

In schools

Busting stereotypes from an early age

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Professor Liu Bin makes it a point to let her son and daughter be exposed to the same activities, whether it is science or baking.

Once, her 14-year-old son, who likes biology, brought home eggs of insects like butterflies and observed their life cycles.

His nine-year-old sister saw his experiments and was fascinated.

With her mother's encouragement, the girl read up about animal life cycles online and visited the Science Centre Singapore.

"She was particularly interested in the hatching of eggs. So we spent a whole day there looking at the different stages of how an egg hatches into a chick," says Prof Liu, who heads the National University of Singapore's (NUS) chemical and biomolecular engineering department.

Her two children also enjoy baking, an activity that they started at home last year during the Covid-19 pandemic.

"We bought them one oven each," says Prof Liu, who is also NUS' vice-president of research and technology.

"Basically, what the brother can do, his sister can do too. They have equal exposure and opportunities to do whatever they wish, if they're interested."

The academic's deliberate decision to involve both her children in activities traditionally associated with one gender is an example of what observers say ought to be done: Tackle the issue of gender stereotypes early.

As Singapore reviews the way it treats women and how it can bring about a cultural and mindset change on gender equality, the longstanding issue of females being under-represented in science is a concern.

Efforts by higher education institutions and groups like United Women Singapore are under way to raise their participation in Stem (science, technology, engineering and mathematics) disciplines.

GENDER BIASES

Data from the Ministry of Education shows a growing proportion of women in Stem degree courses, from 38 per cent in 2017 to 41 per cent in 2019.

Still, females are concentrated in certain fields. They make up the majority, or 75 per cent, of the health sciences cohort but only about a third, or 35 per cent, of the IT cohort.

Dr Juliana Chan, chief executive of Wildtype Media Group, which focuses on Stem communication, says results from its survey with international research group YouGov of 1,064 local respondents on their perception of Stem careers reflect similar gender biases.

Subjects like biology are seen to be more suited for girls, and design and technology more for boys, it found.

"These inherent biases in society may be one of the factors dissuading women from pursuing certain Stem courses, including data science and engineering," she says.

Such biases affect gender diversity across jobs – a 2018 report found that only 22 per cent of artificial intelligence (AI) professionals globally are women.

And only 30 per cent of local researchers and engineers are women, according to a survey by the Agency for Science, Technology and Research in 2018.

This trend is known as the "leaky pipeline" of female talent in Stem, when women who have such degrees do not end up working in related jobs.

They leave for various reasons, including work environments that make them feel marginalised or undermined, or family and childcare obligations.

Observers say having fewer women in Stem careers can affect policies in research, healthcare, industry and government.

National University of Singapore (NUS) provost Ho Teck Hua says: "For any fast-moving industry like Stem fields, the issues you're facing are very complex. Your team has to be diverse enough to get the talent and views from different people."

"That's the reason why I think women's voices need to be in



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IMPORTANCE OF ROLE MODELS

As long as girls can learn about successful people who look like them in jobs that are traditionally male-dominated, they can imagine a similar future for themselves.



DR JULIANA CHAN, chief executive of Wildtype Media Group, suggesting that parents can first expose girls to role models.

there, because they give a different perspective of their needs, or even other segments of people they interact with."

One example is in AI, says Dr Chan, where there have been reports of recruiting tools that favour men over women and medical algorithms that are unable to detect particular diseases in women.

"As AI reflects the biases of those who build and train it, more women should be included in de-

signing such tools," she adds.

DEBUNKING MYTHS

At NUS, 42 per cent of students in Stem courses – from undergraduate to PhD level – are female. But this proportion dips to about 30 per cent for the engineering and computing schools.

Professor Ho says it is not about forcing girls to study Stem subjects, but empowering them to make informed choices.

This involves correcting misconceptions about disciplines and jobs, he adds, by talking about how careers have changed and making role models across sectors more visible.

Some people perceive engineering to be boring or computing to be mere coding behind a screen without human interaction.

"But the nature of jobs has changed so much that such preconceived notions need to also change. Career options are a lot more varied than people think," he says.

For instance, mechanical engineers can go into fields like robotics and AI, or even do consulting work in banks.

Prof Liu says the engineering faculty reaches out to junior college

students and their parents, to tell them about career opportunities and debunk myths.

Students also go to NUS to see its teaching labs where faculty demonstrate experiments.

Prof Liu adds: "When we ask parents and students what they think of chemical engineering, they usually say 'Jurong Island' and 'oil refinery'."

"In fact, chemical engineers are important in many industries, like vaccine delivery, water treatment, climate change and even cosmetics and shampoo formulation."

Prof Ho says the interdisciplinary nature of studies now allows students to try various fields and even pursue contrasting majors, so that they are not pigeonholed into certain boxes.

"You could major in both computer science and philosophy."

ROLE OF PARENTS

Parents are critical in encouraging children to pursue their interests.

Nanyang Technological University (NTU) third-year computer science student Gia Lim, 23, says: "I was very fortunate that my parents never imposed any gender norms in my education choices. As long as

I excel in what I do and have an interest in it, it doesn't matter."

Being in a male-dominated course does not bother her, although she has heard statements like "women can't code".

"My mum was slightly worried that I might lose out if I had to keep fighting with the boys. But I think there's a slight shift in attitudes among my peers – gender is not a major deciding factor in choosing courses," she adds.

Dr Chan, a married mother of two, says parents can first expose girls to role models who look like them.

"As long as girls can learn about successful people who look like them in jobs that are traditionally male-dominated, they can imagine a similar future for themselves."

The Science Centre Singapore is a rich resource full of physics and engineering exhibits, she says, and parents can enrol their daughters in typical "boy" activities like coding, beyond classes like ballet.

Prof Ho says: "Parents need to support their children even if they are in the minority. Tell them it's okay to be in the minority, if that's your passion."

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