Engineering Education: *Producing the Leaders of Tomorrow*

IT has been said that a nation's wealth depends on the capacity of its people to learn. Under Budget 2011, the government had allocated scholarships worth RM576 million for those wishing to further their studies. This is just part of the government's effort to turn Malaysia into a high-income nation.

The question is: Will Malaysia be able to achieve this lofty ambition? JURUTERA sought the opinions of Prof. Zita binti Hj. Mohd. Fahmi, the Deputy Chief Executive Officer of Malaysian Qualifications Agency (MQA), and Ir. Assoc. Prof. Megat Johari bin Megat Mohd Noor, Director of the Engineering Accreditation Department, Board of Engineers Malaysia (BEM), to answer these questions.

Recently, Malaysia became the 13th signatory member of the Washington Accord, an agreement under the International Engineering Alliance (IEA). With the membership, Ir. Assoc. Prof. Megat said, local engineering graduates can now look forward to job opportunities among the other signatory countries, namely, Canada, the United States, Ireland, the United Kingdom, South Africa, Australia, New Zealand, South Korea, Japan, Taiwan, Singapore and Hong Kong (China).

He added, "This allows those who graduated from programs that have been accredited by the BEM to work globally without having to undergo another review or examination. For example, if they want to work in Australia, they can use their local qualifications without being re-examined."

Prof. Zita pointed out that the accreditation endorsed by the IEA carries value, and that value indicates the quality of the engineering qualifications in Malaysia. So, from the job market prospect, the quality and mobility of Malaysian engineers is higher and better compared to engineers from countries which do not belong to the alliance.

With the imminent liberalisation of ASEAN, the engineering standard has become a very important factor in the mobility of engineers. Prof. Zita said, "Today, our engineering graduates have to serve not only the country's needs, but also the needs of both the regional and international market. Despite the recognition by the IEA, local graduates cannot be complacent as they need to compete with graduates from other countries."

Ir. Assoc. Prof. Megat: "We need engineers who are able to think and solve problems efficiently, even problems that they did not foresee."

Ir. Assoc. Prof. Megat Johari bin Megat Mohd. Noor

While some may be concerned with the issue of a possible brain drain, Ir. Assoc. Prof. Megat pointed out that it was also an opportunity for local engineers to gain experience abroad and bring it back to Malaysia to jumpstart the local industry. He pointed out that the real concern lies in the fact that the pay for local engineers is not attractive.

He said, "In this increasingly globalised world, the industry cannot just rely on lowly paid engineers. They must give due recognition to them. It is a fact that fresh engineering graduates working for the government are better paid, so the private sector has to step up or else they will lose out."

Ir. Assoc. Prof. Megat stated that many developed countries boast of industries that have leading edge technology. By providing the opportunity for local graduates to be engaged in such technology abroad, Malaysia will certainly benefit from the technology transfer and knowledge gained. For example, he said, the recent Malaysia's Most Innovative Award was presented to a company which produced remote control submarine, the only one in Malaysia to do so. The company was formed by a local engineer who returned to the country after spending several years working in France.

Prof. Zita concurs, adding that, "Liberalisation forces us to achieve a high standard in everything we do. As such, we need high quality graduates to contribute to new knowledge, new production methods and better quality services for national competitiveness." She added that the country needed highly skilled labour who rely more on automation instead of manual workers.

According to her, Malaysia produces good quality engineering graduates who are comparable to those from Australia and even the United Kingdom. However, besides academic excellence, she maintained that it is just as important for these graduates to learn to adapt and adjust within a rapidly developing society. As such, young engineers should continue to broaden their knowledge even after they graduate.

Ir. Assoc. Prof. Megat stressed that Malaysia needs to produce engineers who are able to solve the problems of tomorrow to propel the country to become a high-income nation.

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He explained that engineering education in Malaysia can be very theoretical because the study duration is only four years. To extend the engineering program to five years to include practical training just like in Europe would not have been feasible. The model that is currently being practised in the country is, the university provides the theoretical knowledge, while the industry provides the practical knowledge. An engineering student needs to complete a four-year education program, then work for three years, before they can sit for their examination to become a professional engineer.

Ir. Assoc. Prof. Megat said, "Malaysia is currently producing 15,000 to 20,000 engineering graduates a year. Can our industry really support that? The most likely scenario is that 20% will receive good training, while the remainder do not. For now, it is good enough for the students to get some exposure, the industry would have to provide the additional training."

In Australia, the industry is required by law to provide practical training to engineering graduates. He said, "If we do something similar here, it would really benefit our students. We do not want just a few companies doing that, we need everybody to get involved. After all, we are building a nation, so everybody has to play their part so that we will get better quality graduates at the end of the day."

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Prof. Zita binti Hj. Mohd. Fahmi

Prof. Zita agreed, adding that, Malaysia needs this kind of collaboration and that there should be a balance between the role of the universities and how the industries can contribute. She said, "The universities of today are addressing the needs of the Malaysian Qualifications Framework with an effective internal quality system which emphasise on outcome based education, thus meeting the requirements of the engineering standards and graduate attributes as prescribed. In addition, the Ministry of Higher Education requires practical training embedded within these programmes. With all these in place, I believe the graduates of these accredited programmes possess the competencies, skills, right mindset and attitude to serve their community and society at large."

She pointed out that the globalised economy would look for highly skilled workers who are lifelong learners, and those who can adjust and adapt to new changes. Prof. Zita stressed that, in this globalised economy, graduates need skills that cut across borders, language skills, interpersonal skills and ICT skills.

Although Malaysia is currently leading the pack in the ASEAN region, local institutions have to maintain, if not enhance, the standard of their engineering programs. The institutions also have to ensure that their learning facilities and curriculum is up-to-date. The lecturers should ideally be a combination between those with high paper qualifications and those with relevant industrial experience.

In addition, these institutions should set up their own internal quality department for them to remain competitive. Prof. Zita said, "An institution capable of producing highly employable graduates, recognised to serve in the international market, generally reflects the exceptional quality and competitiveness of its programmes. This will naturally attract students from other countries to study at local institutions."

Ir. Assoc. Prof. Megat said, "Local universities should benchmark their programs against others that are better than them so that they can keep on improving. Unlike in the past where grades are the most important consideration, local universities now focus on outcome-based results. For someone to graduate, they must have exceeded a certain level in all the necessary outcome to become an engineer."

In the past five years, although he has seen some positive changes, such as the establishment of research universities and apex universities by the government, these changes are slow in coming. Another example is the involvement of the academic staff with the industry, which will help students become well versed with the industry's problems.

The BEM is currently implementing the ruling that at least 30% of the staff from an engineering program needs to consist of professional engineers. Prof. Madya Ir. Megat said, "We made it a requirement that every engineering program in Malaysia must have at least three professional engineers as part of their teaching staff. Although not everyone likes the idea now, we will reap the benefits in 5-10 years. In Canada, all their teaching staff in engineering programs must be professional engineers."

Right now, he stated that, there are one or two universities that still consider themselves as a purely teaching university. Ir. Assoc. Prof. Megat believes that this is the wrong mindset to have because elsewhere, the academic staff are required to be involved in research if the institutions offer degree programs and above. By not doing so, the university is unable to expand its wealth of knowledge, thus resulting in its students losing out.

He said, "We want to produce graduates to be leaders and captains of industries as they are the ones who will push for change. To do that, we have to overcome the negative perception that local graduates are no good. In France, everyone wants to be an engineer because the captains of industries are usually the engineers."

Ir. Assoc. Prof. Megat believes that, in just five years, Malaysia's development can catch up with South Korea provided that the government, the industry and the universities come together. As accreditation becomes even more important to this end, it is only a matter of time when the government decides that only programs that are accredited will be offered. ■