Shaping pathways towards tertiary education

ROZANA SANI
rsani@nst.com.my

COME Dec 19, results for the Pentaksiran Tingkatan Tiga examination will be announced, ending the suspense for Form Three students nationwide.

While some may be overjoyed and others probably less so with the results, the release of the results marks the beginning of another journey.

Next year, the third formers will advance into Form Four, following the footsteps of millions of other students in the national school system before them, taking the first step towards preparations for higher education or employment upon finishing their secondary school education.

But what is different this time around is that these group of students will have the distinction of being the first batch of Fourth Formers under the new Secondary Schools' Standard Curriculum (Upper Secondary) or KSSM Menengah Atas.

Under the new system, students will no longer go into the conventional Arts or Science streams like before. Instead, based on student capability, availability, suitability (facilities/infrastructure), as well as consideration of each school, they will be able to choose from 89 elective subjects grouped in two packages: STEM (Science, Technology, Engineering and Maths), and Arts and Humanities.

The new packages will allow students to pick up to five elective subjects. This will be in addition to Core Subjects (Mata Pelajaran Teras) which are Bahasa Melayu, Bahasa Inggeris, Science, Mathematics, History and Islamic/Moral Studies, and the compulsory subjects (Mata Pelajaran Wajib) Physical and Health Education.

However, there are concerns as to how students should select their combination of subjects, especially with regard to entry to higher education institutions.

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Selecting subject packages

IN a briefing, Education Ministry deputy director-general (policies and development) Dr Habibah Abdul Rahim advised students to pick their subjects wisely because it paves the way for their future. She added that the students can change subjects midway through schooling, but noted that it will not be an easy feat because there will be a lot of catching up to do.

So what is the best for upper secondary school students manoeuvring the pathway to tertiary education?

What are the ways to select KSSM (Menengah Atas) subject packages that will effectively ensure students have the right qualifications for their fields of interest at tertiary level?

Students have an opportunity to curate their learning experience. This will benefit when students migrate to tertiary education, as they are more aware of the nuances of the profession of their choice.

DR LOGENDRA STANLEY PONNIAH
Head of the School of Education at Taylor's University

CONCERNS

The STEM package offers subjects grouped under Pure Sciences and Additional Maths, Applied Science Technology and Vocational labels.

The Arts and Humanities package offers students a chance to take up a combination of subjects from the Languages, Islamic Studies as well as Humanities and Arts categories. Under Humanities and Arts, there are a variety of subjects ranging from Principles of Accounting, Economy, Business, Malay Literature, English Literature and Tamil Literature to Visual Arts and Music.

The total selection of electives under both packages, according to Dr Logendra Stanley Ponniah, head of the School of Education at Taylor's University, suggests that the Education Ministry is moving towards mainstreaming vocational and technical education into conventional education.

"Students have an opportunity to curate their learning experience. This will benefit when students migrate to tertiary education, as they are more aware of the nuances of the profession of their choice," he said.

He highlighted that the role of secondary education is to broaden student perspectives and the role of tertiary education is to entrench them into specific professions. "We should not lose our equilibrium. We must be aware not to funnel the student too early and limit their possibilities."

He opined that students' perspective of the electives should be more explorative in nature than a definitive career pathway. "Students have two things working against them. One, at 16, they may not be certain what they may want to do with the rest of their life. Their thoughts and perspective are constantly evolving, so keeping a broad option is desirable.

"Second, the trend of employment and profession of the future is also evolving. How certain are we that the profession we are studying for will remain the same in the near future? One way to navigate a period of uncertainty is to study for change rather than study change itself."

Unless a student has shown a keen interest and demonstrated talent in a specific vocational/profession — or skills-based areas like culinary or coding from early on — and whose decisions are not easily influenced by trends, the best thing is to keep options as wide as possible.

"If parents believe their children have not displayed any passion for anything, they should encourage them to study conventional STEM subjects like Pure Sciences and Additional Maths because these are critical building blocks of knowledge needed for a science-based profession and career, and a requirement for such programmes at university," Logendra advised.

"Maths and Science are linear in nature — you need to learn step-by-step as opposed to Arts and Humanities where they are sequential in nature. It will be a challenge for someone to acquire them on an ad hoc basis later."

Having said that, Logendra emphasised it is important to note that students need a balance of both STEM and arts and humanities in their education.

"Some subjects like Mathematics focus on problem-solving while others like arts and humanities focus on critical thinking. They are not the same and we need both."

Education Ministry is moving towards mainstreaming vocational and technical education.

TIPS FOR CHOOSING ELECTIVE SUBJECTS

Do some self-reflection to identify strengths and potential before selecting.

Keep options as wide as possible.

Choose electives to explore the subject rather than to define a career pathway.

Balance STEM and Arts and Humanities subjects so that both problem-solving and critical thinking skills are gained.

For those who **have no clear passion,** stick to conventional STEM subjects.

For vocational or profession-based electives, **be aware of the content** of the electives. Consider background of the subject an industrial demand.

Those with clear aims in mind in terms of career pathway and direction in tertiary education must **choose their electives options accurately:**

- For foundation, matriculation and Form 6 related to science, medicine, health, engineering, biotechnology and others, choose all the pure science subjects and additional mathematics.
- For a future career in engineering, computer science, design, manufacturing or accounting, opt for three pure science subjects (which must include additional mathematics) and one STEM (applied sciences and technology) or non-STEM elective subject.
- For fields of business, fashion or new media design, take a combination of two subjects from each of these two packages: vocational, and applied science and technology.

INFOGRAPHIC NST

The announcement of Pentaksiran Tingkatan Tiga examination results marks the journey into Form Four where students will now be able to choose to study STEM and Arts and Humanities.

Choices in the new curriculum allow students to explore careers like coding and programming.

SUBJECT PACKAGES UNDER SECONDARY SCHOOLS' STANDARD CURRICULUM (UPPER SECONDARY)

CORE SUBJECTS:
- Bahasa Melayu
- English Language
- Science
- Mathematics
- History
- Islamic/Moral Studies

COMPULSORY SUBJECTS:
- Physical and Health Education

STEM ELECTIVE SUBJECT PACKAGES:
- Pure Science and Additional Maths
- Applied Science and Technology
- Vocational Subjects

ARTS AND HUMANITIES ELECTIVE SUBJECT PACKAGES:
- Languages
- Islamic Studies
- Humanities and Literature

INFOGRAPHIC NST

DETAILS

Students who have clear aims in mind in terms of career pathways and direction in tertiary education must choose their electives options accurately to ensure they reach their goals, said Associate Professor Dr Fatin Aliah Phang, an academic fellow at Universiti Teknologi Malaysia Centre for Engineering Education as well as senior lecturer at the varsity's School of Education Faculty of Social Sciences and Humanities.

"For students who wish to further foundation and matriculation studies and Form Six, related to Science, Medicine, Health, Engineering, Biotechnology and others, the option is to choose all the pure science subjects under the STEM elective which are Chemistry, Physics, Biology and Additional Mathematics after taking the core and compulsory Subjects.

"For students who wish to pursue a future career in Engineering, Computer Science, Design, Manufacturing or Accounting, opt for three Pure Science subjects (which must include Additional Mathematics) and one STEM (Applied Sciences and Technology) or a non-STEM elective subject," she added.

Professor Dr Fatin Aliah Phang

"To continue studies at certificate and diploma levels at public universities, polytechnics, community colleges and skill-based institutes in the fields of business, fashion or new media design, students should take a combination of two STEM (Applied Sciences and Technology) and two STEM (vocational) subjects."

As for the Arts and Humanities package, a student can take any combination of non-STEM elective subjects and add one subject from the STEM elective (except vocational) which will enable them to continue studies or pursue a career in the related fields.

Fatin said some of the vocational or profession-based electives may have similarities with university level courses with similar projects, contents and syllabi.

"Students and parents must be aware of the content of the electives before making the choices. Teachers who have been teaching the subjects can be consulted to know more of what the subjects have to offer and the capability of the students to take them up."

SELF-REFLECTION

Before students select their electives, they have to make several considerations apart from looking at their talent and interests.

Universiti Sains Islam Malaysia Student Affairs Division psychology officer Nor Farhana Sulaiman said the they should also consider the background of the subject and industrial demand.

"Background of the subject consists of how the knowledge/subject can be applied, how it can contribute to the community and how the whole idea of the subject/knowledge can be connected to real life so that students will get an idea of how far this subject will be beneficial to them in planning their career pathway," she said.

She noted that electives in both STEM and the Arts and Humanities packages have their own strengths and are important in building knowledge and skills needed in the industry as well as society.

"For students to know the electives they should take up, they must identify their strengths and potential. Do some self-reflection, ...what are the areas you are good at, that you enjoy exploring, and the challenges you are eager to face," she said.

Meet school counsellors for career counselling, Nur Farhana advised.

"Build a network with people in the industry such as your relative, neighbour or family friend to get the right picture of what you want to be in future.

Students can start using platforms like LinkedIn to get connected with people in the workplace or field or study. Do not wait until you enrol in the university. It will give a broader understanding of certain fields and various options to help students start planning their career pathway. It is also beneficial for them to learn and discover new things about future careers."

Siti Fatimah Abdul Ghani

Siti Fatimah Abdul Ghani, head of the Intervention Section at Universiti Putra Malaysia Registrar's Office, said the new packages under KSSM for upper secondary school students can help avoid the student-stream mismatch that was common previously.

"The options they choose will impact the course of the rest of their lives. The most important thing for students is to determine their passion... There is no point trying to shove a square peg into a round hole: if your passion is accounting, then don't accept the pressure of choosing Pure Sciences subjects, for example, just because that's where 'the smart students' are. The choice is up to you. Remember, do what you love!"

Whatever electives students choose, Siti Fatimah said they should inculcate good reading habits and a sense of inquiry as these skills will enable them to learn and grasp the knowledge and skills better.

Nor Farhana Sulaiman

UNIVERSITY IMPACT

Sunway Education Group chief executive officer Dr Elizabeth Lee said the offering of electives for Form Four students looks more like a bundling of both the Science and Arts, which she believes will be good for students as it will make them a lot more rounded in their upper secondary education.

"It should enable students to make a well-prepared and informed choice of tertiary studies as they have had the opportunity to study a variety of subjects to know what's of most interest and suitable for themselves," she said.

Dr Elizabeth Lee

Lee mused that perhaps universities need to change too and allow for more Liberal Arts subjects or electives at the tertiary level. "It is believed that in the age of robotics and AI, we need graduates to be a lot more creative and artistic as machines can and will take over the more skills-based work," she said.

Fatin, meanwhile, said universities should view the offering of vocational or profession-based electives in upper secondary as an opportunity to revise their curriculum in view of the new Secondary Schools' Standard Curriculum (upper secondary).

"For example, diploma programmes in related electives such as Computer Science, Fashion, Graphic Design and others can allow students to transfer some credits. This can shorten the study period or add other advanced content into existing diploma programmes," she said.