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ARTIFICIAL INTELLIGENCE:

*Mike Sparling:
AI impacts your job*

*Dr. Deepak Gupta:
Understanding AI is essential*

*Maxim Jean-Louis:
AI risks, challenges, opportunities*

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Cover photo provided courtesy of Durham College. Mike Sparling, Principal Investigator/Project Manager of the AI Hub, Durham College. Mike discusses AI in a story beginning on page 7.

EXECUTIVE DIRECTOR

Cindy Gareau

1-866-742-5429 ext. 104 info@ocasa.on.ca

CONTRIBUTING EDITOR

Bill Swan

1-866-742-5429 bill.swan@ocasa.on.ca

OCASA

65 Overlea Blvd., Suite 210

Toronto, ON M4H 1P1

Phone: 1-866-742-5429 Fax: 1-866-742-5430

Email: info@ocasa.on.ca www.ocasa.on.ca

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www.kelman.ca info@kelman.ca

Managing Editor: Cheryl Parisien, cheryl@kelman.ca

Design/Layout: Kristy Unrau

Advertising Sales: Jeff Kutry

Advertising Coordinator: Stefanie Hagdiakow

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Krista Pearson, PhD, CHRL
Registral, Algonquin College
Registraire, Algonquin College

Artificial Intelligence and the challenge of the future

L'intelligence artificielle et les défis de l'avenir

As Ontario's colleges move into the 51st year, it only seems fitting that we turn attention to the future: technology, robotics, artificial intelligence, and much that is yet to be defined. These are not new, but in application and adoption, we are standing on the doorstep of the future. I am not sure if we're entirely ready. Helping us find our way, we've enlisted help from applied researchers and early adopters, such as Mike Sparling of Durham and Deepak Gupta of Centennial. Articles by both are featured in this issue of *College Administrator*.

As administrators we need to prepare for and question technological changes in a way that is critically thoughtful and deliberative. In the administrative role we are often in partnership with our most exciting of change-makers, necessitating the ability to balance enthusiasm with responsibility. These changes have been realized, for the most part, in instructional or research spaces. But how do we help move beyond those safe "other" spaces; how do we normalize disruption to the way we run our service and other operations? To embrace and thrive in the future, we need to hold ourselves accountable for participating in the change; we need to make fact-based decisions, but cannot be so risk-averse that we fail to seize progress and opportunity. And embrace the irony: those fact-based decisions will heavily utilize artificial intelligence in the gathering and analysis of those facts. Consider the potential – college communities realigning systemic relevance with greater risk investment.

Your insights and perspectives are critical now, more than ever, as the demands and expectations of administrators evolve. If you see a need for information, through webinars,

As administrators we need to prepare for and question technological changes in a way that is critically thoughtful and deliberative.

Alors que les collèges de l'Ontario entament leur 51^e année, il semble approprié que nous nous tournions vers l'avenir, vers la technologie, vers la robotique, vers l'intelligence artificielle et vers toutes ces choses qui restent à définir. Rien de tout cela n'est nouveau, mais en ce qui concerne leur application et leur adoption, nous sommes à la porte de l'avenir. Je ne suis pas certaine que nous soyons totalement prêts. Afin de nous aider à trouver notre chemin, nous avons demandé l'aide de spécialistes de la recherche appliquée et d'utilisateurs précoces, tels que Mike Sparling de Durham et Deepak Gupta de Centennial. Ils ont tous les deux écrit des articles qui sont présentés dans ce numéro de *College Administrator*.

En tant qu'administrateurs, nous devons nous préparer et nous interroger sur les changements technologiques de manière critique et délibérative. Dans nos rôles administratifs, nous sommes souvent en partenariat avec nos plus excitants transformateurs. Cela demande d'être capable d'équilibrer enthousiasme et responsabilité. Ces changements ont été réalisés, pour la plupart, dans des espaces pédagogiques ou de recherche. Mais comment pouvons-nous faciliter une transition qui va au-delà de ces « autres » espaces sûrs? Comment pouvons-nous normaliser une perturbation dans la façon dont nous gérons nos services et nos autres opérations? Pour accueillir le futur et y prospérer, nous devons faire en sorte que notre participation au changement soit notre responsabilité. Nous devons prendre des décisions fondées sur les faits, mais nous ne pouvons pas passer à côté du progrès et des opportunités par peur du risque. Il faut aussi accueillir l'ironie : ces décisions basées sur les faits utiliseront fortement l'intelligence artificielle pour collecter et l'analyser ces faits. Considérez les possibilités : des communautés collégiales qui réorientent la pertinence systémique avec un plus grand investissement dans le risque.

Vos idées et vos points de vue sont essentiels maintenant, plus que jamais, alors que les demandes et les attentes des administrateurs sont en évolution. Si, lors de webinaires ou de cours, vous constatez que des informations supplémentaires seraient nécessaires, ou si vous voyez du contenu pour *College Administrator*, dites-le-nous. L'APACO est votre organisation. Aidez l'APACO à pourvoir à vos besoins en faisant un pas de l'avant. Faites partie de cet enjeu, ainsi que d'autres conversations. Tirez parti de votre adhésion grâce aux webinaires, aux cours en ligne, à la conférence annuelle des leaders et des innovateurs ou faites du bénévolat avec un comité de l'APACO. [c|A](#)

courses, or even content for *College Administrator*; let us know. OCASA is your organization. Help OCASA serve your needs by stepping forward. Be a part of this and other conversations. Take advantage of your membership through webinars, online courses, the annual Leaders & Innovators Conference, or volunteer with an OCASA committee. [c|A](#)



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By Mike Sparling

Principal Investigator/Project Manager the AI Hub, Durham College
Professor, Durham School of Business, IT and Management

Par Mike Sparling

Chercheur principal / gestionnaire de projet / Professeur AI Hub
École de commerce du collège Durham, TI et gestion



Photo courtesy of Durham College.

ARTIFICIAL INTELLIGENCE

Definition: A system that can sense its operating environment, reason, learn, and act in response to input in pursuit of objectives.

It is a week before Christmas 2017 and the GTA has just been hit with its first significant snowfall in several years just as the evening commute begins to choke the roads of this large city. An hour before I'd usually depart the college, my mobile phone notifies me that I should leave shortly to make an evening appointment because traffic along all routes is particularly heavy.

INTELLIGENCE ARTIFICIELLE :

Un système ou des processus commerciaux capables de percevoir leur environnement opérationnel, de raisonner, d'apprendre et de répondre aux données fournies, en fonction de ses expériences passées et de ses objectifs.

Nous sommes une semaine avant Noël 2017 et le Grand Toronto vient d'être frappé par la première grosse chute de neige qu'il a vue depuis plusieurs années, alors que la circulation du soir commence à étouffer les routes de cette grande ville. Une heure avant mon départ habituel du Collège, mon téléphone portable m'informe que je devrais partir bientôt afin de ne pas être en retard à un rendez-vous de soirée, car la circulation est particulièrement dense sur toutes les routes.



As I head to the car, I ask the voice assistant, Siri, to show me the best route to my next appointment. The phone displays various routes, traffic volumes, accident indicators, and estimated times. Like most readers, I have come to value the time estimates of these systems, and within larger metropolitan areas they are quite accurate. I plot a route to my destination, ask for a podcast and start a long night of commuting on Highway 401. Each time I step on the brakes, I know there's an intelligence beyond mine between the pedal and the brakes, moderating braking to adjust for conditions and other variables. I pass road service and emergency response vehicles knowing they have been assigned to zones and are equipped with supplies based on predicted need and I pass a few accidents, some with deployed air bags and others without, knowing that even the safety systems of our vehicles are governed by intelligence beyond ours.

This scenario isn't meant to illustrate applications of artificial intelligence, though AI deeply permeates all the above. It's actually meant to illustrate that AI isn't a future we'll one day confront but instead is a present we have thus far accepted with little thought as to why or what. Many ask, "When will AI impact our lives, jobs, and academic programs?" My hope is that over the next few pages you come to realize it's not a question of when *will* it; rather, it is an examination of when *did* it. AI is already here, its impact often unseen, and the AI transformation has only begun.

Measured in millions and billions, the impact of AI on employment and economic growth is already evident and growing. Yet while 73% of senior executives cite AI as a key strategic driver core to their future, and 82% report they understand the impact AI can have on their organization, these same executives are concerned about the ability of their organization to embrace change and successfully implement AI-based programs that maintain their competitive position. Fully 44% of executives felt that "delaying AI implementation will make their business vulnerable to new, disruptive tech start-ups" but a 2017 McKinsey survey of over 3,000 AI-aware C-level executives from 10 countries and 14 sectors found that "Only 20% of respondents have adopted AI at scale in a core part of their business. 40% are partial adopters or experimenters, while the balance are contemplating their strategy."

The AI Effect

When a problem becomes computationally possible, it becomes "less AI" and more "regular practice." An autopilot system in an airliner remains an implementation of AI regardless of its origins in the early days of aviation. An automobile airbag is dependent on Symbolic AI to determine its state, and regardless of the proliferation of websites with cheap flight booking offers, airline and freight logistics remains an active field of research in AI.

En me dirigeant vers ma voiture, je demande à l'assistant vocal Siri de me montrer le meilleur itinéraire pour me rendre à mon prochain rendez-vous. Le téléphone affiche divers itinéraires, différents volumes de circulation, des indicateurs d'accident, ainsi que les temps estimés. Comme la plupart des lecteurs, j'en suis venu à accorder de l'importance aux estimations de temps de ces systèmes. Ils sont assez précis dans les grandes régions métropolitaines. Je planifie un itinéraire jusqu'à ma destination, je demande une baladodiffusion et j'entame une longue nuit sur l'autoroute 401. Chaque fois que j'appuie sur les freins, je sais qu'il y a une intelligence autre que la mienne entre la pédale et les freins. Elle modère le freinage et s'ajuste aux conditions de la route et aux autres variables. Je dépasse des véhicules de service routier et des véhicules d'urgence, sachant qu'ils ont été affectés à certaines zones et qu'ils sont pourvus de matériel en fonction de besoins prévus. Je dépasse aussi quelques accidents, certains véhicules ont leurs coussins gonflables déployés et d'autres non, et je sais que même les systèmes de sécurité de nos véhicules sont gouvernés par une intelligence au-delà du nôtre.

Ce scénario n'a pas comme objectif d'illustrer les applications de l'intelligence artificielle, bien que l'IA imprègne profondément tout ce qui précède. Son but est en fait de montrer que l'IA n'est pas un avenir auquel nous ferons un jour face, mais plutôt un présent que nous avons jusqu'ici accepté sans trop savoir pourquoi ou ce que c'est. Plusieurs personnes demandent : « quand l'IA aura-t-elle un impact sur nos vies, sur nos emplois et sur nos programmes de formation? » Ce que j'espère, c'est que les prochaines pages vous feront réaliser que ce n'est pas une question de *quand ça arrivera*, mais qu'il faut plutôt regarder *quand c'est arrivé*. L'IA est déjà là, ses impacts passent souvent inaperçus et la transformation qu'elle apporte ne fait que commencer.

L'impact qu'a l'IA sur l'emploi et la croissance économique est déjà évident et continu de croître; il se mesure en millions et en milliards. Pourtant, bien que 73 % des cadres supérieurs parlent de l'IA comme étant un moteur stratégique majeur, un élément essentiel à leur avenir, et que 82 % d'entre eux affirment comprendre l'impact que l'IA peut avoir sur leur organisation, ces mêmes cadres supérieurs sont préoccupés par la capacité de leur organisation à accueillir ce changement et à correctement mettre en œuvre des programmes reposant sur l'IA leur permettant de maintenir leur position concurrentielle. En tout, 44 % des cadres estiment que de « retarder la mise en œuvre de l'IA rendra leur entreprise vulnérable aux nouvelles entreprises technologiques perturbatrices ». En 2017, McKinsey a cependant réalisé un sondage chez plus de 3 000 cadres de niveau C, révélant que « seulement 20 % des répondants ont adopté l'IA à grande échelle dans une partie essentielle de leur activité. Les répondants étaient avertis en matière d'IA et provenaient de 10 pays et de 14 secteurs d'activités. Quarante pour cent d'entre eux sont des adopteurs partiels ou des expérimentateurs, tandis que les autres réfléchissent à la stratégie qu'ils veulent adopter. »

Les cadres interrogés lors de cette étude font tous partie d'entreprises du Fortune 1000, c'est-à-dire les grandes organisations qui ont accès à des ressources, à des consultants et qui peuvent attirer des talents qualifiés. Par contre, pour les PME, qui représentent 98 % de l'économie de l'Ontario, l'indice de préparation concernant les chefs d'entreprise sondés qui adoptent ou adopteront bientôt des solutions d'IA tombe à 21 %.



Photo courtesy of Durham College.

The executives surveyed in this study are all with *Fortune* 1,000 firms, the large organizations who have access to resources and consultants and who can attract skilled talent. For small and medium enterprises (SMEs), in contrast, which represent 98% of the Ontario economy, the readiness index falls to 21% of surveyed SME business leaders who are adopting or will soon adopt AI solutions. This weakness in adoption in the SME market is not, for the most part, believed to be a lack of understanding but instead represents the realities of the SME market – challenged for time to consider the strategic needs of the future, and unable to access the knowledge, skills and resources required to further priorities beyond the core of the business.

If we accept the commonly held belief that AI is crucial to our business, why do we have such a difficult time defining what AI is? After all, ask a group of botanists “What is a banana?” and you’ll get a pretty uniform response with little if any difference of opinion. Ask a group of computer scientists, and for good measure include some practitioners in that mix, “What is Artificial Intelligence?” and you will get a vast collection of responses. While there are similarities, there is a considerable difference of opinion on what constitutes AI, and how it fits a broader taxonomy of research themes and implementation challenges.

The definition for AI that I have used in my research and teaching is that artificial intelligence is a term that represents *a system or business process that can sense its operating environment, reason, learn, and act in response to input, based on prior experience, in pursuit of objectives.*

L'effet IA

Lorsqu'un problème peut être résolu grâce à l'informatique, il finit par relever « moins de l'IA » et plus de la « pratique régulière ». Un système de pilotage automatique d'avion de ligne demeure une mise en œuvre d'IA, peu importe ses origines remontant aux premiers jours de l'aviation. Un coussin gonflable d'automobile dépend de l'IA symbolique pour déterminer son état, et peu importe la prolifération des sites Web avec des offres de réservation de vols bon marché, la logistique des compagnies aériennes et du fret reste un domaine de recherche de l'IA actif.

Ce faible niveau d'adoption que l'on retrouve sur le marché des PME n'est généralement pas considéré comme un manque de compréhension, mais représente plutôt les réalités du marché des petites et moyennes entreprises (PME). Ces entreprises doivent prendre le temps d'examiner les besoins stratégiques futurs et n'ont pas accès aux connaissances, aux compétences et aux ressources nécessaires pour faire avancer les priorités autres que celles qui leur sont centrales.

Si nous acceptons la croyance commune selon laquelle l'IA est cruciale pour notre activité commerciale, pourquoi est-il si difficile pour nous de définir ce qu'est l'IA? Après tout, demandez à un groupe de botanistes « qu'est-ce qu'une banane? » et vous



Further, an observer of the behaviour would consider the results intelligent if a human performed the action. This definition synthesizes many academic and applied perspectives. While ideally all factors of the definition are met in an application, in many cases we find that some aspects may not be met yet the system would still be considered an AI solution.

A unique aspect of artificial intelligence is what is often referred to as the “**AI Effect.**” Again, this term is open to interpretation, but I generally use Dr. Thad Starner’s definition which states that “*when a problem becomes computationally possible, it becomes ‘less AI’ and more ‘regular practice’*” or as some have simply stated “*the challenge with AI is that once something becomes possible it ceases to be AI.*” An appreciation for the AI Effect is important because while we’ve had autopilot systems in airliners for many years of statistically quite reliable service, the autopilot system remains an implementation of AI. An automobile airbag is dependent on Symbolic AI to determine its state, and regardless of the proliferation of websites with cheap flight booking offers, airline and freight logistics remains an active field of research in AI.

Recognizing the importance of leadership in AI as a predicate to continued growth, the Government of Canada is investing \$125M in a Pan-Canadian AI program to ensure that Canada retains, attracts, trains and retains top research talent in deep learning and reinforcement learning. This AI program is mandated to establish interconnected nodes of scientific excellence in three of Canada’s major centres for AI.

obtiendrez une réponse assez uniforme, un avis avec peu ou pas de différences. Prenez un groupe d’informaticiens, et pour faire bonne mesure, incluez quelques spécialistes au mélange, et demandez-leur « qu’est-ce que l’intelligence artificielle? » et vous obtiendrez une vaste gamme de réponses. Malgré certaines similitudes, il existe une considérable divergence d’opinions sur ce qui constitue l’IA, et sur la façon dont elle correspond à une taxonomie plus large de thèmes de recherche et de défis de mise en œuvre.

La définition de l’IA que j’ai utilisée dans mes recherches et pour mon enseignement décrit l’intelligence artificielle comme un terme représentant *un système ou des processus commerciaux capables de percevoir leur environnement opérationnel, de raisonner, d’apprendre et de répondre aux données fournies en fonction de ses expériences passées et de ses objectifs.* De plus, si un humain effectuait l’action, une personne observant le comportement considérerait les résultats comme intelligents. Cette définition synthétise de nombreuses perspectives académiques et appliquées. Idéalement tous les facteurs de la définition devraient être rencontrés en pratique. Nous constatons cependant que dans bien des cas certains aspects sont absents, bien que la solution puisse quand même être considérée comme une solution d’IA.

Un aspect unique de l’intelligence artificielle est ce qu’on appelle souvent « **l’effet IA** ». Encore une fois, ce terme est sujet à interprétation, mais j’utilise généralement la définition du Dr Thad Starner voulant que « *lorsqu’un problème peut être résolu grâce à l’informatique, il finit par relever « moins de l’IA » et plus de la « pratique régulière»* » ou, comme certains l’ont simplement énoncé, « *le défi avec l’IA, c’est que lorsque quelque chose devient possible, cette chose cesse d’être de l’IA* ». Il est important de reconnaître l’effet IA, car bien que nos avions de ligne soient munis de systèmes de pilotage automatique depuis de nombreuses années et que, statistiquement, ils sont assez fiables, un système de pilote automatique demeure une mise en œuvre de l’IA. Un coussin gonflable d’automobile dépend de l’IA symbolique pour déterminer son état, et malgré la prolifération des sites Web avec des offres de réservation de vols bon marché, la logistique des compagnies aériennes et du fret reste un domaine de recherche de l’IA actif.

Comme le gouvernement du Canada reconnaît l’importance de la position de meneur en ce qui concerne l’IA comme facteur de croissance continue, il a investi 125 millions de dollars dans un programme pancanadien d’IA pour s’assurer que le Canada conserve, attire et forme les meilleurs chercheurs

Intelligence artificielle

Intelligence artificielle est un terme qui représente un système ou des processus commerciaux capables de percevoir leur environnement opérationnel, de raisonner, d’apprendre et d’agir en fonction des données fournies et des objectifs. Si un humain effectuait l’action, une personne observant le comportement considérerait les résultats comme intelligents.

Artificial Intelligence

Artificial intelligence is a term that represents a system or business processes that can sense its operating environment, reason, learn, and take action in response to input and objectives. An observer of the behaviour would consider the results intelligent if a human performed the action.

The Toronto-Waterloo presence is established by the recently launched Vector Institute. These research institutions are world-renowned, and Canadian scientists are aggressively sought, but leadership in scientific research must be paired with leadership in application and commercialization to create value and competitive advantage for Canada.

Companies successful in the competition for scarce talent have found that AI is allowing a shift in value to the edge of the business network, by empowering customers, engaging staff, and developing business systems in ways never possible. Yet for all the promise of AI, the business transformation required for its adoption remains difficult for small and medium enterprises (SME) whose strategic priorities often preclude long-term investments in experimental development.

en apprentissage en profondeur et en apprentissage par renforcement. Ce programme d'IA a pour mandat d'établir des nœuds interreliés d'excellence scientifique dans les trois des principaux centres d'IA du Canada. Le lien Toronto-Waterloo a été établi par le tout récent Vector Institute. Ces établissements de recherche sont reconnus dans le monde entier et les chercheurs canadiens sont activement recherchés, mais la position de meneur dans la recherche scientifique doit être jumelée à une position de meneur dans l'application et la commercialisation afin de créer de la valeur et des avantages concurrentiels pour le Canada.

Les entreprises qui se disputent les talents rares ont constaté que l'IA permet à la valeur de se déplacer en périphérie du réseau d'affaires en donnant plus de pouvoir aux clients, en engageant le personnel et en développant des systèmes d'affaires grâce à des moyens jusque là inexistants. Pourtant, malgré toutes les promesses de l'IA, la transformation commerciale nécessaire à son adoption reste difficile pour les PME dont les priorités stratégiques excluent souvent les investissements à long terme en développement expérimental.

Ce duopole de défis, c'est-à-dire passer de la recherche théorique à la pratique et le besoin de convertir l'avantage technologique en solution d'affaires, est créateur d'opportunités pour les collèges de l'Ontario. C'est sur ce point que mon collège, le collège Durham, a concentré ses efforts de recherche appliquée pour finalement créer le Centre de recherche

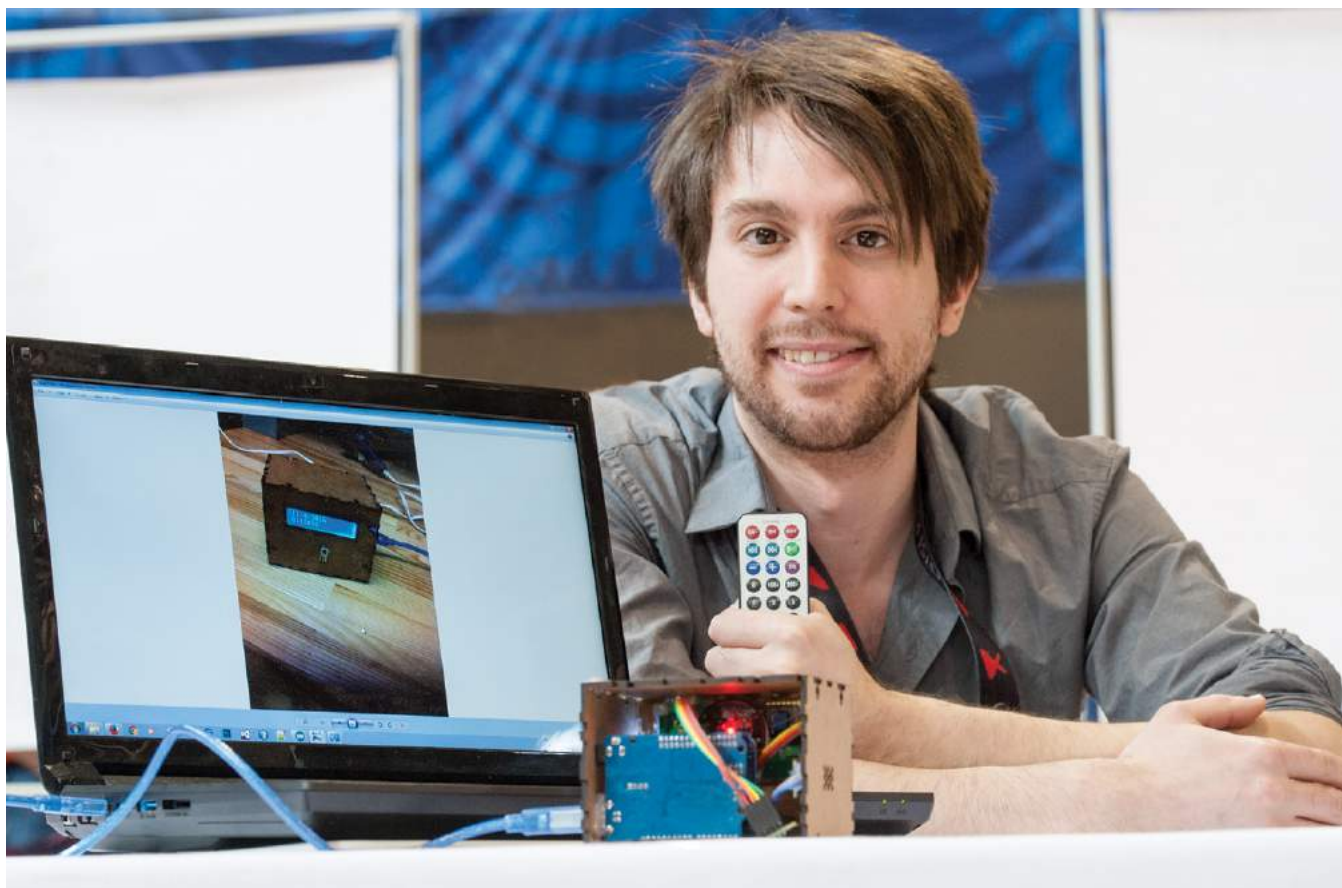
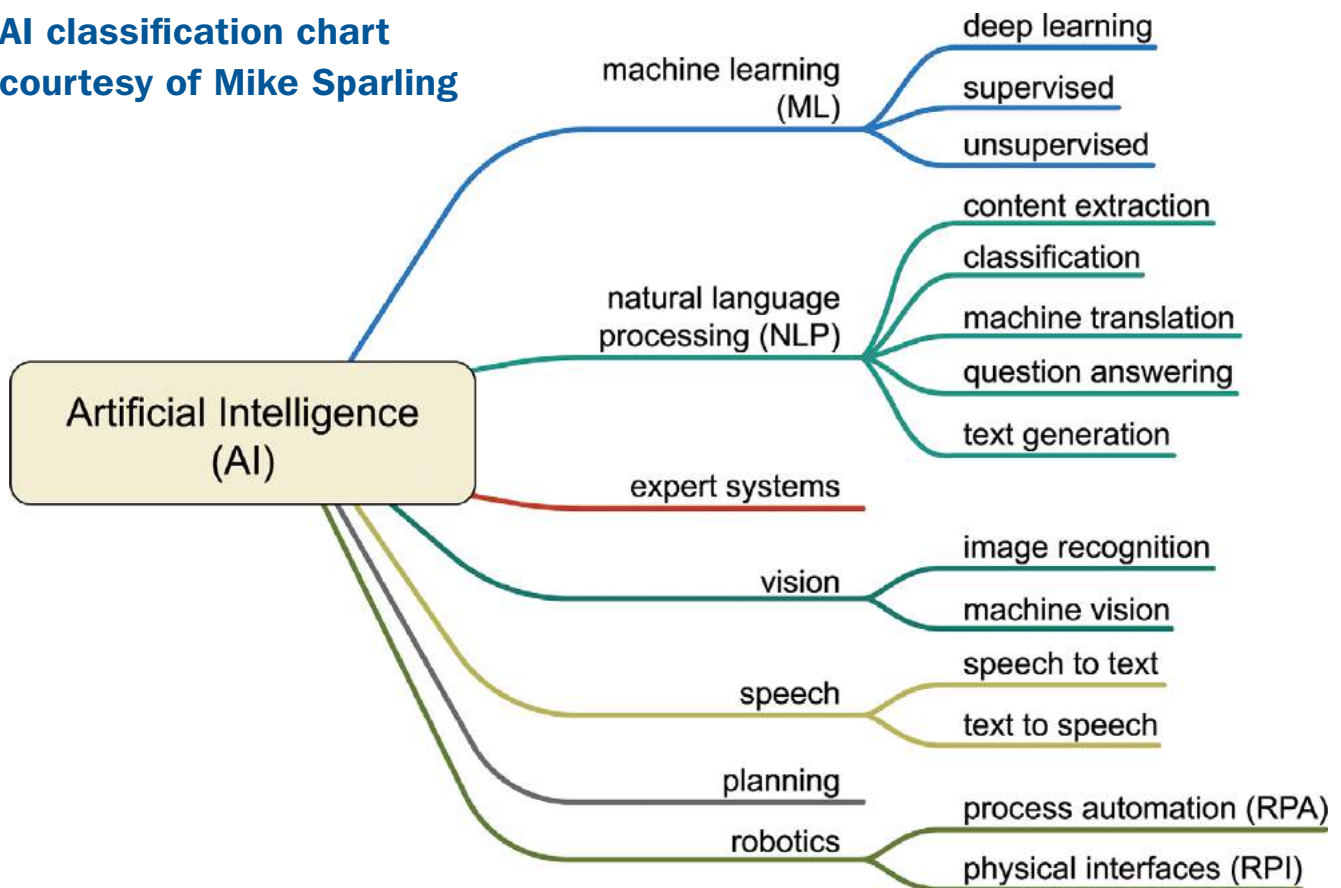


Photo courtesy of Georgian College.

AI classification chart courtesy of Mike Sparling



This duopoly of challenges, the conversion of theoretical research to practice and the need to convert technology advantage to business solutions, is where opportunity exists for Ontario colleges. It's where my college, Durham College, has focused its applied research effort in the creation of the Hub for Applied Research in Artificial Intelligence for Business Solutions (the AI Hub) which works with industry in the adoption and commercialization of AI in their products, services and solutions. The strategic imperative for action on incorporation of AI into the business operations of every firm is high, but the reality is that a scarcity of actionable knowledge, educated staff and robust platforms remains as a significant barrier to growth and ultimately success. This is where opportunities for curriculum and academic programming are urgently needed.

Narrow AI

Narrow artificial intelligence is the application of techniques that create the impression of intelligence within an environment with limited variables, conditions and outcomes. Siri or another voice assistant is an example of a narrow AI, as is a spam detector in email.

appliquée en intelligence artificielle pour les solutions d'affaires (le Centre IA ou AI Hub en anglais). Le Centre IA travaille avec les entreprises pour qu'elles puissent adopter et commercialiser l'IA dans leurs produits, leurs services et leurs solutions. L'impératif stratégique pour l'intégration de l'IA dans les opérations commerciales de chaque entreprise est élevé, mais en réalité, la pénurie de connaissances concrètes, de personnel formé et de plates-formes robustes demeure un obstacle important à la croissance et ultimement, à la réussite. C'est pour cette raison que des curriculums et des programmes d'études doivent être mis en place de façon urgente.

À l'aube du XIX^e siècle, plus de 90 % de la population de l'Amérique du Nord travaillait dans le domaine de l'agriculture. À cause de transformations au niveau du pouvoir, de la chimie et des pratiques, cette statistique a chuté à moins de 2 % en 200 ans. L'efficacité a pendant ce temps monté en flèche, une nécessité considérant que la population a cru par plus de 650 %. L'efficacité, l'échelle et l'automatisation ont triomphé du travail, pour le meilleur ou pour le pire. De nouvelles compétences sont devenues nécessaires et la formation avancée a créé un avantage concurrentiel. Nous sommes aujourd'hui à l'aube de la prochaine vague d'innovation en agriculture, démontrant que l'apprentissage à long terme est une exigence dans tous les domaines, dans tous les secteurs de l'industrie et pour tous les rôles, et bien que nous ne l'ayons jamais appelée « agriculture artificielle » ou « AA », les caractéristiques de transformation sont étrangement similaires.

At the dawn of the 19th century, over 90% of the North American population worked in agriculture. Through transformations in power, chemistry and practice that number fell to less than 2% in 200 years while efficiency skyrocketed, which had to happen to support the over 650 percent growth in population. Efficiency, scale, and automation triumphed – for better or for worse – over labour. New skills were required, and advanced training created competitive advantage. We stand today on the cusp of the next wave of innovation in agriculture, demonstrating that lifelong learning is a requirement in all sectors, industries and roles not just technology and while we never called it “artificial agriculture” or “AA” the transformation patterns are eerily similar.

In his 2018 keynote talk at the Davos Economic Forum, Alibaba CEO Jack Ma noted that, “It’s time to change the way we teach. There’s no point teaching skills that machines have. The skills we need to teach are the ‘soft skills’ that humans will always have but machines never will. Those are the skills we need to develop and teach.” EQ trumps IQ in the machine intelligence era.

It is a common misconception I hear often in my research work – “my programs aren’t technical, so we aren’t exposed to artificial intelligence the way the IT programs are.” This is an easy to understand perspective because, despite being one of the most searched terms in 2017, AI is also one of the most misunderstood and confusing terms of the last decade. It has become the new “big data”. Suffice to say, regardless your role in administration, the programs you may oversee, or the courses you may teach, artificial intelligence is already impacting what you do and that will intensify through the remainder of this decade.

According to Dr. Elaine Popp, vice president, Academic at Durham College, “Our faculty, students, industry partners, and administrators constantly identify innovative new scenarios as they work with AI. The potential impact goes far beyond our technology programs, with opportunities to enhance other programs in preparing students for success in their chosen careers, recognizing how rapidly their future employers are adopting AI.”

Some places where AI is influencing curriculum, reflecting the reality of our AI rich world includes:

- In game design, the agents and characters that populate worlds are based on AI.
- Movie special effects are heavily reliant on AI to produce realistic characters, crowds, new worlds and 3d visualizations from 2D stock.
- In the justice field legal briefs are increasingly researched and prepared by AI systems. Conviction sentencing, and parole recommendations are generated by AI systems.
- First responders are integrating AI systems, including threat prediction, visual recognition systems (including license plates and facial recognition) workforce scheduling and route planning are all systems that are heavy users of AI techniques.
- Business systems from marketing to sales, from human resources to strategy, from logistics to audit

IA faible

L'intelligence artificielle faible consiste en une application de techniques qui créent l'impression d'une intelligence dans un environnement avec des variables, des conditions et des résultats limités. Un assistant vocal comme Siri est un exemple d'IA faible, tout comme le sont les détecteurs de pourriels de nos boîtes de courrier électronique.

En 2018, lors de son discours d'ouverture du forum économique de Davos, Jack Ma, PDG d'Alibaba, a remarqué : « il est temps de changer la façon dont nous enseignons. Il est inutile d'enseigner les compétences que les machines possèdent. Ce que nous devons enseigner ce sont les « compétences non techniques, le savoir-être ». Quelque chose que les humains auront toujours, mais que les machines ne posséderont jamais. Ce sont ces compétences que nous devons développer et enseigner. » À l'ère de l'intelligence artificielle, le QE l'emporte sur le QI.

C'est une idée fautive qui revient souvent dans mon travail de recherche : « mes programmes ne sont pas techniques, donc nous ne sommes pas exposés à l'intelligence artificielle comme c'est le cas pour les programmes d'informatique ». C'est une perspective facile à comprendre, puisque bien qu'étant l'un des termes les plus recherchés de 2017, l'IA est aussi l'un des termes les plus incompris et les plus déroutants de la dernière décennie. C'est devenu le nouveau « big data ». Il va sans dire que, quel que soit votre rôle dans l'administration, les programmes que vous supervisez ou les cours que vous enseignez, l'intelligence artificielle a déjà un impact sur ce que vous faites et cela va s'intensifier tout au long de la décennie.

Selon la Dre Elaine Popp, vice-présidente à l'enseignement au collège Durham, « nos facultés, nos étudiants, nos partenaires de l'industrie et nos administrateurs trouvent constamment des scénarios novateurs lorsqu'ils travaillent avec l'IA. L'impact potentiel va bien au-delà de nos programmes technologiques. Nous avons là l'occasion d'améliorer d'autres programmes en reconnaissant à quelle vitesse leurs futurs employeurs adoptent l'IA et en préparant les étudiants à réussir dans les carrières de leur choix. »

Voici certains domaines où notre monde riche en IA a exercé son influence :

- En conception de jeux vidéo, les acteurs et les personnages qui peuplent les mondes sont basés sur l'intelligence artificielle.
- Les effets spéciaux que l'on retrouve au cinéma dépendent grandement de l'intelligence artificielle pour produire des personnages réalistes, des foules, de nouveaux mondes et des représentations 3D à partir de modèles 2D.
- Dans le domaine de la justice, les dossiers juridiques sont de plus en plus recherchés et préparés par les systèmes d'IA. Les condamnations et les recommandations de libération conditionnelle sont générées par les systèmes d'IA.

are all deeply integrated AI systems. The big accounting houses use AI extensively in the audit lifecycle, which is already dramatically altering entry-level opportunities for new finance grads.

- AI is abundant in healthcare. Image processing, drug interaction profiling, patient history, knowledge and prediction, remote diagnostics and intervention, genomics and custom therapy programs, even the proliferation of Emergency Defibrillation systems depends on AI to make a lifesaving complex medical procedure deployable to the scale it is!

Canada needs AI researchers, but what we really need are the people who will create businesses from AI, use AI at work, and interact with AI in their lives. We all need to understand how AI benefits and manipulates our lives (consider ethics, bias, and

Business facts

- Artificial intelligence represents +14% growth in global GDP by 2030. This is an addition of \$15.7 trillion. [PWC2017]
- 73% of senior executives cite AI as a primary strategic driver, core to their future. [IBM2017]
- 85% report they understand the impact AI will have on their organization. [Ransbotham2017]
- A chronic barrier to industry success with advanced technology is the “skills gap” costing the Ontario economy \$24.3 billion in GDP & \$3.7 billion in provincial tax revenues annually. [Conference Board of Canada, 2013]
- Small & Medium Enterprises (SMEs), which make up 98% of Ontario employment, face unique challenges in adopting artificial intelligence. [Ontario Chamber of Commerce, 2016]
 - ✓ 61% of SMEs aren't ready to adopt AI, citing complexity as the root of their concern. [Salesforce2016]
 - ✓ 21% of SMEs presently use business intelligence and analytics [Salesforce2016]

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- Les premiers intervenants intègrent des systèmes d'IA à leur travail, dont des systèmes de prédiction de menaces et des systèmes de reconnaissance visuelle, entre autres pour les plaques d'immatriculation et les visages. Les systèmes de planification des effectifs et de planification des itinéraires s'appuient aussi beaucoup sur des techniques d'IA.
- Les systèmes d'entreprise, du marketing aux ventes, des ressources humaines à la stratégie, de la logistique aux vérifications sont tous des systèmes d'IA profondément intégrés. Les grandes entreprises de comptabilité utilisent l'IA de façon intensive dans le cycle de la vérification, ce qui modifie déjà considérablement les opportunités d'emploi de premier échelon pour les nouveaux diplômés du domaine des finances.
- L'IA se retrouve un peu partout dans le domaine de la santé. Tout passe par l'IA, le traitement des images, le profil des interactions médicamenteuses, les antécédents des patients, les connaissances et les prédictions, les diagnostics et les interventions à distance, ainsi que les programmes de génomique et de thérapies personnalisées. Même la prolifération des systèmes de défibrillation d'urgence dépend de l'IA, sans laquelle il serait impossible de déployer cette procédure médicale complexe pouvant sauver la vie à cette échelle!

Le Canada a besoin de chercheurs en IA, mais ce dont nous avons vraiment besoin, ce sont des gens qui créeront des entreprises grâce à l'IA, qui utiliseront l'IA au travail et qui interagiront avec l'IA dans leur vie. Nous devons tous comprendre de quelles façons l'IA nous est profitable et de quelles façons elle manipule nos vies (il faut tenir compte de l'éthique, des préjugés et des vulnérabilités). Nous avons besoin de diplômés prêts à diriger et à participer à un monde « d'IA d'abord ». Tout commence par ce que nous enseignons dans nos programmes et par la façon dont nous préparons les étudiants à leur avenir. Comprendre que l'IA fait déjà partie de tous les rôles et de toutes les entreprises nous rappelle son importance dans notre programmation académique.

Quartz, un organe de presse d'origine numérique, l'exprime ainsi : « C'est un paradoxe moderne que nous sommes maintenant capables de transmettre des mégaoctets d'information en un clin d'œil, mais que nos cerveaux absorbent encore ces données à la vitesse de transmission frigidité que l'évolution a établie. » Pour faire face à cette abondance de données, nous nous tournons vers des systèmes, et pour avoir pleinement confiance en ces systèmes, nous devons comprendre ce qu'ils font pour nous. Nous devons comprendre comment ils en arrivent à ces conclusions et quels sont les impacts de la décision à prendre. En l'absence de systèmes, ou plus communément aujourd'hui, en l'absence de confiance dans les systèmes, nous faisons marche arrière et prenons des décisions de gestion à l'aide de notre instinct, avec les nombreux résultats documentés qui en découlent. L'administration de l'enseignement supérieur est un domaine où la quantité de données et le rythme de changement créent un scénario dans lequel l'IA, en tant qu'assistant et dans certains cas en tant qu'agent autonome, pourrait être la bienvenue.

vulnerability) and we need graduates who are ready to lead and participate in an “AI first” world. This begins with what we teach in our programs and how we prepare students for their future. Understanding that AI is already in every role and every company reminds us of its importance in our academic programming.

Quartz, a digitally native news outlet, put it this way: “It’s a modern paradox that, while we can now transmit megabytes of information in the blink of an eye, our brains still absorb it at the glacial baud rate set by evolution.” To cope with the abundance of data we turn to systems for help, and to fully trust the systems we must understand what they are doing on our behalf: how they are arriving at conclusions, and the implications to the decision at hand. In the absence of systems, or in the greater case today the absence of trust of the systems, we revert to management decisions by instinct with the many documented outcomes that produces. Higher education administration is one area where a wealth of data and a pace of change create a scenario where AI, as an assistant and in some cases as an autonomous agent, could be welcomed.

“We recognized early in 2017 the importance of embracing AI within the college,” said Don Lovisa, Durham College’s president. “The leadership team and I have provided direction and financial support to our research and academic community, which has led to the establishment of three internal AI-based projects to accelerate our adoption of AI and the development of a Machine Learning (ML) Technology Lab, which includes a state of the art GPU-accelerated ML development server.”

AI is visibly transforming how enterprise and consumer systems are developed. The urgency to move decision-making from instinctive to data-driven has been growing for many years. Transparency has become important in postsecondary administration as our broader stakeholder network seeks to better understand our contributions and expenditures. College presidents, boards, senior executives and academic leaders alike all face challenges in domestic direct enrolment, funding, retention, student achievement, and the acute challenges of student mental health and the dynamics of interpersonal relationships. In PSE and in other industries, AI has demonstrated its ability to aid in detection of patterns, notification of recommended or prescribed action, and in select cases to autonomously respond to events. We are just now at the dawn of the use of AI within academic administration.

The transformation of management decision-making, academic product planning, course scheduling, student at risk intervention, individualized learning plans, prospective student recruitment, alumni and industry engagement, dynamic learning agents and immersive learning simulations, synthetic “teaching assistants”, course and program learning and employability skills semantic analysis, and custom course references and reading packages are all examples of active research and product development by the broader education technology ecosystem where AI is presently being used to enhance operations and delivery. One of the biggest changes that an AI-based solution brings is that rather than being dependent on programming and custom solution development, AI systems generally replace programming with training and it is the domain experts who need to be central to the training rather than a technology specialist.

« Au début de l’année 2017, nous avons reconnu l’importance d’adopter l’IA au sein du collège, explique Don Lovisa, président du collège Durham. L’équipe de direction et moi-même avons fourni une orientation et un soutien financier à notre communauté de recherche et à notre communauté universitaire. C’est ce qui a mené à l’établissement de trois projets internes sur l’intelligence artificielle ayant comme objectif d’accélérer notre adoption de l’intelligence artificielle et à la mise au point d’un laboratoire de technologie d’apprentissage machine (AM ou Machine Learning, ML, en anglais). Ce laboratoire est muni d’un serveur de développement d’AM propulsé par un processeur graphique à la fine pointe de la technologie.

Informations commerciales

- L’intelligence artificielle représente une croissance du PIB mondial de +14 % d’ici 2030. C’est un ajout de 15,7 billions \$. [PWC2017]
- 73 % des cadres supérieurs parlent de l’IA comme étant un moteur stratégique majeur, un élément essentiel à leur avenir. [IBM2016]
- 82 % déclarent qu’ils comprennent l’impact que l’IA aura sur leur organisation. [HBR2017]
- « L’écart de compétences » concernant les technologies de pointe est un obstacle récurrent au succès de l’industrie. Il en coûte annuellement à l’économie ontarienne 24,3 milliards \$ en PIB et 3,7 milliards \$ en recettes fiscales provinciales. [Conference Board du Canada, 2013]
- Les petites et moyennes entreprises (PME), qui représentent 98 % des emplois de l’Ontario, font face à des défis uniques en ce qui concerne l’adoption de l’intelligence artificielle. [Ontario Chamber of Commerce, 2016]
 - ✓ 61 % des PME ne sont pas prêtes à adopter l’IA, mentionnant sa complexité comme étant la source de leurs préoccupations. [Salesforce2016]
 - ✓ 21 % des PME utilisent présentement l’informatique décisionnelle et l’analytique. [Salesforce2016]

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Ultimately like so many things organizational, the path to success with AI in higher education lies with a common set of goals that transcend organizational boundaries and traditional responsibilities, and a will to see it through an often-bumpy implementation that includes failing at experiments. As with any significant change initiatives, AI adoption demonstrates that while it is easy to proclaim support for experimentation and innovation at an all employees meeting, it is another thing entirely to mean it and to see it through. The rewards for AI adoption are nearly infinite for our institutions, our communities, our teams, our students and our graduates.

The question isn't when will AI impact postsecondary education. Rather, as educators, how fast must we move to catch up to industry and early adopters to remain relevant and competitive? The answer will probably unnerve even the most progressive of institutions. [C|A](#)

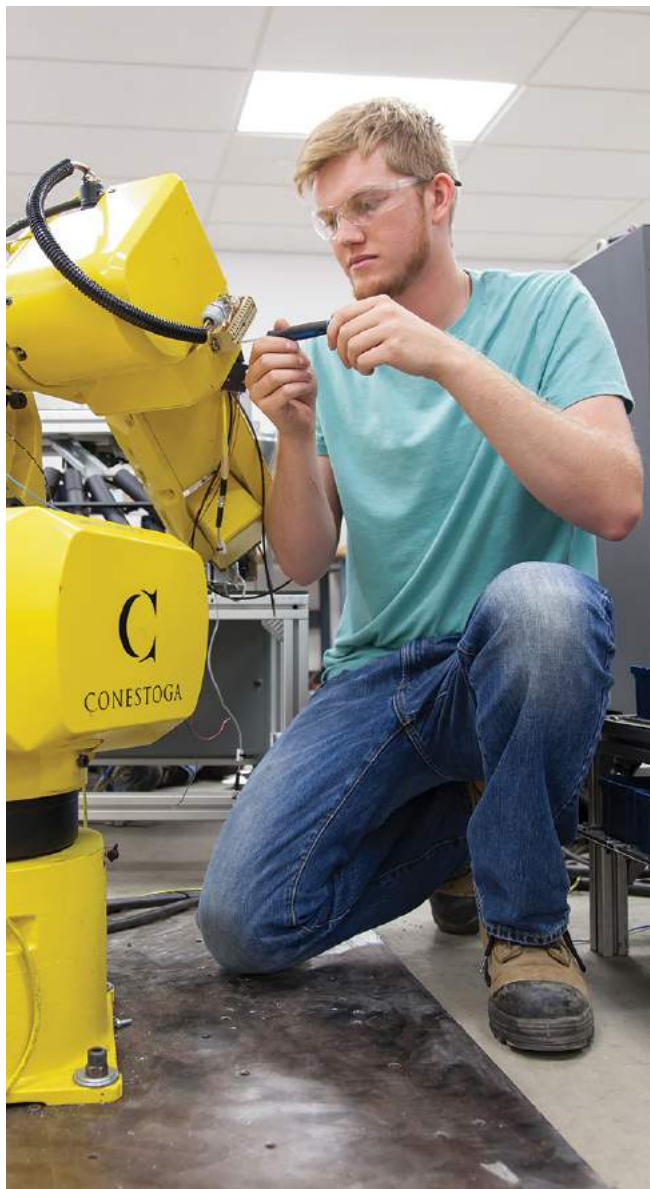


Photo courtesy of Conestoga College.

L'IA transforme visiblement la façon dont les systèmes liés aux entreprises et aux consommateurs sont développés. Depuis maintenant de nombreuses années, il se fait de plus en plus pressant que les décisions soient prises en fonction des données plutôt que de l'instinct. La transparence est devenue importante dans l'administration postsecondaire, car notre réseau élargi d'intervenants cherche à mieux comprendre nos contributions et nos dépenses. Les présidents, les membres de conseils d'administration, les cadres supérieurs et les chefs de file académiques des collèges font tous face à des défis en matière de recrutement direct à l'interne, de financement, de maintien du personnel et de rendement scolaire. Ils font aussi face aux défis difficiles que posent la santé mentale des étudiants et la dynamique des relations interpersonnelles. En enseignement postsecondaire et dans d'autres industries, l'IA a démontré qu'elle était en mesure de rendre service. Elle est capable de détecter les tendances, d'émettre des avis concernant des mesures recommandées ou prescrites et, dans certains cas, de réagir de façon autonome aux événements. Nous sommes à l'aube de l'utilisation de l'IA dans l'administration académique.

La transformation de la prise de décision en matière de gestion, de la planification des produits académiques, de la planification des cours, des interventions concernant les élèves à risque, des plans d'apprentissage individualisés, du recrutement d'étudiants potentiels, des engagements concernant les anciens élèves et l'industrie, des agents d'apprentissage dynamique et des simulations d'apprentissage immersif, des « assistants à l'enseignement » artificiels, de l'apprentissage des cours et des programmes, de l'analyse sémantique des compétences favorisant l'employabilité, des recommandations de cours personnalisés et des trousseaux de lecture personnalisés sont tous des exemples de recherche active et de développement de produits provenant de l'ensemble de l'écosystème des technologies de l'éducation où l'IA est actuellement utilisée pour améliorer les opérations et l'exécution. Comme les systèmes d'IA remplacent généralement la programmation par de l'entraînement, ils ne dépendent pas de la programmation et du développement de solutions personnalisées. Ce sont donc les experts du domaine qui doivent être au centre de cet entraînement, plutôt qu'un spécialiste en technologie. C'est l'un des plus grands changements qu'apportent les solutions d'IA.

En fin de compte, comme tant de choses dans l'administration, la route vers le succès de l'IA dans le domaine de l'enseignement supérieur repose sur un ensemble commun d'objectifs qui transcendent les frontières organisationnelles et les responsabilités traditionnelles, ainsi que sur une volonté de passer à travers une mise en œuvre souvent cahoteuse et pavée d'échecs expérimentaux. Comme pour toute initiative importante de changement, l'adoption de l'IA démontre que s'il est facile de proclamer son soutien à l'expérimentation et à l'innovation lors d'une réunion regroupant tous les employés, appuyer concrètement ces propos et les mettre en œuvre est une tout autre histoire. Les récompenses que peut apporter l'adoption de l'IA sont presque infinies pour nos institutions, nos communautés, nos équipes, nos étudiants et nos diplômés.

La question n'est pas à savoir quand l'IA influencera l'éducation postsecondaire. À titre d'éducateur, il faut plutôt se demander à quelle vitesse nous devons agir pour rattraper l'industrie et les utilisateurs précoces afin de demeurer pertinents et compétitifs. La réponse troublera probablement même les institutions les plus progressistes. [C|A](#)



By Bill Swan
Contributing Editor

THE FUTURE IS NOW

Computers that can read and talk are changing the face of jobs and education

Arificial intelligence. You hear about it every day in the news: It is about to destroy the job market; it will assume all work and finally hand humans a full life of leisure; it will soon be smarter than we are and rule the world.

Or maybe it will simply create the neatest video games ever, like, really.

It may do all of those things.

One thing it is not, however, is a force lurking in our future.

“It is happening right now,” says Karen Creditor, President and CEO of OCAS, (the college application centre). “Artificial intelligence and machine learning and deep learning are not something that will happen in the future in colleges.

“At OCAS, we use it but we’re just scratching the surface. And whether they’re conscious of it or not, all college administrators are using it in some way. We have to be able to understand the impact on our jobs and understand what we want the impact to be in how we interact with students.”

What does AI include? The most obvious example: self-driving cars. Last fall, a self-driving car appeared on a street in Ottawa. A pilot program will put test cars on the streets of Stratford. The question is no longer “if” but “when”? How do we make the transition? Do we ramp up step by step from semi-autonomous cars (vehicles that take over some functions, such as braking, parking etc.); or leap fully to self-driving vehicles (no steering wheel, no way for a human to assume control). The issue is now more about liability, insurance, and how soon we can pry the steering wheel out of the hands of flawed *homo sapiens* and save more than a million lives each year around the world.

In January, *Microsoft Research Asia* demonstrated technology that can read printed material with better comprehension than a human. From the Microsoft media release: “On Jan. 3, Microsoft submitted a model that reached the score of 82.650 on the exact match portion. The human performance on the same set of questions and answers is 82.304. On Jan. 5, researchers with the Chinese e-commerce company Alibaba submitted a score of 82.440, also about the same as a human.”

Ray Kurzweil, chief engineer at Microsoft, says computers can read “one million books in six seconds. And reading comprehension will not linger at the human levels, but will improve.”

Combine that with rapidly improving voice recognition and you can see where this is heading. Siri, Alexa and company are about to become much more articulate and knowledgeable.

Karen Creditor at OCAS: “We used to have a receptionist answering the phone and directing calls. That’s been replaced with software. Another example is our tier one call centre support for students. Students can continue to call and talk to a human agent,” or interact with canned chat responses, a very rudimentary chat bot.

“Students basically ask the same questions,” Karen says, and agents can provide an answer by hitting one key and thus handle simple queries simultaneously.

A fully automated bot that can comprehend the questions and provide the answers may be in the future. “We’re not there yet but that is the path that we’re on,” Karen says.

Here’s an example from the job front. Normally, for each issue of *College Administrator*, we record five or six hours of interviews. To improve the accuracy of our notes, we have each interview transcribed. The cost: \$1 U.S. per minute, or close to \$75 Canadian an hour with a turnaround of 72 hours. (Or 12 hours for a premium fee. See *Rev.com*.)

But preparing this issue, we used a new service, Sonix, based on machine learning: an algorithm that teaches itself. It’s all online and costs \$5 an hour (plus \$15 a month membership) with a turnaround of no more than a couple of hours. Granted, the service requires slightly more review for accuracy.

“The principle underlying technologies are automated speech recognition (ASR) and natural language processing (NLP),” Jamie Sutherland, Chief Executive Officer & Co-Founder of Sonix, told us in an email reply to a query. “ASR is the processing of speech to text whereas NLP is the processing of the text to understand meaning. Both leverage machine learning to improve from experience over time.”

A college that is turning out highly skilled transcription professionals may consider a program adjustment.

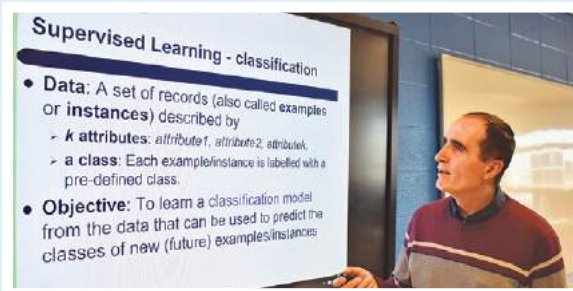


Ken Steele
President, Eduvation Inc.



Karen Creditor
CEO and President, OCAS





Ilia Nika, software program coordinator.
Photo courtesy of Centennial College

Centennial program identifies at-risk students

Ilia Nika, Software Programs Coordinator in the ICET Department at Centennial College, has led a team to create a program to identify at-risk students.

“The machine learning models were trained using a large dataset which included student records of 2009-2015,” he said in an email reply to CA questions. “The ensemble classifiers which combine the results of several machine learning algorithms, produced a better accuracy of prediction, approximately 80%.”

“Currently, we are extending the solution to predict students at-risk by week 6 or 7 of the semester using D2L data,” Ilia added.

The dataset used in this research was provided by Centennial College Institutional Research Office. The project was partially funded by the Applied Research and Innovation Centre.



Photo courtesy of Centennial College

“It used to be that a bookkeeper had a guaranteed job for life,” said Karen Creditor. “That was a great profession. But very few people do manual bookkeeping any longer, instead using software programs. This has evolved into the field of accounting where software programs can be quite sophisticated in resolving tax problems, for example.”

Want more examples? Computers are better at diagnosing some diseases than doctors; fewer lawyers will be needed; real estate agents may be redundant; and, even alas, computers have already begun to replace some writers.

Administrators are not exempt, although there is a tendency to see AI as tools to simply do more in limited time.

Ken Steele, President of Eduvation Inc.: “For 30 to 40 years now we’ve been increasingly automating lots of backroom administrative functions. We have ERP systems; we’ve got classroom space allocation software; we’ve got scheduling software. Only a few years ago I was talking to registrars who were doing class scheduling manually and they know that the software makes that a lot more efficient.”

Steele, a consultant and speaker, even predicts his own job insecurity. “The bulk of what I do is scanning and crunching and sifting to detect patterns,” he said. “Algorithms are increasingly good at scanning data and finding patterns. It’s only a matter of time before algorithms are able to do what I’m doing.” He added, hopefully: “They may still need the motivational speaker.”

It is a future faced by everyone.

“Projections by the World Economic Forum and the Oxford Humanity Institute indicate that 40 to 50% of all employment will change by 2045,” Steele said. “We’re afraid of disruption and I think we’re right to be.”

Could this be a threat to colleges? Ilia Nika, a faculty member and Software Programs Coordinator, ICET Department, School of Engineering Technology and Applied Science at Centennial, thinks not. “Colleges, unlike universities, are by design very agile and can respond quickly to changes,” he said. “We need to move quickly and embrace the new reality . . . I see this mostly as a great opportunity for colleges to review the existing offering and/or create new programs that will provide the necessary set of skills for the new workplaces.”

And what might those skills be, if the technology is shifting so rapidly? “Information and Communication Technology Council (ICTC) has constantly published outlook reports that provide good information on industry trends in Canada and types of skills that will be in high demand,” he said.

It is not just the jobs that are being changed in this digital world. Students themselves are changing and this concerns Anthony Morelli, a computer science professor at Central Michigan University.

“The answer is already out there (online) for just about everything,” he said. “If you’re not good with creating your assignments, or if you are taking assignments right out of the textbook, students can search it and find it.

“(As a professor) you need to be aware of how you craft your questions and assignments.”

Today's mania for standardized testing at elementary and high school creates a problem. "Kids in high school come in (to postsecondary) with the bad habits of just wanting to pass the test. Sometimes I go off topic and get the common question: Is this going to be on the test? My answer: I don't know. I haven't made it yet."

Lisa Gandy, an assistant professor of computer science at CMU, sees this as leading to the next challenge: "By the time you're in college you know dates and things like that. But in college learning should be more about understanding. How do you test for understanding when students have been taught to memorize?"

The digital world also "is changing the way in which students learn," Steele says. "We're still seeing that change happening. It's going to be another 10 years before the students coming into our campuses are as digitally native as they're going to get."

"The students we're getting now were seven or eight when the iPhone came out," he said. "They were 10 when Facebook started. They're not digital from the cradle" as they will be in the next few years.

The digital world is also changing how we evaluate students. Why, Steele asks, would we give everyone the same exam? "Why not an exam that is fluid and that in real time adjusts itself to be more or less difficult depending on how the students are doing? That way you're testing the student's actual ability."

The answer is already among us: the Ontario College of Nursing has administered computerized adaptive testing for Nursing Registration since 2016. Although not without flaws, the test NCLEX pass/fail exam was designed in the U.S. confirms an applicant's knowledge with from 75 to 265 questions. Each question depends on response to previous questions until the algorithm can confirm the applicant has passed (or not).

The role of the teacher may also change in this changing new world, Steele says. "Soccer coaches are not going to be replaced with AI because their job is to motivate," he said. "It's to encourage kids to build their relationship."

"If we think of our teachers as soccer coaches instead of as scientists who share their wisdom then we have a different sense of it. But that coach role, the mentor and the guide on the side remain uniquely human" at least until "we create truly trans human intelligence systems."

Karen Creditor, who came to OCAS from a position as director of handheld operations at Research In Motion (RIM), says it is increasingly important for colleges "to both teach the skills for the jobs that exist today and help students understand that they'll probably return to college at some point" to learn new skills required for the future.

"We have to change the flaw in our thinking that says that you go to postsecondary once and learn all you need to know for the rest of your life. We must help students understand the concept of lifelong learning." **CLA**

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In recent years, traditional and social media have been awash with references to buzz words such as big data, machine learning, artificial intelligence, Internet of Things, deep learning, computer vision, autonomous vehicles, analytics, and robotics. As college administrators we are invested in both the current and future of work and learning. How do we make sense of all this, and not be bewildered with and confused with various technological advances gathering mainstream attention?

I am fortunate to have spent my career dedicated to innovation and entrepreneurship. As a professional engineer and now leader at a top Canadian research college, I have enjoyed staying connected to several of these advances reported in the media: my role allows me to vicariously participate in the work of our faculty, support staff, and learners as they participate in this knowledge economy, and contribute to several of the above developments.

In this article, I will provide an overview of artificial intelligence, and reflect on its implications for college administrators.

Artificial intelligence (in contrast to natural intelligence demonstrated by humans and other species) has been around for decades, beginning as an academic discipline since the 1950s. It is closely associated with the development of modern computing. Artificial intelligence is very much an applied discipline, built upon fundamental advances in more fundamental disciplines such as mathematics, computer science, psychology, and linguistics. Artificial intelligence is really an umbrella term referring to a family of research and development areas that broadly seek to replicate or exceed natural intelligence, such as natural language processing, reasoning, learning, perception, and robotics. Machine learning is one domain within broader artificial intelligence, as is computer vision.

As a discipline, artificial intelligence has witnessed peaks and troughs. The latest surge has been enabled by a few things: we are living in a hyper-connected world with just about every new device on the market and in our homes capable of communicating via the Internet. Artificial intelligence is generally a data hungry discipline, thriving in this context.

When I worked on my undergraduate thesis in chemical engineering in late 1990s, I first used artificial intelligence methods (specifically artificial neural networks and clustering analysis) in the context of understanding large amounts of chemical plant data. Chemical plants tend to be highly

automated, with thousands of sensors and control elements across a distributed network. Vast amounts of data are collected every second and streamed to a control room for plant operators to monitor and make decisions. Such industrial applications with access to large amounts of data have been fertile areas for the development of artificial intelligence, before trickling down to mainstream consumer solutions.

Today, we are generating a huge amount of text, audio, and visual data, through our social media activity, and our smart phones. Wherever there is digitization, data is created, stored, and transmitted. When you consider the growth in computer storage over the decades, this information explosion becomes evident.

I first learned programming in late 1980s on an IBM-compatible desktop PC running the Disk Operating System (DOS) with a 20 MB hard disk drive. Today, computers carry hard drives exceeding a TB. I have more computing power and storage on my iPhone than was on the computers used for the Apollo missions.

By investing in professional development, administrators can be better equipped to deal with artificial intelligence.

Other advances such as deep learning have also contributed. Aided by Moore's law and an exponential growth in computing power and algorithmic advances, deep learning software can mimic the layers of neurons in the human neuro-cortex. Research by University of Toronto's Dr. Geoffrey Hinton has contributed to these major advances in deep learning.

Despite all this, challenges remain. Advances in various domains of artificial intelligence have not been uniform. Optical character recognition is more advanced relative to other domains such as creativity. Artificial intelligence in general is also data hungry. Researchers are trying to develop artificial intelligence techniques that require significantly less data than they do today. Artificial intelligence has been applied to specific, narrow problems, and work is under way to realize the holy grail of general intelligence (the kind of broad-based intelligence that we humans have).

In these innovative contexts, academic leadership can be a conflicted thing! By engaging in research, innovation, and venture creation, colleges contribute to exciting developments in areas such as artificial intelligence with profound implications for our economies, societies, and our planet. And yet, we can be bewildered by their implications for our own academic mission, especially in terms of preparing our learners to not just survive, but thrive in an ever-changing socio-economic landscape.

Thanks to our strong engagement with industry, our institutions are recognizing the value of knowledge and skills development in artificial intelligence and allied fields for our learners. We see the value of ensuring our graduates are digitally literate when they enter the workforce. But what about those who are already in the workforce, such as college administrators? It is incumbent upon us to be digitally literate as well. Digital literacy goes well past using Facebook, Twitter and LinkedIn. We need to be adept not just as consumers (“buyers”), but more importantly as creators (“innovators”) of digital products and services.

It means understanding how raw *data* can be processed to uncover *patterns*, which can successively be processed to *information*, and *knowledge*. It means understanding the fundamentals of *object-oriented design*, *data modeling*, and *knowledge representation*. It means understanding the broad fundamentals of how artificial intelligence systems are architected and to recognize their strengths and limitations. Will this be hard? Possibly, but it is not as daunting as one might think it to be. As an applied discipline, artificial intelligence is still reliant on advances in fundamental disciplines such as mathematics. Major discoveries and breakthroughs in these fundamental disciplines are hard to come by. By investing their continuous professional development into developing a thorough understanding of these fundamentals, administrators can be better equipped for artificial intelligence, without being overwhelmed by the vast array of commercial applications.

With the easy availability of machine learning and other artificial tools over the cloud, it is easy to get sucked into a lot of hype. Unfortunately, artificial intelligence is yet to come anywhere close to its long-term vision of general intelligence. As with any computer application, even artificial intelligence is not immune to GIGO (garbage in, garbage out). Machine learning applications “trained” with data sets with underlying implicit human biases reproduce the same biases. Developing a critical appreciation of strengths and limitations of various facets of artificial intelligence is essential to demonstrating good judgement.

Every one of us is participating in this digital economy enabled by artificial intelligence whether we recognize it or not. Our interactions with intelligent agents varies from chat bots, Internet search engines, machine translation tools, photo identification to voice recognition. For our learners and our own institutions to thrive, not just survive, we must be creators and innovators, not just consumers. Because of its applications to every sector of our economy where humans endeavour, every industry and every occupation can be affected. Our nursing graduates will need to be

sophisticated and critical users of clinical decision support systems. Our engineering technologists will need to both design and troubleshoot these systems. Our writing professionals must recognize the limitations of machine translations and be prepared to offer value added services.

We must be mindful that artificial intelligence can be used productively, but also lends itself to misuse. We need to expose our learners to the ethics of artificial intelligence, not just the science and technology in it. Various thinkers and futurists such as Ray Kurzweil also foresee a future where machine intelligence could easily exceed human intelligence in the coming decades with profound implications for our civilization. While some doomsday scenarios may be far-fetched, as education leaders dealing with the economies and workforces of tomorrow, a healthy respect is desirable.

Human ingenuity, persistence, and empathy will be valued even more ahead. The diffusion of artificial intelligence into every part of our economy and society will offer new opportunities for our graduates. New occupations will be created, as will new kinds of ventures which will be unleashing the next waves of innovation.

We live in extraordinary times where we have innovated at rates never before seen in our collective human history. Artificial intelligence is finally here to stay. We must be prepared to learn, embrace, participate in what it has to offer. [c|A](#)



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Maxim Jean-Louis
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Artificial Intelligence in higher education: Opportunities, risks and challenges

Not one day passes without a new claim about artificial intelligence (AI) whether referring to the use of AI in warfare with “killer robots”, or autonomous drones that will deliver your groceries before you even knew there was no beer left in the fridge, and deliver it to you just when you realized the robots have taken your job!

There is increasing talk about and examples of how AI is used and may be used in assisting us to identify and map the spread of diseases, to predict diseases like cancer, and to assist the police and justice system in predicting criminality and recidivism. In the broader scope of the public discourses there are, however, also concerns about the potential and real impact of bias in AI and autonomous decision-making systems whether in the banking and insurance industries, or in criminalizing races and communities based on historical data.

Our current observation at Contact North | Contact Nord is that higher education, as a microcosm of broader society, is not immune to the different claims regarding AI. There are claims that AI will allow us to personalize learning and provide just-in-time feedback and support to students, resulting not only in better success rates, but more effective allocation and use of resources on both the sides of students and institutions. AI will then free educators for “other” aspects of an educator’s responsibility such as research and community engagement.

It is crucial to remember that all knowledge (and that includes AI) is not an unqualified good and can be used to serve humanity or service selfish, individual or collective gains to the detriment of broader society. Considering the potential but also addressing several challenges and issues in the use of AI in the specific context of higher education necessitate that we steer away from an approach to see AI in *binary terms*, as totally evil or an unqualified good. It is also important to acknowledge that AI is *already*, in many respects, shaping our definitions of knowledge, our definitions of research, as well as our definitions of the curriculum, instructional design, teaching, learning and student support.

Let me offer five ways AI is already changing the core business of higher education:

1. **AI is changing “Knowledge” as we knew/know it.**

For hundreds of years the definition, production of and accreditation of “Knowledge” (with a capital K) have been the sum of the core functions of higher education. As gatekeepers in defining, producing and defending knowledge, higher education had the monopoly, with the teacher as the all-knowing source of knowledge. Up to now. Answers to questions on Google are defined by recommender systems based on often obtuse criteria and commercial interests. Not only is there no longer a definitive answer, but users are getting the answers based on their historical search records interpreted by autonomous recommender systems.

2. **AI is changing research and the dissemination of the findings.**

Research and the production of knowledge have moved from the hallowed halls of higher education to knowledge producers outside of higher education, often funded by commercial interests, collecting and analyzing Big Data where “N=All” approach to data collection and the patterns we find become Knowledge. Big Data and AI are claiming objective, evidence-based knowledge that surpasses the subjective, biased accounts of research before Big Data. The discourses around Big Data are not interested in the “why” but assume that it is enough to know “what” is happening. The collection of and access to Big Data and methods such as Machine Learning and Deep Learning have outpaced Ethical Review Boards and Peer Review. What counts in AI are models and what these models can do. The Black Box of AI has, in many respects, become the producer and final accreditor of knowledge.

3. **AI is changing curricula and teaching.**

As teaching and learning increasingly moves digital and online, faculty and students are relying more and more on what is available online and, as pointed out above, what is recommended. While no one will contest the fact that we have access

In disciplinary contexts such as mathematics, economics and some of the applied sciences, intelligent tutoring systems offer huge potential.

to more information than ever before, we forget that recommender systems do not care about quality or whether the information had been peer-reviewed. And while the notion of peer review is not fail proof, it has been, up to now, one of the ways scholars ensured the reliability and veracity of knowledge claims. Finding resources or images on topics are dependent on the underlying algorithms used in search engines that often flow from and perpetuate historical biases and stereotypes.

4. **Outsourcing our understanding of teaching and learning.** Very few, if any, higher education institutions have the hardware and software, as well as the human expertise, to make sense of the increasing amounts of students' learning data we have access to. Commercial providers of learning management systems (LMS) offer these analytics (at a price) and sell us dreams of not only a better understanding of student success, but increasingly of models that describe, explain, predict and prescribe curricula and learning.
5. **No longer business as usual.** In an increasingly resource-constrained world, AI offers administrators in higher education access to models that can assist in optimizing available resources based on an analysis of historical and current data on a scale unheard of before. In many respects AI offers higher education administrators access to insights outside the parameters of what was humanly possible, as long as we can provide these AI systems with data. Satisfying the need for more data, we may have become obsessed with measuring and quantifying everything, and those aspects of the teaching and learning journey we cannot directly measure or quantify, we develop proxies that are artificial and thus may not be accurate or the algorithms may not be complete.

AI will also contribute to more effective teaching and learning. Here are seven ways:

1. AI provides us the opportunity to see patterns in enrolment of designated groups, student success, allocation of resources, or patterns in the broader higher education landscape. As such we have access to insights we would not have had access to before.
2. There are a number of processes in higher education that can and should be *automated*. Some of these automated processes may require human oversight, while other processes with relatively little risks to the institution or students, can function without human oversight, on provision that there is a way affected individuals can raise objections. One example would be the identification of

inactivity on the institutional learning management system in cases where the latter is a compulsory or essential part of the learning design. In large classes it is humanly impossible for faculty and support staff to monitor activity patterns and respond to unusual patterns or inactivity. AI can, depending on the context and the nature of risk to students and the institution, identify students, send out a personalized email or message indicating the importance of the particular activity, and offer a range of FAQ or contact numbers should the affected student need to speak to someone. So AI could identify students (based on criteria based on research and human insight) and respond to an immediate need on a scale humanly impossible.

3. AI offers huge potential for intelligent tutoring systems in disciplinary contexts and introductory courses where successful learning depends on the mastery of threshold concepts as part of a linear, sequential unfolding of the learning journey. In disciplinary contexts such as mathematics, economics and some of the applied sciences, intelligent tutoring systems offer huge potential by providing step-by-step guidance in the form of feedback and hints.
4. The development of models for describing, explaining, and predicting student success and students-at-risk in order to prescribe certain actions (whether to students or the institution) can be greatly enhanced by AI. It is, however, important to note that identifying patterns in student behaviours and categorizing students according to risk categories do not yet explain the "why" of their behaviour. These identified patterns have to be used as basis for further research to not only look for correlations but also to get a better understanding of the underlying constituting mechanisms resulting in these patterns.
5. Developing a collective and integrative business and learning intelligence capacity in institutions of higher learning has become paramount to ensuring not only the sustainability of institutions, but also to develop and deliver more appropriate and effective allocation of resources. Currently data that can inform institutional decision-making is scattered across an institution, in different formats and quality.
6. Using AI can provide engaging learning environments by means of virtual and mixed reality, simulations and games, providing real-life digital representations of people, environments and objects, encouraging student engagement and interest while providing an immersive, responsive and adaptive learning setting. →

AI offers higher education administrators access to insights outside the parameters of what was humanly possible.

All Knowledge (including AI) can be used to serve humanity or service selfish, individual or collective gains.

7. AI can contribute to improving assessment by discontinuing the stop-and-test approach. With the use of AI, assessments can be developed into meaningful learning activities that evaluate learning in real-time.

Opportunities, risks and challenges

AI has placed higher education at the centre of a profound transformation, which creates both extraordinary opportunities and risks. One of the major attractions of AI is the expectation that AI will be able to perform more objective analyses and as a result, reach better decisions than humans. There is, however, evidence that algorithms and various models are not more objective than the individuals who developed and built them, and the data that are used in training AI systems. No one would also negate the potential of AI to be immensely powerful, but there are concerns about who steers current initiatives, whose interests are served, and what/whose values are steering developments in AI.

Higher education cannot afford to miss the opportunity to, not only engage with the discourses surrounding the potential, risks and challenges in developing and implementing AI, but to critically contribute to these discourses. We cannot afford to engage with the potential, risks and challenges in developing and implementing AI in higher education as if AI can only be considered in terms of the binary of good or bad. The 'truth' of AI in higher education most probably lies in the grey areas in between good and bad.

Like everyone in our sector, the thinking of our team at Contact North/Contact Nord is evolving as AI is a rapidly changing development. However, it is important to emphasize that the potential of AI in higher education is to extend human capabilities of teaching and learning and not view this technological advancement as a solution or substitute for rigorous pedagogical solutions and effective teaching.

We very much look forward to engaging with other colleagues and our college partners on this. [CA](#)



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ABOUT THE EVENT

Monday, June 25

Keynote Presentations



“Landscape for Colleges in Post-Election Ontario”

Linda Franklin

President and CEO
Colleges Ontario



“Resilient Leadership in our Rapidly Changing Times”

Jim Harris

Strategic Advantages

Tuesday, June 26

Presidents' Panel

Learn from three leaders who will share honest, insightful and inspiring stories.



Dr. John Tibbits

President and CEO
Conestoga College



Don Lovisa, BA, MIM

President
Durham College



Mary Preece, PhD

President and
Vice Chancellor
Sheridan College

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Concurrent workshops take place over two days of the conference that focus on the conference theme – *The NEW Three R's: Resilience. Renew. Reinvent*, and provide insight into leadership and emerging trends and issues. The conference workshops are designed to facilitate meaningful dialogue in addition to relevant learning take-aways. For details about the workshop, please visit the website <http://www.ocasa.on.ca/events/2018-leaders-innovators>.

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For more information

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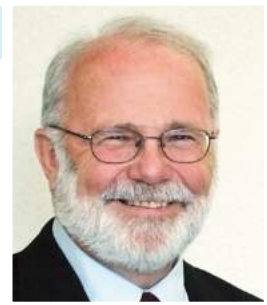
- Registration and Information Table
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- Session Greeters
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SCHEDULE OF EVENTS (subject to change)

Monday June 25 - Registration and Information Desk open 9:00 am – 6:30 pm			
9:00 am – 6:30 pm	Registration Open		
9:30 am – 10:00 am	OCASA Welcome and Conference Kick-off (courtesy of Turning Technologies)		
10:00 am – 11:45 am	Opening Keynote: Linda Franklin, President and CEO, Colleges Ontario <i>Landscape for Colleges in Post-Election Ontario</i>		
11:45 am – 12:00 pm	Refreshment Break		
12:00 pm – 1:15 pm	Luncheon and Awards Ceremony		
	Concurrent Workshops		
1:30 pm – 3:00 pm	CHAIR STREAM <i>Resilience:</i> What's Keeping You Up at Night?	LEADERSHIP <i>Resilience:</i> Practices to Keep You Plugged In and Energized	BEST PRACTICES & EMERGING TRENDS Indigenous Education
3:00 pm – 3:30 pm	Networking Break & Refreshments		
3:30 pm – 4:30 pm	Plenary Session: Jim Harris, Strategic Advantages <i>Resilient Leadership in our Rapidly Changing Times</i>		
4:30 pm – 6:30 pm	Leisure Time Optional: CMU Reception (Optional)		
5:00 pm	Reception (Cash Bar)		
7:00 pm	Dinner		
9:00 pm	The OCASA Games Night and After-Hours Networking Bridges pub and games room		
Tuesday June 26 - Registration and Information Desk open 7:30 am – 12:00 pm			
7:30 am	Breakfast		
8:30 am	OCASA Annual General Meeting		
	Concurrent Workshops		
9:00 am – 10:30 am	CHAIR STREAM <i>Reinvent:</i> Leading Change: The Multifaceted Role of Chair	LEADERSHIP <i>Renew:</i> College Leadership Competencies Charting Your Career	BEST PRACTICES & EMERGING TRENDS The Future of Work and Learning with a Focus on AI
10:30 am – 10:45 am	Networking Break & Refreshments		
	Concurrent Workshops		
10:45 am – 12:00 pm	CHAIR STREAM <i>Renew:</i> Maximizing Faculty Performance	LEADERSHIP <i>Renew:</i> Leading through change	BEST PRACTICE & EMERGING TRENDS How OCAS deals with the pace of technological change
12:15 pm – 1:45 pm	Luncheon and Presidents' Panel: Dr. John Tibbits (Conestoga); Don Lovisa (Durham); Dr. Mary Preece (Sheridan)		
	Concurrent Workshops		
2:15 pm – 4:15 pm	CHAIR STREAM <i>Reinvent:</i> New to the Role of Chair Panel	LEADERSHIP <i>Renew:</i> Sex, Drugs and Rock and Role: Cannabis, #MeToo and other workplace issues.	BEST PRACTICES & EMERGING TRENDS The Future of Work and Learning with a Focus on AI

As AI redefines jobs, how do we serve students, staff, and our own careers?



Brian Desbiens, Ph.D.
Past President, Sir Sandford Fleming College
Associate, Promeus Executive Search

At dinner recently, my grandson and I were discussing which programs and at what schools he was considering applying to once he finishes Grade 12 this year. He asked several questions about what the workforce might look like when he graduates in five years, and how it will change over the course of a thirty-year career. I was impressed with his forward thinking and, in particular, his impression of how artificial intelligence will affect his preferred professions. As a product of the digital age, he had no hesitancy acknowledging that work will be markedly different. Since many jobs will disappear, he knew he needed to assess what he could bring to the table and what he needed to learn in order to be successful.

It so happens I've recently been asked to speak to members of a men's club about how to address their grandchildren when asked about the future labour market. They believe someone from the colleges with a counselling background can help. Indeed, one of the historical successes of the college system has been our ability to adapt programs and provide students with options that are based on the actual demands of the work place. So how do we continue to fulfill this responsibility to offer not only entry level but also sustainable work opportunities in a rapidly changing technological landscape? How do we, as staff, prepare ourselves for the future of artificial intelligence and smart technology?

Let's get the scary stuff out of the way.

In a recent *Toronto Star* article entitled, "An AI threat bigger than killer robots," Benoit Dupont asserts that robots will disrupt every aspect of our economy. He warns of waves of job destruction. Most of all, he fears the

extent to which they will know all about us – our likes, dislikes, and patterns of behaviour – and then coerce (if not force) us to act in their interest. He beseeches us to ensure applications are not used for anti-democratic purposes, but rather for the public good. For example, AI applications to social media were used in Russia's alleged intrusion in the last U.S. election and in the subsequent investigations. There are countless scenarios to fear, but for now, let us focus on what we can more easily control: our career options.

In reality, all jobs that are based on simple processes can be captured and performed more effectively by robots or smart machines. But technological change has always been with us. In my college career, I have seen technology students go from the slide rule, to the handheld calculator, to the desktop computer, to the tablet and smartphones, to today's wearable devices: watches, eyeglasses, and virtual reality goggles. Our cars are outfitted with applied technology not just under the hood, but with cameras and GPS-regulated systems designed to protect us from myriad unseen hazards. This is great because, as we age, our reflexes decline. With the growing popularity of the self-driving car and the ensuing decline in road accidents, we will soon realize just how comparably flawed we were as drivers and wonder how we ever let ourselves behind the wheel. But what will this latest development mean for professional truckers and taxi drivers? If you are responsible for the counselling function at a college, what threats and opportunities lie ahead not only for you in your role but also for students and their careers? If you are an administrative

assistant, what applications will affect your work?

We have already seen smart machines transform the way we complete routine tasks. We no longer need to fuss with paper maps, we can input our desired destination into our GPS device. We then saw the same technology become more intuitive and real-time adaptable, assessing traffic flow and road conditions in order to advise us as to the shortest route, the toll free route, the less obstructed route, or the fastest route. The next development will be the machine's ability to improve upon its own source code; that is, to learn from its own mistakes and become increasingly knowledgeable and efficient. Machines will not only outperform on simple transactions but will be able to learn and do analytical work more quickly. IBM's Watson has already proven this capacity and surpassed our expectations about smart technology, defeating chess Grandmasters and detecting abnormal human tissues far more accurately than any medical specialist's diagnostic ability. Furthermore, it doesn't need to rest or refuel; it eliminates human error due to fatigue and inattention. Plus it can work 24/7.

So AI has gone from potentially replacing not just blue collar workers, but also white collar professionals. It is estimated that 50% of the jobs in the western world will disappear and 70% of those in developing nations. The remaining jobs will be redefined, eliminated and created. Of the hundreds of programs taught in the college system, we need to determine which fit these three categories. Medical Lab Technology, for example, was a very sophisticated and prestigious program when it was transferred to the colleges

for delivery in the 1970s. Today, automation has totally changed this field. Medical Imaging is increasingly the job of computers that decipher digital images like MRIs and CT scans more effectively than humans can. Our task as career education professionals, therefore, will be to assess every program in this way in order to determine what impact smart technology will have on its relevance and applicability. Program Advisory Committees will need to include visionaries who know what the field will need not just today but five and 10 years from now when our students graduate or want to progress in their careers.

Student Services managers have to think a decade out in establishing new systems, given the estimated investments required. What will a student information system look like in 2025? Most Registrars will only have one major chance in their career to reformulate their student information system. What do they need to know about the evolution of systems in order to get it right?

But what can we do to robot-proof our children, our students and staff? Joseph E. Aoun, President of Northeastern University in Boston, believes it is crucial that we understand technology and its capabilities and then understand what makes human beings unique so that we can integrate technology to enhance our uniquely human skills, not to replace them. He also thinks we need to reimagine what postsecondary education is all about. He says that experiential learning is crucial and of course our colleges of applied arts and technology are well positioned to provide just that. Our program delivery includes extensive co-op, fieldwork, internships, and applied learning. What will be crucial is to keep ourselves ahead of the curve by adapting these modes to new applications.

In a recent series of interviews with college presidents regarding on-line learning, I learned that colleges have embraced, in some cases reluctantly, hybrid technology and for most it is now an integrated part of delivery. Most exciting was the reporting of new approaches, gaming, simulation, video development, virtual and augmented reality approaches to creating innovative learning experiences and environments for our college students. →

How can you cope and learn to “dance with the robots”?

1. Know the important functions for which you have responsibility.
2. Understand how technology can enhance your productivity not just in terms of volume but also accuracy and efficiency.
3. Embrace new approaches to the processes you have a responsibility for delivering. But be sure to include all those affected by your new applications so as to address the impacts on the people and other systems in your college.
4. Identify the human needs of staff beyond what technology can address.
5. Assess your own skills regarding these human and technological needs.
6. Establish an ongoing development strategy so that you can continue to learn, grow and adapt in all three of the literacies (technology understanding, Analytics and Humanics).
7. In the new world of smart technology, you will have to learn how to let machines lead in what they do best and how to manage them because they too will make dumb mistakes which need correcting. Their errors can be very large and impactful. Just ask the federal government how they are doing on their payroll systems. Remember: your human judgement is far more powerful than any computer yet devised.
8. Given the potential for massive changes to our educational systems, get ahead of, not behind, these changes. Spend less time resisting and more time learning about how the latest developments apply to your field of study.
9. Hire people with high computer literacy and analytics skills to complement you and your staff.

– Brian Desbiens

THANK YOU

from the Fanshawe College Administrative Staff Association (FASA) to all Fanshawe College administrators for the work they do to benefit the organization.



FANSHAWE

Dr. Aoun has challenged his institution to define what human beings are uniquely good at and provide an education that enhances these qualities. He calls it Humanics. He lists the following qualities: ethical decision making, entrepreneurship, team building, understanding others, cultural sensitivity, creativity, global perspective and emotional responses to others as areas that human beings excel at compared to robots. So if we are going to robot-proof our graduates, he says, we have to emphasize three literacies: understanding of technology and its application to our work; utilizing the data generated by smart computer applications to our lives and work situations; and identifying what we bring that is uniquely human.

In my coaching of presidents and senior executives in colleges, universities and healthcare facilities, I have been asked by leaders how can they cope with the intrusion of technology. Most presidents feel inundated. The devices may make them more accessible, informed, and able to respond, but do they make them more effective, less stressed decision makers? Managing the very devices that manage us is a challenge today. Just because you send off an email does not mean your job is done. Each of us needs to reflect on how technology helps us and how we cannot allow it to control us.

An interesting perspective on the effects of technology is the heightened awareness of the importance of soft skills. Real face-to-face communication where you not just get the content, but can assess the emotional state and nonverbal attitudes of others is a critical competency. Managing people and things has greater importance

today than ever before. Unfortunately, the perspective that you should be able to manage a much broader scope of direct reports because of technology has led to greater stress. Managers who motivate, negotiate, energize, engage and lead their staff are in high demand and their people skills are crucial. Transactional managers will be in less demand and most threatened by smart applications. This is why there has been such an emphasis on engagement whether it be with students or staff. Technology has led to significant alienation and needs to be offset by the relationship skills of leaders. How are you doing on your relationship skills? Has your institution included on your performance review the soft skills or just listed activities accomplished?

I started in the college system as a counsellor faculty member. I ask myself if I were a counsellor today, what would AI mean to me?

First, it has always been the case that college counsellors are career counsellors and have been called on to have knowledge of careers. We have never really had a great handle on the full spectrum of this knowledge base. I would look for the best applications regarding career information available and link students and staff to them.

Second, there has always been more demand than available time to see students and staff with concerns. I would try to establish technology chat systems where content-based information and simple transactional processes can take place on a technology platform 24/7.

Third, I would look at utilizing a full spectrum of approaches. For example,

in my consulting work I have used face-to-face meetings, phone, Skype, and texting. While face-to-face is best, the others can be very helpful, especially in meeting needs of students/staff who are at a distance, have an urgent need, or other accessibility issues. We simply have to improve on accessibility and responsiveness.

Fourth, I would engage with other service providers such as learning strategists, librarians, academic advisors and admissions officers to ensure I have all the up-to-date information on what and how they are meeting student needs so I can identify how I can improve.

As a faculty member, I have to embrace the fact I am no longer a content expert but a facilitator of learning who has a set of experiences that may be of value especially when organized in effective learning experiences. My challenge is not just to have the student learn about what they need to get employed today but also to acquire the skills and attitude that will sustain them throughout their career and lifetime. My best tool will be to model myself as a lifelong learner to them – one who embraces change in this digital age. This is also the challenge that faces all administrators with supervisory responsibilities.

Artificial Intelligence certainly is transforming our world. We owe it to ourselves and our students to learn how to ride the wave, but preferably on the leading edge. Leaders have a particular burden to carry, but these are tremendously exciting times with great opportunities. If done well, our work will not disappear, but will become less tedious and more meaningful. [c|A](#)

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Derek W. Dobson
 CEO and Plan Manager
 CAAT Pension Plan
 Chef de la direction
 et gestionnaire du Régime
 Régime de retraite des CAAT

Learn from plans like ours to make Canada stronger

Apprenez des régimes comme le nôtre pour faire du Canada un pays plus fort

It is difficult to predict accurately what the increased use of artificial intelligence will mean for Canada's economy. Even though we do not know the future, we can prepare for it. Given our long-term focus on sustainability, we need to consider a variety of scenarios and their impact on the Plan.

As such, we regularly test the CAAT Pension Plan against different financial and demographic risks to assess the long-term health of the Plan. In our last study, the Plan had a 98% probability of remaining fully funded 20 years from now.

Despite these strong results showing the CAAT Plan has a very high level of sustainability, some argue that defined benefit plans are overly risky. I disagree. Nevertheless, the ill-informed debate continues and creates unnecessary concern. I know that increasing the general understanding of our pension plan and the advantages it provides to members, taxpayers, and the economy can only help.

Many Plan members left other jobs because they wanted a defined benefit pension.

With this in mind, I want to share some facts that will help you to champion your pension plan:

- Less than six cents worth of government contributions returns a dollar of CAAT Plan pension.
- Your pension plan is an efficient way for the college sector to attract and retain top talent.
- People with adequate and predictable lifetime income in retirement are less likely to rely on government assistance.
- Your pension income provides a stable tax base for the government.
- Pensioners are more likely to purchase goods and services with confidence.

Employees and employers together bear all the risks of the CAAT Plan, including the small risk of underfunding. There is no government backstop. Instead, the governing bodies decide how to respond. For example, they may choose not to grant conditional inflation protection for a time. This serious responsibility results in prudent risk management to ensure current and future members' needs will be met.

Il est difficile de prédire avec précision ce que signifiera l'utilisation accrue de l'intelligence artificielle pour l'économie canadienne. Bien que nous ne savons pas ce que nous réserve l'avenir, nous pouvons tout de même nous y préparer. Compte tenu de notre concentration à long terme sur la durabilité, nous devons considérer divers scénarios ainsi que leur impact sur le Régime.

À ce titre, nous évaluons régulièrement le Régime de retraite des CAAT en fonction de différents risques financiers et démographiques afin d'évaluer sa santé à long terme. Dans notre dernière étude, le Régime avait une probabilité de 98 % de demeurer entièrement capitalisé dans les prochaines 20 années.

Malgré ces solides résultats qui montrent que le Régime des CAAT possède un très haut niveau de viabilité, certains soutiennent que les régimes à prestations déterminées sont trop risqués. Je ne suis pas d'accord. Néanmoins, le débat mal informé se poursuit et suscite des préoccupations inutiles. Je sais que l'amélioration de la compréhension générale de notre régime de retraite et des avantages qu'il offre aux participants, aux contribuables et à l'économie ne peut qu'être utile.

Dans cet esprit, je tiens à partager avec vous quelques faits qui vous aideront à défendre votre régime de retraite :

- Un investissement gouvernemental de moins de six cents rapporte une rente d'un dollar;
- Votre régime de retraite est un moyen efficace pour le secteur collégial d'attirer et de retenir les meilleurs talents;
- Les personnes bénéficiant d'une rente viagère adéquate et prévisible à la retraite sont moins susceptibles de compter sur l'aide financière gouvernementale;
- Votre revenu de retraite contribue à une assiette fiscale stable pour le gouvernement;
- Les retraités sont plus susceptibles d'acheter des biens et des services en toute confiance.

De nombreux participants du Régime ont quitté d'autres emplois parce qu'ils voulaient une pension à prestations déterminées.

On average, for each dollar of pension paid from the CAAT Plan, 75 cents comes from investment returns. The remaining 25 cents comes from shared employee and employer contributions. Less than six cents of every pension dollar paid originates from government funding. That is a great return on investment and speaks to the efficiencies of investment and risk pooling, as well as the Plan's low administration fees.

Ontario colleges are efficient at delivering education, as demonstrated by the fact that they have the lowest funding per student in Canada. However, they may not always be able to compete for employees based on salary. The CAAT Pension Plan serves as a good attraction tool. We have heard from many Plan members who said they left other jobs because they wanted access to a defined benefit pension. Research shows that members of defined benefit plans have less stress than do members of other retirement savings plans. This reduced stress helps college employees focus on delivering quality education. And when they're ready, they can retire with confidence.

Plan members are also taxpayers. Members contribute to their pension from their paycheques, they share the collective investment risk of the fund, and they pay taxes on their retirement income when they start collecting their pension. This predictable lifetime income makes them far less likely to rely on government support programs, such as the federal Guaranteed Income Supplement (GIS). Unlike the CAAT Plan, the GIS is not pre-funded and is fully borne by taxpayers. Provincial income support programs also draw from tax revenues.

62% of Canadians are worried about outliving their retirement savings: RBC survey 2018

In addition, defined benefit retirees spend their pensions on goods and services, buoyed by the certainty of lifetime predictable income. Retirement income adequacy is a key issue for Canadians: 62% are worried about outliving their retirement savings, according to a 2018 survey conducted for RBC Insurance.

Well-governed, sustainable, jointly sponsored pension plans like ours help Canadians retire with confidence and self-sufficiency. In Ontario alone, nearly one million employees participate in jointly sponsored pension plans. Canadian pension plans are recognized worldwide for their design and governance innovations. We should investigate how we can share the efficiencies of jointly sponsored plans with other sectors so even more Canadians can enjoy adequate and predictable pension income and, in so doing, make the country stronger – regardless of how the future unfolds. [C|A](#)

Les employés et les employeurs assument ensemble tous les risques du Régime des CAAT, y compris le faible risque de sous-financement. Il n'y a aucun filet de sécurité gouvernemental. Ce sont les organes décisionnels qui détermineront comment réagir. Par exemple, ils peuvent choisir de ne pas accorder de protection conditionnelle contre l'inflation pendant un certain temps. Cette responsabilité importante entraîne une gestion prudente des risques afin de répondre aux besoins actuels et futurs des participants.

En moyenne, pour chaque dollar de rente versé par le Régime des CAAT, 75 cents proviennent des rendements des placements. Les 25 cents restants proviennent des cotisations partagées des employés et de l'employeur. Moins de six cents de chaque dollar de rente versé proviennent du financement gouvernemental. Il s'agit d'un excellent rendement d'investissement qui témoigne de l'efficacité de la mutualisation des investissements et des risques ainsi que des frais d'administration minimales du Régime.

Les collèges de l'Ontario sont efficaces quant à la prestation de l'éducation, comme en témoigne le fait que leur taux de financement par étudiant est le plus bas au Canada. Cependant, ils ne peuvent pas toujours se démarquer auprès des employés potentiels sur le plan salarial. Le Régime de retraite des CAAT constitue un bon outil d'attraction. Nous avons entendu de nombreux participants du Régime dire qu'ils ont quitté d'autres emplois parce qu'ils voulaient avoir accès à une couverture de retraite à prestations déterminées. Les recherches démontrent que les participants aux régimes à prestations déterminées vivent moins de stress que les participants aux autres types de régimes d'épargne retraite. Cette réduction du stress aide les employés des collèges à se concentrer sur la prestation d'une éducation de qualité; et quand ils sont prêts, ceux-ci peuvent prendre leur retraite en toute confiance.

Les participants au régime sont aussi des contribuables. Ils contribuent au Régime par le moyen de déductions salariales, ils partagent le risque d'investissement collectif du fonds et ils paient des impôts sur leur revenu de retraite lorsqu'ils commencent à percevoir leur rente. Cette rente viagère prévisible les rend beaucoup moins susceptibles de compter sur des programmes de soutien gouvernementaux, tels que le Supplément de revenu garanti (SRG) fédéral. Contrairement au Régime des CAAT, le SRG n'est pas préfinancé et est entièrement à la charge des contribuables. Les programmes provinciaux de soutien du revenu proviennent également des recettes fiscales.

En outre, les retraités bénéficiant d'un régime à prestations définies dépensent leur revenu de retraite en biens et services, soutenus par la certitude d'un revenu prévisible à vie. L'adéquation du revenu de retraite est une question clé chez les Canadiens : selon un sondage mené en 2018 pour RBC Assurances, 62 % des répondants craignent d'épuiser leur épargne retraite.

Des régimes de retraite conjoints, bien gérés et durables, comme le nôtre, aident les Canadiens à prendre leur retraite avec confiance et autonomie. En Ontario seulement, près d'un million d'employés participent à des régimes de retraite conjoints. Les régimes de retraite canadiens sont reconnus mondialement pour leurs innovations en matière de conception et de gouvernance. Nous devrions examiner comment nous pouvons partager l'efficacité des régimes conjoints avec d'autres secteurs afin que davantage de Canadiens puissent bénéficier d'un revenu de retraite adéquat et prévisible et faire du Canada un pays plus fort, peu importe ce que nous réserve l'avenir. [C|A](#)

Georgian's Academic Quality Officer awarded the CMU/OCASA Outstanding Research Award



The winner of the CMU/OCASA Outstanding Research Award for 2018 is Heather Raikou, Academic Quality Officer at Georgian College.

Ms. Raikou's capstone paper *The Co-Curricular Transcript as Evidence in Quality Assurance Assessments* has been presented for her Master of Arts

in Education through Central Michigan University (CMU).

She will receive the award on June 25 at OCASA's professional development conference *Leaders & Innovators*. The conference will take place June 25-26 in King City. The award is sponsored jointly by Central Michigan University and OCASA.

The second nomination for the award included Norma Williams, Educational Intervener at the York Catholic District School Board for her capstone *Youth with Autism Transitioning from High School to Post-Secondary Settings: Perceptions of Parents in Ontario*.

The CMU/OCASA Outstanding Research Award is presented annually to Ontario students in CMU's Master of Arts in Education, with a Community College concentration, for conducting outstanding research related to Community Colleges in Ontario. A CMU committee first selects the nominees with the OCASA review panel selecting the final recipients.

OCASA awards and student bursaries honour excellence and leadership

Each year OCASA recognizes leadership during the *Leaders & Innovators* Conference June 25-26 through several renowned awards. Award nominations will be accepted until **May 12, 2018** for the following:

- **The OCASA Doug Light Lifetime Achievement Award** pays tribute to an administrator who has significantly influenced college education throughout her/his career.
- **The Distinguished Administrators Awards** recognizes OCASA members who have demonstrated distinguished administrative performance through leadership, professionalism and achievements.
- **The Emerging Leader Award** recognizes administrators who are newer to management (approximately five years or less) and who are positively influencing the college through

their leadership. This award is open to OCASA and non-OCASA members.

- **The OCASA Volunteer Recognition Award** recognizes dedicated volunteers who working on OCASA's behalf at their local college, and/or provincially.

In addition, each year OCASA also awards four **STUDENT BURSARIES** valued at \$500 to support members who are enrolled in advanced studies, accreditation or certification. Any member enrolled in a degree, diploma, or certificate program may complete an application for the draw towards any course completed in 2018.

Help to honour excellence with the OCASA awards!

Nominate a leader today using the online Nomination Forms available at www.ocasa.on.ca/about-us/awards/

Members invited to attend OCASA annual meeting

The Annual General Meeting of OCASA will take place June 26 in King City in conjunction with the *Leaders & Innovators* conference. The OCASA Pension Corporation Annual General Meeting will be held at the conclusion of the Board of Directors'

meeting on June 24. Reports from OCASA's appointees to the CAAT Pension Plan will be received at that time.

Full details on the AGM and the conference will be posted on the OCASA website under "Events".

Your professional association, OCASA Membership Matters

Dedicated to **learning and leading together**, OCASA is the professional College Administrators Network is committed to **connecting, supporting and advancing management and leadership in Ontario Colleges** through a variety of services including:

- Professional and leadership development and support
- Mentoring and shared practices
- Access to a highly engaged community and valuable network of passionate, innovative and committed college leaders, both at your college and from across the system
- Legal coaching and consultation
- Representation through consultation with key stakeholders



OCASA initiatives include:

The *Leaders & Innovators* professional development conference; free members only webinars; an online certification program; online resources for members only; a mentoring program; awards and recognition; legal consultation; leadership and networking opportunities; and more!













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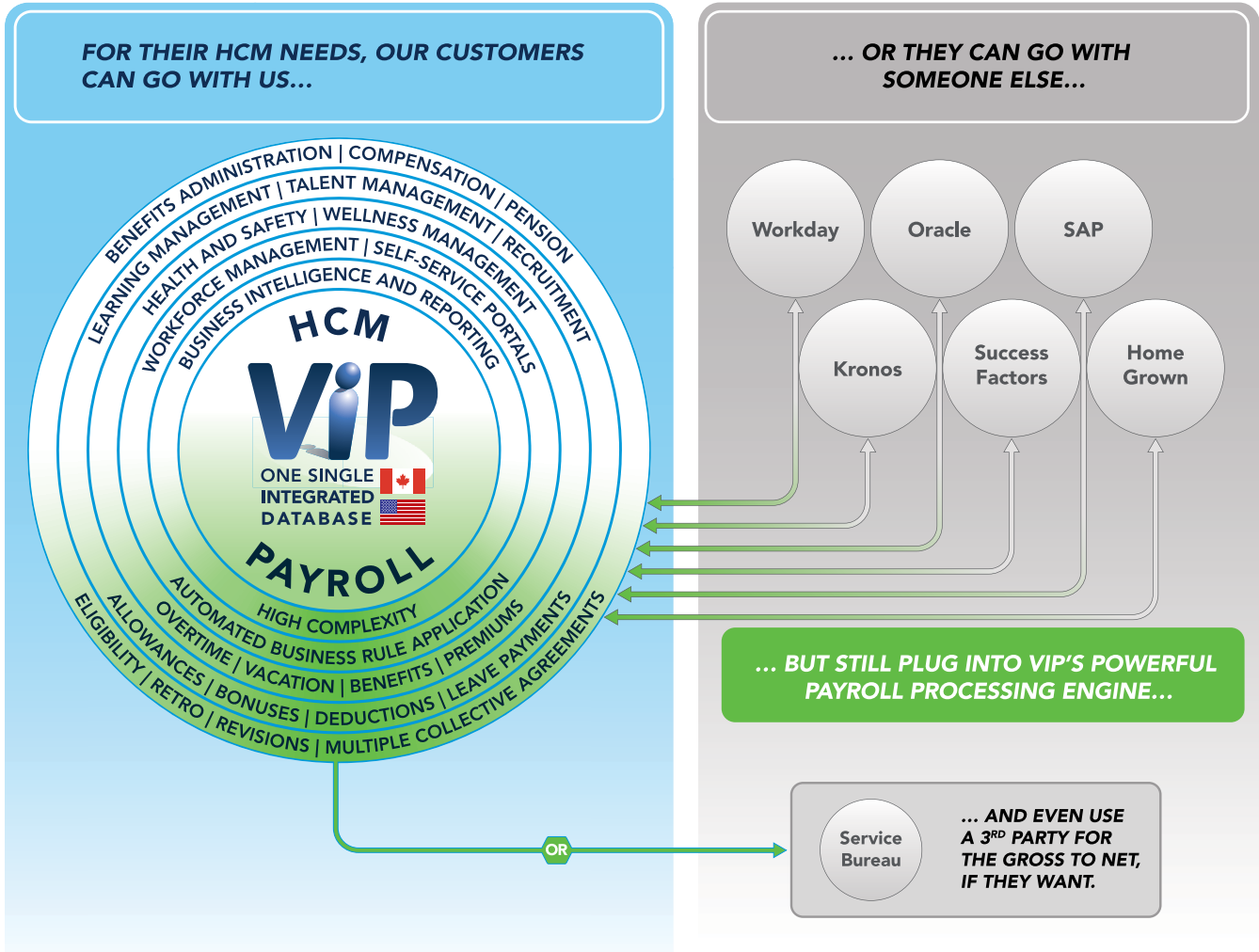
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