Artificial intelligence could hurt education at its most basic level

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Technology changes human beings and society. Electricity changed night-time for humanity. Agriculture initiated settlements and civilization. Vaccines and antibiotics got many diseases eradicated or under control; human life expectancy has doubled in less than a century. These technologies and their effects have made our world what it is. The impact of technology on our biology is also profound and perhaps less noticed. Fire, the technology to cook food, has altered our digestive system over the evolution of our species to differ from that of other mammals.

Technology's influence on individual behaviour can accumulate to cause significant social effects. Agriculture was one such case. We are living through another such period of behavioural change, which may or may not cause a permanent and transformative social effect, depending on what we do now. Smartphones and social media are fraying social connections. While we rue this, we rarely take stock of what kind of tsunami all this is accumulating towards.

"The psychological well-being of adolescents around the world began to decline after 2012, in conjunction with the rise of smartphone access and increased internet use." This is the conclusion of research based on data from 37 countries by Jean M. Twenge, Jonathan Haidt and others. Twenge's book *Generations* goes deeper into the issue. The deterioration in the mental health status of teens is shocking. Self-harm cases, hospital admissions and suicide rates have doubled since 2012. For such a large-scale phenomenon, proving causality will take more time, but the direct effect of smartphones and social media is inescapable.

Another anecdotally evident and now reasonably well researched effect of this 'digital complex' is on 'attention'. This complex is the beachhead of the 'attention economy.' It thrives on grabbing and monopolizing our attention, which is one of the most important cognitive resources for human beings. Unless you pay attention, nothing happens. From relationships and learning to problem solving and development, everything requires attention. Everything suffers if your attention is hijacked.

Let's consider one specific effect of the digital complex on attention. Those who mostly read on digital media read shallowly. Evidence (for example, read Maryanne Wolf and Nicholas Carr) is accumulating that comprehension of the matter being read, its retention and the ability to use it has declined. It has even more pernicious effects on children who mostly read digital formats. fMRI studies are showing that regions of the brain involved in reading are under-developed for primarily digital readers. People are losing their capacity to read meaningfully and usefully.

Technology is not all bad. Electricity, agriculture and fire have been mostly good for us, while nuclear technology took us to the precipice. Stupendous scientific progress and its applications are the foundations of modern life. However, advances have negative effects too, some of them unintended or unexpected. As negative consequences seem unavoidable, efforts to regulate and control new technologies are crucial. This is equally or more important for the technology that is roiling the world today both with wild hopes and dystopian fears: Artificial Intelligence.

Let's consider only one aspect of AI, its effects on education. Without doubt, AI can be used in beneficial ways. For example, AI-based continuous assessment of students' learning can help develop teaching plans customized to every student's pace and interest. Or any learner can use AI-based training or learning modules as though she has a personal tutor. AI applications in education will face the same challenges that any information and communication technology platform does. This has to do with the nature of human learning, which is essentially a social-human process. But let's not dwell on that. The deepest apprehension is about AI's effect on the basics of education.

With AI in the hands of students, home assignments are problematic. With rapid AI advances, almost anything that you ask students to do, they can ask AI to do for them. This is a minor manifestation of a deeper phenomenon—that of outsourcing thinking. A student getting AI to do an assignment is outsourced thinking. The same can be done by teachers; they could ask AI to develop lesson plans or assess student responses.

AI will enable the possibility of outsourcing thinking for all. The human temptation to follow the path of least resistance may overwhelm other considerations. It is a distinct possibility that education, which is significantly about developing the ability to think, will degenerate and implode in many parts. Over generations, if we continue to outsource thinking, we may lose the very capacity to think, or it will get sharply diluted. We should remember what fire did to our digestive system and digital reading is doing to our capacity to learn from written material.

Warnings are being sounded by the biggest experts of AI. If we don't pay heed, we may soon be at the edge of another abyss, like we were with nuclear technology. In education, that is a distinct possibility, and perhaps also with jobs and the very notion of truth.

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