Why AI Can't Be Education's Cure-All

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Education companies continue to tout the ability of artificial intelligence (AI) to greatly improve learning among students at all levels. While AI is being tested today in select applications, such as "intelligent tutors" and so-called "smart content," many of the promises of what this advanced technology can do in education remain largely unfulfilled. The fact is, AI is not a cure-all for education — nor should it be.

More than ever, what's needed is collaborative and comparative research by major players in education into how best to deploy AI as a sophisticated tool for teachers to help them reach and teach students more effectively using a "human-plus-technology" approach known as the blended learning environment. Without a transparent, scientific approach, education is at risk of being stuck with the same problems ten years from now: using a largely marketing approach to "sell" education on AI, without solid methods grounded in research. And, in the process, it will needlessly unnerve educators, students, and parents with visions of "robo-teachers" replacing humans in the classroom.

Teaching and preparing the workforce of the present and future with 21st century skills is a growing priority. The World Economic Forum, for example, has launched an initiative on "Shaping the Future of Education, Gender and Work," encouraging the sharing of analyses and insights, fostering dialogue among stakeholders and experts, and encouraging greater collaboration among "business, government, civil society, and the education and training sector"—by industry, regionally, and globally.

While in Davos at the World Economic Forum, I spoke with Satyadeep Rajan, founder and president of Swiss Learning Exchange who previously was responsible for the education theme at the forum. He stressed the urgency of giving education at least the same attention at key international thought leadership events as is given to other global concerns, such as banking or mining. "Until recently, education has not been taken as seriously or worthwhile. There is a giant gap between what participants at these events know and the real world in education," he told me.

A parallel to the collaborative research approach can be found in medical education, which is often interdisciplinary in nature. The education industry, however, has relied largely on painting a picture of what new technology may do in the future, which would not be acceptable in other science-based industries such as medicine and pharmacology. Given that learning is also science, we in education should hold ourselves to more rigorous standards for quantifying results from using advanced technology.

AI Makes Inroads, But It's Not the Destination

Given the pace of AI disruption across multiples industries -- from manufacturing to food processing and financial services -- it only makes sense that education would also look to AI in hopes of improving results and gaining efficiency. In advanced adaptive learning systems,

for example, AI can be used to enhance the personalized learner experience, to increase competency in gaining knowledge and skills, enhance confidence in what is learned, and improve retention.

Education firms also have been engaged for years in investigating the potential of many innovations such as teacher-AI collaboration and using technology to improve individualized learning and provide universal access to education. For example, Pearson, which is transitioning from an education publisher to a digital-education platform, is making investments expecting a significant future for AI and deep-learning algorithms.

While Pearson is to be applauded for these efforts, there is a danger in turning to AI experts to "fix" education. Instead, education needs to engage in deeper discussions by bringing together leading minds in learning and technology to identify where and how AI can become a meaningful tool for teachers. One possibility is using AI to check homework or perform automatic plagiarism checks. There is much discussion about the role of advanced technology in the classroom, such as AI-enabled tutoring and robotic graders -- even using AI to predict which post-secondary students are at greatest risk for dropping out.

Rather than replacing teachers, AI should be thought of as freeing them up to do what they do best: engaging and encouraging students. Similarly, in computer-based adaptive learning, AI can be used in content curation, freeing up humans from this largely tedious work. But humans, especially subject matter experts, remain key to the content delivery process. Just as in the classroom, it takes a blended approach of human plus technology to realize the full potential of advanced adaptive learning platforms.

The limitations of AI in education stem from the fact that learning is far too complex, messy, and too "biological" (it is a brain function, after all) for it ever to be automated. This contrasts sharply with how AI and advanced algorithms can be used in aggregating data and outcomes that have much greater regularity. For example, AI can replicate and generate photographs, such that it's impossible to tell an original from the AI-enabled copy; the objective is more for games and entertainment interfaces, developers say, than just duping people with "fake" photos. Computer-aided analysis of linguistic patterns has even been used to pursue answers in the long scholarly debate of who likely wrote (or co-wrote) Shakespeare's plays. The key to such applications is that the very data sets with perfect outcomes already exist; data scientists know precisely what they're looking for.

That "perfect outcome" does not exist in education, because every learner is different.

Even when we know the process of how to teach something, it is still unclear how each student actually learns. The education industry needs to explore how AI can make teachers even more effective, such as by supporting them with advanced analytics and data that show where students are gaining mastery and where they still struggle. With research to prove its potential in education, AI can advance learning in a blended environment that augments teachers with the best technology tools at their disposal.

As a final note, it is important to understand that humans establish and maintain a complex model in their minds of how the world works; deep neural networks, however, do not. The latter lacks a deep understanding somewhat similar to the shallowness of rote memorization, which requires giant data sets even to get there. Humans begin learning from the *first* example.