



# Citizenship in the AI Era:

A project to equip future teachers

With funding from



# *Citoyenneté dans l'ère de l'IA (CEIA):*

## project findings

*Summary of the Citoyenneté dans l'ère de l'intelligence artificielle project, March 2022 to March 2023. Funded by the Ministère de l'Économie, de l'Innovation et de l'Énergie, NovaScience volet 2B (Soutien aux initiatives de formation en intelligence artificielle), project 58083.*

## Background

### Citizenship in the era of artificial intelligence

Digital Moment (formerly Kids Code Jeunesse) arrived at the *CEIA* project with five years of rich experience teaching about Artificial Intelligence. We are advised by influential researchers and policy makers in our home province of Québec; we have completed multiple AI-related grants with the support of NovaScience and CanCode; and we have collaborated on AI, Data, and Algorithm projects with UNESCO, CCUNESCO, MILA, ScaleAI, RÉCIT, the Mozilla Foundation, and others. Using all that we know from our own research and that of others, we have taught hundreds of AI classroom and teacher workshops. We are proud of the role we have played in educating Canadians in every province about AI and its ethical implications.

In Québec, we have closely watched as leaders like the Ministère de l'Éducation et de l'Enseignement Supérieur, the Conseil supérieur en éducation, and RÉCIT have laid out a vision in which ethical citizenship is at the centre of life in the digital era. In an age when digital tools and artificial intelligence surround us and influence us each day, independent, critical thinking and action are key for each individual and for society as a whole.

Since 2018 we have seen the release of several landmark initiatives and documents in Québec education that make this point: the [Digital Action Plan](#) and accompanying [Digital Competency Framework](#) (both by the Ministère de l'Éducation et de l'Enseignement Supérieur); the report [L'intelligence artificielle en éducation: un aperçu](#)

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[des possibilités et des enjeux](#) (by the Conseil supérieur de l'éducation); and the report [Développer la citoyenneté à l'ère du numérique](#) and website [Citnum.ca](#) (both RÉCIT).

## Bringing ideas and methods together

Digital Moment enthusiastically supports the vision behind these initiatives, but we know it has taken time to build awareness and momentum at every level of Québec education, in every region. In Fall 2021 we had the insight to combine the Québec vision of *citoyenneté* with the experience we had gained working with teacher preparation programs in Montréal and elsewhere in Canada.

Through our work with Education professors we know that a live workshop can be an effective way to introduce digital-skills topics to young teachers-to-be. A well conducted coding or AI experience early in their training can be engaging and influential in their growth as educators. Digital Moment has had real success in this format: more than 150 pre-service workshops and 5,400 young educators reached in 2018-2022. We felt that this format might help popularize the *Citoyenneté dans l'ère de l'intelligence artificielle* vision in Québec.

We conceived the *Citoyenneté dans l'ère de l'intelligence artificielle* (CEIA) project to bring essential AI ideas to teacher-preparation classes across Québec. With the financial support of the Ministère de l'innovation et l'économie and their NovaScience grant program (volet 2b, Soutien aux initiatives de formation en intelligence artificielle) we felt we could help realize the Québec *citoyenneté numérique* vision. Our goal was to reach institutions both large and small. We wanted to talk directly with the professors who shape Québec's new teachers, and ask them: is the ethical side of AI being taught? Are we putting ethical digital skills at the centre of QC education? How could we help push that implementation forward?

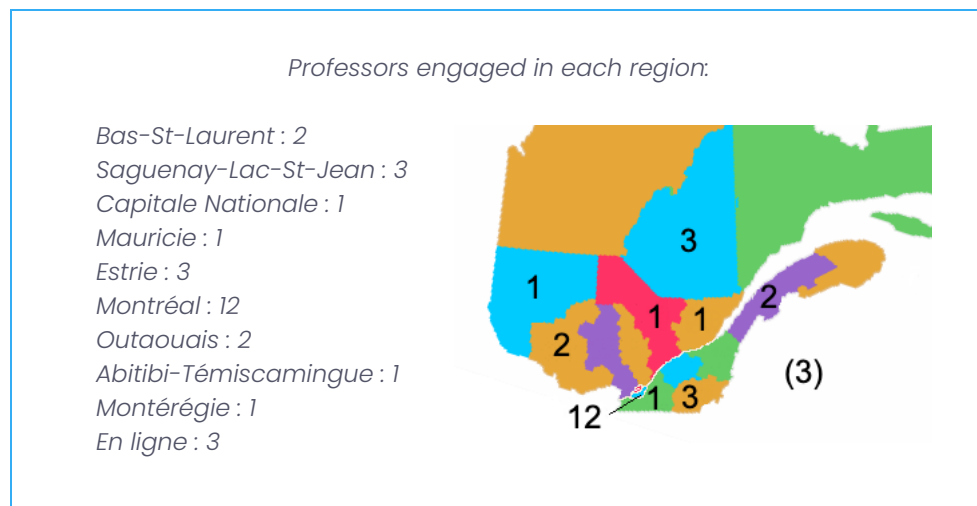
## Discovery with Québec educators

### Who we spoke with

Starting with a circle of close advisors—partners whom we had collaborated with before—we explored how AI is being approached in teacher education programs across Québec. Our advisors helped us design and carry out a round of surveys and interviews, and we met new colleagues from all over the province.

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In all, we surveyed and spoke directly with 24 cégep and university professors, from nine regions of the province and one institution that reaches the full province online. These participants are instrumental in helping young people in their regions become active Québec citizens and educators.



## What they told us

From their responses we know our project participants feel reasonably knowledgeable about AI. This is good news. Unfortunately, they have the impression that their students—these young citizen-teachers—know less. This gap is a problem; our colleagues agree with us (and our AI industry advisors) that it is essential for Québec teachers to understand AI and its implications.

As experienced professors, our CEIA colleagues have specific ideas about what their students need to know. Encouragingly, these align with what Digital Moment has been teaching K-12 educators about artificial intelligence for some time.

Here are some of the ideas and concerns raised in our discussions with professors:

- that artificial intelligence is not magic; it is a human creation;
- that there are human factors built into AI; that therefore AI systems often contain biases;
- that there are problems with the interpretability of AI and our ability to understand how it reached a decision;

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- that it is valid to question whether to trust an AI-made decision, or whether to use AI in any given situation;
- that we leave a digital footprint when we use online tools, and that this becomes data that AI may learn from;
- that there are often commercial interests involved in AI-driven systems; that they may have objectives or incentives that influence their decisions;
- that AI systems can have social consequences on their users; that we may gain from AI in certain ways but lose in others;
- that AI now appears in educational applications; that it prompts the same questions for teachers and learners as it does for general citizens.

Finally, our participants say it is important for these ideas to be dealt with in humanities and education programs. AI is no longer only relevant for science and technology students. We are all affected by AI in the tools we use and in the social systems we operate in, so it is important for us all to know about it. Moreover, as AI becomes common in learning and in school administration it is essential for teachers to understand how AI creates both advantages and risks in education.

## Putting discovery into action

### An adapted workshop with materials

From the discovery phase in this project, we know that some Québec postsecondary educators share our vision. They agree with us about which ideas and skills young teachers need when beginning their careers in the era of AI. It appears, as we had hoped, that Digital Moment's existing Artificial Intelligence program is well suited for teaching young educators-to-be in universities.

In summer and fall 2022 we began with our AI, Ethics, and Citizenship materials, took input from partners at RÉCIT and other organizations, and created a new workshop for CEIA. We now offer this workshop to our participating colleagues as a live or recorded experience, and it has been received enthusiastically.

The CEIA workshop includes:

- Context from the [Digital Competency Framework](#) (Ministère de l'Éducation et de l'Enseignement Supérieur, 2019); the report [L'intelligence artificielle en éducation : un aperçu des possibilités et des enjeux](#) (Conseil supérieur en

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éducation, 2020); the [Montreal Declaration for Responsible AI Development](#); and other sources.

- Ideas borrowed from our [Code in the Classroom resources on AI](#) and our [Algorithm and Data Literacy Project](#);
- Conceptual introductions to data, algorithms, models, and decisions;
- Data and AI case studies in education;
- Presentation of risks we face with AI;
- Hands-on exploration of fun AI tools.

## Highlights for the teachers of tomorrow

Here we present highlights of the presentation: *L'éthique à l'ère de l'IA pour les enseignant.e.s de demain*.

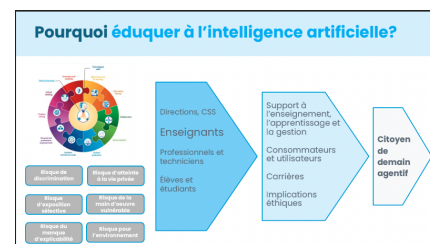
### The Québec education context

Ethical Citizenship and Artificial Intelligence are right at the centre of Québec education. They are well explored by MEES, CSE, RÉCIT, and others. Québec is investing heavily in the healthy implementation of digital systems in education.



### Why educate teachers about AI?

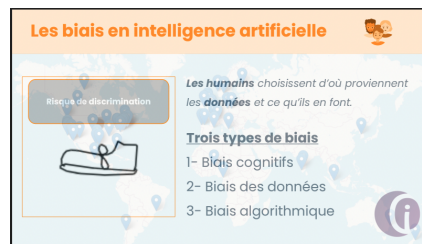
AI is beginning to appear in the classroom. Teachers will see it play a role in teaching & learning and management. They and their students will be affected in education and in general life.



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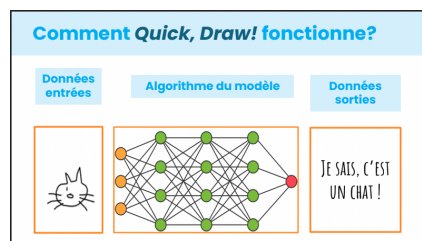
## Google's Quick, Draw!

We like Quick, Draw! as a way to introduce data and algorithms. It is fun to play and it is immediately understandable. Quick, Draw! lets us look closely at user-generated data and connect it to the same concepts and algorithms that appear in more serious AI systems.



## AI's basic parts

Data is taken as input, a "learning" algorithm finds patterns in the data, and a conclusion emerges at the end.



## Risks associated with AI

The Montreal Declaration for Responsible AI identified key risks that we should be aware of as developers, contributors, and consumers. We capture them in summary: Discrimination; Limits to choice and autonomy; Invasion of privacy; Lack of explainability; Loss of work; Environmental impact.

## Case studies

We are already seeing applications of AI in the classroom. Young teachers and their leaders will need to consider whether and how to use these systems in their teaching. Examples: Attention detection; Exam surveillance.

## We can be critical about technology and ourselves

It is important to stay aware of our own biases and selective thinking, and the information we consume. Our cognition interacts with our emotions, and it all gets influenced by AI and technology around us.

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## Project impact

### Testimonials and feedback

The CEIA program has received warm reviews from the professors who have hosted us. They appreciate that this workshop contextualizes AI very specifically: it introduces their teacher candidates to AI in general, then brings the discussion into the Québec school milieu. Our discussions with these young teachers have pushed them to envision the ethical dimensions of the technology they will encounter in their own classrooms. As one professor put it, “the clarity and breadth of this presentation will allow us to lay the groundwork and begin a thoughtful reflection on these issues.”

Participating professors have also told us they value the many references and links included in the CEIA workshop, which reinforce the resources they want their teacher candidates to get to know: the [Quebec Ministry of Education](#), the [Centre de transfert pour la réussite éducative du Québec](#) (CTREQ), the [Conseil supérieur de l'éducation](#) (CSE), the [Réseau éducation collaboration innovation technologie](#) (RÉCIT), the [Montreal Declaration for Responsible AI Development](#) and others.

### Reach and relationships

Between 1 August 2022 and 15 March 2023, we delivered our live *Citoyenneté dans l'ère de l'intelligence artificielle* (CEIA) workshop 17 times around Québec, including one conference. These took place in French (16 workshops, a total of 350 participating student teachers) and in English (1 workshop, 30 participants). We distributed a recorded version (reached 100 more students). Our team continues to book workshops beyond the time range of this project.

*CEIA workshops and recordings reached:*

**29** professors  
**9** regions  
**450** participants

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Each of these is an opportunity for Digital Moment instructors to introduce the essential ideas and resources elaborated above. It gives young Québec teachers time to experiment and play with AI tools, and to discuss the implications that AI will have in their lives and careers. With the professor adding wider context, this creates a transformative new experience in the university program.

## Conclusion

The CEIA project represents an effective early investment by the NovaScience program in durable AI/Citizenship education in Québec's universities. Digital Moment has additional workshops booked beyond the March 2023 end of this project, and the CEIA workshop and its associated materials will repeat in some of the departments we have engaged. We expect to build on the relationships that this project has helped create, leading us to help more universities support their students' 21st century digital skills in multiple ways.

## Acknowledgements

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Digital Moment extends thanks to the Ministry and Minister Pierre Fitzgibbon for supporting the work of educators across Québec as they contribute to a prosperous and ethical future of the province.

We give special thanks to the members of the project advisory group for their expertise and their vision of education about artificial intelligence and its impacts: Ann-Louise Davidson (Professor, Concordia University), Valéry Psyché (Professor, TELUQ), Joel Trudeau (Professor, Dawson College), and Timothy Pereira (Co-founder and Director, AI Launch Lab).

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