INVITED PAPER

AI and the contemporary educational landscape: a personal view

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1. Introduction

This article is about the juxtaposition of two phenomena. Education which often develops slowly, and AI which is showing exponential growth.

Whereas scientific understanding of how to best educate people, young and old, has advanced significantly in the past 30 years, using this knowledge to innovate educational practice is often slow. There are different reasons discussed as to why this is the case. Some concern disruption of longer-term systemic development by often short-term political interests. Others are linked to the influence of educational industrial interests that want to maximize market share and maintain the commercial status quo mainly through publishing and testing.

One classic example of disjuncture between what is understood to be beneficial for learning and what happens in practice relates to how we teach and learn additional languages. In a 1629 publication, The Door of Languages Unlocked, John Amos Comenius proposed a view that language cannot be successfully taught without relation to content. Yet now some 400 years later, language teaching in many parts of the world remains dominated by teacher-centric traditional approaches focused on language structures, devoid of content other than grammar. A complementary approach close to what Comenius was proposing, Content and Language Integrated Learning (CLIL), is steadily being realized in practice globally, but it has already been some 30 years since its launch in 1994.

The term AI was launched in 1956. Since then, we have seen steady development and application of what is termed Artificial Narrow Intelligence (ANI) throughout societies. Since November 2022, there has been widespread discussion on the implications of publicised applications, particularly on generative AI. During 2023 this discussion spread through educational communities with varying degrees of often polarized argumentation. Some of this discussion, in and outside education, has been on the threats and potential of emergent Artificial General Intelligence (AGI) which would involve applications being able to operate at high levels of human intelligence.

One form of generative AI launched by Open AI in 2022 is ChatGPT. There are many others such as Bard,

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Bing, Chatsonic, Jasper, Perplexity, and Youchat. Some of these chatbots are not new. For example, one chat robot, Eliza, was developed by Joseph Weizenbaum at MIT in 1966 as a psychiatrist conversational interface. But since 2023 much discussion in educational circles has focused on the ChatGPT version 3 launched in November 2022, subsequent versions, and what can be done when different types of generative AI are combined.

To get a sense of how rapid generative AI is developing it is worth looking at the changes in different versions from a single provider, Open AI. ChatGPT-1, launched in 2018, was designed according to 117 million parameters. A parameter is a measurement of the complexity and capacity to learn from input data. ChatGPT-3 involved 175 billion parameters, and in March 2023 ChatGPT-4 involved 100 trillion parameters.

During early 2023 discussion within education was heavily reactive, focusing on potential problems and threats. One of these has been on how to prevent students from using generative AI to engage in unethical behaviour such as cheating and plagiarizing. Later in 2023 this discussion shifted towards re-conceptualizing academic integrity, and looking to see how AI, present and future, could be harnessed to enhance education. A key interest was on how the emergence of generative AI could provide opportunities to adapt assessment practices (Cochrane & Ryan 2023) and reimagine possibly outdated assessment strategies (QAA, 2023). Another was on how it could become a new tool to help teachers with their workload and enable them to function even more effectively.

By the time you read this article both AI development and educational discourse on its use may have evolved considerably. However, it can be suggested that such discussion is likely to revolve around one key constant. This constant involves analysing the potential of AI, not just in terms of functional features of teaching and introducing rules, regulations and possibly firewalls to prevent misuse through unethical student behaviours, but in relation to more holistic views on life, learning and wellbeing in school, out of school, and in future life.

The rapid development and crucially, accessibility of AI, is one aspect of the multi-dimensional changes that we can see within the diverse ecosystems in which education exists globally. Discussion about the role of generative AI and education, now and in the future, is not productive if it only focuses on what happens within the confines of educational institutions. The recurring constant in this discussion is that this is not just about technology, but about humanity.

2. Scoping the Landscape of Digital Natives

School are microcosms of their respective surrounding societies, and because these societies differ significantly, generalizations about good and less good teaching practices may be superficial. But since around 2010 we have witnessed important developments in relation to learners and learning across the world. One of these is an emerging global cultural new order driven by access to technologies in which young people's lifestyles are markedly different to earlier generations.

The 2020-2023 COVID-19 pandemic accelerated access to new technologies by citizens, but the trends have been evident for many years particularly with respect to access, age, use and time-on-screen. Impact on the lives, cognition and aspirations of young people has been given considerable attention. See, for example, James et al. (2017); Twenge (2017); Firth et al. (2019); Dienlin and Johannes (2020); Haidt (2021); Haidt, Rausch, & Twenge, (ongoing).

Self-reported student hours spent online and access to the Internet at home for schoolwork have been reported as steadily rising (PISA, 2018). At the same time studies, for example in the Anglosphere, indicate that since around 2012 some societies have reported rapid increases in levels of anxiety and depression amongst young people, especially females. For example, the biannual report (CDC, 2023) of the USA Centers for Disease Control and Prevention reports that whereas adolescent females reporting persistent sadness or hopelessness was 36% in 2011, by 2021 this had risen to 57%. Those who had seriously considered suicide was reported as 19% in 2011, and 30% in 2021. Male adolescent levels are also reported as rising but the increases are smaller, and the rates not at the same levels as with females. One cannot assume that digital lifestyles are the main cause of such changes as there may be others relating to contemporary life. However, this is one cohort of the young people now in education, and when we think about AI in education, issues like this on mental wellbeing need to be part of the picture.

In a meta study on social media as the major cause of what is commonly termed the mental illness epidemic amongst young women in specific societies, principally the USA, UK, and Canada, Haidt (2023) comments 'the arrival of smartphones rewired social life for an entire generation. What did we think would happen to them?'

Studies have been published which claim to show little to no evidence that social media has a detrimental effect on the lives of young people. One well-publicized example is by Orben and Przybylisti (2019) who studied over 17 000 adolescents in the UK, USA, and Ireland. This report has been widely cited to argue that there are few to no adverse effects from forms of online engagement. But using the same data set Kelly et al. (2018) found significant evidence of causal relationships between social media use and the mental health of adolescents.

There are huge global enterprises operating social media networks (Facebook, YouTube, Whatsapp, Instagram, WeChat, Tik Tok, Snapchat) that have considerable commercial vested interests in arguing against links between use and harm. This means that studies which argue one way or another need to be scrutinized in relation to how they have been funded, and what data has been used for analysis. For example, has the study focused on a single platform that young people may have access to but rarely use for frequent and valued communications and entertainment. Does a study of young people's behaviour which uses data from, for example, Facebook, differ to one on use of others such as Instagram or TikTok, where Facebook might be used for connection with family and relatives, but others are used for the 'real action'.

Haidt (2023) specifically refers to a period when health statistics revealing cause for concern started to reveal upward trends. He writes

"Instagram was founded in 2010. The iPhone 4 was released then too – the first smartphone with a front-facing camera. In 2012 Facebook bought Instagram, and that's the year the user base exploded" (Haidt, 2023, p. 35).

Haidt reports that the

"magnitude of association between social media use and depressive symptoms was larger for girls than for boys…. Greater social media use related to online harassment, poor sleep, low self-esteem, and poor body image, in turn these related to higher depressive symptom scores. Multiple potential intervening pathways were apparent, for example: greater hours social media use related to body weight dissatisfaction (≥ 5 h 31% more likely to be dissatisfied), which in turn linked to depressive symptom scores directly (body dissatisfaction 15% higher depressive symptom scores) and indirectly via self-esteem" (Haidt, 2019, p. 59).

Reporting on health and digital use is of key importance when we examine the role of generative AI in education. Put simply, it may be that digital connectivity does not lead to supportive human connectedness. And this is what we need to consider when facing, as now, a new wave of AI technological developments that may or may not enhance teaching and learning throughout education. The ecosystems surrounding schools and therefore teachers and students, their work, their lives online and offline, are undergoing profound change due to the interconnected environmental, societal, geopolitical, and economic polycrises affecting the world.

The educational landscape is changing because the wider environment is changing and AI is one feature that is inter-connected with others. AI has the potential to be a change agent which could be harnessed in education as a force for good, but it is only one reality to which education needs to adapt. This means focusing on not only what happens in school, or with homework assignments, but also out-of-school lifestyles.

"Digital technologies have become an integral part of our lives. Many common activities that once required physical contact, such as talking to family and friends, or consulting a doctor, are now carried out online. The digital space is no virtual second life, but it is an intrinsic part of one's life" (OECD, 2022, p. 10).

Talk in education about increasingly technology-driven life, what it can bring to people and what it can take away, is increasingly on not just functions but the roles of key players, namely students and teachers. Both are now subject to adaptation and change, and not only because of AI. The role of the teacher as a person, a human interface, who strives to realize the best potential of all young people in their care, and the role of the student as an 'active learner' are both heightened. Mitigating the negative challenges resulting from technology-based lifestyles, and other environmental and geopolitical polycrises now affecting the world can be supported by AI but needs to be driven by students and teachers alike, often in new teaching and learning sub-cultures.

3. Shaping Tomorrow: Building Knowledge, Competences and Future-readiness

We can see that young people are acquiring new and crucial skills from their experience of living with integrated technologies from a very early age. This influences how they process and use information. A significant study by Firth et al. (2019) argues that use of the Internet can result in acute and sustained changes in cognition, specifically attentional capacities, memory processes, and social cognition.

We can see that these technologically astute young people are increasingly generating their own contexts for and habits of learning, and that in many countries the speed of this is outpacing how we are responding in education (PISA, 2018).

We can see that convergent and multi-dimensional advanced technologies are creating innovative environments which provide new opportunities for combining the learning of subjects in the curriculum with competence-building for the future. Discussion on AI is particularly significant when we consider the simultaneous building of knowledge, competence, and future-readiness throughout education.

One characteristic of new and adapted curricula is to include life-centric intended learning outcomes that

blend both knowledge and competences. AI has been identified as a possible tool to break away from the inefficiency of generic prescriptive curricula (one size fits all) and provide opportunities for AI-enabled personalised learning that can meet the individual needs of all learners, and supporting their wellbeing, mental health, and resilience.

Building knowledge and competence-based intended learning outcomes into curricula is innovative in some countries, but building capacity to realize these through pedagogical practices is the key to achieving successful curricula transformation. Developing high-impact pedagogy, the science of teaching, can take decades to cascade throughout an educational system. But now AI could play a key role in accelerating both the diversification of learning methods and opening up of new learning opportunities, especially for those who have specific learning needs, neurodiverse learning preferences, or are otherwise marginalized, through what is termed personalized, individualized, and differentiated learning. It also introduces opportunities for adults to engage in lifelong learning, especially for reskilling during periods of employment transition.

There is an educational adage relevant to functional innovative curricula, namely that the curriculum is a tool, not a rule. It is the teacher who is expected to apply a curriculum, and sometimes course curricula are heavy in detail and time-consuming to implement. This, alongside possibly high levels of time required for administration, can make the work of a teacher very demanding. TALIS (2018) reports on professional stress resulting from time spent on continuous grading and reporting and how this reduces time available for enabling student achievement. AI can be used by teachers, and educational entities, to reduce administrative time-on-task and therefore provide space, if not personal energy, to operationalize new curricula through pedagogies. For example, Spain which has recently updated curricula (LOMLOE, 2021) which repeals earlier versions (2006 and 2013) has faced resistance from teachers not because of the learning goals, but the extra administrative workload involved, amongst other challenges (Gortazer, 2020).

The broader goals of a curriculum that serves to enhance the capacity to learn and prepare for actively engaging in lifelong learning after formal education typically focus on learner agency, engagement, efficacy, cognition, and competences. Developing student agency (taking responsibility and making choices); engagement (being involved in constructing teaching and learning processes); efficacy (self-belief in having capacity to reach goals); cognition (analytical systems thinking); and competences (applying knowledge and know-how to solve problems and achieve goals) are widely viewed as essentials in leading-edge curricula. The question is now if and how AI could be used to enable students to navigate development of these in and outside school, and how it could transform outdated teaching and learning environments.

Statements of intent on improving education such as the 2019 Alice Springs (Mparntwe) Education Declaration can now be seen throughout the world.

"The Declaration includes some significant changes to ensure Australia's education system continues to provide the best opportunities for young Australians in a rapidly changing world… Education has the power to transform lives. It supports young people to realise their potential by providing skills they need to participate in the economy and in society and contributing to every aspect of their wellbeing" (Australian Education Council, 2019, p. 2).

Now there are increasing numbers of guidelines on generative AI educational policy and descriptions of how it can lead to change available such as through Miao at al. (2021) and Sabzalieva and Valentini (2023) for UNESCO, Tuomi (2018) for European Union, the UK's QAA (2023) and Russell Group (2023), and through international crowdsourcing such as Nerantzi et al. (2023).

National and regional changes to curricula focused on developing skills for future-ready adult life in the Information Age involves recognizing that AI will play a significant role in student's future lives, and that learning to use it should start from an early age. This does not mean taking up classroom time with students on digital devices because that limited time needs to focus on student-teacher interface. But it does mean developing competences that encompass all aspects of the digital world into teaching and learning processes. One example is the introduction of 'futures readiness' into Finnish education from 2016 to 2019 for students from age 7 years upwards (FNAE, 2014).

Futures readiness involves developing student agency; engagement; efficacy; cognition; and competences. Some competencies and related skills relate to managing safety and security in virtual and other digital spaces; awareness of the forces that can be used and unleashed in cyberspace; communication ethics; navigating internet superhighways; and being empowered to use forms of AI for good. Just as the slide rule (1850s) and calculator (1960s) provided new tools to enhance the learning of mathematics and engineering, so AI can be used to improve educational access and equity. But the key foundation for realizing all of these depends not on tools and machine learning but on the knowledge, skills and understanding of AI by the teacher whose principal task is to "engage in a practice of human improvement" (Hattie, 2023, p. 215).

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