Book Review: Should Robots Replace Teachers?
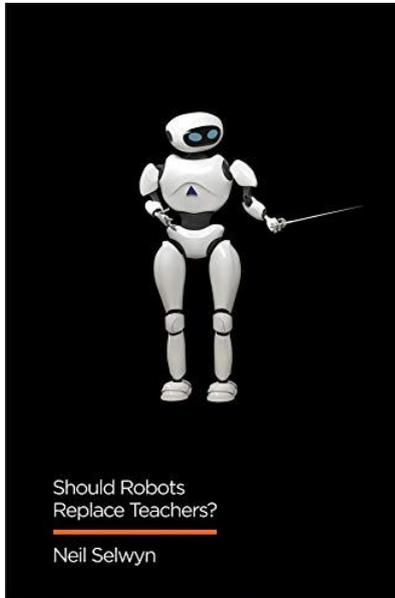
Neil Selwyn

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Review date: 10th October 2019

Neil Selwyn is a well known academic who has written several careful books on education technology. Once again, with his new book "Should Robots Replace Teachers?" he provides a clearly written, accessible book that can lead the time-limited educator and teacher to consider key issues and the questions raised by a new generation of emerging education technologies built around techniques of machine learning and artificial intelligence.

It is a lively time to be involved in teaching and learning. What are effective ways to teach and for students to learn in a world that, by all accounts, is changing dramatically and, for some observers, an education system that is not well adapted to the times? Intense debate on these broad issues often prevails, as it should, and Selwyn's book ought to encourage well-informed

contributions about many of the significant features of the rapidly evolving education technology environment.

Over the last decade in the UK there has been a noticeable shift away from conventional information technology in education. In the school curriculum there is now a stronger and more central role for computer science as a taught subject (though this development has its critics), and across all phases of education new kinds of computational tools are finding their way into classrooms and lecture halls. This new generation of tools aspire to provide active and rich cognitive support for student learning and aim to provide useful automation for at least some aspect of a teacher's job (usually in the name of easing workload). Education technology is becoming less passive than it used to be when it did nothing until someone used it for some purpose. These new forms of education technology have the potential to become active agents in the relationship between teaching and learning, guiding, diagnosing and providing feedback on progress to teacher and learners.

And there lies the challenge! This book is for teachers and educators who want to be equipped with a critical understanding of the looming transformation of education that new AI-based digital technologies intend to bring to classrooms, workshops and lecture halls. Selwyn, ever constructive but critical, notes rightly, that:

> "... it is worrying that the growing presence of AI in classrooms is not already provoking great consternation and debate throughout education." (25)

> "Despite the concerns raised in this book, AI in education is still not seen as a particularly contentious issue amidst broader debates around education." (119)

There are many ways to explain this lack of concern: topic fatigue (we're all a bit tired of hearing about education technology); information overload (there's just too much information to absorb or understand); private sector promotion (maybe it's all just overblown marketing hype); or expert endorsement (academics and technologists in the know say it's great so why argue).

Perhaps, too, we simply remain wedded to a belief in the essentially human nature of teaching so that, in our minds, teaching lies beyond significant automation and therefore there is minimal risk.

But these are precisely the reasons why educators should be critical and this book will provide a strong foundation for considering the implications of this new generation of education technologies but without submerging the reader in technical detail.

Responses to the questions raised by Selwyn are urgently required. The social and political context of education is both dynamic and, in the UK at least, more contested perhaps than it has been for at least three decades. The traditional boundaries of management, ownership and organisation of education have been opened up to the influence and investment of external agencies and entrepreneurs of all kinds. The free-for-all of digital capitalism is seeking new horizons to exploit while the changing status of teachers has left the profession vulnerable to the influences of politically and commercially motivated marketing.

Selwyn can only point us in the right direction, to equip us to ask good questions for which there may be no 'right' answers.. The important goal is provoke debate: "... there is plenty of reason to expect the increased AI-driven automation of teaching to lead to the diminishment of teachers, teaching and education." (121). This book, says Selwyn, "...is best seen as a provocation … "(131) and it takes us up to the important stage of helping to make it clear what the issues are. It raises "...a host of informed and pointed questions..." and is "...an important first step in achieving meaningful and sustainable change." (132). These claims for the book's purpose are justified and it is exactly what the book achieves.

Education technology is fast becoming a more active agent in the relationship between teachers and learners. It is no longer a matter of knowing how to curate or limit one's 'digital footprint' (vital though this is) because data

extraction and automated interpretation have become so powerfu. Software machines now engage in various forms of predictive modelling, extrapolating from what is already known about teachers or students to recommendations and judgements about where they should be in the future. Of course, this is what teachers do on a daily basis but that machines might do this automatically should concern every educator: the primary teacher enthusiastically using apps like [ClassDojo](#), a secondary school teacher seeking more effective oversight of pupil behaviour with [AS Tracking](#), a college lecturer aiming to personalise learning with tools like [Knewton](#) or a university professor lecturer concerned about [student plagiarism](#).

Overall, the book brings and order and clarity to the substantial arguments and questions about the purpose, value and efficacy of AI-based education technology. Chapter 2 is the only one that examines actual robots, i.e. devices that in whole or in part resemble a human form and behaviour. These are either programmable, (their value for curriculum learning is in the process of creating behaviours through coding), or they arrive 'out of the box' pre-programmed to respond interactively with children and students. While such devices are perhaps not so common in classrooms the chapter raises profound issues about the role of robot 'companions', particularly when these devices purport to offer emotional support to needy individuals and/or guide a teacher's attention towards those individuals it has identified.

These themes of bot-like behaviour pervade the entire book. Chapter Four discusses intelligent tutoring systems and personal assistants which are simply more abstract, less obviously humanoid software systems that nevertheless engage with children and students in various forms of emulated dialogue that relate to a curriculum. Such tools are by no means new and prototypes began to appear in the early 1960s. Today they have become both more powerful in terms of software and much cheaper to implement using everyday kit such as PCs, tablets and smartphones all connected to ubiquitous cloud infrastructures provided by all commercial providers of such systems.

In spite of the lofty claims that are sometimes made for these tools, they are not much more than what was once known as computer-assisted instruction or programmed learning, being built typically on a coached instruction model of one-to-one teaching. Where they differ is in the use they make of the data they absorb from interactions with students based on myriad data signals. These data, used to guide and structure the learning pathways a learner might follow, can include many types of biometric data to infer a range of more subtle personality features such as motivation, attitude or emotional states.

This is entering new territory where algorithms attempt to characterise the state of mind of learners beyond their local position in a sequence of curriculum content. In turn, this can lead to decisions about the attainment, capability or disposition of the student and may invoke actions such as repetition of material, testing and assessment, promotion to the next stage of curriculum content or, in the name of diagnostic assessment, flagging problematic issues that may require alternative interventions.

However and thankfully, as Selwyn correctly notes, teaching is not simply a matter of directing learners what to do next. It also involves explanations and reasoning which, at their present state of development, are probably incapable of providing these, if indeed they will ever be capable of doing so. For as Selwyn also reminds us, the role of the teacher's personality and the performative, body-centred character of much good teaching is presently well beyond the capabilities of such technologies.

Moreover, and importantly for those concerned about ethics and privacy, these data are inevitably captured and integrated into cloud-based collective representations of learner behaviour. As will be well-known to readers of this review, the social and political issues surrounding the gathering of personal data into private ownership in pursuit of economic gain are some of the most toxic in public discourse today. Selwyn acknowledges these issues indirectly and they cannot be ignored:

> "The suggestion of intelligent tutoring being rolled out across education systems needs to be taken seriously. if we are going to allow ourselves to have a learning companion for life then we need to think carefully about what we are letting ourselves in for." (75)

The book ends with many questions but no straightforward answers; just plenty to think about. It provides an agenda that should frame any discussions about how computational technologies might be deployed for teaching and learning. Is the continuous monitoring and 'nudging' of learner behaviour the right way to go? How does this change our definitions of teaching? If AI is pragmatically 'better' at certain types of activity are we confident that the data it uses to generate its outputs are useful and accurate?

Above all, are we exchanging the technically smart for the socially stupid? Today, these new technologies are not usually transparent in the sense that the basis for judgements about attainment or capability can be explained clearly. Teachers are people who have learned what they know, so they also know something about how to learn it and have empathy with others doing the same. Teachers are, by definition, social beings, and they can use the whole range of social activity from thinking aloud to bodily performance to enable and encourage effective learning. They can compromise, negotiate, be spontaneous, or deviate when necessary. None of these important qualities are yet possible for advanced computational tools but their absence must qualify discussions about when and how to use them.

If there is an omission in Selwyn's book he has nothing to say about *how* these technologies find their way into classrooms, workshops, studios or lecture halls. What kind of policy-making processes drive their implementation? According to more recent work on this topic (e.g. by [Ben Williamson](#) or [Stephen Ball](#) and his colleagues), we are no longer steered by traditional forms of policy making at governmental level and instead have entered an era of a type of policy-making-on-the-go driven by non-governmental policy networks comprising organisations with strong

vested interests. We have simply to observe the prominent role of influential corporations such as Apple, Microsoft or Google in fostering the use of powerful cloud supported devices in schools,

Moreover, these actors are not only extraordinary developers and manufacturers of computational technologies but they are also extraordinarily powerful lobbyists on behalf of the idea of the 'robotisation' of education. It ought to be clear to the concerned professional that today the real players in framing, selling and implementing the education technology agenda are those same 'surveillance capitalists' that [Shoshana Zuboff](#) has discussed at length.

However, Selwyn suggests there could be a way forward in the professional race to keep ahead of the machines, and this is his final provocative thought but one that should keep us busy:

> "Public policy and professional debates about AI and education need to move on from concerns over getting AI to work like a human teacher. the question, instead, should be about distinctly non-human forms of AI-driven technologies that could be imagined planned and created for educational purposes." (127-8)

It is not clear what such "distinctly non-human forms" might look like or be capable of, but it is an important idea. For, as he also writes, "... it is crucial that teachers work together with machines on their *own* terms … in ways that ...improve the quality of and the nature of the education that results."(126)

These two provocations work together. They speak of partnership rather than replacement, a partnership that both preserves and amplifies the important qualities of the human being without attempting to replace or automate them. Above all for this partnership to work, educational professionals must strive to ensure that they have a clear and loud voice in the changed landscape of policy making.