C21 CIO ALLIANCE

THE FUTURE OF AI IN K12 EDUCATION REPORT

Table of Contents

Letter From The CIO Alliance Chair and C21 Canada Leadership

As we stand on the brink of revolutionary changes in education, it is our pleasure to introduce the C21 Canada "Future of AI in K12 Education" report, a milestone document prepared in collaboration with the C21 Canada CIO Alliance, CEO Academy and Board of Advisors. This report embodies our commitment to leading Canadian education into a future where artificial intelligence (AI) enhances learning environments in profound and positive ways.

Under the dedicated leadership of our team and the robust participation of national and global experts, we have crafted a vision that harnesses AI's potential to transform K12 education, while being mindful of ethical and data privacy considerations. Our goal is to facilitate a national dialogue that prepares our educators and students for the opportunities and challenges of today and tomorrow.

"*We can't control it (AI) and we can't ban it but we can help students learn to use it, in a supervised way, in a thoughtful way and a meaningful way*."

-- Dr. Sarah Eaton, an associate professor at the University of Calgary and an expert in AI education.

Given the accelerated growth and popularity of generative AI making its way into K12 education, the CIO Alliance aims to provide leadership across Canada by curating resources and insights to help support leaders, students and teachers optimize generative AI to enhance the learning process with a lens on equity, safety and security.

Leveraging the collective knowledge of our C21 Canada network of leaders, we are advocating for a National Call to Action to harness the insights, and best practices of K12 systems across Canada. While there are many unknowns in preparing our next generation leaders, it's incumbent that we ground our students with the essential global competencies, the C21 Canada 7Cs to better prepare for a future that is not clearly seen!

We are excited to share our findings and recommendations at the upcoming C21 Canada CEO Academy Summit. Together, we can shape an educational future that reflects our highest aspirations for Canada's next generation of leaders and learners.

With sincere gratitude,

Peter Singh
C21 Canada CIO Alliance Chair

Robert Martellacci
Co-founder & CEO, C21 Canada, Inc

Karen Yamada, Chief Learning Officer
President

C21 Canada, Inc

David Roberts, Co-founder &

C21 Canada, Inc

About the ClO Alliance Introduction

The C21 CIO Alliance aims to develop a national leadership alliance of progressive public-school CIO's committed to setting Canadian standards to optimise 21st century learning, innovation and technology tools in schools and homes.

Our national collaboration is aimed at bridging the knowledge gap that may exist in some regions of the country. As generative AI is evolving at an accelerated pace, it is our goal to remain agile as an organisation in order to lead the way in helping shape the future vision and policies around AI in K12 education in Canada.

Executive Summary

“The UNESCO report warned that countries needed to set their own terms for how technology is designed and used in education, particularly with rapid developments in AI being implemented frequently. Children need to be taught to live with and without technology. Technology should support but never replace human interactions in teaching.”

“*Students will always learn best from teachers they love. AI is not a magic power AI is a great amplifier and accelerator. Amplify great ideas and great practices. Schools have woken up to this digital world, this AI world. That is transforming learning in amazing ways. The greatest promise of AI lies in the personalization of learning experience. While you study math on the computer the computer can figure out how you learn and makes learning more granular, so much more interactive and fun. Game based learning powered by AI makes learning more interesting and engaging*.”

--**Andreas Schleicher**, is the Director for Education and Skills, and Special Advisor on Education Policy to the Secretary-General at the Organisation for Economic Co-operation and Development (OECD) in Paris.

The "Future of AI in K12 Education" report is a comprehensive analysis prepared by the C21 Canada CIO Alliance, focusing on the integration and impact of artificial intelligence in Canadian K12 education. This summary highlights the key findings and strategic recommendations outlined in the report:

1. **Global and Canadian Perspectives:** Our research includes a thorough scan of AI applications both globally and within Canada, revealing a dynamic landscape where some regions lead while others follow. The insights from these scans are crucial for understanding how AI can be effectively integrated into Canadian education systems.
2. **AI in Classroom Practice:** We explore the current use of AI in classrooms, addressing the technology's dual role as both a facilitator of cheating and a powerful educational tool. Innovative districts, such as NYC Public Schools, have shifted from banning AI tools like ChatGPT to creating policies that harness their educational potential.
3. **Leadership in AI Education:** CEO Leaders like Dr. Chris Kennedy in West Vancouver School District and Tom D’Amico from Ottawa Catholic School Board are showcased for their proactive approaches to AI in education, serving as models for other leaders across Canada. At the provincial level, British Columbia recently released a K12 report: Digital literacy and the use of AI in education: supports for British Columbia schools and the province of New Brunswick held the first province-wide stakeholder k12 ‘Think Tank.’
4. **Best Practices and Resources:** The report provides an extensive collection of best practices and resources, including case studies and policy guidelines, to assist educators in navigating the complexities of AI integration.
5. **National Call to Action:** To Establish a Task Force in Developing a National Framework that is of Common Interest to all Canadian Education Systems: We propose a unified approach to embracing AI in education across Canada. This includes enhancing transparency, promoting equity and inclusion, safeguarding privacy, and fostering digital literacy and interdisciplinary collaboration.

The report serves as a crucial roadmap for educators, policymakers, and stakeholders seeking to leverage AI to enhance educational outcomes while addressing its inherent challenges. By fostering an informed and proactive approach, we aim to position Canada at the forefront of educational innovation and equity.

We invite all attendees of the C21 Canada CEO Academy Summit to engage with this report and join us in shaping a future where AI not only supports but elevates K12 education across our nation.

What is GenAI?

GenAI, or Generative Artificial Intelligence, refers to a type of AI technology capable of generating text, images, audio, and other content based on the data it has been trained on. It includes models like ChatGPT (for text generation), DALL-E (for image creation), and various others that can generate new content after learning from large datasets.

What is the Promise and Potential for K12 Education

The promise and potential of GenAI for K-12 education in Canada are vast and multifaceted. Here are some key areas where GenAI can make a significant impact:

1. **Personalized Learning**: GenAI can tailor educational content to meet the unique needs of each student. It can adjust difficulty levels, provide additional resources, and offer personalized feedback, helping students learn at their own pace and style.

2. **Accessibility**: AI tools can help break down barriers for students with disabilities by offering voice-to-text or text-to-voice functionalities, personalized interfaces, and other assistive technologies. This enhances inclusivity and accessibility in education.

3. **Enhanced Engagement**: GenAI can generate interactive and engaging content such as virtual simulations, educational games, and interactive quizzes, which can make learning more enjoyable and effective for students.

4. **Efficiency in Education**: AI can automate routine tasks such as grading, scheduling, and even answering frequently asked questions, freeing up teachers to focus more on teaching and less on administrative tasks.

5. **Support for Teachers**: GenAI can assist teachers by providing teaching aids, generating creative lesson plans, and offering insights into student performance, which can help in identifying areas where students might be struggling.

6. **Scalability of Educational Resources**: AI can help in creating and distributing educational content across various regions without additional costs, ensuring that high-quality education is more uniformly accessible.

7. **Continuous Learning and Improvement**: As GenAI systems continue to learn and adapt, they can update educational content and strategies based on the latest educational

research and data trends. This can ensure that the educational content remains relevant and up-to-date.

Despite these promising aspects, the integration of GenAI in education also requires careful consideration of ethical issues, such as data privacy, bias in AI algorithms, and the impact on employment within the education sector. Ensuring that these tools are used responsibly and that educators are properly trained to use them will be crucial in realizing their full potential in the Canadian K-12 education system.

What the Research Says

There is no question that integrating generative AI in K12 education is a daunting task, especially for educators. A recent research released by the International Society for Technology in Education (ISTE) suggested that only 9% of professors in the U.S. are using some form of modelling with technology to prepare the next generation of educators. This, in combination with teacher technology laggards, has led to the majority resisting the integration of generative AI. Further, the soon-to-bering baby boom generation educators for the most part remain uninterested in grappling with this latest technology trend that will not go away.

As quoted in the U.S. Department of Education Office of Educational Technology's AI Policy Report, "**AI in education can only grow at the speed of trust**." —Dr. Dale Allen

On the flipside, students have discovered the power and potential of leveraging AI to cheat or, on a more positive note, as an assistant to enhance the learning process.

An excellent turnaround scenario developed more recently this past year in NYC Schools where initially, the district banned the use of ChatGPT. Upon further investigation, New York City Public Schools recently announced the launch of an Artificial Intelligence policy lab with an aim to work with national experts and school districts across the country to craft policy around the smart use of AI for teaching and learning.

Who's leading the way in Canada? Dr. Chris Kennedy, Superintendent of Schools & CEO West Vancouver, has been a strong proponent of embracing Generative AI. Read his thoughts on AI here: Better Prompting and Other AI Stuff I Have Learned.

Expert reports highlighted in this document include the U.S. Department of Education Office of Educational Technology's AI Policy Report, the UNESCO Report on K-12 AI curricula, and CoSN's AI Guidance For Schools Toolkit from TeachAI.

There are also a number of resources that discuss the practical uses of AI through case studies, such as:

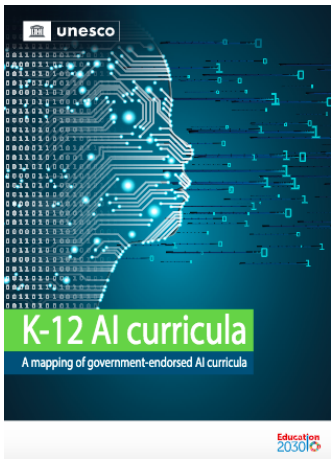
- K-12 Teachers Say Classroom Models Need to Evolve to Prepare Canadian Students for the Future
- School boards grappling with AI use in classroom, but formal policies still elusive
- From chalkboards to chatbots: How to use artificial intelligence in the K-12 classroom
- New York City schools are embracing AI. Lawmakers had some questions. After an about-face on ChatGPT, the Department of Education plans to develop AI policy for grades K-12 by June

A Global Scan of AI in K12 Education

While C21 Canada is national in scope, we've been mindful of casting a broad net through partnerships and alliances to keep Canada at the forefront of innovation on a global scale. This section examines the widespread adoption and application of AI across educational systems worldwide. As we delve into this essential exploration, we share a compilation of global resources, unveiling insights, strategies, and innovative approaches that various nations have harnessed to enhance the educational experiences of students. This array of global resources promises to be invaluable for educators, policymakers, and stakeholders who seek to leverage the transformative potential of AI in education on an international scale.

Exclusive Interview with **Andreas Schleicher**, Director for Education and Skills, and Special Advisor on Education Policy to the Secretary-General at the Organisation for Economic Co-operation and Development (OECD) in Paris.

1) UNESCO Report: K-12 AI curricula: A mapping of government-endorsed AI curricula



This report focuses on government-approved AI curricula for K-12 schools, aiming to address the lack of historical knowledge in defining AI competencies and curriculum design. It examines existing AI curricula, emphasizing curriculum content, learning outcomes, development processes, alignment, tools, pedagogies, and teacher training. The findings inform future policy planning, national curriculum design, and AI competency development strategies. UNESCO's study investigates global practices for AI curricula in primary and secondary education, specifically targeting government-endorsed programs for learners from kindergarten to grade 12.

Read Full Report

2) OECD Digital Education Outlook 2023

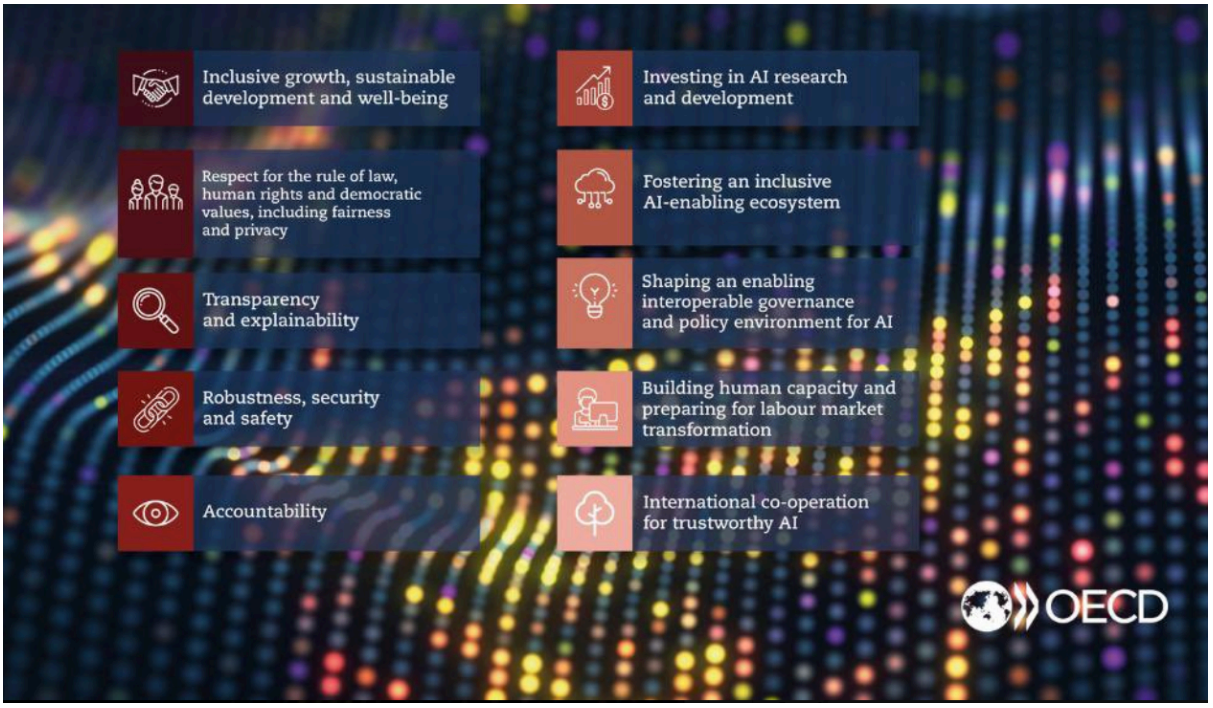
Dr. Andreas Schleicher, OECD Director for Education and Skills, has been actively discussing the future of education in the context of artificial intelligence (AI) and technology. He emphasizes the importance of shaping educational systems that don't just compete with AI but complement it, preparing students to become "first-class humans" in a tech-driven world. Schleicher advocates for education that fosters human qualities and skills that machines cannot replicate easily, such as critical thinking, creativity, and emotional intelligence.

Furthermore, Schleicher has outlined key areas where AI can significantly impact education, such as transforming traditional classroom settings into more active, flexible, and individualized learning environments through AI-powered educational technology (EdTech). This approach is aimed at moving away from the old factory model of education to more collaborative and personalized learning experiences.

Read Full Report

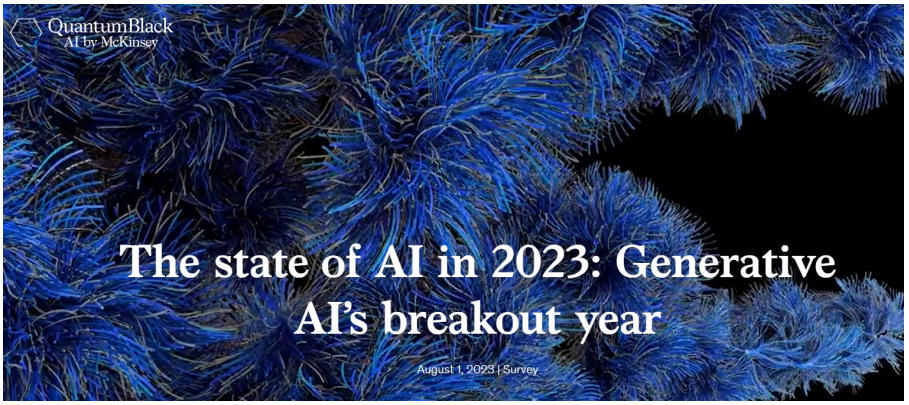
OECD AI in Education Policy Observatory

OECD updates AI Principles to stay abreast of rapid technological developments May 3, 2024



Read full story

3) The state of AI in 2023: Generative AI’s breakout year

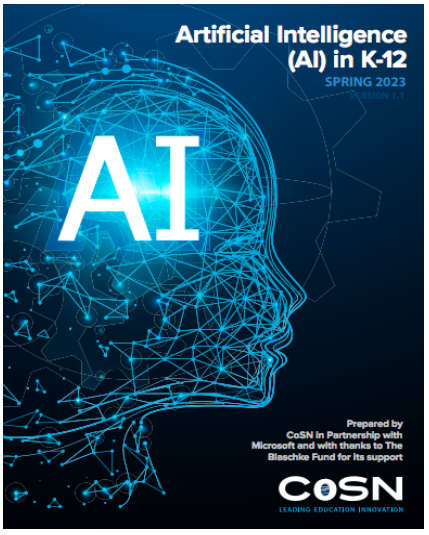


In addition to education, AI tools have also been very impactful in a number of industries.

The McKinsey Global Survey highlights the rapid growth of generative AI (gen AI) tools, with respondents stating their organizations use gen AI regularly. Company leaders are embracing gen AI for work tasks and plan to increase overall AI investment due to advancements. Despite this, organizations are still in the early stages of managing gen AI-related risks, with less than half addressing accuracy concerns. Early adopters of gen AI are exploring its potential, especially those termed as AI high performers. While gen AI is expected to disrupt businesses and lead to workforce changes, there hasn't been a significant increase in overall adoption since 2022, and its use remains limited to specific business functions.

Read Full Report

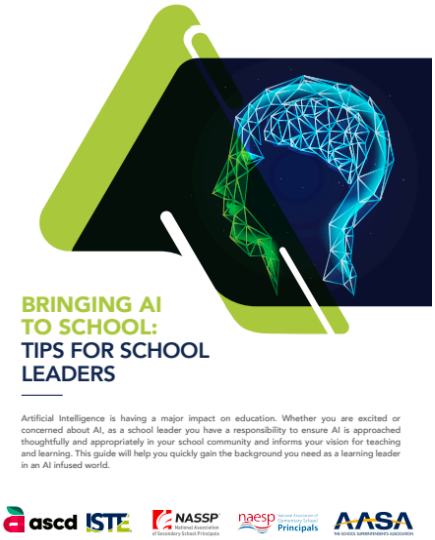
6. CoSN Report Artificial Intelligence (AI) in K12



AI is rapidly expanding in education, offering the potential to provide personalized instruction at scale but also presenting new challenges. This publication aims to assist school and district leaders in navigating AI's impact on students, teachers, and families. Rather than replacing teachers, AI has the potential to enhance their roles by automating routine tasks, allowing for more personalized and meaningful learning experiences. However, there is a need for critical consideration of privacy, bias, and algorithmic literacy when implementing AI in educational settings. Many AI technologies are not designed with education-specific privacy laws in mind, and there are concerns about biases in AI algorithms and the need for educators to be literate in AI to use it effectively.

Read Full Report

7. ISTE Report Bringing AI to School: Tips for School Leaders



Artificial Intelligence is having a major impact on education. Whether you are excited or concerned about AI, as a school leader you have a responsibility to ensure AI is approached thoughtfully and appropriately in your school community and informs your vision for teaching and learning. This guide will help you quickly gain the background you need as a learning leader in an AI infused world.

Generative AI, which encompasses ChatGPT and the other new content-creation tools, is the type that is getting the most attention recently. As such, this guide will focus primarily on generative AI, though all types of AI have implications for education and are worth understanding in greater detail.

Read Full Report

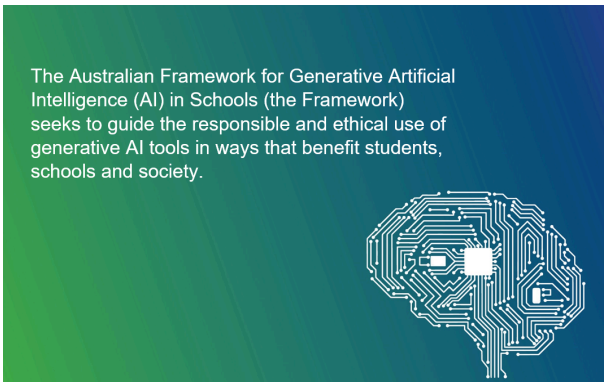
Who's Leading? Australia is One of the Earliest Movers

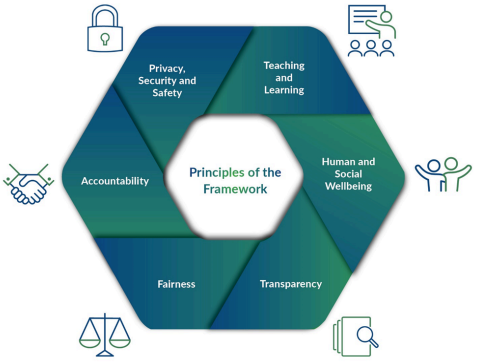
Australia's federal education minister, Jason Clare, was quoted stating that ChatGPT was "not going away" and ChatGPT as a tool was becoming as vital as a "calculator or the internet."

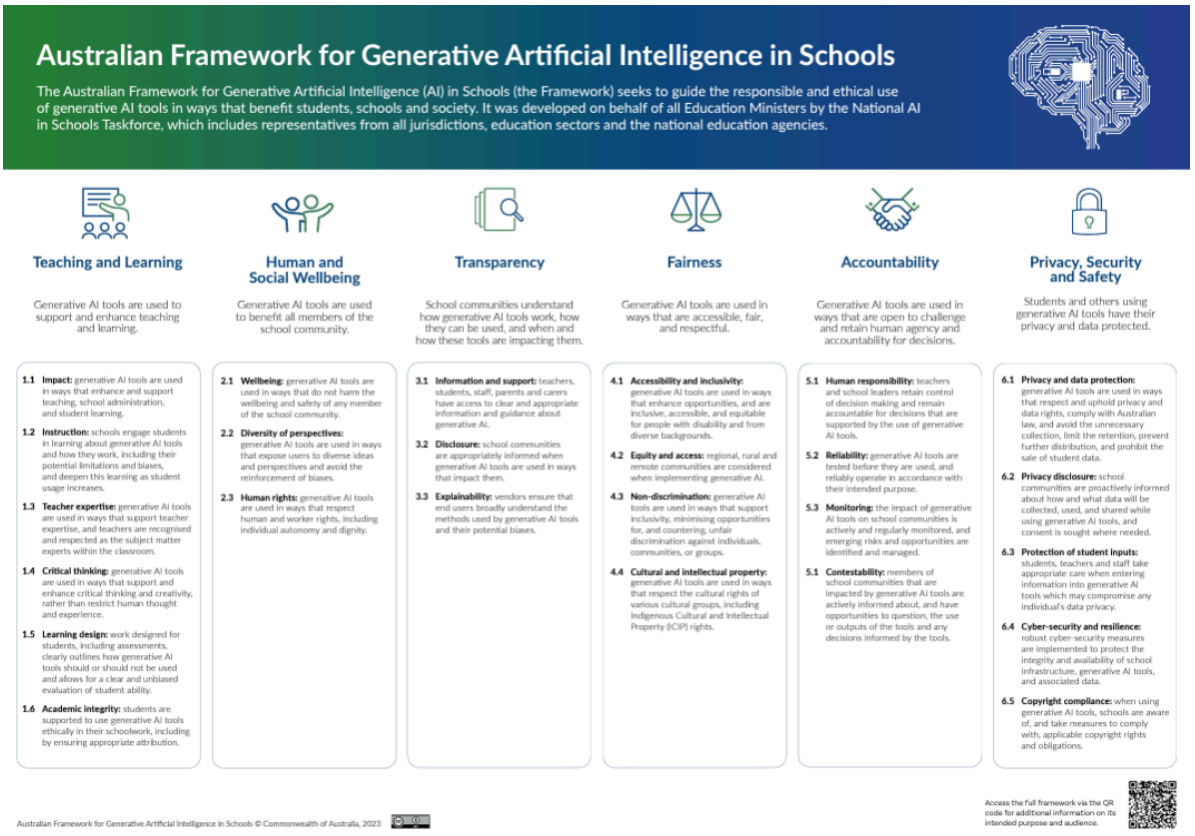
Australia is actively developing and implementing AI in K12 education through a national framework established by the National AI Schools Taskforce. This framework emphasizes responsible AI usage to enhance educational outcomes while protecting student privacy and safety. It includes a $1 million investment for safely integrating AI technology into schools and aims to support educators and students in navigating the challenges and opportunities presented by AI. This initiative highlights Australia's commitment to preparing students for future technological landscapes by prioritizing secure, effective, and equitable AI integration in education (The Educator Online).

It takes a village! The journey began with the National AI in Schools Taskforce which included representatives from all jurisdictions, the National Copyright Unit (NCU), non-government school sector peak bodies, Independent Schools Australia (ISA) and the National Catholic Education Commission (NCEC), and representatives from national education organisations, including the Australian Curriculum, Assessment and Reporting Authority (ACARA), the Australian Education Research Organisation (AERO), the Australian Institute for Teaching and School Leadership (AITSL) and Education Services Australia (ESA), with secretariat support provided by the NSW Department of Education.

The Australian Framework for Generative Artificial Intelligence (AI) in Schools
The Australian Framework for Generative AI in Schools (the Framework) seeks to guide the responsible and ethical use of generative AI tools in ways that benefit students, schools, and society. The Framework supports all people connected with school education including school leaders, teachers, support staff, service providers, parents, guardians, students and policy makers.





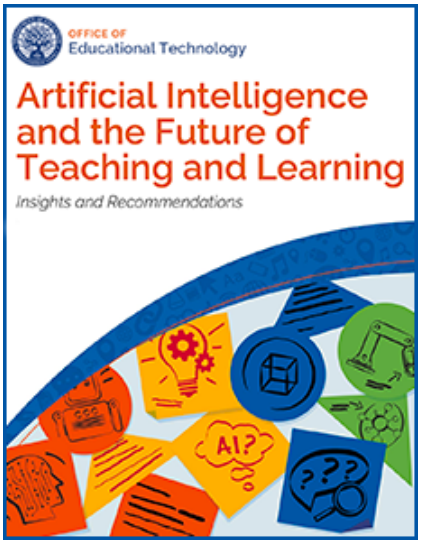


Footnote: The Framework will be reviewed by Education Ministers within 12 months of publication and every 12 months thereafter to accommodate the fast-moving pace of technological development in generative AI. Education Ministers may determine to review the Framework more frequently at their discretion.

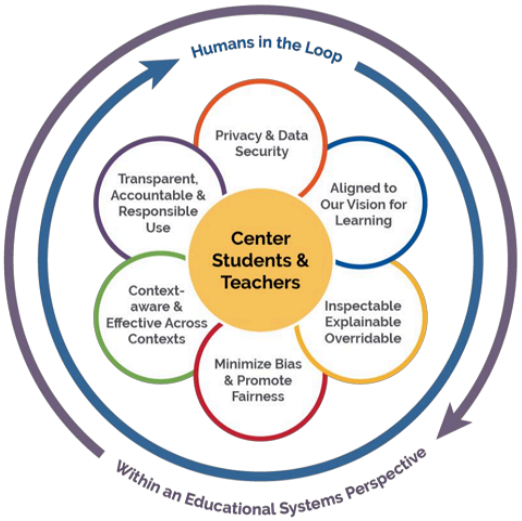
Read Full Report

United States

U.S. Department of Education Office of Educational Technology's Policy Report: Artificial Intelligence and the Future of Teaching and Learning



This policy report highlights the necessity of disseminating knowledge, involving educators, and improving technology strategies and policies for the implementation of artificial intelligence (AI) in education. It characterizes AI as a swiftly progressing collection of technologies that identify patterns in data and automate actions, providing guidance to educators on how these evolving technologies can propel educational objectives forward, all while assessing and mitigating significant risks.
U.S. Recommended Framework



In this figure, we center teaching and learning in all considerations about the suitability of an AI model for an educational use. Humans remain in the loop of defining, refining, and using AI models. We highlight the six desirable characteristics of AI models for education (elaborating from principles in the *Blueprint for an AI Bill of Rights* to fit the specifics of educational systems):

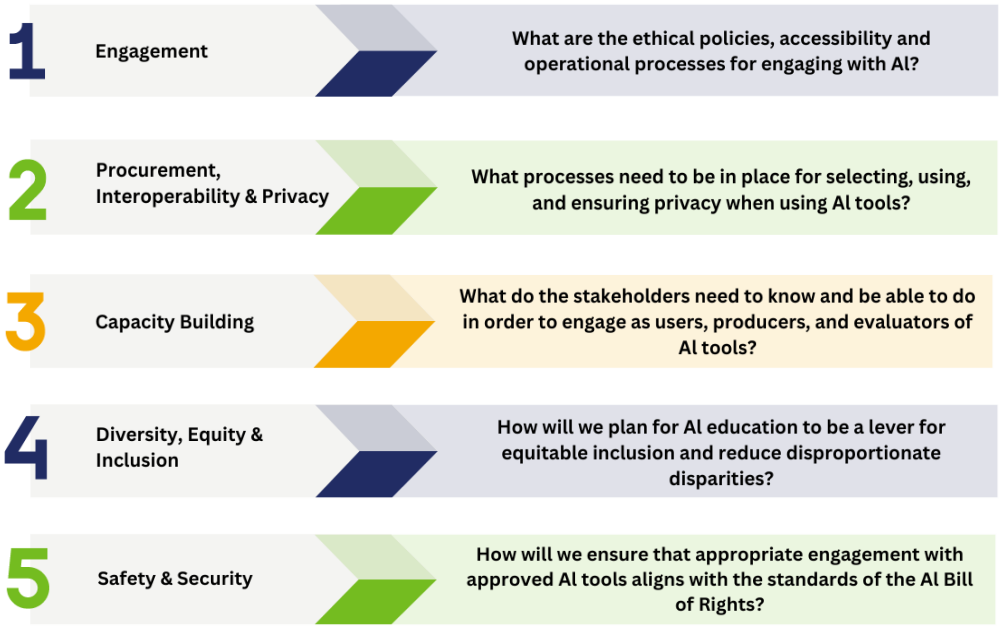
Read Full Report

NYC Schools Launches AI Policy Lab After an Initial Ban

As artificial intelligence (AI) continues advancing and integrating across society, our school district has an imperative to foster ethical AI literacy for all learners. AI offers immense opportunities to enhance teaching and learning outcomes, but also presents risks related to bias, privacy, accessibility, and others that we must safeguard against.

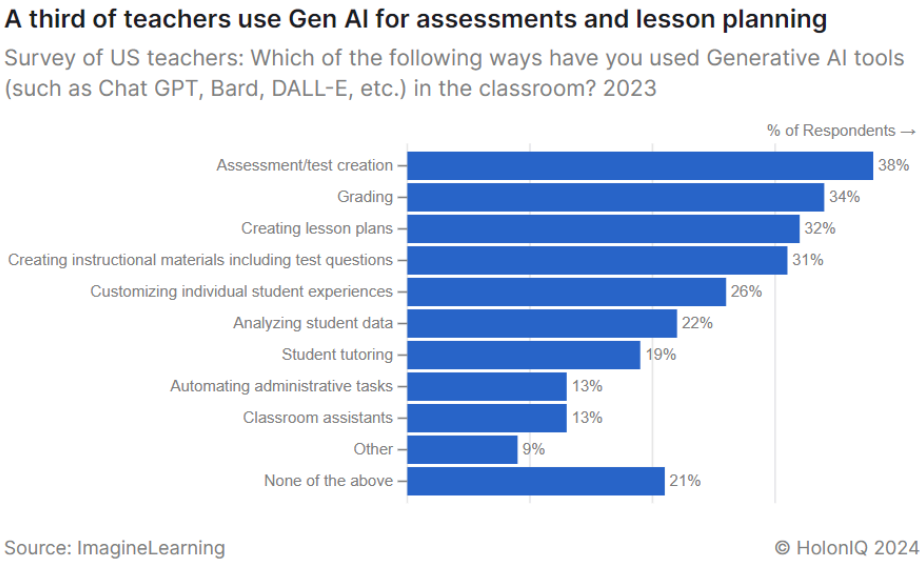
To start this journey, the Division of Teaching and Learning's Digital Learning and Innovation

team in partnership with the EDSAFE AI Alliance is launching the K12 AI Policy Lab. This collaborative effort brings together stakeholders across every NYCPS Division to review, study, and draft K12 AI Policies with a comprehensive perspective towards safety, data security and privacy with a focus on ensuring equity for all users. The policy work is guided by the EDSAFE AI SAFE benchmarks framework.



Read Full Report

Survey of How US teachers are Using GenAI : Which of the following ways have you used Generative AI tools (such as Chat GPT, Bard, DALL-E, etc.) in the classroom?



Click Here For More Details

Canadian Scan of AI in K12 Education

Closer to home, we've conducted cross Canada to understand who has embraced GEN AI and to what degree. We've attended conferences and received copies of numerous books, and reports on AI released by education leaders.

"*Canada's approach to AI in K-12 education is characterized by a cautious yet proactive strategy that seeks to harness the benefits of AI while addressing its challenges through comprehensive policies and educator preparation*." ChatGPT4

While Canada typically lags behind in the adoption of new innovations in education compared to our neighbours to the south in the United States, it's actually not necessarily a bad thing as we have the benefit of learning from their implementations.

There's no question Canada can benefit from approaches taken by other Countries, despite Canada not having a national education department at the national level. CMEC (Council of Ministers of Education, Canada) is best positioned to take a leadership role.

As education in North America navigates the complexities of a digital era, the North American Scan of AI in K-12 Education section of this report is a crucial lens through which we explore the regional landscape of AI's integration in school systems. This section delves into the adoption, implementation, and ongoing evolution of AI technologies across the continent. Our exploration extends beyond observation to offer a practical toolkit for educators and stakeholders. We will discuss tips for successful integration, unravel the myriad benefits and challenges inherent to AI in K-12 education, and provide strategic insights into incorporating AI technologies within the educational fabric of the North American school system.

C21 Canada has taken a leadership role in initiating a national conversation.

New Brunswick Department of Education Emerges as a Leader Nationally in Hosting the first Province-wide AI 'Think-Tank.'

Team C21Can at NB AI in Education 'Think Tank' Randolph MacLEAN, Robert Martellacci, & Katina Papulkas

Recently, C21 Canada was invited to attend The New Brunswick Department of Education and Early Childhood Development is hosting an AI in Education Think Tank.

This day-long event lived up to its promise to be a dynamic exploration of the transformative role that artificial intelligence plays in shaping education and the New Brunswick workforce.

The think tank brought together a diverse group of professionals, fostering a collaborative environment to share ideas, experiences, and strategies for leveraging artificial intelligence to enhance the learning experience in our education system.

This is a unique opportunity to engage with thought leaders, industries and educational leaders while exploring cutting-edge technologies and contributing to the ongoing dialogue on the future of education.

C21 Canada Webinar Series: The Future of AI in K12 Education

Watch Here

Canadian school boards are grappling with the integration of artificial intelligence (AI) in classrooms, especially as students return to class. However, despite concerns about how AI technology will impact learning and academic integrity, many school boards lack formal policies specifically addressing its use.

The Canadian Press conducted a survey, reaching out to 10 school boards across different regions of the country.

"*We can't control it and we can't ban it but we can help students learn to use it, in a supervised way, in a thoughtful way and a meaningful way*."

-- Dr. Sarah Eaton, an associate professor at the University of Calgary and an expert in AI education

They inquired whether these boards would implement a formal policy for the 2023-24 school year regarding teacher and student use of AI. This includes technologies like chatbots capable of solving math problems or writing essays. Surprisingly, none of the boards had an official AI-specific policy in place. Some indicated they would apply

their existing codes of conduct to AI use in the classroom, while others are actively consulting on how to best address this rapidly growing issue.

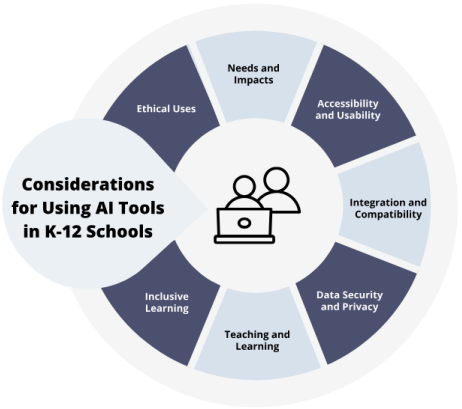
For instance:

- The **Toronto District School Board**, the largest in the country, stated that its staff would be “looking into it further” to determine if any changes are needed to the board’s academic honesty rules.
- The **Peel District School Board**, just west of Toronto, is “keenly aware of the ethical implications and potential risks associated with AI in education.” They are taking a proactive approach to mitigate risks, ensuring alignment with best practices and the unique needs of their diverse student population1.

While formal policies are essential, it’s crucial to strike a balance between embracing AI’s potential and safeguarding academic integrity. As educators, they aim to support the use of assistive tools to enhance learning, not replace it1.

- **British Columbia**

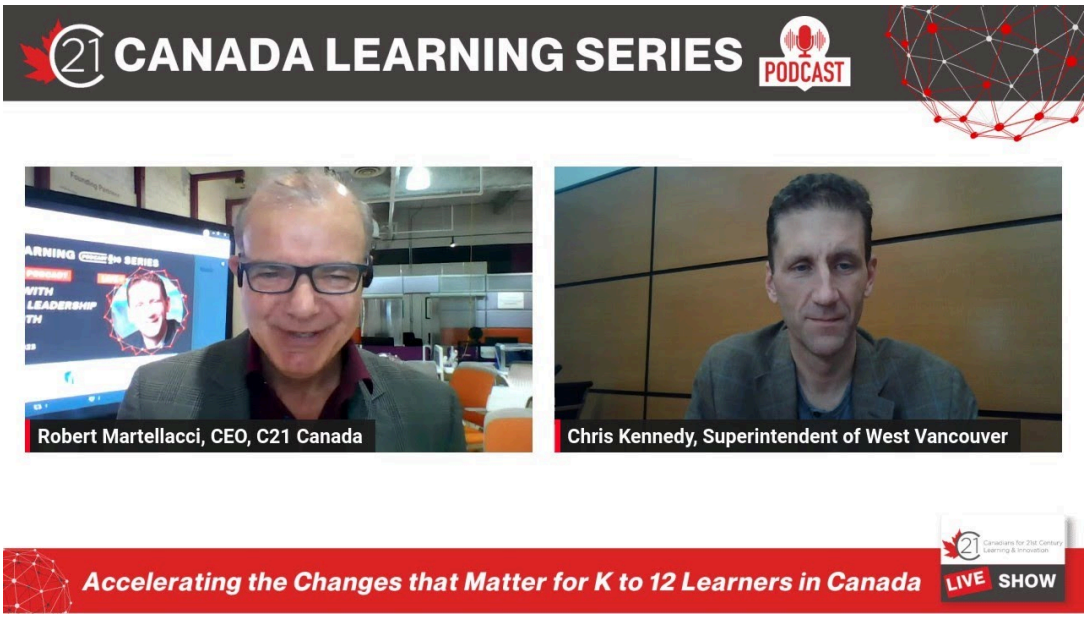
Digital literacy and the use of AI in education: support for British Columbia schools



Read Full Report

Canadian Pioneering Innovators in K12 Education Embracing AI

C21 CEO Academy member **Dr. Chris Kennedy,** Superintendent & CEO, West Vancouver School Division



[Better Prompting and Other AI Stuff I Have Learned]
September 18, 2023 by cultureofyes

Surrey students explore the next digital frontier - artificial intelligence

With 2023 being the breakout year for the advent of artificial intelligence (AI), educators around the world are unsure of what to make of what may very well be the next big disruptor.
Similar to the impacts the internet and smartphones have had on the world, many are looking at artificial intelligence as the next generation-defining technology that will radically change the course of everyday life.

Read More

West Vancouver District Cybersecurity and Artificial Intelligence Course

This ADST 12 course will dive into Cybersecurity and Artificial Intelligence. Both areas impact many aspects of our lives today, and demand for trained professionals in these areas is growing exponentially. For example, in Canada, the unemployment rate for Cybersecurity professionals is 0%.

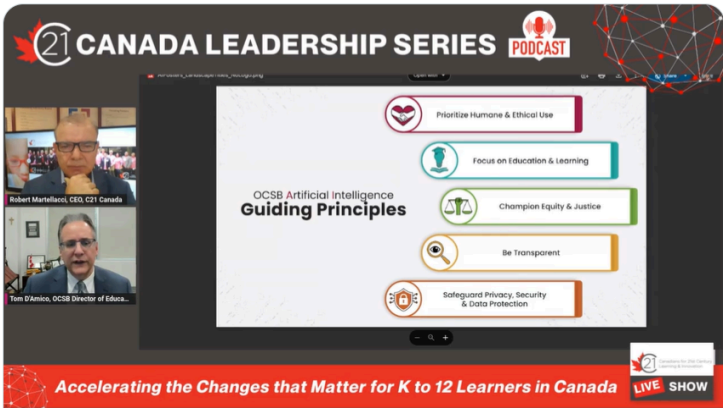
Students will learn about Digital Citizenship, Cybersecurity, Cybercrimes, Viruses, DDoS, Phishing, Cryptography, the Internet, how to stay safe online, and ultimately get Cybersafe certified. In addition to learning about Cybersecurity, there will be an opportunity for students to compete in CyberTitan – one of Canada's largest cyber defense competitions. The top 10 ranked Canadian Teams receive a trip to Ottawa to go head-to-head for the coveted title of CyberTitan National Champions.

Read More

Ontario

C21 CEO Academy Leadership Series on the Future of AI in Education with Tom D' Amico, Director, OCSB

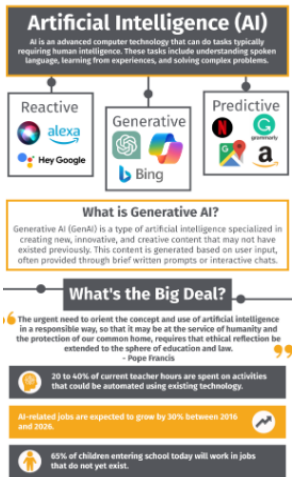
Tom shares the principles which guide district-wide learning and inquiry about AI for good in education. Pilots, networking groups, trials, focus groups, parent session, student feedback have all been encouraged to spread the word about emerging AI products and their impact on teachers and students.



Watch Here

Educational Computing Organization of Ontario Launches first ever province-wide teacher webinar on learning to use AI for learning. [Read more]

Waterloo Catholic District School Board Leading the Way in Sharing GenAI Resources



[Read More]

Canadian Government Report on AI

While the Government of Canada does not have jurisdiction over K12 education, it does provide a practical Guide on the use of Generative AI

Generative artificial intelligence (AI) tools offer various advantages to institutions. While federal organisations should explore their potential uses for enhancing operations, caution is necessary due to the evolving nature of these tools. The document advises federal institutions to evaluate risks before adopting generative AI, limiting their use to manageable situations. The guidance outlines an overview of generative AI, addresses challenges, presents responsible usage principles, and suggests policy considerations and best practices. It emphasises the importance of involving key stakeholders like legal experts and privacy specialists, highlighting coordination among federal bodies.

Read Full Report

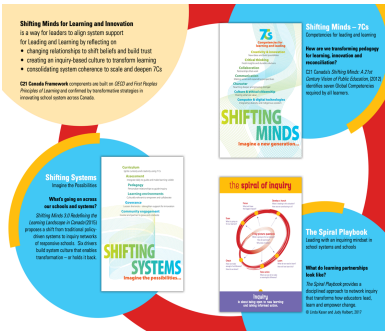
Driving Change through the C21 Canada System Drivers & 7Cs

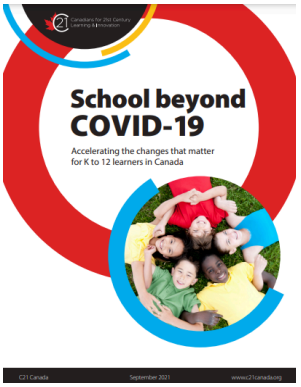
C21 Canada supports the integration of leading- edge skills and competencies, teaching practices, and learning technologies into Canada's education systems. The organisation provides a national forum for leaders to share ideas and build the capacity for system-wide transformation.

A previous C21 Canada release, Shifting Minds 3.0: Redefining the Learning Landscape in Canada, proposed a shift from hierarchical policy-driven systems toward "networks of strong, responsive schools with educators collaborating continuously and sharing knowledge both horizontally and vertically" (Milton 2015, 8). Shifting Minds 3.0 noted the crucial role leaders play:

System leaders create the conditions for transformation by encouraging leadership at all levels, imbued with the very attributes we are aiming to develop in young people— creativity, inquiry, collaboration, calculated risk taking, reasoned problem solving, and the capacity to learn from experience and face the next challenge. (17)

1. **Shifting Systems**
2. **Shifting Minds**
3. **Accelerating What Matters**





C21 Canada National Call to Action

Title: Embracing Ethical AI in Education: A Canadian Call to Action

As Canada continues to advance in the realm of artificial intelligence (AI), it is crucial that we prioritize and promote its ethical use in education. AI has the potential to revolutionize the way we learn, teach, and interact in educational settings. However, without responsible implementation, it can inadvertently perpetuate biases, compromise privacy, and hinder equitable access to quality education. Therefore, we must unite as a nation to advocate for the ethical use of AI in education, ensuring that it benefits all learners and upholds our Canadian values of inclusivity, fairness, and respect.

1. Promote Transparency and Explainability:
We call upon educational institutions, policymakers, and AI developers to prioritize transparency and explainability in the implementation of AI systems. It is crucial that students, teachers, and parents understand how AI is being used, what data is being collected, and how decisions are being made. Clear communication and accessible information will help build trust and encourage responsible AI adoption in education.

2. Foster Equity and Inclusion:
We urge educational stakeholders to prioritize equity and inclusion in the development and deployment of AI technologies. AI should not exacerbate existing inequalities but should be leveraged to bridge the digital divide and provide equal opportunities for all learners. We must ensure that AI systems are designed to accommodate diverse learning needs, respect cultural sensitivities, and address biases that may perpetuate discrimination or disadvantage certain groups.

3. Safeguard Privacy and Data Protection:
We call for robust privacy measures and data protection protocols to safeguard student information and sensitive data. Educational institutions must prioritize the security and responsible handling of personal information when utilizing AI technologies. Striking a balance between utilizing data to improve educational outcomes and respecting individual privacy rights is paramount to maintain public trust and confidence in AI-driven educational initiatives.

4. Foster Digital Literacy and Critical Thinking Skills:
We emphasize the need to equip students, teachers, and educational professionals with the necessary digital literacy and critical thinking skills to navigate an AI-driven world. AI should be seen as a tool to enhance learning and augment human capabilities, rather than replace them. By promoting digital literacy, we empower individuals to understand AI's strengths and limitations, encouraging informed decision-making and ethical use of AI in educational contexts.

5. Encourage Interdisciplinary Collaboration:
We advocate for interdisciplinary collaboration between educators, AI researchers, policymakers, and other stakeholders to shape the ethical use of AI in education. By fostering dialogue and knowledge exchange, we can develop guidelines, best practices, and policies that promote the responsible integration of AI into the Canadian education system. Collaboration will ensure that AI technologies align with educational goals, address ethical concerns, and prioritize the well-being of learners.

Conclusion

The "Future of AI in K12 Education in Canada" report, spearheaded by the C21 Canada CIO Alliance, marks a significant milestone in the integration of artificial intelligence (AI) within Canadian K12 education systems. This comprehensive document, produced in collaboration with leaders from the CIO Alliance, CEO Academy, and Board of Advisors, outlines a vision for harnessing AI to enhance educational outcomes, ensuring ethical considerations and data privacy are prioritized. The report advocates for a national dialogue to prepare educators and students for the opportunities and challenges presented by AI, underscored by the inclusion of global and Canadian AI applications and their implications for educational practices.

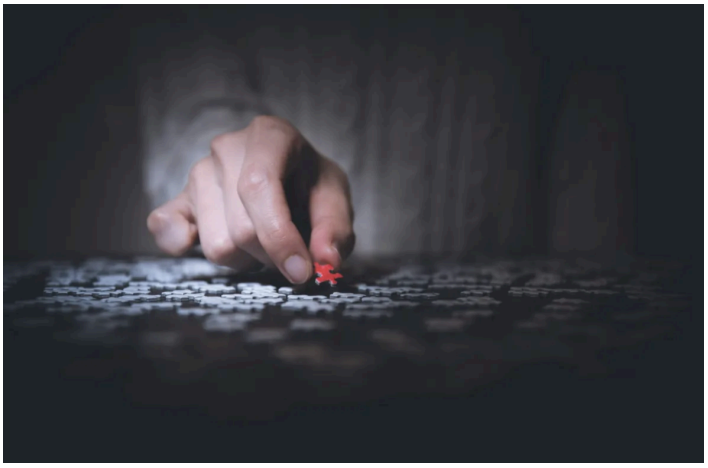
Central to the report are discussions on AI's dual role in classrooms as both a potential facilitator of academic dishonesty and a transformative educational tool. It highlights innovative approaches, such as those adopted by certain Canadian districts that have shifted from restricting AI tools to leveraging them to foster educational advancement. The report also

details the creation of AI courses and microcredentials aimed at equipping educators with necessary AI skills. Furthermore, a "National Call to Action" is proposed to establish a task force for developing a unified framework to guide AI's ethical integration into education across Canada, promoting transparency, equity, privacy, and digital literacy. This call to action and the strategic recommendations offered in the report aim to position Canada as a leader in the ethical use of AI in education, enhancing both teaching and learning experiences.

As Canada embraces the potential of AI in education, we must ensure that it aligns with our values and advances our commitment to equitable, inclusive, and ethical education. By embracing transparency, equity, privacy, digital literacy, and collaboration, we can shape the future of AI in education for the betterment of all Canadians. Let us join forces and answer this call to action, creating an educational landscape that harnesses AI's power responsibly while nurturing the growth and development of every learner.

Additional Resources

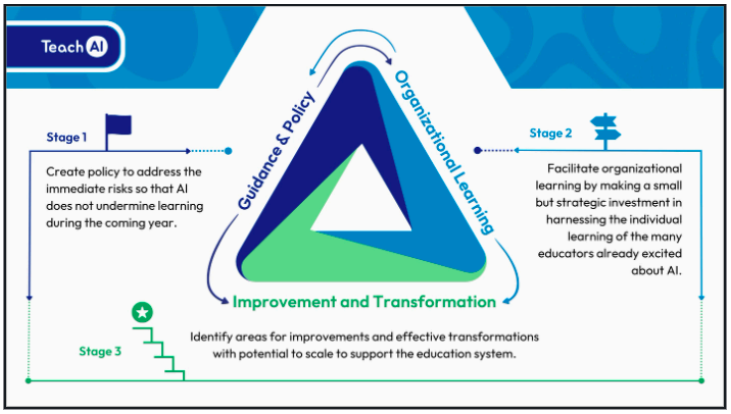
UN Research Sheds Light On AI Bias



Most educators already know intuitively that large language models such as ChatGPT have the potential for AI bias, but a recent analysis from The United Nations Educational, Scientific and Cultural Organization demonstrates just how biased these models can be.

Read Full Report

Teach AI



Designed to help education leaders and policymakers understand the implications of AI in education and develop responsible policies that focus on teaching and learning.

Read More

AI competency frameworks for school students and teachers

Government-endorsed K-12 AI curricula

- Only 11 countries had developed and endorsed K-12 AI curricula up to 2021

Country/ region	Curriculum title	Grades		
		Primary	Middle	High
Armenia	Curriculum of ICT		X	X
Austria	Data Science and Artificial Intelligence			X
Belgium	IT Repository			X
China	AI curriculum embedded in the Information Science and Technology curriculum	X	X	X
India	Atal Tinker Labs AI modules		X	X
Republic of Korea	'AI Mathematics' under Mathematics Subject Group for High schools			X
	'AI Basics' under Technology Home Economics Subject Group for high schools			X
Kuwait	Standards curriculum	X	X	
Portugal	Information and Communication Technologies	X	X	X
Qatar	Computing & Information Technology	X	X	X
	Computing & Information Technology (High Tech Track)			X
Serbia	Informatics and programming – Grade 8		X	
	Modern technologies – Grade 3 and 4 of gymnasium			X
UAE	AI curriculum embedded under the Technology Subject Framework	X	X	X

For more information:

Government-endorsed K-12 AI curricula

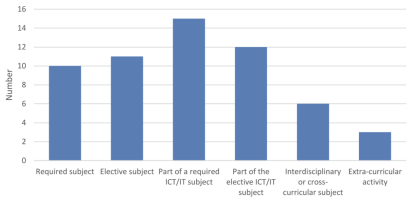
- 4 countries had K-12 AI curricula in development

Country/ region	Curriculum title	Grades		
		Primary	Middle	High
Germany	Identifying and Formulating Algorithms [Algorithmen erkennen und formulieren]	X	X	X
Jordan	Digital Skills		X	X
Bulgaria	Computer Modelling, Information Technology and Informatics	X	X	X
Saudi Arabia	Digital Skills	X	X	X

Types of K-12 AI curricula

Drawn from "K-12 AI curricula: A mapping of government-endorsed AI curricula"

- Discrete AI curricula as **an independent subject**
- **Embedded** AI curricula (mostly in ICT curricula)
- **Interdisciplinary** AI curricula
- **Multiple modality** AI curricula
- **Flexible/Ad-hoc** AI curricula



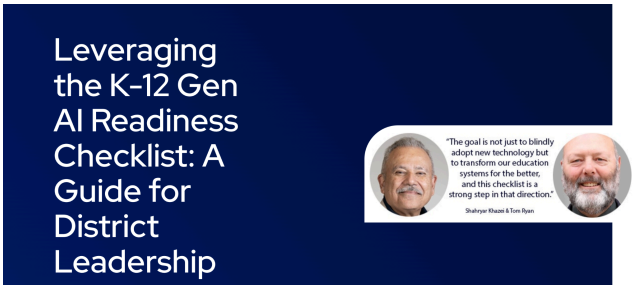
4. AI CFS: Two-dimension Matrix

Minimum AI literacy for **all students** | Expected curricular outcomes for **most students** | Expected curricular outcomes for **students who are strong at AI**

Aspects	Progression Levels		
	Understand	Apply	Create
Human-centred mindset	Human Agency	Human Accountability	AI Society Citizenship
Ethics of AI	Embodied Ethics	Safe and Responsible Use	Ethics by Design
AI techniques and applications	AI Foundations	Application Skills	Creating AI Tools
*AI system design	Problem Scoping	Architecture Design	Iteration and Feedback Loops

Read More

CoSN's AI Readiness Checklist



The Checklist covers readiness in Executive Leadership, Operational, Data, Technical, Security, Legal/Risk Management. Below are some ideas for how the Checklist can be leveraged in your school district.

Read Full Report

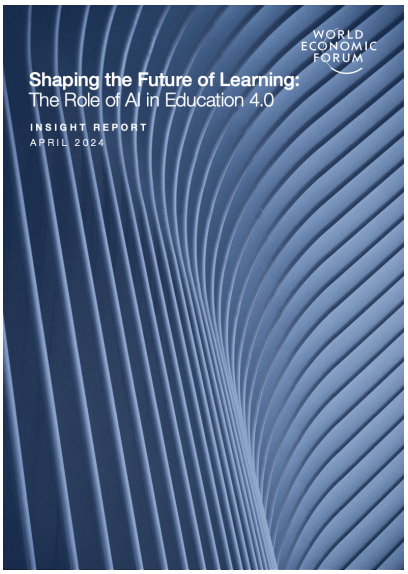
Teachers' Competences-Teaching With, About and For AI

In February 2023, in response to developments related to artificial intelligence (AI), the AI in Education team was established within the European Digital Hub. From February to the end of June 2023, the team, called the AI Squad, held intensive discussions on various aspects of the use of AI and its impact on education.

The report is intended for teachers, school leaders, consultants and policy makers in education.

Read Full Report

Shaping the Future of Learning: The Role of AI in Education 4.0

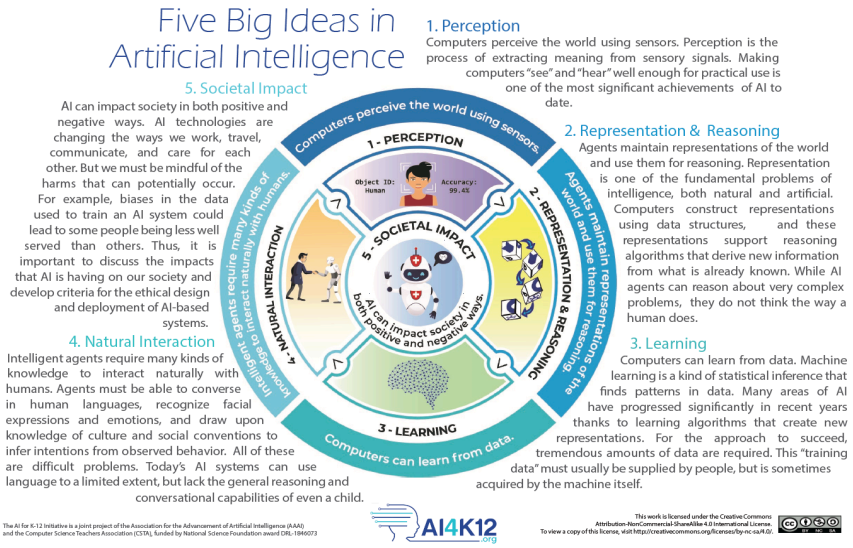


This report explores the potential for artificial intelligence to benefit educators, students and teachers. Case studies show how AI can personalize learning experiences, streamline administrative tasks, and integrate into curricula.

The report stresses the importance of responsible deployment, addressing issues like data privacy and equitable access. Aimed at policymakers and educators, it urges stakeholders to collaborate to ensure AI's positive integration into education systems worldwide leads to improved outcomes for all.

Read More

The Artificial Intelligence for K-12 Initiative (AI4K12): The Five Big Ideas in Artificial Intelligence poster



[Read Full Report]

News Articles

- **K-12 Teachers Say Classroom Models Need to Evolve to Prepare Canadian Students for the Future**

As the new school year commences for numerous Canadian students, educators nationwide are urging the adoption of innovative teaching approaches that align with the current classroom and future workplace dynamics. According to a recent survey by Microsoft, which polled over 500 Canadian teachers and school leaders, the majority expressed the need for schools to better accommodate the changing requirements of students. These educators are advocating for reforms that enhance classroom engagement, inclusivity, and relevance in this digital age.

- **School boards grappling with AI use in classroom, but formal policies still elusive**

Several major school boards in Canada are starting the new school year without established guidelines regarding the use of artificial intelligence in classrooms, despite worries about its effects on education and academic honesty. Although there is general agreement on the necessity for increased oversight and direction concerning AI in education, one education expert believes that universal policies might not be effective solutions.

- **From chalkboards to chatbots: How to use artificial intelligence in the K-12 classroom**

The ethical concerns of students relying extensively on artificial intelligence tools like ChatGPT for their schoolwork are being raised in educational contexts. Dr. Ron Darvin, an

assistant professor in language and literacy education, explores the impact of artificial intelligence on teaching methods and student learning.

- **New York City schools are embracing AI. Lawmakers had some questions. After an about-face on ChatGPT, the Department of Education plans to develop AI policy for grades K-12 by June**

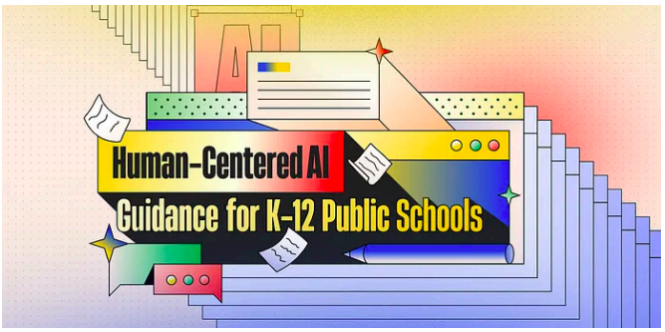
During a recent City Council hearing in New York, officials from the Department of Education emphasized the significance of artificial intelligence (AI) tools, including advanced ones like generative AI tools such as ChatGPT, in enhancing students' education and career preparation. Melanie Mac, the director of the Office of Student Pathways, highlighted the city's goal to make New York City public schools a global leader in integrating AI into education. The focus is on expanding programs that teach computer science and digital skills, embedding them into the core curriculum and various subjects to equip students for successful careers and positive societal impact.

- **NYC Schools Working With Experts to Launch AI Policy Lab**

Nine months after initially banning ChatGPT, New York City Public Schools aim to work with national experts and school districts across the country to craft policy around the smart use of AI for teaching and learning.

- **Superintendent Reykdal Introduces Guidan**

“AI is a powerful tool, but it only enhances learning if students and educators embrace an ‘H→AI→H’ approach,” Reykdal continued. “Start with human inquiry, see what AI produces, and always close with human reflection, human edits, and human understanding of what was produced.”



- **Some Tips for Using AI in School**

Whenever a new information technology arrives, though, there is a tendency to predict revolutionary implications for student instruction and the expectation that the “wundertech” of the day will finally replace those pesky and expensive teachers. This was a concern in the early 16th century when Venetian printer Aldus Manutius started producing large numbers of cheap books on paper rather than parchment.

- **AI In The Classroom-The Manitoba's Teacher's Society**

A mind-blowing tech revolution is bearing down on you as an educator. Open AI's ChatGPT and a hundred variations of artificial intelligence are about to delight and terrify you as they claim space in your professional life. Even though AI apps and products might worry or upset you now, future you will use them as routinely as you now use Google. Kirsten Thompson, president of the Manitoba Association of Educational Technology Leaders (MAETL), is deep into ChatGPT.

- **OCSB to begin testing AI in classrooms**

The Ottawa Catholic School Board (OCSB) will start teaching students about the potential benefits and risks of generative artificial intelligence as early as this fall. The OCSB has spent the last year testing AI tools such as ChatGPT and Gemini, which let users generate images or responses to text-based requests. At a meeting on April 23, the board's director of education Tom D'Amico presented guidelines for the implementation of AI in all OCSB classrooms, describing the technology in revolutionary terms.

Case studies

Chappaqua School District Tackles Thorny Issues Of ChatGPT, AI And Machine Learning

Faculty learned about artificial intelligence and machine learning and explored the impact on education, instruction and students.

Read More

"I would have one point that I think all too often as we talk about AI and generative AI we jump to the conclusion of job loss and one of the findings from our report is that it's much more a story of augmentation and to just highlight that if we take the role of a teacher for example teachers are some of our most overworked workers today in the in the country and if you look at all the activities that teachers are working on there are a number of things that they're doing that are not student facing that are just administrative and so I think the huge kind of potential for this technology is how can we help augment professions and help free up time so that it can then be repurposed in the case of a teacher that would then be allowing them to spend more time directly with students to help improve student outcomes." --McKinsey & Company on Gen AI Podcast

Did you know that only 7% of school systems have provided advice on the responsible use of AI, as reported by UNESCO? Yet, 81% of parents and 72% of students are eager for guidance on the responsible use of generative AI for schoolwork, according to the Center for Democracy and Technology.

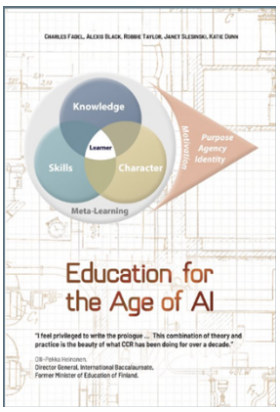
Generative AI in the classroom: Hype or reality? On World Teachers' Day 2023, the OECD, with Digital Promise and the European SchoolNet, is brought together a panel of international experts to place teachers and learners at the heart of a discussions on the impact of GenAI. OECD Recorded Webinar

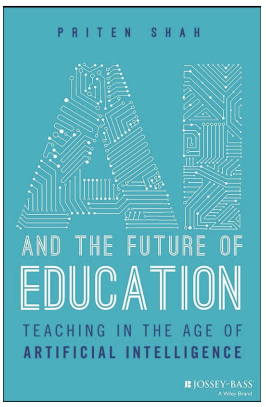
NYC Schools Working With Experts to Launch AI Policy Lab
Nine months after initially banning ChatGPT, New York City Public Schools aim to work with national experts and school districts across the country to craft policy around the smart use of AI for teaching and learning.

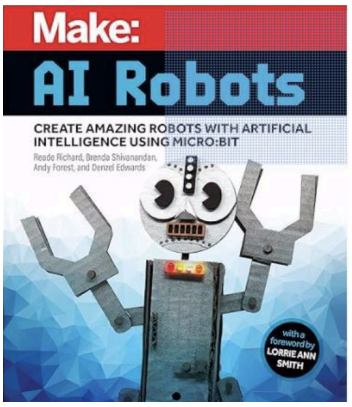
In the long-term, the pandemic may prove to be a watershed moment for education. By utilising AI ethically and with purpose, societies can look forward to addressing previously overwhelming educational inequalities and enabling all learners, from all backgrounds, to achieve their full potential, as long as there is universal and equal access to the necessary hardware, infrastructure and connectivity. The Institute for Ethical AI in Education hence urges all governments to guarantee that every single learner has adequate access to a device and an internet connection, and to heed the recommendations in the Framework. Only then will all learners be able to benefit optimally from AI in education. (The University of Buckingham, The Institute for Ethical AI in Education Final Report: Developing the Ethical Framework for AI in Education)

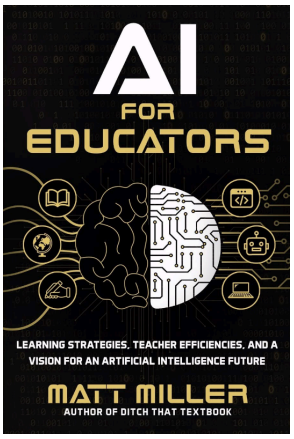
Privacy considerations
As with any online system, personal information should not be entered into a generative AI tool or service unless a contract is in place with the supplier and covers how the information will be used and protected. (Government of Canada Guide on the use of Generative AI)

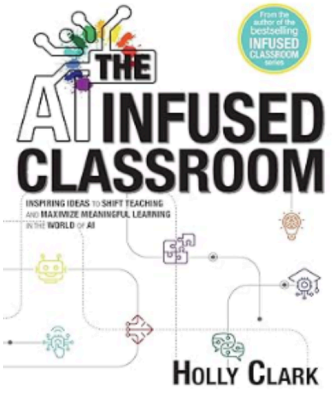
Book Resources

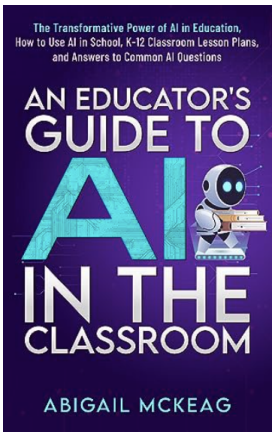


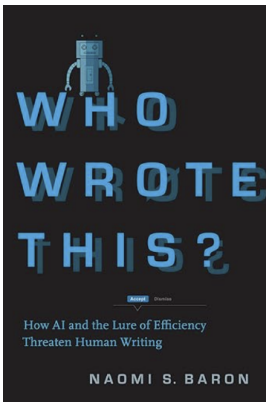


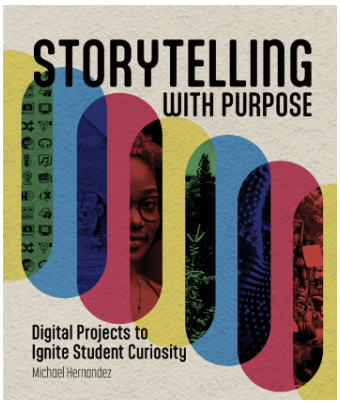


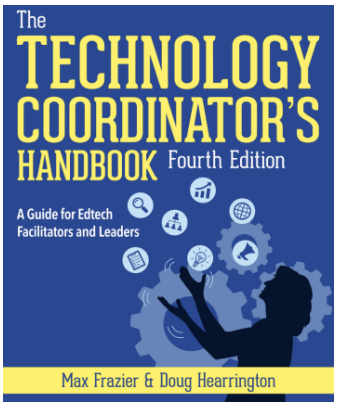


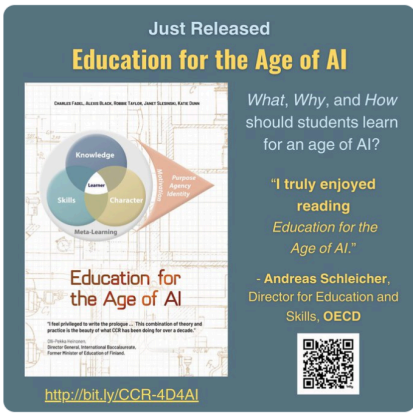


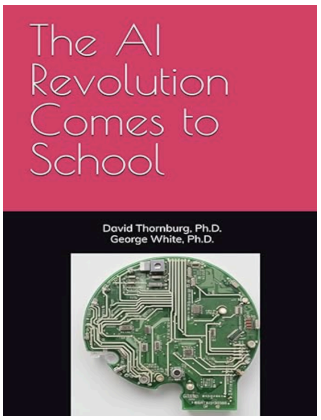


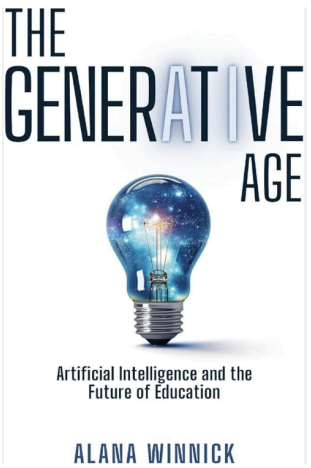












The C21 Canada Board Advisors

C21 Canada: Canadians for 21st Century Learning and Innovation is a national, not-for- profit organization advocating for 21st Century models of learning in public education.. Founded in 2011, board advisors represent a unique blend of national education organizations and private-sector companies with a shared moral imperative of inclusive scaling of global competencies to position Canadians for economic, social and personal success in a digital future.

Michael Furdyk, Co-founder
TakingITGlobal

Tanya Lush, Director of workforce development
COVE Workforce Initiative

Joe Simms, VP of Sales Canada West and United States
Compugen

Steve Brown, CEO
Nelson

Bonnie Schmidt, Founder and President
Let's Talk Science

Bill Roche, Co-Founder and Director
Power Play

Steve Joordens, Professor of Psychology
University of Toronto Scarborough

Sean Slade, Head of Education, North America
BTS Spark

Katina Papulkas, Senior Education Strategist
Dell Technologies

Gina Cherkowski, Director of Research & Development
Headwater Learning Foundation

Board Chair
Robert Martellacci

The CEO Academy

The CEO Academy is a Pan-Canadian professional network of school system superintendents (chief executive officers of their district) committed to setting Canadian standards for 21st century learning, innovation and technology in the education system. This facilitated network is a model of collaborative inquiry. Members share a focus on creating cultures of innovation and transformation, and a moral imperative to develop global competencies that students need for their future.

Chris Kennedy, Superintendent of Schools/CEO
West Vancouver School District

Mark Pearmain, Superintendent of Schools/CEO
Surrey School District

Patricia Gartland, Superintendent of Schools/CEO
School District 43 Coquitlam

Sean Nosek, Superintendent of Schools/CEO
Abbotsford School District

Chris Usih, Chief Superintendent of Schools
Richmond School District NO. 38

Kurt Sacher, Superintendent of Schools
Chinook's Edge School Division

Ken Sampson, Superintendent of Schools
Holy Spirit Catholic School Division

Christopher Fuzessy, Superintendent of Schools
Foothills School Division

Shauna Boyce, Superintendent of Schools/CEO
Parkland School Division

Vicki Moore, Director of Education
Sun West School Division

Gwen Keith, Director of Education

Holy Family Catholic School Division

Christian Michalik, Superintendent of Schools/CEO
Louis Riel School Division

Tom D'Amico, Director of Education
Ottawa Catholic School Board

Marianne Mazzorato, Director of Education
Dufferin-Peel Catholic District School Board

Heather Campbell, Director of Education
Rainy River District School Board

Rashmi Swarup, Director of Education/CEO
Peel District School Board

Cindy Finn, Director General
Lester B. Pearson School Board

Mike Helm, Director General
New Frontiers School Board

Elwin LeRoux, Executive Director
Halifax Regional Centre for Education

Anthony Stack, Director General
Newfoundland & Labrador English School District

Monique Boudreau, Directrice Generale
District scholaire francophone Sud

Paul Landry, Regional Executive Director of Education
Strait Regional Centre for Education

Randolph MacLEAN, Superintendent/CEO
Anglophone East School District

Tracy Beaulieu, Director
Public Schools Branch, PEI

Douglas K. Prescott, Superintendent of Schools
Canadian International Schools in Beijing

The Research Team

Hanan Mousa, Digital Media and Marketing Specialist
MindShare Learning

Hana Elsayed, Digital Media and Marketing Associate
MindShare Learning

Peter Singh

TDSB, Executive Officer, IT Services

CIO Alliance Chair

Principal Writer

Robert Martellacci, Co-founder & CEO C21 Canada