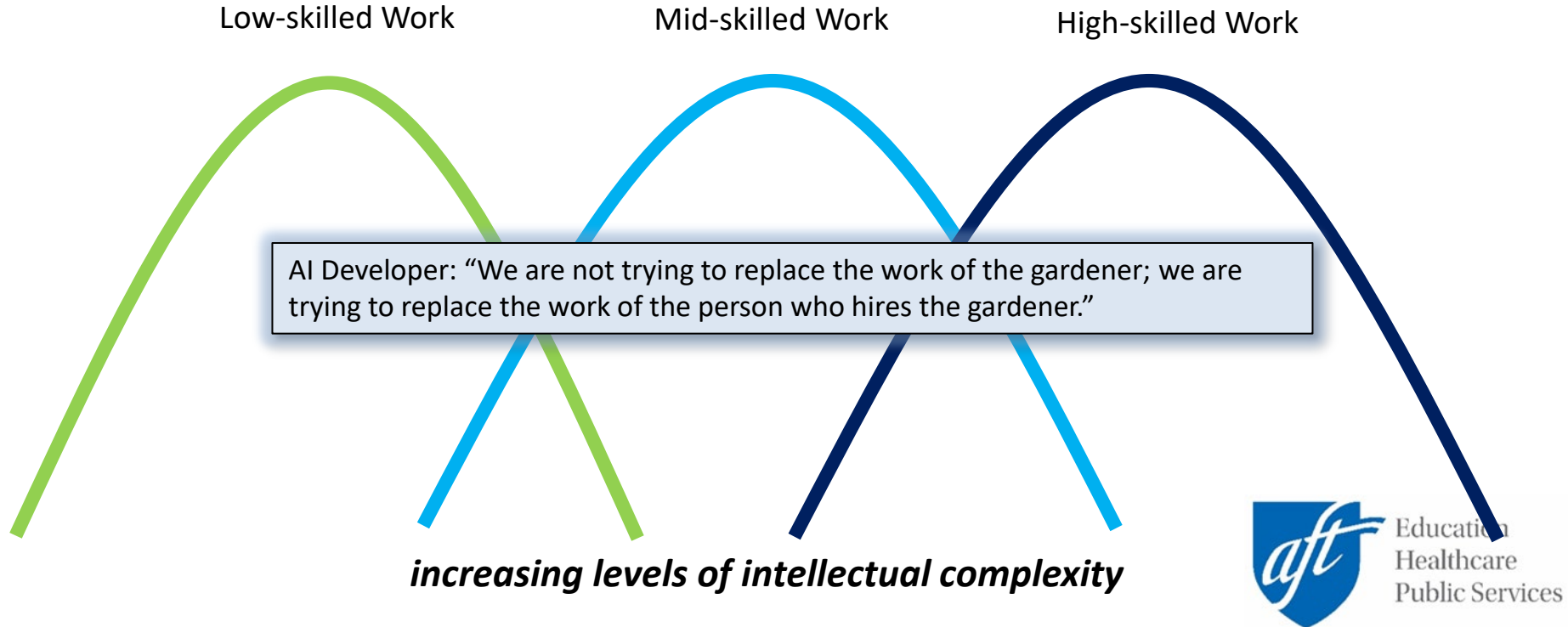
AI Exposure

This phenomenon stems from the rising intellectual sophistication of AI. Future focus is not on low-skill, low-wage jobs.

AI's impact on jobs

Most jobs are exposed to AI in advanced economies, with smaller shares in emerging markets and low-income countries.

Employment shares by AI exposure and complementarity

- High exposure, high complementarity
- High exposure, low complementarity
- Low exposure
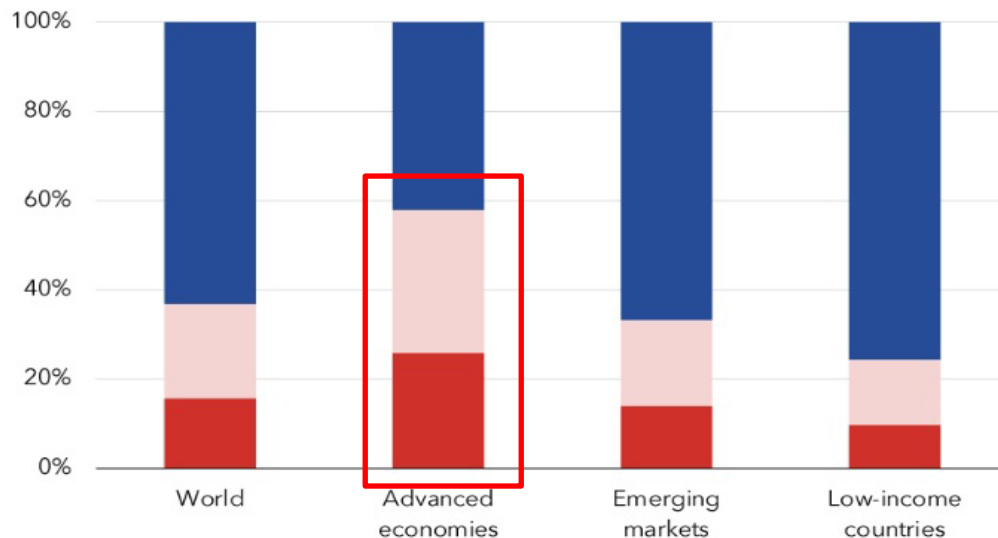
Source: International Labour Organization (ILO) and IMF staff calculations
Note: Share of employment within each country group is calculated as the working-age-population-weighted average.

IMF

The Question:

Will artificial intelligence replace workers?

Answer: Artificial intelligence will **not** replace all workers. But workers who do not accept and use artificial intelligence in their work are more likely to be displaced.

However, context matters a lot…

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AI in Education - The New "Wild West"

Old Wild West

- Lawlessness
- Individualism
- Conflict
- Manifest Destiny
- Economic Opportunity
- Romanticism

New "AI" Wild West

- Lack of Regulation
- Personal Data
- Disruptive Innovation
- AI Everywhere
- Economic Shifts
- Ignore Challenges

I'm not certain this analogy is appropriate for Luxembourg.

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In Schools

Question: **Will artificial intelligence replace teachers?**

Answer: You must think about more than teaching and learning.

There are real "good enough" challenges to replacing teachers:

1. The "custodial" nature of PreK-12 schools.
2. The social & emotional development of children in Pre-12 schools*.
3. The need to teach critical thinking, problem-solving, and empathy in schools
4. The "personal touch" of teachers with students and parents.
5. The limited hours of "production." (1,390 vs. 8,760)
6. They are funded by tax dollars.

*Some developers believe AI can do this too.

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Not Being Replaced is Not the Same as Not Changing

"Many people are curious about the future of work considering the introduction of automation and artificial intelligence. While some jobs may become obsolete, others are set to stand the test of time. Here are the professions that are expected to thrive over the next 30 years according to the Bureau of Labor Statistics." – Yahoo Finance Feb 26th, 2024

WHY?

1. **Healthcare, Projected 10-year job growth**: 1.8 million openings/year
2. **Educators, Projected 10-year job growth:** 857,600 openings/year
3. **IT and Cybersecurity Experts, Projected 10-year job growth**: 377,500 openings/year
4. **Skilled Trades, Projected 10-year job growth**: 31,650 openings/year
5. **Environmental Scientists and Sustainability Experts, Projected 10-year job growth**: 136,800 openings/year

"As AI becomes more integrated into schools and takes on a larger role in delivering content, the role of teachers will likely evolve to emphasize skills that AI cannot easily replicate or where human interaction adds significant value."

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The Opportunities*

1. **Streamlining Routine Tasks**: Generative AI can take over routine responsibilities such as grading, attendance tracking, and generating lesson plans, giving teachers more time to focus on student engagement and personalized instruction.
2. **Enhanced Student Support**: AI can enhance classroom services by offering more tailored and personal feedback to students, answering routine questions, and assisting with tutoring.
3. **Support for Planning and Curriculum Design**: AI tools can help teachers develop curriculum plans, analyze student performance data, and even simulate various teaching strategies' outcomes, enabling more informed decisions on instructional approaches.
4. **Professional Development and Training**: AI can offer customized professional learning experiences for teachers, adapting to their learning pace and providing the most current knowledge on teaching strategies, education policies, and classroom technologies.
5. **Improved Communication**: AI-powered tools can assist with translating instructional materials and parent communications in real-time, helping teachers better engage with students and families from diverse linguistic backgrounds.

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The Risks*

1. **Bias and Discrimination**: AI systems can inherit biases from the data they are trained on, which may lead to unfair or unequal treatment of students.
2. **Privacy Concerns**: AI in education often requires access to vast amounts of student data, raising concerns about the protection of personal information.
3. **Loss of Teacher Instructional Integrity**: The increasing reliance on AI-driven tools for decision-making in classrooms could reduce teachers' ability to exercise professional judgment.
4. **Dependence on Vendors**: Education systems might become overly dependent on third-party vendors providing AI solutions, which could result in challenges like service disruptions, loss of control over student data, and potential difficulties if the vendor changes or discontinues services.
5. **Student Overdependence**: The integration of AI in education raises important ethical questions about the impact on student autonomy, consent, and how much control automated systems should have over learning processes and decisions.

The Evolving State of Teaching

❖ **Digital Literary/Skills**
1. Critical Thinking, Problem Solving
2. Interdisciplinary Learning
3. Communication, Collaboration, and Teamwork
4. Entrepreneurial, Leadership, and Management Skills
5. Expansive Adaptability and Flexibility
6. Ethical Reasoning and Civic Responsibility
7. Human Creativity and Innovation
8. Environmental and Global Citizenship
9. Digital Literacy and Self-Directed Learning
10. Health and Wellness, Mindfulness and Stress Management

Levels of AI

(for educators)

Chart Showing the Different Levels of AI Skills for Educators

Each sublevel has specific skills that educators would know and be able to do.

Level 1 Skills (Easiest to Learn and Integrate):
a. Using AI Tools for Routine Administrative Tasks
b. Utilizing AI-Enhanced Tools for Lesson Planning
c. Engaging AI for Personalized Student Learning
d. AI-Assisted Communication with Students and Parents

Level 2 Skills (Moderately Easy to Learn and Implement):
a. Using AI for Data-Driven Classroom Performance Insights
b. Collaborating Using AI-Enhanced Tools
c. Creating AI-Generated Educational Content
d. Facilitating Discussions on AI Ethics and Equity

Level 3 Skills (Intermediate Skills Requiring More Time and Expertise):
a. Leveraging AI for Differentiated Instruction
b. AI Tools for Professional Development
c. Designing and Implementing AI-Powered Assessments
d. Introduction to Coding and AI Concepts for Educators

Level 4 Skills (Complex Skills Requiring Substantial Training and Leadership):
a. Leading AI-Driven Educational Initiatives
b. Developing AI-Integrated Curriculum
c. AI for Educational Research and Continuous Improvement
d. Shaping AI Policies and Ethical Guidelines for Schools

Level 5 Skills (Most Advanced and Transformative):
a. Developing Customized AI Solutions for Education
b. Implementing AI Across School Systems for Leadership
c. Pioneering Cutting-Edge AI Research in Education

Before We Dig In…

Commonsense Guardrails for Using Advanced Technology in Schools

The guidelines and guardrails in this document rest on a few **core values**:

1. The first considerations when contemplating any technology must be to **maximize safety and privacy**; no pedagogical application should ever be allowed to jeopardize students or educators.

2. Schools must **promote human interaction and individuality** as the primary approaches to learning. Technology cannot be allowed to replace direct in-person interaction among students and educators.

3. **Empower educators to make educational decisions.** Certified professionals must decide when, whether and how to incorporate technology in pursuit of their larger educational priorities. Technologies and technology vendors must serve, not drive, those decisions and priorities.

4. Technologies must be deployed so that they **advance equity and fairness** in public education and cannot be adopted so that they widen, rather than help close, the digital divide and other inequities in our schools.

5. Schools must **advance democracy**. Technologies can be used to build young people's capacities for vigorous civic engagement. But technologies can also be used to promote misinformation, disinformation and radicalization. Schools must be incubators for healthy democracy and must instill in students the skills to use technologies accordingly.

6. Schools must **teach digital citizenship and balance**. Students must learn the rules and expectation for responsible use of technology and must develop balanced approaches to technology.

Teachers' Quick Start to AI

1. <u>AI Literacy</u>
   - Understand what AI is and how it can enhance teaching and learning.
   - Familiarize yourself with foundational ethics, including issues like bias, privacy, and responsible use of AI.
2. <u>Limit Your Tools</u>
   - Focus on 3–4 key AI platforms, especially from major providers.
3. <u>Learn Prompt Engineering</u>
   - The essential skill for unlocking AI's full potential in teaching.
4. <u>Start with Teacher-facing AI</u>
   - Begin by using AI for tasks like lesson planning, resource creation, and meeting individual needs.
5. <u>Collaborate and Share</u>
   - Leverage collective learning by sharing experiences and strategies with colleagues.

Basic Prompt Engineering

1. <u>Objective</u> – State exactly what you want:
   - "Help me write an email to a parent of struggling student."
2. <u>Context</u> – Provide background, details, and requirements:
   - "Mention he is personable, but lack focus, fails to complete work, and may fail."
3. <u>Format</u> – How do you want your response structured:
   - "Make the email friendly but have a serious tone."
4. <u>Scope</u> – Indicate how much detail do you want
   - "The email should be two paragraphs long."
5. <u>Examples*</u> – Show an example of a similar request:
   - "Here is an example of an email I wrote to a different parent last year."

*Helpful but not required.

Pro tip: Always frame your question as an "expert." For example:
"I am an expert 6th-grade Luxembourgish teacher who wants…"

Let's Dig In (1) - ChatGPT

ChatGPT is the most powerful and often rated as the best Generative AI. In fact, many other AI platforms use ChatGPT as the foundation for their AI models (MSFT Copilot, Apple's AI, and countless business AI models).
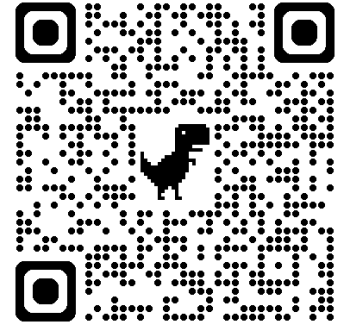
ChatGPT is a very powerful tool. It is "trained" on the Internet. If the information on the Internet is bias and/or unethical, responses from ChatGPT can be as well.

https://openai/chatgpt

Let's Dig In (2) - Chatbots

Note: This is an "open" Chatbot, it was "trained" on the MENJE website and any public website that has information about Luxembourg's schools.

Luxembourg Schools

By Robert Weil 👤

Provides detailed information about Luxembourg's schools
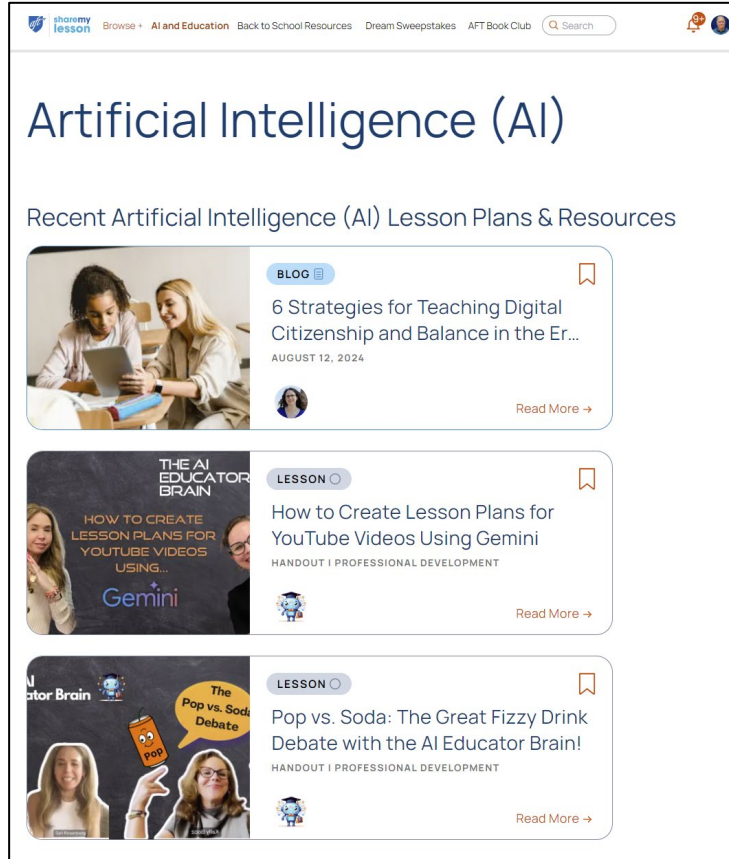
When teacher create Chatbots, they would develop "closed" Chatbots to help ensure privacy and safety.

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Let's Dig In (3) - SML

AFT's Share My Lesson platform has numerous resources related to AI. The "AI Educator Brain" is very popular.

If you don't have a Share My Lesson account, go here, it's free!

https://sharemylesson.com

SML AI

Artificial Intelligence (AI)

Recent Artificial Intelligence (AI) Lesson Plans & Resources

BLOG
6 Strategies for Teaching Digital Citizenship and Balance in the Er...
AUGUST 12, 2024
Read More →

LESSON
How to Create Lesson Plans for YouTube Videos Using Gemini
HANDOUT | PROFESSIONAL DEVELOPMENT
Read More →

LESSON
Pop vs. Soda: The Great Fizzy Drink Debate with the AI Educator Brain!
HANDOUT | PROFESSIONAL DEVELOPMENT
Read More →

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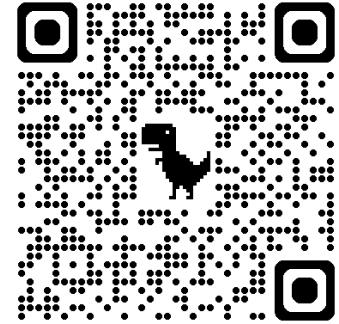
Let's Dig In (4)

Khanmigo for Teachers

https://www.khanmigo.ai/teachers
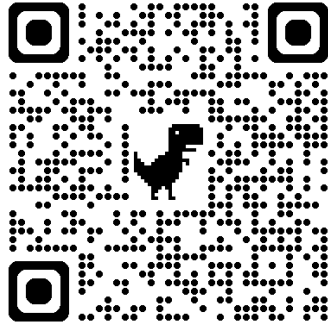
Khanmigo Tools

Free AI powered tools designed to save you time and improve instruction!

Tools | My Documents

All Tools | Plan | Create | Differentiate | Support | Learn

Search

Chunk Text
Break complex texts into manageable sections for easier student comprehension.

Class Newsletter
Produce engaging newsletters to keep parents informed about class activities.

Class Snapshot
Review your students' performance and trends.

Clear Directions
Generate concise, easy-to-follow instructions for assignments and activities.

Discussion Prompts
Craft engaging prompts to stimulate meaningful classroom discussions.

Exit Ticket
Create quick end-of-lesson assessments to check student understanding.

Fun Class Summary Poem
Transform memorable class moments into a creative poetic recap.

IEP Assistant
Streamline the creation of Individualized Education Plans.

Informational Text
Create informational text for a variety of topics.

Learning Objective(s)
Develop clear, measurable learning objectives to guide instruction.

Lesson Hook
Plan compelling lesson starters to engage students.

Lesson Plan
Create structured, detailed lesson plans tailored to your curriculum and students' needs.

Letter of Recommendation
Create personalized letters of recommendation.

Leveler
Adjust the complexity of a given text.

Make it Relevant!
Link lesson content to students' lives and interests to boost engagement.

Multiple Choice Assessment
Create multiple-choice assessments on a variety of topics.

Questions Generator
Create questions for a specific piece of content.

Real World Context Generator
Connect lesson topics to engaging real-world examples and applications.

Recommend Assignments
Receive recommendations on what your students should work on next.

Refresh My Knowledge
Refresh your content knowledge in various subject areas.

Report Card Comments
Generate personalized, constructive report card comments.

Rubric Generator
Design clear, detailed grading rubrics to set expectations and simplify scoring.

SMART Goal Writer
Create specific, measurable, achievable, relevant, and time-bound goals.

Text Rewriter
Customize text to meet your instructional needs.

Bonus Slide #1

According to a report published by Common Sense Media, social media usage among teenagers drastically increased between 2012 and 2018. A survey conducted in the U.S. earlier this year showed16 percent of today's teens admit to checking their social feeds nearly constantly and another 27 percent do so on an hourly basis (in 2018).

From: *Increases in Depression, Self-Harm, and Suicide Among U.S. Adolescents After 2012 and Links to Technology Use* -Jean M. Twenge, San Diego State University
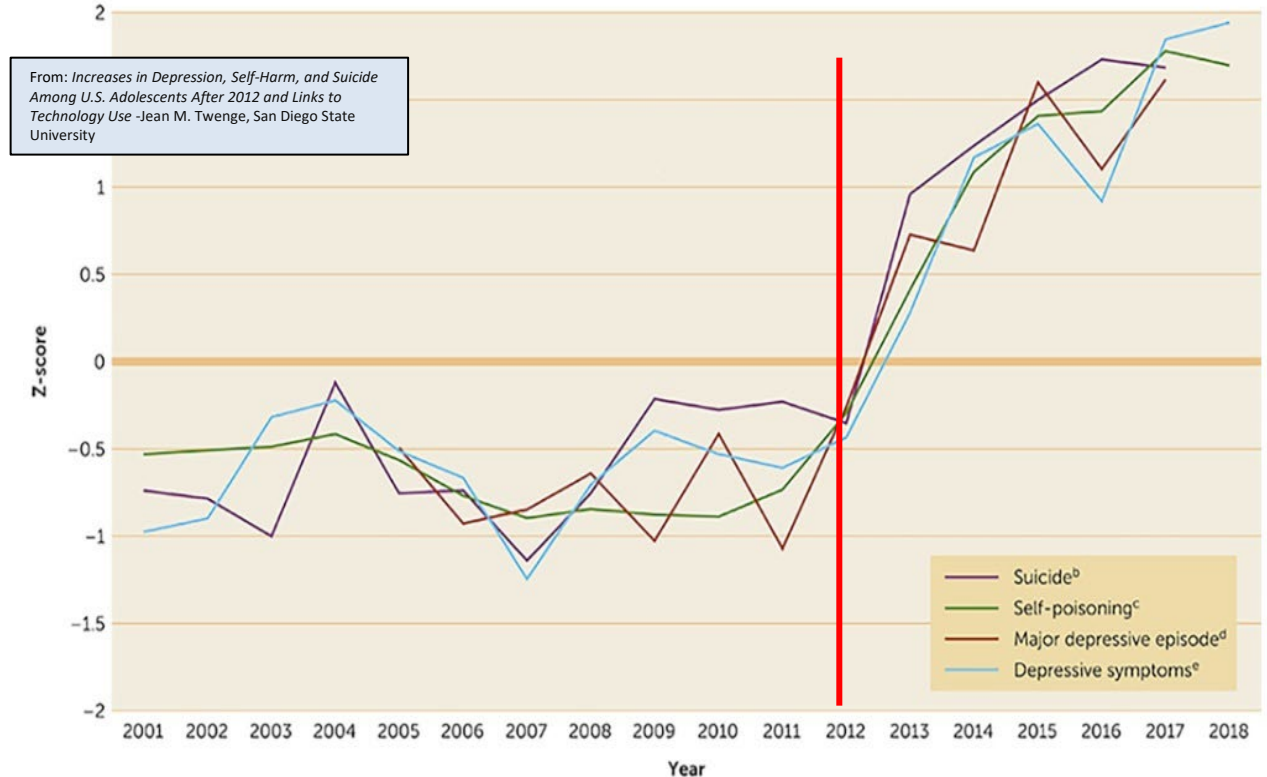
Bonus Slide #1 (update)

2018-2022

We once thought this trend was concerning enough, a new threat has emerged with the rise of artificial intelligence. As AI continues to reshape the digital landscape, it amplifies the risks posed by social media, from misinformation to the erosion of privacy. The pressure for constant online engagement is growing, and the manipulation of attention through AI algorithms further complicates the struggle for balance in the lives of young people.
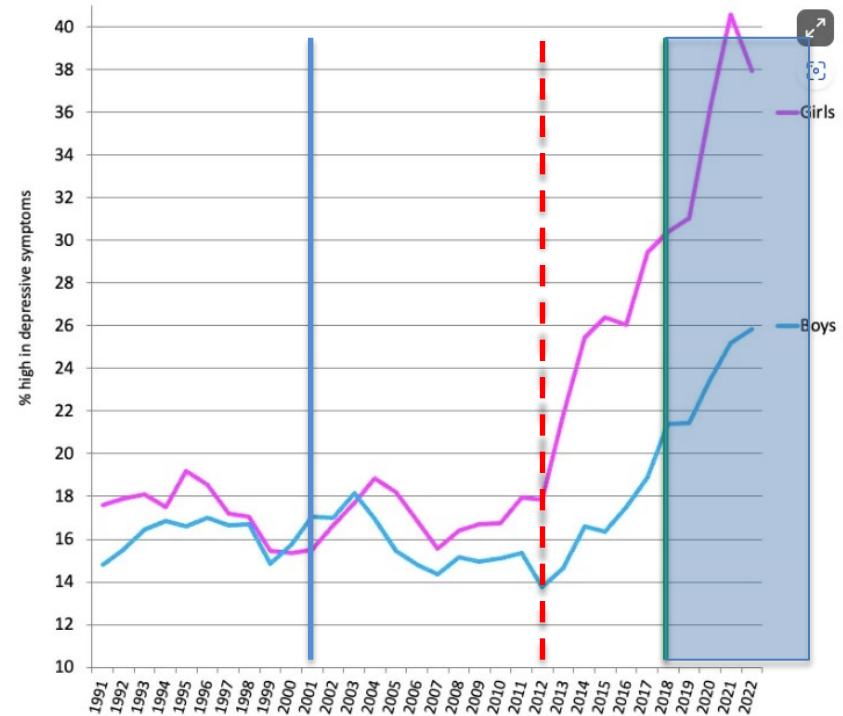

Figure 1: Depression among U.S. teens (8th, 10th, and 12th graders), 1991-2022. Source: Monitoring the Future surveys of 8th, 10th, and 12th graders

es

Bonus Slide #2

Most of the drop was before COVID

Historical PISA Scores – All Countries

Trends in mathematics, reading and science performance

PISA test scores, OECD average

Source: OECD (2023), PISA 2022 Results (Volume I): The State of Learning and Equity in Education.

Ironically, the OECD has noted that placing too much emphasis on test scores has contributed to young people losing interest in education.

Important Note: Since the introduction of PISA testing, the OECD has published numerous reports on strategies for countries to enhance their performance.

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Thank you.

rweil@aft.org