

Brave new worlds: reflections on the automation of education

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The case for automation

Challenged by an ever-expanding workload and increasing levels of public accountability, the continued commitment of teachers and school leaders to exploring ways of optimising efficiencies within core business has never been more important. In this regard, further exploration of automation is an understandable and rational response towards addressing some of the identified systemic inefficiencies that exist throughout Australia's educational institutions.

In and of itself, the process of 'automation' is nothing new. George Veletsianos, Canada Research Chair and Associate Professor of Royal Roads University, points to the work of American psychologist Sidney Pressey during the 1920s and 1930s, who recognised a future where machines would eliminate 'the grossly inefficient and clumsy procedure of conventional education.'

But, when we reflect on the existing operational state of our school systems, it must be asked: has technology delivered on its ambitious

promise to accelerate our collective productivity and improve student learning outcomes through automation – or not?

In April this year, five states and territories made a decision to 'delay transition' towards NAPLAN Online, a digitised version of the contentious standardised test which claimed, among other things, that it would deliver 'a better assessment... (and) a faster turnaround of... more precise results.' A variety of concerns were raised around a lack of infrastructure, perceived software incompatibilities and potential issues around equity of access – these concerns were reasonable and presented legitimate challenges in terms of NAPLAN Online achieving its goals.

In summary – it would seem that the reality of integrating automation in an education context is more complex than it might first appear. Author and communication scholar Joshua Reeves of Oregon State University has argued that "automation of communication raises broad social, economic and political concerns." Similarly, Veletsianos warns of what he describes as "the reductionist agendas of the efficiency narrative,"

likening automation to an ideological lens defined by taking the shorter path to the correct answer ahead of foregrounding rich critical and creative thought. And yet, elsewhere around the world, innovative educators are thoughtfully leveraging automation to improve positive learning outcomes for students.

A question the reader might like to reflect upon and throughout the reading of this article follows: *what does the implementation of successful automation look like in my school context?*

The automation of instruction via 'the flipped classroom'

Borrowing at least in part some of the ideas from the automation narrative, the concept of the 'flipped classroom' has enjoyed considerable attention over the past decade as a result of the work of Aaron Sams and Jon Bergman, two practicing teachers from Woodland Park High School in Colorado, USA.

Simply put, 'the flipped classroom' is a pedagogical approach in which the teacher-centric instructional input is reappropriated to YouTube (or a comparable online video-streaming platform) 'in response to a realisation that class time would be best spent guiding knowledge and providing feedback, rather than delivering direct instruction.'

To be sure, the flipped classroom is by no means a 'silver bullet' to engagement – it is a mode of teaching and learning which requires students to assume the responsibility of viewing the instructional input prior to class. The time initially reserved for instructional input (which would have typically been provided by the teacher at the beginning of the lesson) is subsequently reassigned to additional time 'on task,' and is presumably directed towards a more engaging learning experience.

There are clear functional benefits associated with automating these elements of the students' learning experience – for example, the opportunity to review content as many times as required without being restricted to a particular time, place or situation, independent of the teacher.

The stifling of automation via 'the flopped classroom'

When we consider what automation might offer our classrooms, a due consideration of context is critical. There are aspects to the pedagogy of the flipped classroom which might in fact exacerbate behavioural disengagement – consider the scenario in which a student with a poor academic record arrives late to her Mathematics class and is essentially unable to practice the content the students are working through because the instructional input has been viewed during the previous evening.

Elsewhere, anecdotal reports of teachers 'passing the torch' to the video during class time discredit the original flipped classroom pedagogy, reducing the impact of the teacher



to that of video coordinator. Clearly, this is not what the architects of the flipped classroom intended.

At the time of writing, there are many schools in Australia whose existing network infrastructure cannot practically support staff and student access of platforms like YouTube – the efficacy of which essentially depends upon a healthy internet connection as a conduit to learning.

Gaining momentum: the automation of assessment

One of the most appealing contexts for automation revolves around the efficiencies that it might offer educators in terms of expediting feedback to students. Tools like Google Forms, Socrative and PollEverywhere are reasonably intuitive examples of free, popular digital products that teachers can use to gather data in a range of ways to inform their ongoing planning.

This sentiment is echoed by Nick Ostidick of UiPath, an industry leader in Robotic Process Automation (often just referred to as RPA), who contends that "by monitoring levels and patterns of student knowledge, automation will be able to help teachers identify and address gaps in their teaching."

How automated technologies will process or 'handle' the data we elicit from our students is an emergent and exciting space. Ostidick contends

that an increasing focus on automation will 'allow schools to adapt to student needs and provide more individualised teaching, allowing students of different skill level to work together in the same classroom.'

If automation can personalise learning in the form of adaptive assessment, then the implications for differentiation are significant. Indeed, what has been described as the 'Netflixication' of education is pointing towards a learner-centred mode of adaptive instruction where suggested courses of study are presented based on the analytics gathered during previous engagement in learning.

What is less clearly understood is how automation might be applied in the context of an open-ended assessment – a student's piece of creative writing or a painting, for example, doesn't lend itself naturally to this assessment mechanism. Contemporary products like JoeZoo reflect the increasing sophistication of technologies to analyse student data – the US-based algorithm aims to review a student's word-processed submission and award it a range of scores for grammar, spelling, punctuation and so on, as determined by the teacher.

The automation of observation

Another element of practice which is in the midst of transformation is the teacher observation space. The increasing focus at a systems level on

coaching conversations and teacher reflection has profound implications for reflection. While the human connection clearly forms a vital part of the coaching relationship, the fact remains that technologies are in development that are developing the capacity to facilitate meaningful, empathetic, coaching conversations based on data collected through previous interactions.

Consider how this reality is manifesting in related industries. It is significant that startups like Voxta are creating chatbots 'with speech recognition capabilities in four different languages' that enable users to ask questions in their own language that can share insights into the different policies and views of political parties. Other platforms are offering users the opportunity to speak with empathetic, intelligent beings who are able to respond thoughtfully to scenarios like losing a job, applying for government housing, diagnosing disease and more.

The UK-based tech company +rehabstudio has led some exciting development in this space around the development of an intelligent 'edubot' – a Tyrannosaurus Rex named Tina that was able to respond to students' questions about dinosaurs using Facebook Messenger.

Just because we can, does that mean we should?

The increasing popularity of Massively Open Online Courses (MOOCs) has raised questions about the need for teachers or faculty members to lead learning. Indeed, courses on platforms such as Coursera are now able to be delivered in a fully-automated capacity, that is to say, without the active participation of the traditional educator. It is worth contemplating: what is gained in terms of accessibility and efficiency, and how does that measure up against what is potentially lost in terms of engagement and human connection?

Nick Ostidick of UiPath has spoken of the development of automation within the educational climate as 'an inevitable reality'. If we accept his position, then it is incumbent on educators to steer the conversation

towards the best possible outcomes for students and learning. Implemented thoughtfully and effectively, automation in schools will return time and productivity to educators and school leaders.

While poorly implemented automation processes threaten to rob us of meaningful human interaction, a successful automation narrative offers school systems the rich possibility of spending more time doing more of what we love: engaging our students in learning, and enjoying the moment – in person.

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