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A degree in learning to be human

Universities can no longer operate like a factory, churning out graduates, just in time, to industry specifications, as quickly and as cheaply as they can.

To view training as a cog in the machine as we move into Industry 4.0 – characterised by accelerated change and job automation – may be our undoing, says the writer. He adds that the traits of curiosity, creativity and connecting the dots, as well as understanding oneself in society, will help people learn to be human, as well as earn a living. ST FILE PHOTO

Tan Eng Chye

For The Straits Times

Visitors to the National University of Singapore's University Hall may have seen a quote from the great philanthropist and former vice-chancellor Lee Kong Chian in the lift lobby. It reads:

"A university is not just an object of pride and prestige, nor only an instrument for acquiring knowledge, but also a home in which the human spirit can find freedom, and draw inspiration."

Students come to the university for many different reasons – to acquire knowledge and skills to prepare for work, to explore their interest and passion in different areas and subjects, or simply to find themselves. Very often, and increasingly, for all three reasons.

As a university, we see ourselves as more than just a bridge to the world of work – we strive to inspire students to learn, and provide the environment for our students to realise their potential.

Today, more than ever before, students must be taught to make connections that cut across boundaries, such as those carved out artificially for reasons of administrative efficiency and disciplinary politics – between the arts and the sciences, and between the technical and the human.

Hence, we decided to strengthen broad-based, interdisciplinary education with the opening of our new College of Humanities and Sciences.

Launched last month, the new college draws on the expertise of two of its oldest faculties – arts and social sciences, and science – and will take in more than 2,000 undergraduates. The college, which will admit its first cohort in August this year, marks a major shift from the traditional way of learning in separate disciplines.

TEACH LESS, LEARN MORE

In my 30-plus years as an educator, I have learnt a few things about learning. It can be done passively or actively, through specific instruction, or as a happy but unintended consequence.

It can be done in a classroom, laboratory, over a lunch discussion, or experientially. In the field of learning science, scholars have proposed theories and debated learning methods for over 70 years.

In 2005, the Ministry of Education's "Teach Less, Learn More" initiative signalled a philosophical shift, where curriculum was reduced to create space for creativity, critical thinking and a love for learning.

It is always a delicate balance to decide how much is enough. Singapore's performance in the Trends in International Mathematics and Science Study and the Programme for International Student Assessment has always been exceptional and the envy of many other nations.

This suggests that we are doing some things right. But there has also been a nagging concern that we might still be teaching too much. I believe that there is still room to improve our calibration.

Singapore is an efficient society, and we are conditioned to hurry and meet key performance indicators. Teachers are under pressure to complete the syllabus and students are expected to learn everything by the exam date. This is compounded by the rapid changes in the world that seem to require students to learn ever faster.

LEARNING IS NOT LINEAR

The authentic acquisition of knowledge is a complex process of exploration, and often failure. Learning is not a simple linear progression (pardon the pun by a mathematician).

It is messy and often doubles back on itself – it sometimes leads to dead ends. But dead ends can lead to moments of serendipitous insights. Learning science suggests that some meandering actually improves learning outcomes. For example, a 2000 US National Research Council report, How People Learn, found that learning is most effective when it occurs across varied and non-adjacent situations. In a word: interdisciplinary. Subsequent research has also borne this out.

Such learning takes time and patience – not just in picking up the skills or content, but in the making of meaningful connections.

These connections can be across domains and topics, across space and time, and across changing societal perceptions. But these connections are essential to make the learning personal for an individual.

Otherwise, there is no learning, only the accumulation of facts, which would be forgotten over time.

At first glance, the idea of less teaching and more meandering for more learning might sound counter-intuitive.

After all, all graduates must find work when they graduate. They need to show employers that they can code, model in Excel, or write a proposal, and so on. To dabble in this and that – and not to hone specific skills to land that first job – can be seen as indulgent.

Nothing could be further from the truth: We believe that the freedom to explore is in fact necessary to enhance our students' capacity to learn.

Our graduates will need to meander and arrive, learn and unlearn, as knowledge decays faster. We are not preparing our students for their first job. We are preparing them for many jobs in their 40 to 50 years of working career – we want them to be lifelong learners.

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CURIOSITY IS VITAL

In 1968, scientist George Land had 1,600 five-year-olds take a test that he developed for Nasa to select creative and innovative scientists and engineers. These children repeated the test when they were 10 and 15 years old.

The percentage who scored in the "highly creative range" fell from 98 per cent to 30 per cent, to finally 2 per cent. Dr Land explained: "What we have concluded is that non-creative behaviour is learnt."

Creativity is driven by curiosity. So is learning. Dr Land's experiment suggests that the formal school system may have caused children to lose their innate curiosity.

This is tragic. We hope to address this, in part, by promoting interdisciplinary learning, and especially, through our new college.

FOCUS ON HOW STUDENTS LEARN

There are two parts to what we want students to learn – knowledge, and the thinking skills to integrate and apply knowledge.

The transmission of knowledge is well understood and easily done. The latter is much more challenging an endeavour.

The types of skills that we want our students to learn – creativity, critical thinking and analysis, and so on – cannot easily be taught using traditional methods.

Our focus should therefore be on understanding how our students learn. We need to rethink the why, what and how of teaching and learning, especially since students today are very different from when their parents were students.

We need to consider more deeply the motivations and inclinations of students, to light fires of curiosity and excitement.

We need to show them why and what they are learning in school is relevant. We need to engage them cognitively and emotively.

We have long known that just conveying knowledge is insufficient.

Studies have shown that active modes of learning – such as group discussions, experiential learning and teaching others – have longer retention on average. Retention of knowledge is only the first step to learning. To learn deeply and for long-term retention, we need our students to engage in the active modes of learning.

ENDING THE CHURN

Advances in technology will create many opportunities. Digital skills will be in great demand in the foreseeable future.

In such a world, we cannot hope to beat computers in what they do, and it would be foolish to try. This means that our students should focus on human-centric skills.

The university can no longer operate like a factory. Our focus cannot be on churning out graduates, just in time, to industry specifications, as quickly and as cheaply as we can.

We want to focus on preparing our students, not just for the future of work, but for a future that we cannot today foresee or predict.

In fact, to view training as a cog in the machine as we move into Industry 4.0 – characterised by accelerated change and job automation – may be our undoing. The traits of curiosity, creativity and connecting the dots, as well as understanding oneself in society, will help people learn to be human, as well as earn a living.

Focusing not so much on outcomes, but on the process, will enhance our students' capacity to learn.

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