

Past, Present and Tackling the Future of Artificial Intelligence (AI) in Education: Maintaining Agency and Establishing AI Laws

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Abstract

The urgency to establish laws for using generative artificial intelligence (GAI) is upon our society. At the end of the year, 2022 OpenAI made available to an international public its ground-breaking software, ChatGPT which is utilized by 1.8 billion users per month. Never before has a technology application been so successful so quickly. In this paper, the author outlines a history of artificial intelligence (AI), discusses ways in which generative artificial intelligence (GAI) technologies are used today, and delineates the future use of GAIs in education for all areas of study. A focus is on analyzing the advantages and disadvantages of GAIs with particular attention to the consideration of human agency versus machine agency. The author examines ways to avoid problems using GAIs currently. Also considered are ways in which human beings can use GAIs in the future while maintaining their own power, autonomy and control. To support this, Marshall McLuhan's laws for the electronic media are revised as "Laws of Generative Artificial Intelligence" to aid educators from kindergarten to higher education for teaching in the "GAI Era".

Keywords

Education, Artificial Intelligence, AI, Generative Artificial Intelligence, GAI, Educational Technology, Educational Media, Media Literacy, Critical Literacy, Information Literacy

1. Introduction

On November 22, 2023, Open AI launched ChatGPT to overwhelming success and usage (Dyer, 2023). By the end of February 2023, three months after it was

launched, ChatGPT had 158 million users and is now being used by 1.8 billion people per month (Dyer, 2023). It is generally acknowledged to be the fastest-growing digital software application to date (Gordon, 2023). The questions, that the famous French painter, Paul Gauguin raised, I feel impelled to ask about GAI. These queries are embedded in the title of one of his renowned artworks entitled, *Where Do We Come From? What Are We? Where Are We Going?* In order to answer this answer, as a society we need to firstly look at placing generative artificial intelligence (GAI) in a brief historical context. Secondly, education and AI will be contextualized within the current environment we are grappling with today. Following this, in this paper, the pros and cons of AI for teaching and learning will be addressed. Fourthly, I will discuss how AI can be used in education effectively particularly looking at human agency in relation to machine agency. Finally, I will conclude about where we are headed in the future using this technology and the need to establish “Laws of Generative Artificial Intelligence” to aid educators in all subject areas from kindergarten to grade 12 and in higher education regarding their decisions for teaching and learning.¹

2. A Brief Historical Context

To begin with, I ask: Where did we come from? To do this I will talk about past technologies that have created great changes and revolutions. I turn to the development of the technology, the “*Guttenberg press*” in approximately 1440 AD. Before this press was developed, scribes, usually living in monasteries were employed to write and illuminate books by hand, which was painstaking, time-consuming, and offered people a limited product. As a result of the Guttenberg press, large numbers of books could be reproduced inexpensively. Consequently, knowledge quickly dispersed throughout Renaissance Europe, and ideas proliferated and spread broadly to all populations at great distances apart. Moreover, languages were standardized, and literacy greatly improved. The Guttenberg press has been considered one of the most seminal technological inventions humans have produced. An impactful fallout discussed was the loss of jobs to scribes (Ghaffer, n.d.; McDaniel, 2015).

Secondly, I move to the next great technological change that occurred during the 19th Century called “*The Industrial Revolution*” which altered rural farming industries reliant on handmade production to urban economies dependent on machines and industries. Large population shifts resulted from people moving from farmlands into cities that housed factories which produced goods for the masses. The benefits of the Industrial Revolution were manifold from increased production of goods to lowered prices for consumers who could acquire more items from clothes and furniture to watches and cookware. Some of the fallouts were pollution, exploitation of workers, shortened life expectancies of employees, and reduced quality of life for those working in the industries (Dolfma,

¹Note that this paper is a revised version of a distinguished lecture I had given June 23rd, 2023, on “*Leveraging Artificial Intelligence to Enhance Learning*” at the 23rd educational leadership forum for the global citizenship foundation.

2022).

The third great era of change is known as the “*Digital Revolution*”. Many of us including myself lived through this era for the past 40 years. We saw great alterations, seeing the move from analogue technology usage to digital technology practices. Even though the concept of the computer was developed in 1822—two centuries ago by Charles Babbage—it was not until the 1930s that the German inventor, Konrad Zuse developed the first electronic-mechanical binary computer considered to be the first functional computer (Swaine, Hemmendinger, & Freiberger, 2023). Following that time period, computers were refined. I personally remember the experience of working on a computer punch card system in which my cards had to be physically sent to the central IBM office tower in downtown London, England in the 1970s for data processing. By the 1980s, the advent of purchasing home computers “en masse” by laypeople enabled the public to store information in binary code. People were communicating and creating, consuming and prosuming using their home computers for work and pleasure. Later in the 1990s, the Internet was established along with smart devices, mobile phones and the development of social media which has had a large impact even to today with positive benefits including access to large amounts of information, new industries, improved convenience for people, and communication on a large scale. Some of the fallouts—as there are always ones in relation to technologies—are that we are susceptible to computer attacks, there is a well-documented mental health decline in our civilization, and the disintegration of a robust sense of societal and world cohesion. Indeed we see the impacts of that today (Carnegie Mellon University, 2023; Dolfmsa, 2022; Swaine, Hemmendinger, & Freiberger, 2023).

Moving towards the fourth technological movement is what is now acclaimed to be the one called “*Generative Artificial Intelligence*”. Artificial intelligence, sometimes called machine intelligence, is defined by Poole, Mackworth, & Goebel (1998) as any digital machine that mimics humankind’s intelligence capabilities purpose. In short, it is adept at performing what normally entails certain aspects of human intelligence. Many people are surprised by what AI can do today. However, it is important to keep in mind that AI development began years ago.

Close to a century ago, the famous Englishman, Alan Turing, pioneered the Universal Turing Machine in 1935: it was capable of reading symbols, scanning information, storing data, and producing new symbols. In summary, it could follow commands. According to Copeland (2023), Turing perceived computers learning from experience while having the ability to tackle new problems. He envisioned utilizing the use of guiding principles and an heuristic approach to do this (Copeland, 2023). Since Turing’s work, international researchers have been developing AI creating ongoing advancements in the last seventy years². Turning to our current age of what is termed “Big Data” where we have immense computing AI capacities, according to Anyoha at Harvard University, humans can col-

²Refer to the work of Copeland (2023) to acquire a more detailed description of the historical development of artificial intelligence.

lect through AI usage seemingly limitless amounts of information. Anyoha writes:

We now live in an age of “big data”, an age in which we have the capacity to collect huge sums of information too cumbersome for a person to process. The application of artificial intelligence in this regard has already been quite fruitful in several industries such as technology, **banking**, **marketing**, and **entertainment**. We’ve seen that even if algorithms don’t improve much, big data and massive computing simply allow artificial intelligence to learn through brute force. (2017, para. 9)

Indeed, key features of our society in the era of artificial intelligence are profound and have altered in all fields of human endeavour from medicine and technology to business. AI has an immense and inordinate impact on our lives today ranging from now accepted and relied upon voice-activated assistants, like Alexa, Siri, and Google Maps. It is now ubiquitous as we, for example, turn to such AI software as grammar correction. Grammarly is an example of this type of application. Google is also something that is a part of our lives today wherein AI documents computer searches to earmark potential buyers through algorithms and we receive advertising catering to our interests and past purchases (O’Neil, 2017).

Currently, some speculate that we are on the threshold of a fourth revolution: what some call WEB 3.0 (Bozkurt, 2023) and others name “*Generative Artificial Intelligence*” (GAI) as described by Mondal, Das and Vrana (2023). It uses machine learning and deep learning to produce datasets that generate models to produce a variety of texts. With deep learning the human brain’s neural networks are simulated to discern data patterns and rules. New data is generated that conforms to the data that was mined (Yu & Guo, 2023).

Writing from the perspective they are coming from which is business and communications, the authors Mondal, Das and Vrana (2023) state:

Generative Artificial Intelligence (GAI) has brought revolutionary changes to the world, enabling businesses to create new experiences by combining virtual and physical worlds. As the use of GAI grows along with the Metaverse, it is explored by academics, researchers, and industry communities for its endless possibilities. (2023, para. 1)

Generative artificial intelligence (GAI) such as the now renowned ChatGPT, which is OpenAI’s chatbot is like other GAIs: extremely versatile and has reinforcement learning techniques. It offers what in the past was undertaken by humans such as conversational capabilities, and text content production including written text, sound, videos, imagery, code, and multimedia. Generative AI software applications amass large amounts of data while absorbing structures and arrangements of this training data input, producing information with parallel

representations. Even though GAI's have been in our society for a while (including the Transformer in 2017, DALL-E in 2021), it was not until ChatGPT, created by Open-AI was launched to the international public at the end of 2022, that GAI's produced a public awareness on a mass scale (Dyer, 2023) and has been embraced and used by the public on an immense level never before seen so quickly and so widely used (Gordon, 2023). Over the last 7 months, people began to envision the tremendous possibilities that GAI software has in all fields from Economics, Science, and the Arts to Education. Anyone who had easy access to the Internet can use these programs, and some at the present time are free or remain free to this date.

By using GAI's we are training them. According to Bozkurt, 2023:

Generative AI technologies do not learn per se, but rather undergo training. The offerings they present are ultimately a product of the content we provide, which feeds their algorithms. Consequently, this viewpoint emphasizes the importance of big data, as it functions as a rapid data repository, metaphorical a data farm, from which generative AI can extract and harvest information, contextualize it into knowledge, and ultimately attain a so-called algorithmic wisdom. This positions big data and online networks as extensions of generative AI's neurons, eventually transforming the web into a global brain. (2023, p. 200)

Since ChatGPT's launch, we have seen competition emerge—it appears it is an aggressive race—similar to when the Internet was unleashed in the 1990s in which I experienced viewing the launch of a multitude of search engines competing, such as Yahoo and Google—of course, Google won (Auletta, 2010). At the present time, Bard by Google, Microsoft's BING and others have emerged on the scene competing with ChatGPT while further iterations of software released are seeming to occur at an endless rate. Note that even though many were launched with no costs attached, AI companies are beginning to charge customers now. We are hearing how AI is making advances and allowing people to undertake tasks with ease throughout the world. Artificial intelligence is used in all fields, from medicine in which doctors use AI to aid in medical diagnosis and find new antibiotics, to assisting in job applications in all fields, and to gathering data on individuals by large corporations (West & Allen, 2018). I will now narrow in to discuss the field of AI and Education.

3. Discussion of Education and Artificial Intelligence

Like Gauguin, I ask, What Are We? In other words, "What is happening in Education today in relation to Artificial Intelligence Usage?" I believe that AI is making a fundamental and profound impact on education. As learners and educators, some people have embraced digital programs using what Leonard (2018, 2020) terms, "*entities with agency*". He explains that through coding algorithms,

there are great limits and constraints embedded in the applications thereby enabling AI to have agency affecting student learning and their production (2020). Since AI can imitate many human operations, executing tasks that previously could only be undertaken by people, AI usage relating to teaching and learning are manifold from data compilation, and marking, to producing texts both written and multimodal.

I have found that in the middle years to grade 12 schools and within higher education chatbots like ChatGPT are being used a lot within the last seven months for a multitude of reasons in a variety of ways inside and outside of schools. At all levels, I perceive students are using AI to help with their writing in subjects across all curricula from History to English Literature and Science for such texts as essays, reports, reviews and creative writing. For all disciplines, other AI applications like TOME can produce presentations similar to PowerPoint. In the arts, learners utilize AI software like DALL-E or NightCafe.Studio to create artworks whether they be digital paintings, sketches, or photographs. Other AI applications like Adobe Character Animator enable animations and such video AI apps like the Runway App are used to make moving imagery in record time. Let us turn to music education where music AI software like Amadeus Code enables people to quickly write songs. Another such App, BOOMY allows pupils to breezily create musical lyrics. Editable Dance Generation (EDGE created by Stanford University) and Choreomaker are now being used to choreograph dance. Other examples in other disciplines include the AI App called LeapMATH assists students to learn math, it claims, easily and with enjoyment. Mondly is an example of an AI chatbot that supports the development of student learners in 33 languages. At the higher education level students are using all of the above and more. Additionally, AI programs such as Elicit can help undergraduate and graduate students as well as instructors and professors produce research questions and literature reviews.

Like the students they teach, educators are using AI applications, and I have found that some are embracing them. Similar to youths at the middle and secondary level, teachers are employing AI Apps and software to do tasks from writing written texts and making artwork to producing PowerPoint-like slideshows. Additionally, educators can use AI software like ChatGPT to write curricula. Cameron (2019) outlines how in Singapore teachers are utilizing robots in schools to do such tasks as reading stories to children. Also, he depicts China's usage of AI in terms of facial recognition to monitor learners' expressions and levels of engagement in classrooms. Moreover, described is the situation recently of 60,000 Chinese schools using AI for grading (pp. 18-19). Indeed, some researchers look at using AI favourably as is illustrated by the research work of Ndukwe, Daniel and Amadi, written as early as 2019, who explain in their paper that learners need well-timed, suitable, and correct feedback that is so important to their own educational development. This contrasts with typical grading, especially essay assessments for heavily populated classes. Utilizing a grading system

that is automatic they employed a chatbot to provide questions that demanded written student answers. They found that there was an “inter-rater agreement level” (2019) between human educators and the AI grading systems employed. As a result, the authors argue for the use of chatbots in schools noting that they found that employing AI for assessment shows timely feedback and more student engagement. Indeed, educators are using AI right now to grade internationally (Eaton, 2023).

In summary, AI is being employed in classrooms today for all aspects of teaching and learning by educators and their students. Learners today are born into the world of technology wherein their future is now connected to AI usage (Popenici & Kerr, 2017). As discussed, students and educators are readily adapting to novel AI applications within K-12 and higher education (Chen, Xie, Zou, & Hwang, 2020; Viljoen, 2023). I will next turn to look at the advantages of AI.

4. Pros of Artificial Intelligence

AI is extremely valuable for a number of reasons in teaching and learning that enable both students and educators important and numerous opportunities.

4.1. Twelve Reasons that AI Is Beneficial in Schools

Firstly, AI collects vast amounts of data, in fact, we have never had the capacity to handle information of this magnitude in the past (MOMA, 2023; OECD, 2016; Olson, 2023; Viljoen, 2023). The second benefit is that AI can aid, and augment humans’ thought through mining this data (Anyoha, 2017). The third advantage is that AI provides at the present time, completed and increasingly sophisticated texts for students and teachers to use. Content creation is useful: GAI can construct and convert written, image-based, music, and multimodal texts (OECD, 2016). Fourthly, AI software applications can suggest ways to approach problems, provide understanding, and answers to complex issues through texts, undertake editing of works, and chat with its users providing ideas (Eaton, 2023). Segueing on this, another benefit is that it can edit texts already written (Eaton, 2023). Sixthly, AI, according to Eaton (2023) enables students to critique written texts produced by AI, work with them, and build from them. The seventh benefit is that it can boost and enrich educational institutions’ capabilities to adjust to altering situations, and thus avoid limitations to a prescribed set of approaches for content delivery, and evaluation (Kong, 2020; OECD, 2016). Additionally, AI can facilitate personalized learning in terms of educational, community and individual needs (Chen, Xie, Zou, & Hwang, 2020; Kong, 2020). A ninth benefit is that AI can enable immersive, interactive, adaptive learning experiences through recording, such as AI apps in language acquisition (Leonard, 2021). Added to this are the multimodal experiences that promote skill and knowledge development nurturing learners’ engagement through diverse, simulated and interactive experiences (Baidoo-Anu & Ansah, 2023; Kong, 2020; Leonard, 2020, 2021;

MacGregor, 2023). A further advantage of AI, although problematic, is that it enables educators to save tremendous time and great effort by using it to write tests, screen shows, and curriculum, among other handy texts. AI is useful in this way to produce, to teach with, and to evaluate learners' assignments as has already been discussed (Barre, Mills, & Weber, 2023). The 11th advantage is that AI enables students' and schools' competitiveness internationally and prepares youth for the workforce where they are being used (OECD, 2016). Finally, the twelfth benefit and the one I want to discuss in more detail, is that AI enables users the ability to play with AI software, circumvent AI, and use it in creative ways that have not been perceived by its software designers. This is very evident in the creation of some AI artworks today by professional artists (Clark, 2022; Kong, 2020; MOMA, 2023). As we all know artists can be subversive. They have always used the newest technologies in creative ways as is evidenced by Leonardo da Vinci (1452-1519), approximately, 500 years ago, to today illustrated by such visual artists as Kate Crawford (MOMA, 2023).

It benefits educators and learners to examine the approaches that professional artists are taking to use AI in playful, imaginative ways. By taking this path, as Olson (2023) and Song and Koo (2023) discuss, teachers can promote creativity. What they are talking about is the "co-construction" of art production by working as a partner with AI. The idea here of co-construction of art is key. It is not approaching AI in a typical way, and by this, I refer to the use of such AI software like DALLE-E2 or Dream.Studio in which the user asks AI to produce a work and AI spews out the artwork on demand. What I am talking about is the artists working in conjunction with AI with both artist and AI having agency. Moreover, other artists/educators are using AI for the public good. Turning to two examples of professional artists and educators' works will illustrate the above points (Clark, 2022).

4.2. Visual Art

The first example is in visual art, and I direct attention to what occurred recently at MOMA (2023) which is the Museum of Modern Art in New York City. A recent video was made that illustrates what I am discussing. It was posted on YouTube in April of this year entitled, "*AI Art: How Artists are Using and Confronting Machine Learning.*" Artists such as Refik Anadol, and Trevor Paglen are highlighted. They are experimenting with AI as a tool to reveal what is sophisticated yet prejudiced, political, and cultural. For example, Paglen focuses on the theme of AI surveillance using algorithms to mine data. In his work he critiques AI looking at the oversimplification of data processes while exploring ethical concerns and biases. Through his artworks, Paglen scrutinizes and displays algorithmic subjectivities and biases in AI and by doing this, reveals the impact of AI data on our lives. In her seminal book, O'Neil (2017) and also Leonard (2018: p. 67) advise that individuals do indeed need to take back agency by comprehending the ways in which AI algorithms work and interact thoughtfully

in terms of developing a critical view and practical usage between the power dynamics of AI and the user. Writing about this same concept, Leonard in 2018 writes:

It then becomes the job of the individual using digital tools to critically review the digital environments to assess if the environment is serving the user, or if the user is serving the environment. If the users of digital tools want to support their creative behaviors, then the ability to critically question digital environments for creative agency must take place to preserve the user's creative agency. (p. 57) These artists are examples of people who maintain their own agency while illustrating to the public viewers AI processes and controls.

4.3. Dance

The second example is one that involves dance. Colin Clark from the Ontario College of Art and Design University (OCADU) in Toronto, Canada recently worked with other educators and artists conducting a series of workshops for the organization, The Pan Canadian Dance and Disability Digital Project (which uses the acronym DDD Project). Colin Clark himself is an artist and an educator. Working with AI software, he aids people with disabilities in movement, helping them to learn dance looking at inclusive design and art practice. The fundamental goals include building digital capacity, fostering human-focused design practices, and developing new projects.

Clark states, using his own perspective that:

I bring together two sides of my work in life which are looking at how to design emerging technologies and computer systems to be more inclusive of the full range of human diversity. Of course, as a practicing artist, I am always curious about how these technologies, these tools, and this software that I write and make, can be used for unexpected and creative ways in terms of art. I bring together this practice of inclusion with my own work making music and improvising... I am excited to see what happens ... in terms of spontaneous improvisation and creating a system that is both social and has technological aspects as well. (2022)

In short, Clark is dedicating himself to improving the lives of his students with disabilities using AI in Dance Education.

I hope the above two examples discussed by educators/artists illustrate important ways to use AI wherein the user creates and/or co-creates with AI, using these technologies to explore, advance ideas, benefit individuals including ones with disabilities and produce innovative artworks. In summary, this is an exciting era in which AI offers opportunities, and advances that can benefit schools, students, and teachers at large within education.

5. Cons of Artificial Intelligence

At this point, I will address what is happening with artificial intelligence that is impacting humans in negative ways. Recently, widespread, extensive discussions have been in the news about AI media coverage including the talk of an open letter which was written in March 2023, three months ago. Some, like Yann LeCun (who was awarded the 2018 Turing Award for his research on deep learning) express that concerns are overblown (Kleinman, 2023). However, given that this letter was signed by close to 1200 people consisting of scientists, academics, corporate executives, and experts knowledgeable in AI technology, I believe this is of grave concern (Loizos, 2023). The United Nations Secretary-General, *António* Guterres last week declared that there is a need for an establishment of a global watchdog for AI that could play a role similar to how the International Agency of Atomic Energy regulates nuclear technology. He proclaimed, “*The scientist and experts have called on the world to act, declaring AI an existential threat to humanity*” (Democracy Now, June 15, 2023).

People called to place a moratorium for 6 months on AI in order to stop further generative AI developments for this time period to implement societal regulations and develop governmental policies pertaining to its usage at large. It is important to know that these individuals who signed this letter have been key in the development of technologies and are asking for a hiatus on Generative AI including Yoshua Bengio, an AI pioneer (who shared the 2018 Turing award with Hinton and LeCun); Elon Musk, owner of OpenAI who financed ChatGPT; Steve Wozniak, co-founder of Apple; and engineers at Amazon, Microsoft, and Meta (the umbrella company for such Apps as Facebook and Instagram). Additionally, Geoffrey Hinton, who shared the 2018 Turing Award with LeCun and who has been recently called by journalists the “godfather of artificial intelligence” also signed the letter. It is interesting to note that Hinton recently resigned from Google warning in a BBC newscast that AI chatbots are what he termed, “scary” (Kleinman & Vallance, 2023). In the future, and this could be sooner than we think, Hinton warns, GAI could progress to a much more sophisticated level (Kleinman, 2023; Kleinman & Vallance, 2023).

At the present time, Generative AI lacks in significant areas. There are many more; however, I will address what I believe are of grave concern. Firstly, it cannot create new theories, but only mine data right now (Anyoha, 2017). Additionally, GAI texts often have biased and discriminatory content as it is created by software designers, engineers and others whose prejudices are apparent in AI texts. Data collected is also negatively influenced by cyber trolls (Chomsky, 2023). The result is toxic content that is misogynistic/sexist, ageist, and racist and if left unchecked can influence undiscerning readers who may promote further discrimination (Chomsky, 2023). Other concerns are unchecked data collection and text production by generative AI that does not distinguish the real from the fake: fake news including disinformation and misinformation abounds in GAI texts (Black & Fullerton, 2020). Added to these problems, the famous

linguist and academic, Noam Chomsky (2023) points out GAI's inability at the present time to prescribe and predict, to discern what is, what could be, and what is impossible to come into being. As well, GAIs do not have the ability to create moral thinking—this has become apparent. For instance, drawing upon Chomsky (2023) again in a recent article, he revealed his conversation with ChatGPT. He asked a direct question about its morals and its personal stance on an issue to which the ChatGPT response was that it was unable to have moral beliefs, nor from these, make judgements about good and evil. Chomsky concludes that “the most popular and fashionable strain of A.I.—machine learning—will degrade our science and debase our ethics by incorporating into our technology a fundamentally flawed conception of language and knowledge” (2023: p. 1). Data privacy concerns is also an issue along with data security issues (Baidoo-Anu & Ansah, 2023; Democracy Now, 2023; Li et al., 2020; O’Neil, 2017; Verma, Yusri, Dolowitz, Bulchand, & Png, 2023). Li et al. (2020) found that AI data could be vulnerable to expert hackers: indeed, at the present time there is no guarantee of data safety using AI. Another concern and worry is student rampant plagiarism using GAI where learners can use chatbots to generate essays, reviews, slide shows, video reports and multimodal texts without any thinking, synthesis or communicating involved (Verma, Yusri, Dolowitz, Bulchand, & Png, 2023). A further concern is that without educators’ oversight working with GAIs, many mistakes can occur (Verma, Yusri, Dolowitz, Bulchand, & Png, 2023). Baidoo-Anu, & Ansah (2023: p. 14) point out that GAI can misinform by writing incorrect answers to questions, and providing fabricated references to texts that are nonexistent. Additionally, to date, at the present time, ChatGPT and other chatbots were trained on information up to 2021 and thus are only aware of data to 2021 or before this time. Information from 2022 or 2023 is nonexistent (Baidoo-Anu & Ansah, 2023: pp. 14-15). Another issue pertains to the future. If a political or corporate force has free reign on GAIs these could be used in a destructive, controlling manner. I can envision that GAIs could be used to control students using these technologies as China is now doing to monitor student facial expressions during classes. This could in the future be used in detrimental, anti-democratic ways to suppress, repress, and control humans given certain political regimes. The final problem I want to outline is that GAIs companies, I have found, are already charging customers for their more sophisticated technologies. Thus a digital divide can occur between those who can afford better GAIs and those who cannot which can create lasting impacts for the socioeconomically challenged.

Given these problems, it is important to ask, “What do we do in education?” Is banning Generative AI a solution? Three months ago in the University of World News (Wood, 2023), it was disclosed that Oxford and Cambridge Universities in England have banned ChatGPT and The Paris Institute of Political Studies has done the same (MacGregor, 2023). Given what I have observed in Canada where I am located, I have found that students currently are using ge-

nerative AI from middle schools to higher education, and I surmise it would be extremely difficult to ban unless we ban all cell phones which is, incidentally what France has done in 2018, within kindergarten to the 9th grade (Ledsom, 2019). However, like many countries, I do not foresee a ban happening in my country on phones nor computers in the foreseeable future. Others on an international level concur (Verma, Yusri, Dolowitz, Bulchand, & Png, 2023). People state GAI's are here to stay, and we have to work with them (Verma, Yusri, Dolowitz, Bulchand, & Png, 2023). So how do we approach students using GAI's in schools?

6. AI in Education

How can we use AI in education effectively? To be clear and upfront, I am not advising a total ban on artificial intelligence usage in schools. Taking the pros and cons of AI into account, I recommend that we use generative AI in classrooms only when we—as educators—think students could benefit, selecting GAI's carefully, and using them to promote knowledge and skill development in our classrooms today. What I am advocating for is that educators include GAI's by using them some of the time—not all of the time—in a knowledgeable, up-to-date, very discerning manner, by being aware of the risks, teaching learners what the shortcomings are, being cognizant of its benefits to student learning and making sure that pupils do not lose valuable skills as a result of relying on this newly emergent technology.

A key question I advise us to ask is, “How can educators, administrators, students and institutions mitigate the hazards, dangers and challenges presented by using GAI in education?” In order to lessen the problems using GAI's, firstly I would like to turn to effective media education literature which has been developing for decades on an international scale and has been extraordinarily impactful. I suggest that we could greatly benefit from teaching those in education to further student development regarding digital learning and by doing so become more critically literate, “Dr. Sasha Luccioni, a research scientist at the AI firm Hugging Face, argued that society should focus on issues like AI bias, predictive policing, and the spread of misinformation by chatbots which she said were ‘very concrete harms’ (Kleinman, 2023)”.

How Do We Avoid These Problems?

What strategies can we use in this era of GAI's? 1. Since students are using GAI's right now, their educators can teach the pros and cons outlined in this text regarding their exciting capabilities and limits. First and foremost, I propose that in education we need to be open about this with learners. Facilitate students' broader implications of AI usage. Ask students to critically evaluate GAI's. Assign critiques of AI texts and ask students to improve them. Teach learners to use them smartly.

To avoid AI difficulties I advocate that we teach our students proper research

methods at all levels. Research is complex and it would be easy to do but disastrous for students to completely rely on GAI to generate all texts. Impart the importance to learners of developing their own skills comprised of gathering data, problem-solving, synthesizing and constructing thoughts in an informed, coherent and analytical manner, and then communicating these through texts they write themselves without help from technologies. By following this process they become independent writers and independent thinkers. This is of the utmost importance (Black & Fullerton, 2020). Teach our teachers as well so that they have the ability to develop skills, to acquire knowledge about pedagogy, teach these skills, and to design strong curricula. To do this, proper training in all aspects of artificial intelligence is needed at the teacher education level at faculties of education (Black & Fullerton, 2020).

An area of increasing concern for people is they have been alarmed by the proliferation of fake news. I believe it is imperative that teachers and learners develop the ability to acquire data themselves without bias in order to discern escalating censorship and fake news within K-12 schools and higher education (Black & Fullerton, 2020; Journell, 2019). I argue that all learners and educators should discern how to detect fake news comprised of 1) *misinformation* which is the unintended dissemination of erroneous information; 2) *disinformation* which is untrue information intentionally portrayed as accurate and correct; and 3) *weaponization*, which is damaging genuine, lawful and well researched content through suggesting that it is questionable and therefore trying to discredit experts (Black & Fullerton, 2020). The 4th way is to *undercut* well-researched, soundly-written information through personal, unsupported and baseless attacks (Black & Fullerton, 2020; Journell, 2019). The final way is the proliferation of *deep fakes* which enables AI software users to create photographs or videos of people that are false and enable, in the case of the moving image, individuals to state ideas that appear to be real. In our present culture, deep fakes abound and are used for a variety of reasons. For example, they are employed in entertainment making actors appear ageless. Such was the case in 2016 of Carrie Fisher starring as the young 19-year-old Princess Leia in the film, *Star Wars, Rogue One* when she was in real life at that time 60 years old (Black & Fullerton, 2020). Another popular use of deep fakes is to discredit and undermine politicians such as the former President of Germany, Angela Merkel and the American President, Joe Biden. People need to fact-check when reading imagery. It can also be used for nefarious purposes to trick people such as the distraught mother who watched her daughter screaming out that she was hurt: the purpose was to acquire ransom money (Democracy Now, June 15, 2023). To combat fake news, I strongly advocate the crucial need for critical literacy needs to be consistently taught by educators today. Promote critical thinking by asking learners to undertake such activities as checking authors' credentials. Teach them to examine writers' profiles and bios and compare and contrast ideas between authors. Search what criticism is posted by others. Assist in having learners formulate

ideas about who these authors are and what perspectives they hold. Teach to discern whether the author is real or a troll or bot. There are many effective media literacy techniques teachers can employ (Black & Fullerton, 2020; Journell, 2019).

A further problem and again a cause for worry when researching information is that of internet censorship of which learners need to be aware. When people click on Internet sites they are often providing data to corporations using AI to collect private and professional information click by click (Auletta, 2010). This data is used to shape learners' future Google searches so that users' own preferences are provided at the top of the information searches. The result is a Google Bubble a term created by Eli Parier in 2014 which perpetrates knowledge isolation creating myopic perspectives if users are unaware (Black & Fullerton, 2020). Internet censorship also includes examples like what occurred in the China.cn search engine which made information unattainable to Chinese citizens regarding political dissension towards those in power in that country (Auletta, 2010: pp. 134-135; Black & Fullerton, 2020). A further example is recent American Internet users' restrictions making it difficult to access leftist political sites by 55% (Damon, 2017). In education, ways to combat censorship are many: when collecting information teach students to learn about diverse perspectives. As well, learners can use other search engines than Google such as DuckDuckGo, that guards against privacy mining, avoids Internet microtargeting, does not provide individualized search results, and thus protects against filter bubbles (Templeton, 2019).

An area of advice I would offer is for educators to not allow their students to consistently rely on GAI to generate texts. Rather, teach students so that they know how to formulate their own work whether they be written, visual, audio or multimodal. Additionally, to avoid problems I foresee, I strongly advocate that we do not, "throw the baby out with the bathwater" as an old saying goes. I have always believed in this truism in regard to technology. That means keeping what is tried and true. Keep what works. To this end, I suggest an emphasis on project learning, experiential learning and inquiry models harkening back to John Dewey (1966, 1997). This enables learners to become involved in work from inception to completion that teachers can mark at all stages of the learning processes. Importantly through doing this, teachers can oversee learning from its beginning to its end.

As well, I would also like to point out that GAI can easily aid in student plagiarism but unfortunately, even though there are programs developed to catch these such as GPT Radar and CopyLeaks (according to Barre, Mills, & Weber, 2023) it is still difficult to discern as these GAI programs are imperfect and unreliable (Baidoo-Anu & Ansah, 2023). This is a grave problem. I foresee student plagiarism could be rampant in the future with students using GAI to generate work including essays, artworks, reviews, and more. Consequently, teachers could emphasize process and in-class work to prevent abuse of AI usage. During class time—this allows instructors to completely oversee students' practices and

the development of learners' work in class. When teachers feel the need, there is nothing wrong with them relying on hand-written in-class tests and hand-written in-class projects. It worked in the past; it can work in the present. These processes are invaluable, and I believe we do not want to lose them. To use an old adage, "If we do not use it we lose it." If we lose this, I could see a dumbing down of skills and knowledge in future generations. The importance of students developing their own abilities to problem solve, examine concepts, create texts, and communicate these to others will maintain student autonomy in a do-it-yourself manner that fosters thinking and critical skills and creativity that are so crucial to students for their own cognitive development.

To avoid problems, I want to advise teachers to get to know GAI applications. Educators should work with GAIs and if they find that there are some which are beneficial for teaching and learning utilize these technologies. Also to circumvent difficulties, as a teacher, it is important to be open: openness is the operative word. As with all technology usage transparency is key. What I mean by this is to keep the discourse between educators and learners open so that one knows how students are using the technologies, and be open to learners sharing their usage with you as an educator and others in the class. Additionally, be open to learning about technology AI usage from your students.

Lastly, I strongly believe that technology should work for us and not that we are subsumed by and work for technology. Employing artificial intelligence without criticality may damage the learning skills of students if people do not use AI with discernment, caution, and thoughtfulness. In looking at using artificial intelligence in education effectively I turn to the famous media theorist, Marshall McLuhan to guide us. McLuhan advised that we should be aware of the effects of media upon us and control it: awareness is indeed key. Grappling with the attraction and effects of electronic media, Marshall McLuhan, the famous Canadian media expert, created four laws of the media to prevent what he termed getting sucked into the maelstrom. What he meant by this was that in using current technologies we can often, to use his metaphor, get pulled down under into the vortex of the media water torrent (Sobelman, Donaldson, McMahan, & McLaughlin, 2002). As educators, we want to control the technologies and use them in beneficial ways in teaching and learning. This also relates to generative artificial intelligence technologies.

7. Laws of Artificial Intelligence

We can begin structuring a GAI framework in education by revising McLuhan's theory established in the video text, *McLuhan's Wake* (McMahon, 2002) by the National Film Board of Canada. He viewed new digital technologies of the late 20th century as enticing, seductive, and highly influential that create addictive environments which affect individuals, groups, and societies (McLuhan, 2001). Consequently, McLuhan argued for a media ecology to prevent digital technologies' control and their negative effects on humans. In this work, he outlined what he entitled, *4 Laws of the Media* (McMahon, 2002) which I believe can be ad-

justed and altered to guide us in the handling and usage of generative artificial intelligence. From this, we can observe and recognize patterns of GAI effects on humans if we revise these laws in relation to GAI. I will provide below McLuhan's 4 laws and for this I directly use McLuhan's terminology (refer to [McMahon's text, 2002](#)) to relate to our era today:

Law #1—What human characteristic or experience does this generative artificial intelligence enhance? We can look at GAI's purpose and how it improves human function. Does it extend the body, senses or mind for humans, collectives or society at large?

Law #2—What previous technology, process, medium, or methodology, does this generative artificial intelligence make unnecessary? What processes are eliminated partially or fully?

Law #3—What obsolescent technology, medium or system does this generative artificial intelligence retrieve? We can question what in the past—whether prehistoric, Renaissance or up to the 21st century—is made important once more?

Law #4—What will this generative artificial intelligence reverse into when it is fully used, pushed or driven? We should observe the effects, contradictions and ecological impacts of using GAI that may be unintended.

Following McLuhan's four laws ([McMahon, 2002](#))³ I would like to introduce two new laws to guide us with generative artificial intelligence usage:

Law #5—How can we use this generative artificial intelligence to promote learning and skill development, using honesty, integrity and ethical correctness? Based on sound reflection about its benefits and downfalls, educators, students, and users can make a decision regarding the use of GAI by choosing one of **four positions**: 1) utilize, 2) modify, 3) reject or 4) subvert generative artificial intelligence technologies. We can ask: Should we **utilize** GAI because it is extremely beneficial? Should we **modify** the use of GAI to make it beneficial? Should we **reject** using it because it is not beneficial in the educational process? Should we **subvert** the GAI application to make it useful to us? It may be a combination of the above. Whatever we decide it should be a conscious choice based on sound reasoning to improve educational processes.

Law # 6—What human agency versus generative artificial intelligence agency are utilized? Never before has technology been an entity with agency. As discussed, GAI is indeed a "tool with agency" ([Leonard, 2020](#)). We can pose the question: As a result of using a specific GAI, what human agency does the GAI technology **take away** from us if used? If we modify or subvert the GAI, or dance in a co-creative process, what agency do humans **employ** versus the technology itself? In training GAI applications how can we **retain** important human agency while using GAI? What decision can we make as teachers, learners, and users to maintain important human agency?

One example of using these laws is using GAI to produce an essay. BING, a

³For a fuller description of McLuhan's 4 *Laws of Media* refer to McMahon's seminal video (2002).

chatbot, for instance, can be employed to write essays and can save students great time and effort. This extends from the tool as agency as the chatbot collects data to create and communicate in text multifold essays on the subject. BING obsolesces former technologies to gather information and type texts such as the old-fashioned computer. GAI retrieves the quill and manuscript as traditional technologies are used to convey information. Finally, BING usage can reverse into new student dependency on a machine for concept creation, data collection, synthesis of ideas, and communication of concepts. Consequently, the 5th question I ask is, how we can control this environment and new experience in education to be beneficial to student learning? One answer I will provide is that we could use BING to generate an essay that the students criticize. If they find some parts beneficial they could use this as a reference in the essay they create on their own. GAI thus has agency in creating a written text that can be accepted or rejected by humans using their own agency in the brainstorming, writing, communicating and critiquing processes.

Another example is using the GAIs, Pixray or DALL-E to make an oil painting. It enhances our ability to acquire ideas, makes the traditional brush and oil paint usage obsolete, retrieves the painter as the photographer of life images, and reverses into flattened computerized imagery production that looks somewhat the same. Again, I ask how we can control this GAI technology usage so that using DALL-E becomes beneficial to learners and they do not lose necessary skills such as oil painting techniques in the artmaking processes. An answer is to use DALL-E as one of a number of sources to generate ideas in sketchbooks that may be used in the brainstorming process during the studio creation stage. Therefore the GAI is used as one of many sources of sketches to develop ideas and not as the final text. Using this GAI image the student can then modify it and use other sources to create an oil painting with texture and a 3-dimensional quality like a Van Gogh painting that would be impossible to create using the current GAI technology. GAI thus has agency in again creating an image-based text that can be used by humans who have agency in the idea phase of the artmaking process and continue to have agency in the production and postproduction processes.

I have confidence that the road ahead is through employing this framework of the “**Laws of Generative Artificial Intelligence**” while being enthusiastic yet critical and thoughtful regarding GAI usage. I believe we should be reflective with this new technology so that we can ensure in our classrooms today that we use GAIs in positive ways such as, for example, assisting students to learn languages and aiding learners with disabilities like dyslexia. In these ways, GAIs do indeed offer exciting usages.

8. Conclusion: The Future

To refer to Gauguin’s painting I ask at this point, “Where Are We Going?” It is extremely crucial to be critical of emerging GAI technologies and use them with great care, with discernment, and with knowledge. As with any technology, there is a fallout and we are hearing about it already in our fourth technological period

we are entering, the **Era of Generative Artificial Intelligence (GAI)**. I return to repeat the crucial warning the United Nations Secretary-General, Antonia Guterres, gave recently. He advised the international necessity to address AI as it is an extremely serious threat equivalent to that of nuclear war (*Democracy Now*, 2023, June 15). His advice: to immediately implement a global watchdog. Additionally, we are bombarded by the warning of great job losses ahead in all areas of work with a looming promise of a societal restructuring. For instance, *Kleinman* (2023) from the BBC writes that companies are replacing employees with AI. Discussed recently is the strike by workers of the Writers Guild of America that is severely affecting Hollywood and New York media productions in the United States and Canada. One of the crucial reasons for this strike is to prevent the usage of media companies like Disney to use GAIs to write screenplays (*Meyrat*, 2023). From the Canadian Broadcasting Corporation (CBC), *Pittis* (2023) describes current fears that GAIs will soon begin to threaten the workforce jobs in all fields causing further increasing societal disparities between the wealthy and socioeconomically challenged. Indeed, the very nature of what is conceived as “creativity” is threatened. For instance, recently we are experiencing such established organizations as the Academy of Motion Picture Arts and Sciences which runs the Academy Awards. *Sherman* (2023) cites Recording Academy CEO and President Harvey Mason Jr., who has formulated new rules because of AI developments. Working extensively with a research team for the upcoming 2024 Oscars, Mason declares that “We don’t want to see technology replace human creativity. We want to make sure technology is enhancing, embellishing, or additive to human creativity” (para. 6). AI effects are felt globally wherein these new AI technologies are creating a reshaping of power dynamics between rich and poorer countries with the wealthy again benefitting greatly while the poorer are exploited, uncompensated, are dominated by those with fiscal means (*Korinek & Stiglitz*, 2021; *Weber & Stanton*, 2019).

Meanwhile, again in the news, *Goodyear* (2023) and *Pittis* (2023), both from the CBC News warn that Google, Microsoft, and other tech firms are in a competitive race for improved GAIs. Initially, Google had possession of the generative AI technology and consciously chose to use it internally to improve technology usage. However, when Microsoft released ChatGPT to the layperson, Google began to release its own chatbots. As Goodyear argued, they did not have a choice but to compete (2023) and other companies soon followed.

These are businesses and their primary concerns are fiscal, not educational. As a result of these companies’ competition, the exponential acceleration of GAIs is occurring to produce improved ones now and in the future. On June 15, 2023, just last week, the European Union announced it was implementing a new law regarding controlling AI as “as governments around the world grapple with how to respond to the possible threats of the fast-moving technology. The EU draft law includes restrictions on the use of facial recognition and mandates, disclosure of data by makers of chatbots and deep fake videos”. President of the Euro-

pean Parliament, Roberta Metsola declared that we need limitations, restrictions, and clear boundaries for AI, so it will not damage our human rights and democratic beliefs (Democracy Now, June 15, 2023). Similarly, I believe we need regulations and policies developed at all levels of education from K-12 to higher learning. These will aid in creating strong pedagogical practices to foster exciting teaching and learning using GAI in our future classrooms. We will benefit by teaching and promoting ways for students to seek truths in their learning, to seek robustness in the acquisition of data, and to employ GAI with integrity, creativity and critical thought (Baidoo-Anu & Ansah, 2023: p. 14). We also need to generate discussions and regulations and planning in our teacher training. It is essential to create and use an *Artificial Intelligence Educational Framework*. I propose educators form educational laws for the use of generative artificial intelligence following McLuhan's ideas with revisions as described in this paper. With the progress of GAIs, we need to be cognizant of their impact and be open to revisions to these laws. As educators, I put forth that it is extremely advantageous for us to generate dialogic discussions to forge a path ahead. Knowing all the risks and benefits, I recommend that we use GAIs in an educated, responsible, and ethical manner in our classrooms. Let us hope that what some people are predicting is true: specifically that GAIs will usher in a new Renaissance—a new era of technology enlightenment (Goodyear, 2023).

Kleinman & Vallance (2023) from the BBC exclaim, “Make no mistake, we are on a speeding train right now, and the concern is that one day it will start building its own tracks” (para. 32). Discussions need to ensue by everybody in the educational field. By being cognizant of what is happening, thoughtful about the benefits and fallouts of using these new GAI technologies and employing these “Laws of Generative Artificial Intelligence” for the field of Education, we will be able to inform and create our curricula and refine our pedagogical approaches to meet the challenges of GAIs. I recommend that we need to keep building our own tracks in education on this speeding AI technology train in order to protect and benefit our future teachers and learners in our schools worldwide.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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