Shoring up Singapore’s STEM workforce

With more demand for workers trained in science, technology, engineering and mathematics, rethink how these subjects are taught to motivate students to join and stay in STEM-related jobs

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For The Straits Times

If the recent spike in community Covid-19 cases demonstrates anything, it is that Singapore will have to continue battling the effects of the global pandemic for the foreseeable future.

Our post-pandemic economy will be one where Stem (science, technology, engineering and mathematics) education is going to play an important role.

This is because many of the fastest-growing industries, such as informatics, biomedicine and green energy, require talent that are trained in Stem.

The observation that Singapore needs more Stem workers is in areas like research, manufacturing and science policymaking than we have now.

This can be achieved by attracting more Stem workers, but there are risks when there is over-reliance on foreign labour, as evidenced by the need to close borders in these current times.

Another strategy is to train more locals in Stem.

Unfortunately, a substantial number of local graduates do not choose STEM-related career paths. More can be done to meet these goals. Singapore’s response to this problem has so far largely centred on highlighting successful Stem graduates and making such jobs more attractive by boosting salaries.

As an assistant professor at the National University of Singapore (NUS), I am involved in outreach activities such as open house and student recruitment events. Based on conversations, common prospects and salaries can influence what students choose to study.

For instance, we have seen an increasing number of students supplying for computer science in response to the rise of the tech industry.

However, most Stem industries cannot pay as much as tech companies, while emerging industries like biotech may have more time in the commercial ecosystem here.

To effectively boost retention of local students in Stem, there may be a need to go beyond the current narrative on career and salaries, to understand why most students would choose Stem subjects in secondary and pre-university schools but quit afterwards.

To encourage open-minded learning, students from pre-university onwards could give assignments that require them to draw on contrasting scientific literature and debate one another.

Through such debates, they would be able to acquire critical thinking skills, such as evaluating the limitations of experimental studies. They would also learn to move away from “model” answers and accept ambiguity as a part of many Stem-related jobs, and be more creative in using non-traditional approaches to solve real-world challenges.

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CULTIVATE A CULTURE OF RESILIENCE BY TEACHING THE HISTORY OF SCIENCE

It takes time for good research to bear fruit and when students learn about scientific discoveries within the context of the immense effort they required, students might underrate the value of resilience in science.

When we can learn through history that scientific research rarely yields immediate results, they are likely to become more patient and remain committed to their research endeavors for a longer time.

The growing trend of online learning, students can be directed to sources such as OpenMind and Biographies that truly engage teach the story of science before learning the technical context in class.

It can also be helpful for curriculum planners and teachers to weave history into science education and encourage students to learn from platforms such as physical and online science museums.

We tested this idea during an NUS seminar where I taught the history of how brain cells (specifically neurons) were discovered and why the giant squid was an important animal model to understand how neurons communicate.

This was because the giant squid has one of the largest and most accessible cellular like structures, known as an axon, that is used by biologists and electrical signaling one another.

Students shared with me that they found my approach refreshing, and many gave me feedback that they were able to better retain the concepts taught.

The hope is that as more students carry out a similar vision, they would learn to appreciate the beauty behind it and develop the qualities of scientific ground-breakers - possessing enthusiasm, patience and resilience - to prepare them for inevitable setbacks they may encounter during their education in science and research.

Many students and teachers feel the need to design their lessons to include more interesting stories and check their understanding throughout the lecture.

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