The new machine age for English teachers:The pedagogical possibilities and pitfalls of artificial intelligence

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Introducing the new machine age

While the physical theatre of war destroyed Ukrainian infrastructure and took a tragic toll on human life, a parallel battle in cyberspace was taking place. On February 25 2022, a day after the Russian invasion of Ukraine, the global hacktivist collective known as Anonymous, posted on Twitter that they were 'officially in cyber war against the Russian government' (https://twitter.com/YourAnonOne). Anonymous hackers disrupted and took down Russian government servers, leaked databases of information on staff from the Ministry of Defence and interrupted Russian TV and streaming networks with news from Ukraine. Significantly, on February 26, Anonymous told their Twitter followers, 'If you don't know how to help out, start by exposing and reporting Russian disinformation, it's an important job during these times.'

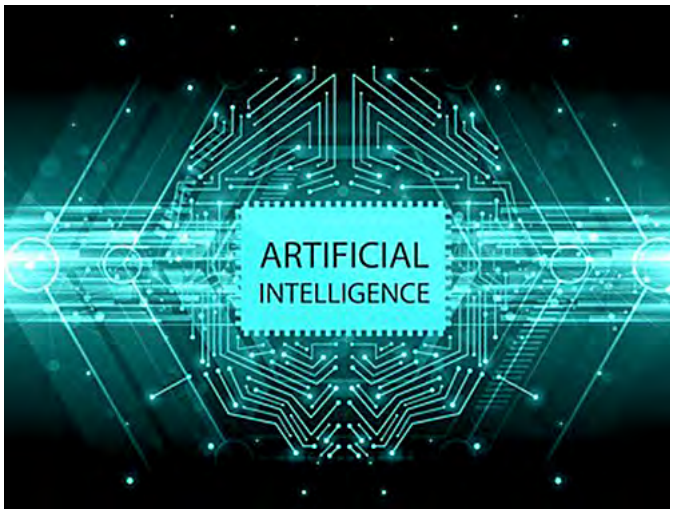

Figure 1 MacKenzie. M,. (October,2018) Artificial Intelligence www.vpnsrus.com

This advice shines a light on a crucial phenomenon of our digital times — rapid flows of bot-generated disinformation circulating and morphing at a global level to target those people who algorithms predict will respond to propaganda and fake messaging.

Welcome to the new machine age. It is one driven by artificial intelligence (AI) automated processes that are powered by 'big data'. This data is constantly harvested from every click, tap and signal from our devices, and extracted through biometric (bodily) information captured in hardware and via apps. Plus, our personal information is increasingly extracted by the 'internet of things' which is the array of networked devices and sensors that are distributed in the common objects we interact with every day in our homes and neighbourhoods. If that reality is hard to get your head around, big tech companies are currently investing billions of dollars in trying to create a vast arrangement of alternative realities, a 'metaverse', for your consumption, leisure, and learning.

This new machine age presages different types of relationships, capabilities and identities positioned at the nexus of machine processes (overt and opaque) that reconfigure what it means to be human and a learner.

In this first article of two we seek to paint a picture of what the emerging technologies of the new machine age, in this case AI, may mean for English teachers, now and into the future. The article is divided into two sections. The first section, written by teacher educator and researcher Erica Southgate, University of Newcastle, explains what AI is and discusses some of their implications for teaching. The second part of the article, is written by Imelda Judge, Head Teacher and English Teacher at Macquarie Fields High School. She will reflect on the implications for English teachers consider some possible approaches in the classroom.

Figure 2 Prismatic Wireframe Head, GDJ, https://openclipart.org/image/400px/275802

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Part 1. Artificial intelligence

Almost all our everyday digital interactions are powered by AI. From internet search engines to personal assistants on our smart phones, to recommendations in social media and streaming platforms and auto text email responses, to the biometric security on devices and predictive algorithms that can determine access to and the cost of insurance policies, AI is ubiquitous both in user-facing applications and behind the scenes. AI has been defined as

> a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments. AI systems are designed to operate with varying levels of autonomy. (OECD, 2019).

Science fiction is replete with narratives about intelligent machines creating dystopian futures. However, this type of AI does not exist. At present we are in an era of narrow AI, not superintelligent machines. Narrow AI is able to do the single or focused task it was designed to do, sometimes with efficiency and effectiveness that can outperform humans (for example, AI-powered search engines can locate and organise vast amounts of information faster than a human could, even if it sometimes amplifies biases). Currently, there are no AIs that have the general range of intelligent and emotional characteristics that humans display in everyday life. There is no AI that exhibits a 'theory of mind' which is an awareness of its own mental states and that of others. This is good to know because AI-powered applications sometimes appear to be magically omnipotent and trustworthy to humans; this is why there are cases of people driving into waterways because a navigation system told them to go in a certain direction, or of humans who, in a mock building fire, followed the instructions from a robot even after the machine had given defective and potentially dangerous emergency advice (Robinette et al. 2016).

A subfield of AI is called machine learning (ML). These are computing systems which do not need to be explicitly programmed to learn from inputs. As Maini and Sabri, (2017) explain:

> (ML's) goal is to enable computers to learn on their own. A machine's learning algorithm enables it to identify patterns in observed data, build models that explain the world, and predict things without having explicit pre-programmed rules and models. (p.9).

AI that can learn by itself through accessing and processing data can make predictions, recommendations and adaptations in online interactions, sometimes without us knowing this. ML is often too statistically opaque for even experts to understand reasons for machine actions, and algorithms can be the property of government and the private sector, leaving us without recourse to interrogate or challenge automated decision-making (for a review of the uses and ethical implications of AI in education, see Southgate et al, 2019). ML-driven automation presents ethical, political and educational quandaries. For example, the phenomenon of deep fakes, which are AI created new or manipulated online images, videos, audio and text, has produced situations where it is difficult to discern what is real from what is not. This challenges the very notion of authenticity and makes rapid authentication impossible for ordinary people. Likewise, there are ML driven language programs, like OpenAI's GPT-3 (Generative Pre-trained Transformer 3) model which:

> … was built by directing machine-learning algorithms to study the statistical patterns in almost a ***trillion words*** collected from the web and digitized books. The system memorized the forms of countless genres and situations, from C++ tutorials to sports writing. It uses its digest of that immense corpus to respond to a text prompt by generating new text with similar statistical patterns. (Simonite, 2020, n.p.) (emphasis added).

Basically, you can give the GPT-3 model a beginning sentence or two and it can construct, in few attempts, a text that can pass for human-written. This type of AI is called natural language processing and is used in speech recognition and translation apps. Initially, for ethical reasons, OpenAI decided not to release all the code for the GPT model. They then reversed this decision while still highlighting the harm that might come from automatically generated and circulated deep writing fakes:

> Any socially harmful activity that relies on generating text could be augmented by powerful language models. Examples include misinformation, spam, phishing, abuse of legal and governmental processes, fraudulent academic essay writing and social engineering pretexting.… Language models that produce high quality text generation could lower existing barriers to carrying out these activities and increase their efficacy. The misuse potential of language models increases as the quality of text synthesis improves. The ability of GPT-3 to generate several paragraphs of synthetic content that people find difficult to distinguish from human-written text in represents a concerning milestone in this regard. (Brown et al., 2020, p.34).

OpenAI models can automatically produce original text, music, images and can write computer code with another human. While the written texts that GPT-3 currently generates might not pass expert teacher scrutiny or be graded beyond a pass level, as the model continues to learn it may well improve in logic and quality. Soon, there will be commercially available natural language processing apps that students can use to produce the

first draft of, and perhaps, an entire written assignment. Machine-authored texts will be considered by many human readers and machine programs as original work. If machine algorithms can learn, through the massive harvesting of existing online artefacts, to produce a piece of work (textual, musical, visual or code) that has not previously existed, does that make it unoriginal or inauthentic? There are already legal precedents for giving AI inventor status and this raises serious questions about acknowledging AI as authors (Matulionyte, 2021).

Figure 3. Alphabet Brain Polychromatic – GDJ (October, 2018) https://openclipart.org/image/400px/308121

In terms of plagiarism, AIs could produce work where no two responses are the same because it learns to check against what it and other AIs have already created. In other words, AI will check its original work against other AI original work rendering plagiarism detection software defunct. AIs may be developed to detect or authenticate AI-generated work but as machines continue to learn by themselves, they may very well learn to avoid such detection.

This rise of synthetic writing raises fundamental questions about the reliance of Western education systems on written text as a form that can denote knowing and understanding and original thought. In terms of assessment, rather than go back to a reliance on handwritten exam, educators will need to understand how to design assignments in authentic and rigorous ways that are not optimal for AI-generated responses and to create curriculum that creatively and critical engage with ML-generated products. We may need to distinguish and understand AI-generated artefacts in ways that shift our conception of human learning as (from lesser to greater degrees) machine-augmented. This has profound pedagogical as well as curriculum implications that will require a greater understanding of AI for teachers and students as citizens of the machine age.

Part 2. AI: possibilities for the classroom

Because critical literacy is about understanding the way we are positioned by texts to adopt particular positions, any study of AI will invites critical literacy. Critical literacy requires students to be alert to hidden meanings that may be ideologically driven or subtly draw on cultural assumptions to create a new truth. The digital world offers so much but it does this at a price: it creates a perceived need that can only be met by yielding information. Artificial Intelligence is able to mine this data to manipulate individual desires until we submit and relinquish all authority.

We are often unaware of or have limited control over our place in the digital world in relationship to machine and automated process. As English teachers, it is therefore imperative that we give our students opportunities to explore what is happening behind the digital texts and apps they are using.

Building student awareness about their personal data and how this might be used or misused without their knowledge is a priority in this technology driven world.

Studying AI: What could this look like in the classroom? Apps in our lives

The process towards awareness and understanding starts with an investigation of those platforms students encounter every day.

Students can first design a survey on the use of apps by teenagers. The aim of the survey is to find out what apps students use and how often they use these. They interview each other and collate results and report back with their findings.

They locate a definition of Artificial Intelligence and discuss what the apps they have located show about the affordances of Artificial Intelligence.

Close study of an App: Tik Tok

One App students most likely list is Tik Tok.

A unit of work about a platform such as Tik Tok needs to consider not only how young people's personal interests are represented but how these are algorithmically driven.

Students could:

1. Explore their personal engagement with Tik Tok
   - Discuss what makes Tik Tok so attractive to young users. List their favourite Tik Toks and why.
   - Brainstorm some potential problems with the app and place these on a post-it note wall for discussion.
   - What are the attributes of this platform that suggest

it might be powered by Artificial Intelligence?

– What information might an algorithm collect via Tik Tok and how might this information be used?

2. Engage critically with Tik Tok using *the Four Corners* production of 'Tik Tok Investigated' (Dias, A. July, 2021). A joint investigation by **Four Corners** and **Hack on triple j** focused on the idea that dangerous content was being delivered to unwitting users with sometimes devastating consequences.
   – *View and respond* critically using a PMI (plus-minus-interesting) table about the key points raised.
   – *Consider* the representation of young people on Tik Tok and the impact the AI has on content creation, curation and recommendation that contributes the shaping of young identities.
   – Engage in further reading and research to collate a number of discursive writing pieces and informational texts on the topic area.
   – *Invite* a teacher expert in technology as a guest speaker.
   – *Debate* the following statement: *TikTok is worth our time.*

The research process for the above topic would provide evidence for a critical writing activity. End with this essay question:

> *How might the inherent meanings in social media texts made available to young people within the Tik Tok app, often influenced by artificial intelligence algorithms, contribute to the shaping of the emerging identities of young people?*

In your response, include reference to at least one multimodal text available on Tik Tok, the joint investigation by Four Corners and Hack on Triple J and one discursive or informational piece of your own choosing.

Deepfakes and the world of truth decay

An exploration of the social and political impacts of Deep Fakes is one way to create a critically literate learning space. The manipulation of the visual through 'Photoshop' is now the least of our worries. This technology has developed so much that being certain about any alleged footage of anyone is questionable, especially in the high stakes arena of an election period where fake news and video-based disinformation may make all the difference for politicians.

Start with the Buzz Feed post ' How to spot a Deepfake like the Barack Obama - Jordan Peele video' by Craig Silverman. This melding of Barack Obama and Jordan Peele available ironically on Buzzfeed can be an effective choice for the English classroom and of great topical importance to explore if you are coaching a debating team.

Like most recent texts you need to review this first as it contains inappropriate language for younger students. Alternative texts could include:

- the campaign by *Represent US*, the non-partisan non-profit organisation promoting political reform in the US that produced freakish deepfakes of Kim Jong-Un and Vladimir Putin to encourage voter participation (Binder.M, October,2020) (RepresentUs, September, 2020).
- the Tom Cruise Deepfake by Chris Ume and Miles Fisher in *The Tom Cruise Deepfake* that created 'terror' in the heart of Washington DC (Corcoran, M.,Henry,M., June, 2021). These synthetic videos created alarm amongst political leaders fearful that deepfakes could trigger social unrest and undermine national security. The likeness of Kim Jong-Un was considered so realistic that programs refused to screen it.

Articles certainly work well in helping debaters explore statements around the importance, and problematic nature, of good citizenship like *The people get the leader they deserve.* Through this statement, students can explore how easily citizen competency is undermined by those who can reverse engineer speech and wield a combination of machine learning algorithms and software applications that produce highly convincing 'face-graft' videos.

Further exploration of the world of deepfakes and disinformation can be made through critical readings and critical viewings of *YouTube* clips like 'Deepfakes – real consequence's (*ColdFusion TV*, 2019)

Why does this matter?

M.Corcoran and Henry (2021) say that 'Some experts are predicting up to 90 per cent of online videos could be synthetically generated — deepfakes — by 2030' . With no effective deepfake detection systems it is easy to see how AI technology can erode public belief in anything online and ultimately erode faith in all media.

Figure 4 DEEPAI Screenshot (April,2022)

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Who needs an author anyway?

Any study of AI offers opportunities to teach the English Textual Concepts. Representation is significant but even more so, a study of AI offers a consideration of Authority. Here is a way to develop student capacity to think about the 'authority of the text' and 'textual authority'.

This study would work well as a precursor to exploring the Year 11 Common Module: Reading to Write or the Year 12 Common Module: Texts and Human Experiences or even as an opening to the Extension Module Literary Worlds.

This study also enables students to explore and better understand the links between multimodal literacy and empowerment in the new machine age and provide a great opportunity to understand the strengths and limitations of AI generated original works.

Figure 5. InferKit demo, screenshot (April, 2022) https://app.inferkit.com/demo

Who owns the material?

A significant issue that needs to be addressed when we use AI is about copyright ownership. This is particularly evident with an app like the Dream app at https://app.wombo.art/ where you can specify the style and subject of a painting and it produces the artwork you requested. This can be purchased at a price so you then own it as a physical item or you can purchase a digital version, as an NFT (non-fungible token or digital asset).

To create the work of art you need to use word prompts, including a 'style' option, to generate a random creation and the app will borrow from all known sources. Art copyright is a particularly fraught area and raises an important consideration: if the artwork has been copied by artificial intelligence, then who is breaking copyright laws and who is the creator.

The following lesson is one way to explore this in your classes, first looking at art and then at narrative.

Part 1: Art appropriation

First you might source an artwork from Dream app by Wombo at https://app.wombo.art/ requesting a specific style that is known to students. The whole class looks closely at the image and answers the following questions.

- What is your response to this text? Do you like it? What does it make you think or feel?
- What does it mean to you?
- What do you think the composer was trying to communicate? Justify your answer

Then reveal the source of the painting as being a synthetic multimodal composition from Dream app by Wombo.

- Ask the question: How would you feel if someone was copying your style of painting and getting money for it? Raise the question of copyright and who owns the product.

Students can then spend some time exploring the Dream app by Wombo and create a piece of art using the language prompts required (one of the prompts is about style and the other requires a word or phrase of your own).

Part 2: Written appropriation

Give students the following text to read:

> Still have long way to go before I can measure up to these professionals! It was a fun day, and I just so happened to be one of the first to arrive at the school.
>
> Since they were only letting a few people inside at a time, I was escorted to the cafeteria where they were having snack.
>
> Which meant I was trapped in that line for a good 20 minutes!
>
> Not that I minded.
>
> I went to work my way around the cafeteria to get some pretty good shots.
>
> The kids looked so sweet in their Halloween costumes.
>
> It was so adorable, especially since I just found out this week that I was moving to Indiana, not Wisconsin.
>
> I was stuck waiting there with my mom and my sister with no snacks!
>
> We had to wait until after snack to enter the school.
>
> I missed most of lunch and recess that day.
>
> That was fine with me.
>
> I was happy to spend more time taking pictures.
>
> For one thing, that is how I spent my afternoon.
>
> And for another, I got to meet more of the moms.
>
> So cute! It was a fun experience, one I would never trade for anything.
>
> Not to mention, not only was I paid for my photos, but I got a lot of great ideas on the photos I want to take when I get home.

In groups get students to respond to the following

questions.

- What is the purpose of this narrative?
- How do you know?
- Are there any edits that you would suggest to the writer to improve the quality of this narrative?
- Is this an experienced writer? Why or why not?

Then do the big reveal. Show them where this 'synthetic media' was generated. https://app.inferkit.com/demo a story generator much like DeepStory AI and the many others out there (Salia. R,. January, 2022). In fact there are all sorts of generators: lyric generators, poetry generators, music and soundtrack generators, and even a fake person generator https://this-person-does-not-exist.com/en

Some questions to explore with the class.

- Is a text still a text if it is not composed by a human?
- How will we, as readers, know if we are engaging in a text that is made by a human composer or an AI? Does it matter anyway?
- How does what we do as readers change if the connection between reader, writer and author is altered?
- Were there any clues in this text that made you question its authorship?

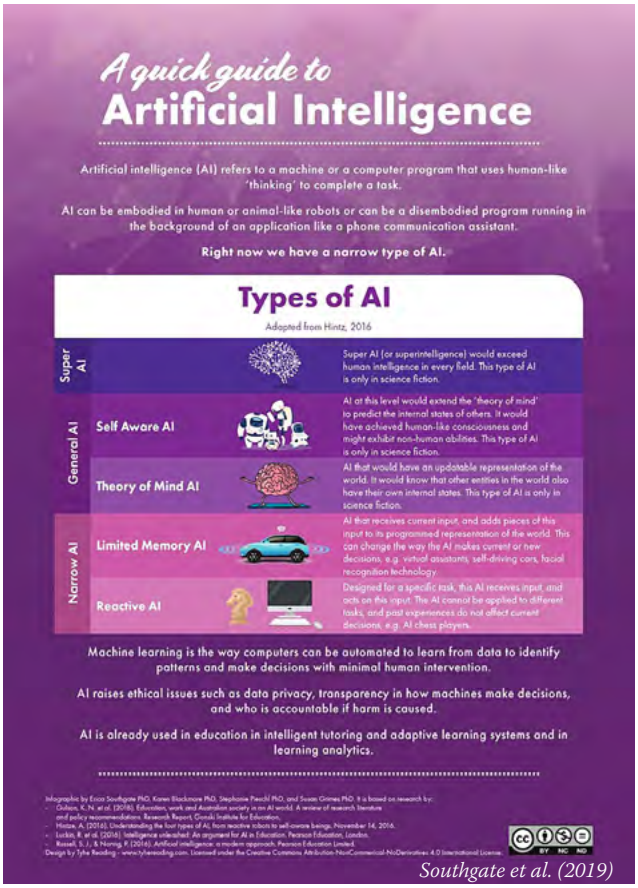
Students can then create their own synthetic narrative text. Once students have designed their text they might see elements in their text that are familiar. Like all texts the AI text draws from what is already circulating. Students discuss:

- Does an artwork, like a narrative, need a human composer? Why or why not?
- What is the impact on meaning making, if all the meaning making is left in the hands of the responder?
- What are the cultural implications if, at the press of a button, we can randomly generate cultural painting practices or art works, out of context?
- Is there a place for AI as authors or composers?

As English teachers, we are well placed to raise and explore new digital literacies and emerging technologies with our students, but only if we can remain current with timely and adaptive professional learning and our own curiosity and play.

One of our responsibilities as English teachers is to give our students the tools to live productive and positive adult lives and to consider their civic responsibilities as contributors to social media. Every social media event has an impact on those who create and on those who receive. As teachers, we have to engage our students in digital literacy that will remain relevant into their adult years. Eerily, we are confronted with the famous words of Hannah Arendt:

> A people that no longer can believe anything cannot make up its own mind. It is deprived not only of its capacity to act but also of its capacity to think and to judge. And with such a people you can then do what you please. (Arendt, H., October, 1978)



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