

Hope yet for

A new approach that incorporates fun, creativity and thinking skills, will make subjects related to the sciences more appealing for secondary school students.

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THE Academy of Sciences Malaysia (ASM) launched the nation's first *Science Outlook* report recently and some of its findings were not very promising.

According to the report, despite substantial investment in science, technology, engineering and mathematics (STEM) education, interest among students is dropping.

Malaysia had set a target ratio (in 1967) of 60:40 science-to-non-science students at the Upper Secondary School level but instead of coming closer to that "ideal" ratio, we're drifting further away from it.

In 2010, the ratio of science to non-science students was 48:52.

But in 2014, the ratio stood at 47:53 with 29% of Form Five students enrolled in the pure science stream.

Numbers are certainly dropping in schools.

Harsheenee Anthony Khannan, 17, says there has been a significant drop of science students in her school compared to last year.

When asked why she chose arts, she says she plans on pursuing a PhD in English and did not see a need to go into the Sciences.

Having said that, she says she doesn't believe that the Science stream is difficult, so long as one likes what they are studying.

Former SMK Tropicana principal Ruth Cheah Kah Yok, 60, agrees that there are less science students compared to arts in her school.

"However, the number of science students is increasing because we have been attracting higher performing students for the last few years," she says, adding that there is a direct correlation

between high-performing students and the enrolment in the science stream.

However, all hope is not lost as some students think the science stream is the better option.

SMK Bukit Indah student Bibiana Lee-Venn says it was completely her choice to join the science stream and sees it as an "open ticket" for her future.

"I really don't know what I want to be (when I grow up) and so, my teacher put me in the science stream," she says.

She also says that being in the science stream is not as hard as people perceive it to be but then again, she also has good teachers to guide her.

For 17-year old student Raelanne Lee Min Yi, she joined the science stream because she found the subject Engineering Drawing very interesting.

She says there are actually an equal amount of science and arts students in her school.

Students should not think that the sciences are "scary", she adds.

"It may seem scary at first because we're all new to this 'higher level' of science but once you develop an interest, you'll get the hang of it."

She adds that there were students who switched streams because they couldn't cope.

The report also says that "science is not appealing to students due to a teaching approach that is theoretical, textbook-based and examination-oriented."

Parent Action Group for Education Malaysia (PAGE) chairman Datin Noor Azimah Abdul Rahim agrees.

However, she says that a core reason students shy away from the science stream is because of Additional Mathematics.

She adds that students would

a drying stream

not be interested if the teacher lacks confidence, isn't articulate, and lacks patience.

She also says parents are mostly unaware of careers in other science fields such as biotechnology, nanotechnology and environment-related disciplines.

"Parents still think that science disciplines are only about medicine, pharmacy and engineering when it is much broader than that," she adds.

"The science stream is perceived as rigid and dominated by nerds, geeks and is not cool or funky," Noor Azimah says.

The many ad-hoc changes in education policies and ineffective teaching methods were also said to be causing the disinterest in STEM.

An Education Ministry spokesperson says that the ministry is taking steps to build an interest in the sciences among students.

The ministry is reviewing the current STEM curriculum as part of the broader (curriculum) reform.

In line with the Malaysia Education Blueprint 2013-2025, new learning approaches are being used including the incorporation of higher order thinking skills (HOTS) questions.

It also encourages project-based and inquiry-based learning, for instance, through the increased use of laboratory work, student-directed inquiry and ICT games-based instructional materials.

"Further, the ministry is streamlining the curriculum to minimise content overlap with other subjects and the post-secondary STEM curricula," adds the spokesman.

As of this year, the ministry plans to introduce the science practical testing elements in the upper secondary national examinations for Biology, Chemistry, Physics and Additional Science subjects.

"In order to achieve this, the ministry has conducted a comprehensive infrastructure stocktake of the existing science laboratories to identify and address gaps in equipment and facilities," he says.

Another reason cited for the drop in interest is the lack of quality teachers and the ministry is already hard at work to upskill the current pool of teachers.

According to the *Science Outlook* report, approximately 41% of science teachers do not possess a Bachelor's degree.

Also, 70% of those holding a Bachelor of Education did not meet the requirements to enter the degree programme.

The minimum requirement is at least three distinctions at the SPM level.

"To sharpen teachers' skills and abilities, the ministry is planning to conduct a diagnostic exercise to "identify gaps in content knowledge and pedagogical skills among teachers of STEM subjects.

"This will be done through a combination of testing and lesson observations that will enable the development of a more tailored professional development approach," says the spokesman.

He adds that the diagnostic evaluation is similar to the Cambridge Placement Test taken by English language teachers and will either be developed internally or sourced from existing national or international assessments.

"The ministry (also) provide teachers with training to ensure that they are able to deliver the new curriculum effectively in 2017," he said, adding that training will focus on content knowledge and pedagogical methods required to teach the curriculum.

"With an emphasis on experimentation and application, the ministry will train teachers to draw linkages between the world that students see and the scientific world, and to use scientific ideas to explain everyday phenomena," he adds.

The ministry also hosts an e-learning video library for students on EduWebTV and covers multiple subjects including Science and Mathematics.

The short videos focus on explaining different topics and is mapped to the curriculum to make it easier for students to search for content.

The ministry rolled out the School Improvement Specialist Coaches (SISC+) for Mathematics in 2013 and is looking into ways to fast-track a similar roll-out of Science SISC+ by this year.

Association of Science, Technology and Innovation (Asti) president Dr Mohamed Yunus Mohamed Yasin believes we can cultivate an interest in the sciences if there is a suitable platform to showcase students' talents.

"Science is not just a boring subject for 'nerds' and 'bookworms'. Science is about doing what's relevant to our daily lives."

Regarding the findings of the report, Dr Mohamed Yunus says that science requires critical thinking and, if the education system doesn't encourage critical thinking, then naturally, fewer people would want to take up STEM subjects.

He says one way to encourage more students to take up the sciences is by "removing the fear of science and mathematics and allowing them to choose what they want to be."

The report took almost two years of analysing vast amounts of data and a myriad of past reports on the science, technology and innovation (STI) fields before it was ready to be presented.

Academy of Sciences Malaysia president Tan Sri Dr Ahmad Tajuddin Ali says there is "nothing new" in the issues highlighted in the report.



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Percentage of students enrolled in STEM and non-STEM streams in national schools

