

Learning

ARUN KAPUR

'Education should aid in the nurturing of ones dreams. Without dreams, nothing works. One must have some idea of where one wants to go. It can change many times but the dream will guide one. Ones dream is ones best road map. However, rarely does this find mention in discussions on education.'

– Arun Kapur

REFLECTING on my years of working in education, I perceive learning as a journey, one in which the final destination is never reached. There is always another hidden bend that needs to be explored. There is always somewhere else to go; there is always something more to learn. Like on any long expedition, it is wise to stop occasionally and take stock of where you are, where you have been, and where you are headed. It is at these times that listening to our

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instincts—our Inner Guru—can refocus our energy for the next phase. It is this journey, the process of learning, that I find most interesting and rewarding. This is a process of discovery – discovering oneself and how we fit into the world around us. Moreover, the more we discover, the more we realize how much more there is left to discover. This is such a beautiful process to experience.

However, it is unfortunate that not all learners experience it so beautifully. Some learners are so fixated on the end game, their destination, that instead of savoring the journey they ignore it and instead find themselves constantly asking, 'am I there yet?' I worry that these learners will not be able to actualize their potential to become the best version of themselves. Since their focus is solely on the destination, they miss out on the

wonderful learning opportunities that are strewn along the path to that destination. On the other hand, those learners who appreciate the process of learning and embrace the experiences, have a wonderful opportunity to actualize their potential.

Through the process of actualizing their potential, learners have the possibility of cultivating what I call Serene Strength, a state of being where all the minute pixels of a person's journey come together and help them develop into a Person of Substance. This does not mean that they have reached the end of their odyssey. Serene Strength is not a destination; it is a state in which a person can achieve optimal growth and development and be the best version of herself.

Philosophers, teachers, students, parents, and politicians are among those who have asked and pondered on the question of the purpose of education, and quite naturally have arrived at varying answers that change over time.

However, at some point in the past, the idea of education and school became so intertwined that when people pondered this question, they instinctively considered the role of schooling. This is not to say that schooling and education are not connected. Asking 'what the purpose of education is' and 'what the purpose of schooling is' could lead to two very different answers. I am sure that schooling does not automatically lead to education.

Education should challenge learners in a manner that fosters character. At the same time, it should enable learners to connect with themselves and understand what life, happiness and satisfaction mean to them. That is why the process of self-reflection is crucial in education. It should be able to instil in all its learners the dynamic process of self-

improvement and the ability as well as the skills to actualize their potential. Learners need to grasp the importance of being able to constantly unlearn and learn, and become proactive learners.

A rich education should provide learners with the skills to become contributing citizens and also instil the values to be good human beings. Character is built during schooling years, and education should instil in its learners' essential traits of a Person of Substance.

Schooling is a tiny part of the education process. It does not necessarily prepare you for life outside of school but should give you sound academic knowledge. Learning in schools tends to happen in silos although real life does not work that way. We have focused too much on schooling and not enough on the process of learning and education. This is something that needs to change. Education needs to help learners actualize their potential. The education systems should impart social and relationship skills to students – values such as honesty and community-building need to be inculcated. Education should help learners navigate the world that is in front of them. They need to be able to sift through information and identify the useful and redundant information that is now available at the touch of a button.

While we talk about what needs to change, we should not wholly dismiss the current system. The purpose of the education system is to challenge you to learn things you never knew. It is essential to understand what we mean by 'learning' to ensure that it is happening optimally. Learning is a complex socio-emotional process that involves cognition and builds on our existing knowledge base to construct new knowledge. This process kicks into action from the time we are born. Research suggests that babies are

actively learning from the time they are born. By the time they are 12 weeks old, they have millions of neurons in their brain and are in the process of developing those into billions as they grow.

A feature of learning that I consider significant is its continuous nature. We never stop learning. It comes down to whether we have the desire to *actively* learn. As human beings, if we stopped learning we would cease to flourish. When we set a goal, we must focus more on the journey than the end goal. It is by focusing on the journey and the learning process that we muster the courage and acquire the skills that will serve us well throughout life. We are not discounting the value of the outcome, but what will serve us as we move beyond the original goal are new sets of skills that we acquired along the journey.

Research has shown consistently that disengagement among students in schools is at an all-time high. The current schooling model across most parts of the world came about at least 300 years ago, much before globalization or any other factors that determine today's world. Then, how is it that the model continues to permeate large parts of the world when the reality today is unrecognizable compared to three centuries ago? Why is it that students across the world are taught the same things, most of which are redundant today? Why have we actively introduced lethargy into schooling and education? Why have we replaced enthusiasm and passion with rote learning and standardized testing?

Imagine if teachers from the 18th century were to visit the world today. They would be amazed at the nature of the change they encounter in modern times. They will marvel at the sophistication of transport, construction, technology, lifestyle and so forth. Then, imagine this teacher entering a

school. Chances are that he or she will be in familiar territory. While they may notice cosmetic changes, they will realize that nothing substantial has changed regarding methodology and transaction.

While researchers and education ministries around the world continue to spend money on trying to fix a broken education system, it does not factor in the outcomes that these systems have to deliver. What are we preparing our learners for? What careers will they be engaged in? Does our education factor in the skills and processes that they need to have a grasp on five, ten or fifteen years from now?

Over centuries, if not millennia, work or career has been a mainstay of every-day life. For some it is a means towards a good life with status and stability. For others, it is a means to an end. And for some others, it is what gives meaning to their lives. Kids as young as five or six are often asked what they would like to do when they grow up. If each one of us were to actualize our potential and do what we love to do, then the world would realize its potential. Even more so, it would not be termed 'work' because we would be doing something we love.

I realize that this sounds wonderful on paper but how do we realize such an aspiration? One of the common answers to this question is to 'find your passion'. While it is a good starting point, I feel it is equally important to create your passion as well. Passion is defined as 'a very strong feeling of love, hatred, anger, enthusiasm, etc.' I feel the more important thing is to get started on something rather than waiting around for passion to come to you. The more we explore, the more experiences we like and the more tastes we develop. This is one way to create passion, by giving your attention to the task at hand.

Now, a few may have had the opportunity to discover their passions early on and be able to nurture it. What about the vast majority of others who are still searching for their passions? How can we enable them? The answer could lie in the age-old idea of apprenticeship. In addition to helping learners explore a range of opportunities, apprenticeship could be a model for a holistic development of individuals.

In a world that seems to be more focused on instant gratification, apprenticeships bring back the notion of patience and mastery. Dedicating oneself to becoming a master crafts-person or technologist or engineer or writer takes time and willingness to learn from someone with experience. This apprenticeship model follows the pathway of many trades; writers, thinkers, artists, storytellers, passed down through generations throughout human civilization.

Technology has been used in education for at least seven decades now, since the end of World War II. It has been seen and sought as a harbinger of change in educational outcomes. However, we are yet to see any revolutionary change in educational outcomes attributed to technology. This could be due to many reasons but I strongly suspect that the main one is that we have not equipped our teachers to teach with technology. What do I mean by this? We have not integrated pedagogy and content knowledge to be transacted using technology. Therefore, teachers are now in a situation where they teach as they have been taught but forced to incorporate technology in their practice. One of the most important things that I urge educationists to consider is that technology should be used to augment the capabilities of a teacher.

We are now at a stage where we are having conversations about robots

and Artificial Intelligence (AI) shaping the educational and work landscape in the decades to come. This is a crucial conversation to be having because the potential for some of these technologies to change the very fabric of life is immense. It is my opinion that we need to have people of substance involved in all processes of this transformation to make it a force for good. I will try and lay out my understanding of these technologies and how I see them shaping not just education but potentially many aspects of our future. In doing so, I hope to be able to describe to you the need for a nuanced and holistic approach to these technologies.

The Artificial Intelligence technology that is set to play an important role in many spheres of life already exists but has made little intervention in education. It is currently used in numerous other sectors and you may have inadvertently used it while clicking on an online video¹ tailored for you or when goods are selected based on your unique tastes while shopping online. These are very basic examples of everyday uses of AI.

Before we go further, let us try and understand what Artificial Intelligence is. For me, to classify a system as 'AI', it would need to add value to a task, and would need to do that without having to be told to do so. So, for example, an Excel spreadsheet can do numerous calculations in a second. Would you classify that as AI? I would not because the spreadsheet needs to be programmed, and any change in the variables would throw the task off course. Would the computer programme that defeated the best chess player² in the

1. J. Lee, N. Kothari and P. Natsev, *Content-based Related Video Recommendations*. (online) Google AI, 2016. Available at: <https://ai.google/research/pubs/pub46263> (accessed 7 April 2019).

world be classified as AI? Again, my answer would be no. The reason being that the programme was developed by studying all the possible permutations and combinations of a chessboard. It excels at that and only that.

So, what would I call an AI? I would say a non-human entity that can add value and act without instruction to adapt to its environment. A technical definition of AI would be: ‘the study and design of intelligent agents’ where an intelligent agent is a system that perceives its environment and takes actions which maximize its chances of success.³

AI is a very nascent field, in my opinion, and we are only at the very beginning of what could be a potential revolution in the making. The boundaries and definitions of what constitutes AI will keep changing as hitherto un-accessed data along with better processing speeds and robotics make huge strides in the coming years. To understand why AI has come into the limelight recently, we need to travel many decades into the past.

To understand how AI has made progress in leaps and bounds recently, we need to look at another concept known as Machine Learning.⁴ Machine Learning is a sub-branch of AI, which in turn is a subfield of Computer Science. As the name suggests Machine Learning is how a machine learns using data. The basic idea behind the concept is to teach computers how to perform tasks without having to

2. *Ibm.com, IBM100 – Deep Blue.* (online), 2019. Available at: <https://www.ibm.com/ibm/history/ibm100/us/en/icons/deepblue/> (accessed 5 April 2019).

3. ‘Artificial Intelligence’, *ScienceDaily* (online), 2018. Available at: https://www.sciencedaily.com/terms/artificial_intelligence.htm (accessed 6 December 2019).

4. C. Meserole, *What is Machine Learning?*. (online) Brookings, 2019. Available at: <https://www.brookings.edu/research/what-is-machine-learning/>

write a programme each time. So, if you want a machine to recognize a tiger in an image, you give the parameters of what a tiger looks like (pointed ears, sharp teeth, yellow, strips, etc) and feed the machine with data to learn.

In the recent past, advances have been made within the field of Machine Learning in what is known as ‘Deep Learning’. A great example of deep learning is Google’s AlphaGo.⁵

Google created a computer programme that learned to play the abstract board game called Go that is thought to be manifold times complex than chess. AlphaGo is the first computer programme to defeat a professional human Go player, the first program to defeat a Go world champion, and arguably the strongest Go player in history. AlphaGo did this by training using thousands of game data of human players to understand how the game worked and learn for itself. In the newer version of AlphaGo named AlphaGo Zero, it learns to play from scratch by playing against itself. If you would like to read the technical paper on Alpha Go’s strategy, please refer to the footnote.⁶

The above scenario from Google’s programme is considered Narrow Artificial Intelligence. This programme can excel only at this game. If you played anything else with it or asked it to do anything, it would lose comprehensively. Narrow AI is where most AI research is at currently.

This also highlights some of the shortcomings of Machine Learning and AI over a five-year-old child. You would have experienced your little

5. Deep Mind, *AlphaGo/DeepMind.* (online), 2018. Available at: <https://deepmind.com/research/alphago/> (accessed 06 April 2019).

6. Storage.googleapis.com, (online), 2019. Available at: <https://storage.googleapis.com/deepmind-media/alphago/AlphaGoNaturePaper.pdf> (accessed 07 April 2019).

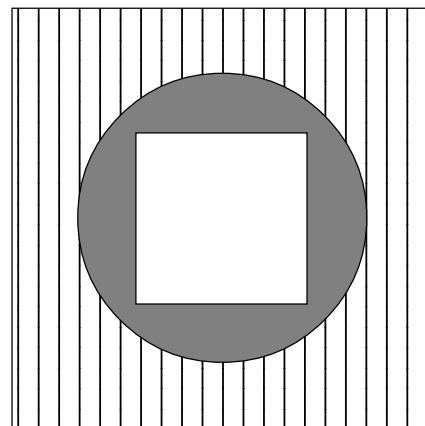


Fig: If the strip square canvas is AI, then the grey circle is Machine Learning which is fueling most of AI and of that ML, the white square is Deep Learning.

one having an ice cream and after a few instances, she would be in a position to ask for her favorite flavour. She can feel the taste and texture of it as it swirls in her mouth and knows which ones she likes and those she doesn’t. A Machine Learning algorithm would need to have access to tens of thousands of ice cream images to recognise what an ice cream is. It cannot feel or experience the joy of it on a summer day nor can it distinguish between ice cream and something that looks similar to ice cream, like pudding.

Today, we abound with the data that we create. Have we stopped to consider how much of this is meaningful and valuable data? Ninety per cent of the data that we have today was created in the last few years as more people began to come onto the online world. At today’s rate, we are producing trillions upon trillions (2.5 quintillion bytes) of data each day.⁷

Soon, we will see AI becoming increasingly common in schools and

7. Forbes.com, *How Much Data Do We Create Every Day? The Mind-Blowing Stats Everyone Should Read.* (online), 2019. Available at: <https://www.forbes.com/sites/bernardmarr/2018/05/21/how-much-data-do-we-create-every-day-the-mind-blowing-stats-everyone-should-read/#1c27964e60ba> (accessed 06 April 2019).

education systems. To remove ambiguity, I feel it will be as early as 2023. It will be used for many different purposes ranging from assisting with course work to grading essays and even scanning the pupil's face to see if the person has comprehended the learning outcomes of a lesson. As with all things, this is not a panacea.

An AI system may be able to scan your face and based on your expression conclude that you are confused or tense, but it will not be able to understand why. You could have been thinking about what your friend said to you or something that may have happened on your way to school. However, what it can probably help with is informing the teacher that this student may not have achieved the intended outcomes of the learning experience.

This is useful since it augments the teacher's capabilities to carry on with a class of 20-30 students and focus on delivering the lesson well without having to worry at that instant about whether it has been comprehended. Based on the feedback, the teacher can then tailor individual experiences for students. This is one possible avenue of how AI can make its way into our classrooms. But it begs the question about privacy! Are we willing to allow a camera or an algorithm to observe our students while they are in school? How would the learners feel about such an intrusion? How can we change the nature of the debate from Artificial Intelligence to Augmented Intelligence, where we use technology to augment our capabilities in whatever we do rather than merely dumb down or replace us? These debates, I would imagine, need to happen at various levels and the likelihood that it may vary from culture to culture is high. We need a (w)holistic approach that prepares us and our learners, to be people of substance, to lead us through these unprecedented times.

The sound of silence

RAHUL JACOB

THE idea of India, at home and overseas, has undergone such a massive revision in the past year that the new reality is almost unrecognisable. Emblematic of this change was a three-page briefing in *The Economist* in August entitled 'The new censors' that bunched India with the authoritarian regimes of China, Hungary and Russia. The inclusion of India, with its long tradition of a rambunctiously free press, was a marker of how the Indian media's reputation has been tarnished. The Economist's special report on India is typically the most detailed assessment of the country's economy and politics by a foreign publication.

In the past, the prospect of further economic reforms has been an overriding theme. The special report in October drew more sombre conclusions, however: 'Mr Modi's instinctive authoritarianism threatens many of the freedoms that make his country so successful. One omen of change is that, in a place as famously chatty as India, few people were willing to be quoted by name in this special report.' This has long been a necessary characteristic of news reporting in China, but hitherto unimaginable in India. The report by the magazine's South Asia bureau chief Max Rodenbeck continued: 'They are not just telling us to be