ARTIFICIAL INTELLIGENCE

Are there implications for education?

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Arthur C Clarke, in the 1970s, famously observed "Any teacher who could be replaced by a computer, should be." He was referring to his 'electronic tutor' which would have easy access to facts and figures and should be used to train teachers. He was of the view teachers could not be replaced. Meanwhile, 37 years later that observation still holds true.

Despite rapid advances in computing speed, connectivity and availability the human teacher continues to provide a superior learning experience for students.

Over the period since Arthur C Clarke's observation, teaching, learning and schooling have evolved. However, the fundamental experience is about experience, acquiring knowledge and understanding.

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Teaching methods have undergone a multimedia transformation, though the fundamental approach has been largely constant. Telling stories is the way humans relate to knowledge. Basic facts and data are now easily accessed anytime, anywhere. With the advent of 24/7 data availability a 'fog' has descended over the ability to make and take decisive action.

(To know, but not understand: david weiberger https://www.theatlantic.com/technology/archive/2012/01/to-know-but-not-understand-david-weinberger-on-science-and-big-data/250820/)

Data driven decisions are now more difficult than ever before, when perhaps what we need are information driven decisions. Means and modes often disguise more than they reveal. When teachers apply their semantic skills it is the outliers which are of interest. Computer learning obliterates these 'blips' and normalises any data to reflect the central seeking tendency of big data.
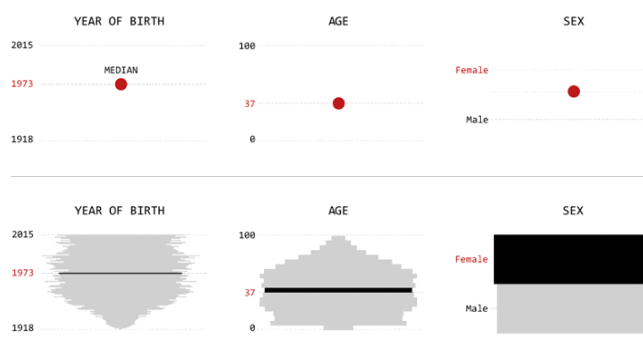
Mean can obscure details, for teachers it is the 'blips' which give the insight.

Flowing data by Nathan Yau

https://flowingdata.com/2017/07/07/small-summary-stats/

Teaching and learning is all about personalised experiences, an individual's perspective is the means of engaging and empowering a learner to seek their own understanding. Schooling with adaptive algorithms may identify a students' progression point as an historical statement, however improving that position requires aspiration and inspiration by the learner to shift their achievement to a higher level.

AI and computers are brilliant at recording history. Precedent (past precedent is a tautology – future precedent is a guess!) may or may not predict future achievements, however as the eleven plus exams demonstrated, they do limit future

achievement by imposing limited expectations on the learner. My students who undertook adaptive mathematics testing soon learned that by providing two clearly wrong answers early in the test, they were then provided with an easier workload and gained a better report because they 'improved' after initial low grade start. If they achieved 100% correct, the questions were more difficult and their report showed no improvement over the course. AI systems can be 'gamed'. Successmaker, in 1997, was an adaptive learning program which received huge 'hype'. <Gartner HYPE cycle: URL: https://en.wikipedia.org/wiki/Hype_cycle >The idea was students would undertake a programmed learning course and emerge with improved knowledge of the topic under study. At enormous cost, this program was deemed to be a failure as it treated all students the same. There was no personalised dimension. Students did not 'engage', they were not empowered to take responsibility for their own learning. There was no urge to discover and use the information to make or tell a story. Every input students made was assessed, with no time to 'play' and make mistakes. Students quickly discovered that no matter what they did there was always more to do. (ICT:Changing Education, Chris Abbott p.77)

Project based learning has received some attention over recent years. While very expensive in time and resources the results are very impressive. The programme can be totally individualised, students negotiate many aspects of their learning. Students become empowered beyond the period of study and often continue with strong interest and activity long after assessments and reports have been issued.

AI has strengths, but the ability to have semantics is not 'yet' one of them.

Meanwhile AI can release teachers from the drudgery of administrivia. Smart notices, only relevant and appropriate information needs to be presented. Voice activated everything. Typing is no longer a skill necessary for anyone. Filing systems, database lookups provide just in time rather than just in case information. In that regard dramatic culling of study topics can be undertaken. Teachers may dream of the ultimate correcting algorithm, however there is no substitute for a teacher reading for understanding (or watching a student made video clip), questioning a student to elicit a response then weighing up and gauging their level of achievement.

For example: Fractions as a topic in mathematics could easily be incorporated into an incidental experience rather than dominating mathematics at many year levels for years with repetition and duplication. Similarly, graphing would become data visualisation, logic would be included into early and middle years. Currently logic is not explicitly studied at any level, including VCE IT. Yet logic is a basic skill in every subject at every level. There are many other topics which dominate student study requirements which are now redundant in the age of ready data access. Many of the reasons why these topics remain is as a legacy of simply they are easily tested and can be commonly agreed as a 'standard'. Anything that would replace will be subjective. So fractions remain.

Taken to the extreme, AI threatens the concept of 'schooling', where groups of students are arranged in 'classes' and seek sufficient knowledge to be certified or 'pass' at a predetermined standard. There is no requirement for a student to go anywhere if the AI can be available 24/7 and the demonstration of acceptable progress on learning tasks posted online can be shown.

Flipped classroom movement has attempted to increase the value of the face to face opportunity. Teachers and groups of students in a learning setting provide an opportunity to learn more and faster than is possible online and physically isolated. Similarly the tendency to wax lyrical about the 'engagement potential' for VR (virtual reality) experiences overlooks the need to be more than entertaining. As television and videotape had previously claimed, images will revolutionise the way students learn. Though that statement depends more on the quality of the content and the task than a clever walk through in ancient Rome. Being a virtual tourist into places inaccessible by time or space may or may not lead to greater learning or gaining a better understanding.

https://www.blackincbooks.com.au/books/its-alive
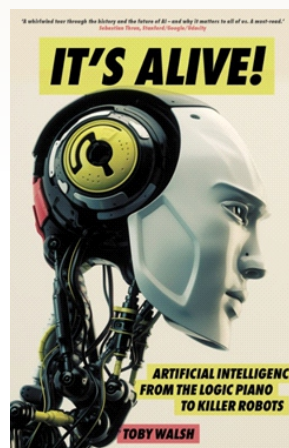
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Teachers provide the insights in such situations, guiding the student experience. Whether AI systems can scale to provide greater exposure to 'the best' teachers remains to be seen. Whether this can be automated is also a question yet to be resolved.

If the purpose of education (and schooling) is to better equip learners with wisdom and knowledge to be productive citizens, then the current schooling and AI systems fall dramatically short.

Ask anyone about their most memorable moment of schooling and without exception it is never the time they gained a high score on an assessment. Invariably it will be an emotional moment when they gained an insight into themselves or others. That is a part of the human condition.

AI can assist, supplement and enhance however education, learning and teaching should be so much more than the simple algorithms currently and foreseeably possible. Perhaps re-visit this topic in another 37 years (2054) and see how the progress is going.