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MBOT
LEMBAGA TEKNOLOGIS MALAYSIA
MALAYSIA BOARD OF TECHNOLOGISTS

TECHIES

RETHINKING "JOBS" FOR OUR CHILDREN

Datuk Seri Panglima
Wilfred Madius Tangau

INTERVIEW WITH SHAIFUL HISHAM SAMSUDIN

Recipent of the National
Technologist Award 2016

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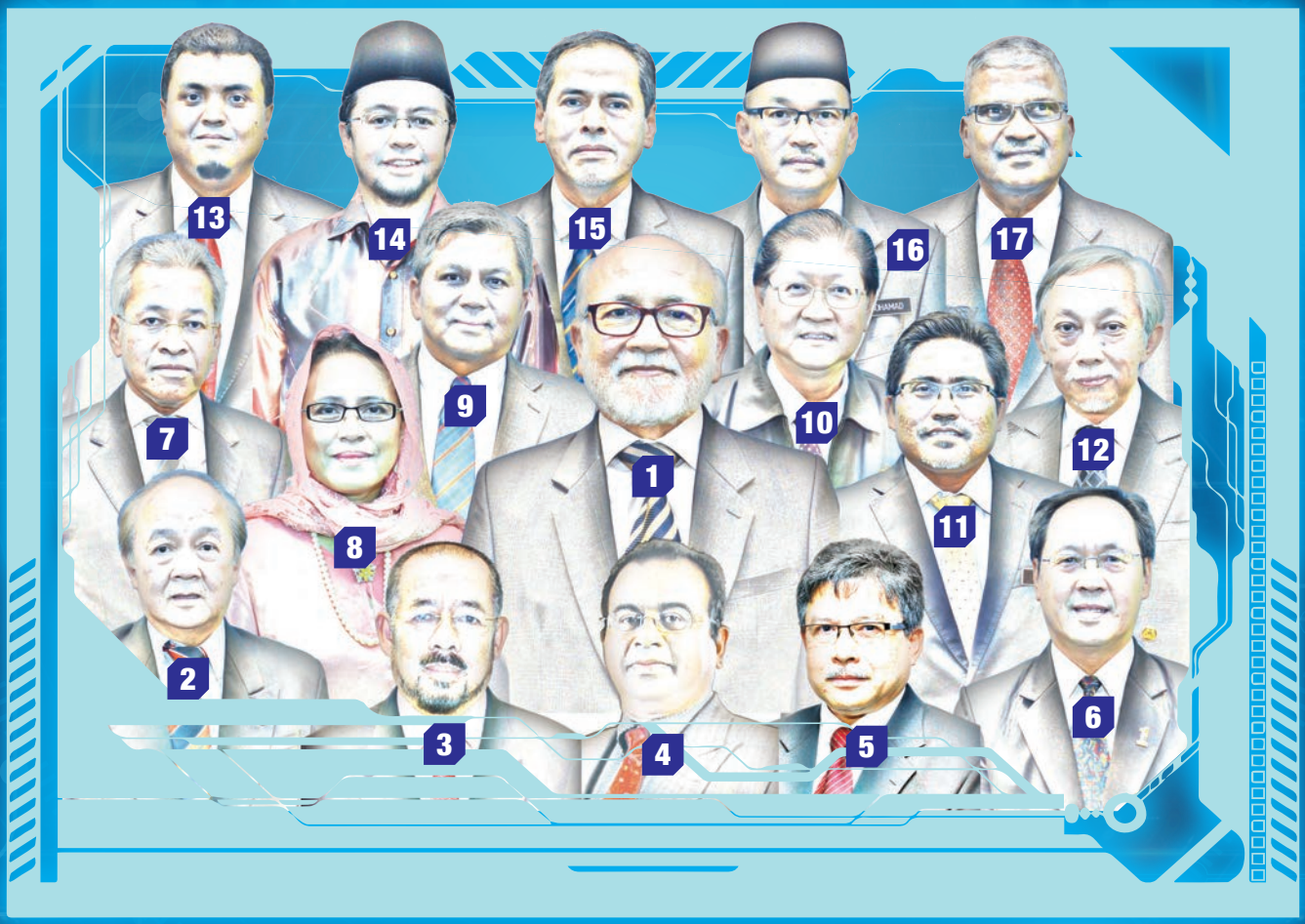

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EDITOR'S NOTE

Datin Paduka Ir. Dr. Siti Hamisah Tapsir
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Following our inaugural edition that was launched in November 2016, we have worked hard to bring out the best to our bulletin so that it truly caters the needs of both our technology and non-technology communities.

We are proud to present to you the Jan-Mar 2017 issue of TECHies. The feature topic in this issue is Robotics. We bring you a special column from the honourable Minister of Science, Technology and Innovation (MOSTI), YB Datuk Seri Panglima Wilfred Madius Tangau on rethinking "jobs" for our children. We also feature an article from Malaysia Society for Engineering and Technology (MySET). Department of Polytechnic Education writes about pathways that can be taken by graduates of polytechnics and community colleges to achieve professional status. Nano Malaysia Berhad shares some insights about the future of nanotechnology in Malaysia and the need for skilled workers in the said sector. The relations between the need for skilled worker and dependency to foreign labour are also discuss by our columnist.

Exclusive this month, we catch up with the winner of the National Technologist Award 2016, Shaiful Hisham Samsudin, highlighting his recent success in the National Innovation Award 2016. We hope Shaiful Hisham will be an inspiration to our technologists to showcase their talents at the national and international levels in the weeks, months, and years to come.

Proving our support to the government's initiatives to spark the interest of Malaysian students to Science, Technology, Education and Mathematics (STEM), we feature articles on Robotics that has become a trend in the current education world. Indeed, given its fast-rising popularity, robotics will be making huge headways in the future of STEM education in the country.

We hope this edition will inspire everyone to read, write and contribute to MBOT. Happy Reading!

FIND INSIDE

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MBOT would like to thank all those who have contributed in one way or another towards the successful publication of this bulletin.

LEMBAGA TEKNOLOGIS MALAYSIA
MALAYSIA BOARD OF TECHNOLOGISTS

PRESIDENT'S NOTE

Tan Sri Dato'Academician (Dr)
Ir. Hj. Ahmad Zaidee bin Laidin FASc

The Malaysia Board of Technologists (MBOT) was launched by the Minister of Science, Technology and Innovation, YB Datuk Seri Panglima Wilfred Madius Tangau on 17 November 2016. All efforts and hard work by several ministries, higher education institutions, organisations, board members, and personnel towards the establishment of MBOT have been paid off on this momentous day. I am confident that MBOT will contribute to the development of our country, particularly in accelerating our progress to become a scientifically advanced nation by 2020.

The inclusion of technologists and technicians into the professional list is expected to create a positive impact on the career development of TVET graduates. Engineering technologists are the doers in the technological field, and they are recognised by the Sydney Accord. Meanwhile, techicians are recognised by the Dublin Accord. MBOT will ensure technologists and technicians produced in the country are of international standards and are able to compete globally. In this sense, technologists and technicians will become professions that will be elevated, appropriately. This will enhance their reputation in the public eye, providing consumers and other stakeholders with independent assurance that the people who hold the credentials possess the knowledge, skills, and ability to practice their occupation competently.
Since MBOT was soft-launched, over 1,000 applications have been received. I would like to express my appreciation to those who applied. MBOT will go through the applications and will give each one its due consideration.

Individual experience and qualification are highly valued for work mobility and this is where MBOT plays its role in awarding recognition. Upon the completion of diploma or bachelor degree programmes, graduates can register as Qualified Technician or Graduate Technologist, respectively. Experienced Graduate Technologists can apply for the title Professional Technologist, after which they are entitled to use the abbreviation of Ts. or P. Tech. Meanwhile, Qualified Technicians are eligible to become Certified Technicians with the abbreviation of Tc. or C. Tech. Registrations for all categories can be done via www.mbot.org.my

MBOT will actively lead programmes pertinent to the networking, development and training amongst its members. One of the aims of MBOT is to create a platform for members to get to know each other, and this will enable future collaboration between them. MBOT will also assist in providing alternative paths leading to higher academic degrees. Skills and training related to recent advances in technology are a must to ensure that members possess updated knowledge, particularly in their fields of specialisation.

I look forward to the support and cooperation from all to further develop MBOT and to execute what has been charted. I appreciate the continuous support from everyone to work with MBOT so that it can give a positive impact to the nation as a whole.

ABOUT MBOT

LEMBAGA TEKNOLOGIS MALAYSIA
MALAYSIA BOARD OF TECHNOLOGISTS

- The Parliament of Malaysia has enacted the Technologists and Technicians Act 2015 (Act 768), an act to provide for the establishment of Malaysia Board of Technologists (MBOT), in line with other professional bodies in Malaysia.
- MBOT is responsible for the registration of graduate technologists and qualified technicians as well as to recognise professional technologists and certified technicians.
- MBOT promotes education and professional training in related technology and technical fields.
- MBOT recognises technological careers and empowering technical and vocational education and training (TVET).
- MBOT will strive to be a signatory to international accords in the field of technology and technical to ensure the technologists and technicians produced in the country meet the international standards and ability to compete globally.

01 VISION

To be a world class professional body for technologists and technicians

02 MISSION

To elevate the standing, visibility and recognition of technologists and technicians

03 OBJECTIVES

- To elevate the standing and recognition of technologists and technicians
- To increase the pool of skilled workforce required to attain a high income economy
- To protect public safety and health

WHO SHOULD REGISTER ?

PROFESSIONAL TECHNOLOGIST

Graduate Technologist with practical experience as stipulated by the Board

GRADUATE TECHNOLOGIST

Holds a bachelor's degree recognised by the Board

CERTIFIED TECHNICIAN

Qualified Technician with practical experience as stipulated by the Board

QUALIFIED TECHNICIAN

Holds a certified qualification recognised by the Board

RETHINKING "JOBS" FOR OUR CHILDREN

There has been anxiety around the world on whether technology would create or destroy jobs.

This was one of the main talks at the World Economic Forum (WEF) Annual Meeting last month.

Held every January in Davos, Switzerland, this annual meeting sees the assembly of over 2 500 participants from businesses, heads of states, scientists, artists, academicians and leaders from various fields that are shaping the world.

Since the last annual meeting in January 2015, the theme has always revolved around the Fourth Industrial Revolution. Here are helpful explanations of the four industrial revolutions by Deloitte:

- The First Industrial Revolution was when mechanical production facilities were powered by steam and water.
- The Second was during the division of labour and mass production with the help of electrical energy.
- The Third and perhaps where most developing countries, including Malaysia is currently at, is the automation of production by electronic and IT systems.
- Finally, the Fourth, which is also championed by the WEF, is the fusion of cyber and physical systems.

As described by Professor Klaus Schwab, the Founder and Executive Chairperson of WEF, the Fourth Industrial Revolution is the convergence of technology and the blurring of boundaries between the physical, biological and digital spheres.

According to a WEF report, "The Future of Jobs", during the period 2015 – 2020, over 5.1 million jobs could be lost to disruption in the labour market. Routine white-collar office tasks such as administrative roles would become less popular thus reducing job opportunities in these areas, while there would be a total gain of jobs in computer-, mathematics-, architecture- and engineering-related fields.

By 2020, more than a third of the core skill sets demanded by most professions would consist of skills that are yet to be considered crucial to the occupation today. The report also said that social skills in general, such as persuasion, emotional intelligence and teaching, would be in higher demand. In contrast, niche technical skills such as programming and machine operation would need to be complemented with good social and collaboration skills.

I was invited to a digital policy leaders meeting on jobs during the Forum. A participant from the industry offered an interesting analogy. The participant conveyed that the current trend in employment is not about the job itself but the role. It is about that skill badges you acquire during your role at an organisation rather than the job positions you have assumed. Another participant highlighted that companies would traditionally train their employees in their respective fields, for example, in engineering, to ensure continuous growth of the organisation.

Now, a person's ability to innovate is not determined by his or her field. Rather, with technology, everyone is empowered to innovate. This gives technologists an ever more important role to play in innovation.

This is evident when Japanese companies are doing away with their "lifetime employment system" and the "seniority wage system". The former hires employees when they are fresh out of university and are expected to remain with the company with loyalty until retirement. The latter pegs your worth to the number of years you have worked for the same employer, meaning your wage is not a reflection

of your performance or even promotion, but your seniority in the organisation.

These systems are no longer sustainable in competitive economies like Japan. Workers are now taking ownership of their roles, especially when given the right tools such as technologies. They are also always looking for a diverse range of experiences.

Robotics and artificial intelligence, for example, have reduced employment opportunities in the traditional manufacturing and construction industries in the American and European economies. Businesses would need to have a coherent strategy that re-skill the employee to work effectively with new technology. To add, governments would need to be agile in adopting new strategies to mitigate societal risks while new broad-based opportunities are created.

To address the challenges of the future of jobs in the long term, one obvious way is to rethink our education systems. In Malaysia, as a start, an education reform that subjected last year's UPSR candidates to a new format was introduced – the higher order thinking skills (HOTS).

According to one popular estimate, 65 per cent of children entering primary school today would end up working in entirely new roles that are yet to exist. We have progressed from focusing on lower order thinking skills (LOTS) in primary schools, that is, reading, writing and arithmetic, to sharpening our children's analytic skills, critical and creative thinking, and cognitive skills.
The introduction of HOTS in the UPSR examinations last year was a good start to preparing our young generation for the future of jobs. Although lesser students aced straight As in their UPSR last year due to the new format, I am optimistic that the pedagogy to help them strive in HOTS would improve over time.

Simultaneously, emerging technologies are fast-changing, that stuffing more subjects in school is not the answer. We most importantly need to teach our children how to study and think.

What is different in the Fourth Industrial Revolution is that we have to start preparing for our next role while being employed in our current one. Lifelong learning, reskilling and retraining are the key to survive the new job landscape.

According to UNESCO, TVET encompasses the study of technologies and related sciences and equips people with practical skills, attitudes, understanding and knowledge relating to occupation in various sectors of economic life. Therefore, TVET prepares our citizens to learn how to learn and adapt, rather than rigidly preparing for specific occupations, preparing us for the jobs ahead. The practicality of TVET has made the world rethink its nature and role to respond to an unpredictable future, to address sustainability issues and to promote equity.

Hence, while TVET students and professionals are very specialised in their fields, they would also have to be very adaptable by being able to acquire new skills throughout their careers.

By
Datuk Seri Panglima Wilfred Madius Tangau
Minister of Science, Technology and Innovation (MOSTI)

MALAYSIA BOARD OF TECHNOLOGISTS: TECHNOLOGISTS AND TECHNICIANS TO BE GIVEN RECOGNITION

KUALA LUMPUR, 17 November 2016 – The establishment of the Malaysia Board of Technologists (MBOT) was realised today. MBOT recognises technologists and technicians as professionals, and elevates the discipline of technical vocational education & training (TVET).

MBOT was officially launched by YB Datuk Seri Panglima Wilfred Madius Tangau, Minister of Science, Technology and Innovation. It is a professional body for the registration and recognition of Professional Technologists and Certified Technicians, in line with the Government's effort to recognise technology and skills graduates.

In his officiating speech, YB Datuk Seri Panglima Wilfred Madius Tangau stated that the 11th Malaysia Plan projected the creation of 1.5 million new jobs in 2020. "Sixty percent of the current workforce requires education and training in related technology and technical fields to move the industry," he added.

To achieve this target, it is vital to spark the interest of students to enrol in TVET courses.

Meeting this demand will require Malaysia to increase its annual intake gradually from 164,000 in 2013 to 225,000 in 2020. Yet, the challenge is not merely numbers. Industry feedback consistently reveals a mismatch between the knowledge, skills, and attitudes these graduates possess, and what is required in the workplace.

In order to accommodate the increasing number of TVET workforce needed in the industry, MBOT will play its role to ensure that the quality of technologists and technicians is parallel with the dynamic and ever-changing development and demand of the industries. Among the current trends of technology development are automation, Internet-of-things and cyber-physical systems.

In line with the 2nd strategic thrust of the National Policy on Science, Technology and Innovation (NPSTI), which is "Developing, Harnessing and Intensifying Talent in Science, Technology and Innovation (STI)", the Ministry of Science, Technology and Innovation (MOSTI) has implemented various

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programmes to increase the human capital capacity in STI. Malaysia has an overarching goal of becoming a developed nation that is inclusive and sustainable by the year 2020, with a society that is stable, peaceful, cohesive and resilient. The country needs knowledgeable, learned, ethical and civilised pool of human capital to drive a strong economic growth.

Tan Sri Dato' Academician (Dr.) Ir. Ahmad Zaidee bin Laidin FASc., President of MBOT expressed his gratitude over the acceptance of MBOT by various parties comprising the government, industry, non-governmental organisations, academia, professional bodies and student groups.

"The launching of MBOT is a moment everyone has been waiting for. Support from all parties is important to ensure MBOT achieves its objectives", he said.

To support the Nation's aspiration to face Industry 4.0, MBOT is the right platform to leverage numerous technological fields under its supervision, which will add value to various industries in the country.

Also present at the launching ceremony was YB Dato' Sri Haji Fadillah Haji Yusof, the Minister of Works, delegates from various ministries and government agencies, the industry, non-governmental organisations, academia, and professional bodies. To add, students from higher learning institutions, TVET institutions and colleges were also there.

MBOT has opened its door for registration in four categories, namely Graduate Technologists, Professional Technologists, Qualified Technicians and Certified Technicians. Holders of at least a bachelor's degree, diploma or certificate in technology and technical fields may apply online via www.mbot.org.my.

YB Datuk Seri Panglima Wilfred Madius Tangau, Minister of Science, Technology and Innovation officiating the launching of MBOT, with Tan Sri Dato' Academician (Dr.) Ir. Ahmad Zaidee bin Laidin FASc., President of MBOT (far left), YB Dato' Sri Haji Fadillah Haji Yusof, Minister of Works (2nd on the left), Dato' Dr. Mohd. Azhar Haji Yahaya, Secretary General of the Ministry of Science, Technology and Innovation (2nd on the right) and Mr. Kua Abun, Deputy Secretary General (Planning and Commercialisation) looking on.

Minister of Science, Technology and Innovation and delegates watching a drone flying demonstration during the launching ceremony.

President of MBOT on his speech

INTERVIEW WITH RECIPIENT OF THE NATIONAL TECHNOLOGIST AWARD 2016, SHAIFUL HISHAM SAMSUDIN

By
Elena Mazlan
Dr. Mohamad Asmidzam Mohamat

19 October 2016 marked a historical moment for Shaiful Hisham Samsudin when he was awarded the **National Technologist Award** during the National Innovation Award 2016 competition (AIN 2016). After his success at the National Innovation Award 2016, we caught up with Shaiful Hisham Samsudin, from Mechanical Engineering Department, Universiti Teknologi Petronas to tap into his aspiration in becoming an innovator and subsequently won his first award at national level.

1 Congratulations! We are sure this award is part of the list of great achievements in your life. How does it feel?

I am truly honoured to receive this award. It means as much to UTP as it is to me. It should really be shared by all who have contributed to the establishment of an environment of creativity within which we work everyday

The research was carried out by a team involving UTP academic staff and colleagues, namely Associate Professor Ir Dr Mokhtar Awang, Azman Ismail and Muhammad Fadhil Abdul Latif.

UTP has won this award for two years running - in 2015 and 2016. Indeed, this is a tremendous achievement.

2 The creation of a technology that is affordable is a key factor for an invention to be accessible by society. Thomas Edison once said that he would make electricity so cheap that only the rich will burn candles. Can you explain the key features of your invention and how it will benefit the society as a whole?

UTP's Friction Stir Welding (FSW) research team managed to invent two new products, namely the Adjustable-angle Fixture for Friction Stir Welding (FSW) and the Orbital Friction Stir Welding (FSW). Both products are essentially fixture/clamp devices for work pieces that can be installed and used on an ordinary 3-Axis Computerised Numerical Control (CNC) milling machine. These inventions enable the FSW process for plate and pipe to use ordinary CNC Milling machines. In other words, a specific FSW machine need not be used.

The products are economical, especially for laboratories or small scale industries, whereby FSW research can be carried out without having to spend millions of ringgit purchasing a specific FSW machine. The quality of the FSW sample produced is similar to that generated using a specific FSW machine.

With the two new products, we anticipate an increase in the use of FSW in Malaysia because of the lower starting cost of using an ordinary CNC Milling machine. This will attract laboratories and industries to be involved in FSW.

As a way forward, we are focusing on introducing these products to the public through local and international exhibitions. Furthermore, we will provide FSW consultancy services to any organisation interested to start their research on FSW.

3 Being an inventor requires perseverance and determination. What were the main challenges you faced and how did you deal with them when inventing these products?

Since 2010, we have developed a few designs on FSW fixtures for conducting FSW experiments. We finally managed to come up with the best result through the latest fixture design. The main challenge was to generate a new idea to solve a specific problem. From the idea generated, we needed to prove the concept and produce a prototype.

In order to obtain good welding, important parameters such as downward force, rotational speed, and traverse speed and tilt angle must be in the optimum range. The user through a parameter setup (CNC machine controller) can determine all the parameters. However, the welding tilt angle can only be determined by the hardware (fixture).

At the earlier stage, our research team encountered a problem while making FSW samples, specifically for plate and pipe welding in UTP. To make a FSW plate, the previous fixture required us to put small wedges under the base to lift the fixture at a certain inclination during the FSW process, where the stability and the angle precision were questionable.

To overcome this problem, our team produced a new design of the FSW fixture with adjustable-angle features to create a more stable and precise welding angle.

For a FSW pipe, the team used an orbital clamping unit (OCU), which provided support and held the pipe pieces together during the FSW process.

4 After the success of FSW, do you have another project you are working on? If so, what will you take from previous experiences onto your next work?

As a member of the Design & Prototyping Centre (DPC) in UTP, my day-to-day job requires me to work together with other UTP researchers. We incorporate the Technology Readiness Level (TRL) method into our research invention, where we are the technology enabler for product commercialisation. With guidance from the Head of DPC, Dr Mark Ovinis and fellow colleague, Nor Shahrul Abu Bakar, we are constantly challenging ourselves to be creative and to invent new inventions.

I am committed in my pursuit of further knowledge, not only to develop myself and advance my career, but to also contribute towards the development and improvement of products for the society. I am also committed towards contributing to UTP's goal to become an internationally recognised research university.

5 Through lifelong learning, one can ensure that one's knowledge and skills are abreast with the state-of-the-art technology. How do you adopt this principle in creating your invention?

It is such a blessing to be a part of UTP. I work with the great minds of the University – from the principal investigators/project leaders and academicians, to my fellow technologists. With their guidance and directions, they have helped me to understand more on the theoretical and practical part of technology.

6 Can you share with us the factors that motivate you to strive for the best?

I am highly motivated by the encouragement and constant support from the principal investigators/project leaders, lecturers, members of the research team and the technologists.

In addition, the research and state-of-the art laboratory facilities in UTP play a major role in my work.The research environment and the culture of innovation and creativity that we have is very much geared towards new findings and breakthrough inventions.

The management has also been very encouraging and supportive. Indeed, it would not have been possible without all these supporting factors and features.

Most of all, my family plays a major role for me in becoming an inventor. I cannot thank them enough for their moral support and belief in me. I would like to dedicate this win to my mother Hindun Sulaiman, my wife Nor Arizan Muhamad Nor, and my children Nur Dina Syazwani and FarisSyazwan.

7 In your opinion, what are the strategies that could be implemented to produce more inventors in the future? What are the qualities that should be possessed by researchers and inventors?

Nowadays, schools have started their own research and innovation activities. This is important as we need to expose and educate children on the importance of innovation and invention at an early age. This way, we can tap into their full potential to create and generate new ideas and innovations.

I also believe that science and technology are fundamental to solving some of our country's challenges. To add, we need to instill a culture of creativity, as it is a crucial attribute that all researchers must possess.

The government has always been supportive in nurturing research and innovative culture in Malaysia through various programmes and incentives. This should be continued indefinitely.

> **"I also believe that science and technology are fundamental to solving some of our country's challenges. To add, we need to instill a culture of creativity, as it is a crucial attribute that all researchers must possess."**
>
> Shaiful Hisham Samsudin

Editor's Note: TECHies would like to thank Universiti Teknologi Petronas (UTP) for their cooperation in making this exclusive interview section possible. We are honoured to be able to publish this winning. This reflects MBOT's support to alleviate the standard of Malaysian Technologists.

A glimpse of Anugerah Inovasi Negara
*AIN is an annual event of the Ministry of Science, Technology and Innovation Ministry (MOSTI), aimed at recognising local inventors who innovate products and services. Any inquiries about AIN can be directed to the Development, Services and Acculturation (DSA) Division of MOSTI.

TVET Graduates vis-à-vis Foreign Labour

By Dr. Naimah Md Khalil

The Malaysian economic agenda outlined in the 11th Plan is expected to create 1.5 million jobs by 2020, 60% of which are expected to require technical and vocational education and training (TVET) qualifications. According to National Economic Advisory Council, currently, the country has a workforce of about 12 million, of which only 28% are highly-skilled, while 60% are employed in small and medium-sized enterprises.

DEPENDENCY TO FOREIGN LABOUR

Malaysia has a large number of foreign labour. In 2010, the number of registered foreign workers reached approximately 2.0 million, which is about 17% of total employment. The figure is possibly doubled if the illegally employed foreign workers in Malaysia are included (Ministry of Home Affairs 2011; Amnesty International, 2010).

Foreign labour is mainly concentrated in the manufacturing, construction, and agriculture sectors. Malaysia Digest's website reported that Malaysian workers have better education attainment compared to foreign workers. World Bank Internal Report to the Ministry of Human Resources of Malaysia in 2013 cited that as such, foreign workers close the shortages at the low end of the human capital spectrum.

While the over-arching policy is to produce higher value-added goods and services, the truth is that large segments of the economy is still very much dependent on low-wage and low-skilled foreign labour who do not contribute to economic growth (Asia News Network, 2016).They are also said to take away jobs from Malaysian workers and depress the Malaysian workers' wages. To add, they also cause firms to have less incentive to invest in superior technologies and to upgrade their investments (Malaysian Journal of Economic Studies, 2015). This is viewed as a critical roadblock on Malaysia's journey to becoming a high-income economy by 2020 (Malaysian Journal of Economic Studies, 2015).

TVET AS THE DRIVER OF THE COUNTRY

Thus, to ensure the success of Malaysia becoming a high-income nation, the availability of a skilled workforce in all sectors is necessary. This is so as to support activities targeted towards a knowledge-based economy, where labour productivity is targeted to expand by an average of 3.7% annually as documented in Eleventh Malaysia Plan 2016-2020. Economists argue that without a rise in productivity - measured in the production of higher value-added goods and services - wages will continue to be low (Asia News Network, 2016). In that regards, TVET has been identified as a game changer and one of the most critical drivers of the country's transformation from middle to high-income nation.

RECOMMENDATIONS

TVET graduates play an important role in realising the country's aspiration to be a high- income nation. But unless there is a better wage scheme or better working conditions and job security, especially for the unattractive economic sectors (for example, in the construction industry), these graduates might opt to find jobs in greener pastures in other countries. This would be a great loss for the country, which has invested heavily in their training. In actual fact, Malaysian corporations can afford to pay their workers more. Our national gross national income (GNI) indicates a 30:70 ratio of wages-to- business profit. This is far behind more developed economies' at a 60:40 ratio (Malaysian Trade Union Congress, 2016). To pay more means the initial cost will be increased, but in the long term, we will be building a stronger economic foundation based on quality.

Industry players need to control the proportion of foreign workers in the industry by changing their business practices - mainly through the introduction of technology. For example, in the construction industry, the use of industrialised building systems could encourage greater participation from locals. This can also lead to other competitive advantages, such as faster construction and improved quality control. Through government policies, incentives can be formulated to encourage industries to adopt technology and mechanisation in order to reduce dependence on foreign labour.

At the same time, industry-led TVET should be strengthened. TVET curriculum should take into account skills development in science and technology, robotics, and ICT. It should also anticipate skills requirement for the future, like the one stipulated in Industry 4.0. At the same time, soft skills, which include competencies that help workers navigate the cultures of workplaces, communicate effectively with others, solve problems, use creativity to manage resources and their emotions effectively, need to be emphasised. These competencies will subsequently translate into higher productivity and enterprise competitiveness.

As such, some measures have been proposed to ensure the employability of TVET graduates and to increase their salaries. This way, our dependence on foreign labour will gradually decrease. There should ideally be zero foreign labour in the service and manufacturing sectors, while in the construction sector there should be a maximum of 30% only. In the agro based/plantation industry, the number should be 50% or less (Malaysian Trade Union Congress, 2016). Indeed, reducing our dependence on low-cost and low-skilled immigrant labour will go a long way to generate a productivity-driven production base.

MySET – Nurturing 21st Century Professionals

Professor Emeritus Dato' Abang Abdullah Abang Ali
President, Malaysian Society for Engineering and Technology (MySET) & Board Member, Malaysia Board of Technologist (MBOT)

The robust and continuous expansion of opportunities in higher education through the setting up of several new public institutions of higher learning (IHLs), as well as the promotion of growth of private higher education in the country by the Malaysian government is highly encouraging. It is also commendable to help meet the nation's needs for a talent pool of highly-trained and skilled graduates and professionals. In order to further enhance Malaysia's competitiveness in the global market place, the country must radically accelerate and intensify its human capital development programmes.

To provide a platform for the professional development of members of the engineering fraternity, the Malaysian Society for Engineering and Technology (mSET) was formed in 2008. It provided professional development for engineers, engineering technologists as well as technicians, with an emphasis on collaborative work of multi-disciplinary teams, which include professionals such as architects and quantity surveyors. Thanks to the efforts of a dedicated team of members, mSET grew steadily, both in terms of membership and number of activities, to become a powerful organisation with an expressed intention to Nurture 21st Century Professionals.

This mammoth task was for the benefit of over half a million engineers, engineering technologists and technicians out there who were provided with facilities and opportunities for professional development that would eventually enable them to qualify as professionals. Yet another initiative was taken by the academic staff of Universiti Kuala Lumpur (UniKL) through the formation of a new society called Malaysian Society of Engineering Technologists (MSET). MSET focused on the engineering technology profession, to ensure that engineering technologists were effectively recognised as important members of the engineering workforce in the country.

Soon after, it was decided that the consolidation of the two societies was of paramount importance. Hence, a new entity called the Malaysian Society for Engineering & Technology or MySET was founded. MySET is a stronger, all-encompassing entity catering to the entire multi-disciplinary and multi-level technical fraternity, comprising engineers, engineering technologists, technicians, architects, surveyors, IT and other allied professionals.

Since engineering is the largest professional group in the country, MySET is keen to engage with the government and relevant agencies in sharing expertise and providing feedback on a comprehensive range of

engineering and technology issues in the country. The recent formation of the Malaysian Board of Technologists (MBOT) to register technologists and technicians in the country is an encouraging initiative by the government. It is hoped that MBOT shall facilitate the professional development of technologists and technicians in the country.

MySET collaborates with other engineering societies, in particular the Institution of Engineers, Malaysia (IEM), which focuses on engineers, and the Technological Association of Malaysia (TAM), which focuses on technicians. MySET and IEM are recently involved in the Medinah and Makkah Accords, which are initiatives under the Engineering Qualification, Accreditation and Professional System Project (EQAPS), under the Federation of Engineering Institutions of Islamic Countries (FEIIC).

MySET is also involved with the Arab and International Commission for Reconstruction of Gaza, based in Amman, Jordan. It has since built some 84 emergency shelters in Gaza after the recent war. MySET is also involved in helping the people of Kelantan build affordable housing in Dabong, Kelantan, after the recent flood. Since humanitarian work is important due to increasing incidences of natural and man-made disasters, MySET has formed a humanitarian foundation called MyREF to assist in engineering humanitarian work.

Members of MySET have assisted the Board of Engineers, Malaysia (BEM), in seeking full signatory status of the Washington Accord, which

allows international benchmarking of Malaysian engineering degrees. The Washington Accord also facilitates international mobility of engineers. MySET is committed to assist in the achievement of signatory status of the Sydney and Dublin Accords for the international recognition of Malaysia's engineering technologist and technician qualifications. MySET has also recently been granted the right to conduct the Professional Assessment Examination by the BEM. Success in this examination will qualify engineering graduates to become Professional Engineers.

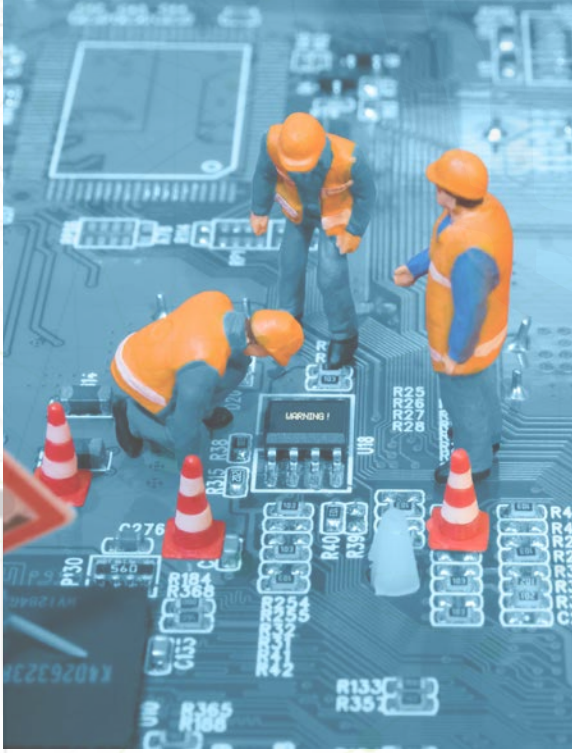
MySET members are highly qualified both academically and professionally to assist the country in its journey of rapid transformation towards becoming a fully developed and high-income nation. We look forward to more contribution in the future insyaAllah.

COMMERCIALISING NANOTECHNOLOGY WITH MBOT CERTIFIED WORKFORCE

Malaysia's vision for 2020 in the nanotechnology field is clear and beneficial for the country in terms of economic growth and human capital development. With the establishment of NanoMalaysia Berhad, a Company Limited by Guarantee under the Ministry of Science, Technology and Innovation (MOSTI) with the clear mandate to commercialise and industrialise nanotechnology, Malaysia is working on the right trajectory to gain at least 5% share of the nanotechnology global market which is expected to grow to USD 3 trillion by 2020. NanoMalaysia's Chief Executive Officer, Dr. Rezal Khairi Ahmad in one of his commentaries stated, Malaysia not only will grow in terms of economy driven by nanotechnology but more importantly will provide high value job opportunities to Malaysians.

NanoMalaysia Berhad is committed towards spreading the knowledge and awareness of nanotechnology to the community.

The projection is partly contributed through Malaysia Commercialisation Year (MCY) where NanoMalaysia is promoting five nanotechnology based products which are under its facilitation programmes namely iNanovation and National Graphene Action Plan 2020. The five products committed to MCY are
(i) nano-silica for tyre application and building insulation,
(ii) ultracapasitor for energy storage in transportation, solar farms and telecommunication,
(iii) nano-enhanced socks for every day wear,
(iv) graphene conductive ink for Radio Frequency Identification system and sensors, and
(v) thermally conductive nanocomposites for electronic heat-sinks.



The production of the aforementioned products committed to MCY did not happen overnight and definitely not by a single person's effort. NanoMalaysia's National Graphene Action Plan 2020 for instance, is a platform of collaboration between the government, industries and research communities. Projects activated under the action plan will naturally require high skilled individuals to innovate graphene based products with the companies. As one of the key outcomes of the action plan, 9,000 jobs will be created by 2020 of which 3,000 are of high value. These high value jobs involved in graphene innovations revolve around technical aspects of the production which includes testing, processing, certification and packaging. These activities will require high skilled technologists and technicians as the backbone support to the product engineers.

Through the establishment of Malaysia Board of Technologists (MBOT) with the mission to elevate the standing, visibility and recognition of technologists and technicians, these 3,000 high value jobs targeted in the National Graphene Action Plan 2020 shall obtain local and world recognition. These job opportunities created by the National Graphene Action Plan 2020 will be value-added with MBOT's recognition and certification.

Graphene conductive ink for Radio Frequency Identification system and sensors

Nano-enhanced socks for every day wear

With Malaysia's aspiration to become a global player in the commercialisation of nanotechnology, MBOT's role to create globally accepted and recognised technologists and technicians for the industries becomes very crucial. Looking at the larger picture, various organisations in Malaysia have started venturing into nanotechnology businesses. Hence, the launch of MBOT this year is timely and appropriate to support MCY, achieving Vision 2020 and beyond.

NanoMalaysia not only focuses on generating wealth for the country but was also mandated to facilitate the development of human capital (research scientists and engineers, and professionals) in nanotechnology-enabled industry. Furthermore, the field of nanotechnology extends into multiple different industries, including medicine, food science and electronics, of which nanotechnology experts and professionals can be developed from those various fields.

Hence, NanoMalaysia believes MBOT's role will complement the effort of developing right skilful workforces to attain a high income economy in the Fourth Industrial Revolution era through these four jumpstart sectors, (i) Electronics Devices & Systems, (ii) Food and Agricultural, (iii) Energy and Environment, and (iv) Wellness, Medical and Healthcare. Each of the key sectors will require technologists and technicians with MBOT certification for start-ups companies, SMEs and large industries innovating nanotechnologies.

Congratulations to MBOT on its establishment and NanoMalaysia will always support your vision to become a world class professional body for technologists and technicians.

YB Datuk Seri Panglima Wilfred Madius Tangau with National Graphene Action 2020 collaborating companies during the MoU Exchange Caremony on 3rd March 2016

ROBOTICS LEARNING AS A TOOL FOR TECHNOLOGY EDUCATION IN SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM)

By: Norzilawati Md Kamsor, Mohd Firdaus Nawawi & Elena Mazlan

Paradigm Shift in Educational Method

The rapid advancement of technology has a clear impact on the education system of a country. The urgency to keep up with technological trends has therefore been recognised by Malaysia. Under one of the 11 shifts in the Malaysia Education Blueprint 2013-2025 (Preschool to Post-Secondary Education), the use of technological tools in classroom learning is put forward.

Robotics education was first introduced in 2005 by the Ministry of Education Malaysia to enhance the elements of technology in the syllabus. It was incorporated into primary and secondary school co-curricular activities throughout Malaysia to elicit creativity and innovation among students. This aims to encourage and motivate students to use high order thinking skills (HOTS). It also acts as a way to promote science and technology, in line with Malaysia's effort to spark more interest in Science, Technology, Engineering and Mathematics (STEM) among students.

Robotics as a new method to technological education at school level

Rapid advancement in technology has called for the need to train students to be creative and innovative, as well as to possess high quality problem- solving skills. This is important to meet job market demands leading to a higher quality of life in the 21st century.

Preparing for a high-tech nation starts at school level. The reality is that the workforce is fundamentally shifting, and the fastest-growing industries require skills that are not taught in the classroom. When jobs go unfilled, it is not down to a shortage of people, but to a shortage of skills. With economies that are now more technology and service-oriented, there is an urgent need to change classroom teaching methods by making collaboration and creativity central to the student's learning experience.

The advancement of modern technology, especially in crucial fields such as computer and automation, makes for a continuous demand for highly motivated and skilled engineers. In order to meet this demand, technology curriculum is required at school level to give students insights and exposure into engineering fields.

Robotic at Pusat Sains Negara (PSN)

Students nowadays will only thrive when exposed to 21st century methods of teaching, like blended learning, flipped classroom, project-based learning, gamification and simulation. Moving hand-in-hand with the change in the education system in Malaysia, Pusat Sains Negara (PSN) has taken initiatives to promote robotic learning in schools. PSN is committed to collaborate with private partners and educators on its journey to redefine technological learning. It is vital that students' learning experiences stimulate the development of essential life skills like computation, along with communication, collaboration, critical thinking, creativity and curiosity.

Robotic Modules for Pre-school, Primary & Secondary Students

Through a few hours of guided work, students will be able to build simple robotic programmes using special robotic learning kits. They are expected to overcome several challenges in making movable robots designed specifically for primary and secondary students. The experience gained combine fun learning elements with basic robotic knowledge. It consists of simple mechatronic and robotic programming, and gives an opportunity to learn valuable hard and soft skills by building and coding robots from scratch.

PSN offers a few robotic programmes through its daily booking system. Parents, teachers and individuals have the choice to book any robotic programmes that suit their needs. The programmes, tailor-made for preschool, primary and secondary students, give opportunities to engage in hands-on explorations with specific tools to construct movable robots using constructionist and basic coding knowledge.

An education module that incorporates robotic elements for preschools, the Robo-Brush module, is one where

preschoolers are encouraged to use their creativity to design two-dimensional robots using clay. Students get to see how the robots operate by integrating electrical elements. Creating a robot that can move teaches students important physics concepts. The aim of the module is to expose the basics of robotics to students in the most engaging manner.

Meanwhile, primary and secondary students enjoy dedicated robotic programmes tailored specially for them, such as Robo-Bugs, Rero Robots and NXT Lego Mindstorm. These robotic education modules touch the creativity side of students on their way to be a "maker", with focus on high-tech edutainment.

Science, Technology, Innovation and Robotics Program (STIR)

STIR is one of PSN's efforts in reaching out to rural or sub-urban students in Science, Technology, Innovation & Robotic. STIR becomes one of the platforms for school students to develop engineering skills through a series of workshops and robotic competitions. It was introduced in 2015 as a culmination of several engineering and robotic programmes conducted by PSN and its partners. In STIR 2016, there were three national competitions, namely the Amphibian Electrical Vehicle (AEV), the Indoor Solar Car Competition (ISCC) and the Mini Robot Competition. Each of the competition comes with its special robotic workshop, where participants learn basic robotic knowledge. The main objective of STIR is to create awareness and interest in robotic technology among students and the community.

In 2016, STIR received participation from over 300 students nationally. Parents and teachers gave their full support and encouragement to the participants, reflecting the acceptance of society members towards the importance of robotic learning. With the exposure and skills gained, youths are expected to turn into technology-creators needed by the Nation rather than just technology-users.

Deputy Minister of MOSTI, YB Datuk Wira Dr. Abu Bakar Mohamad Diah with the winner of National Robot Combat Competition 2016

National Combat Robot Competition

Using Robot Wars as a concept has driven communities in higher learning institutions, national training institutes, polytechnics and personnel in small robotic industries to participate in the National Robot Combat Competition 2016. The competition is seen as a platform to promote robotics as one of the important technological convergences in the new industrial revolution.

The National Combat Robot Competition aims to test the practical knowledge of our youngsters in basic mechatronic, mechanical and engineering skills that are essential in their mission to win the challenge. Participants are given the task to build robots using their own creativity innovation and knowledge.

Last year, the 2nd National Combat Robot Competition was organised, with the theme "Resist or Surrender". The robotic arena was flooded with supporters and 40 teams comprising 250 members from different educational backgrounds, including public and private universities, Institutes of Industrial Training (ILP), MARA training institutions (GIAT MARA), polytechnics, small medium companies (SMEs) and individuals. The battle was exciting and had attracted huge crowds.

After a round of explosions, thuds and clashes, Bertam Team from Institute of Industrial Training (ILP), Kepala Batas, Pulau Pinang was crowned as the champion. The 1st runner up was ADTEC Team from Pusat Latihan Teknologi Tinggi ADTEC, Melaka and the 2nd runner up was ROKU Team from DH Robotic & Automation Company.

The competition recognised the aesthetic value of the designs and the efficiency of the robotic technology with The Best Design Award and The Best Technology Award. The awards were given to Advanced Technology Training Center Melaka and DH Robotic & Automation, an SME based in Malacca, respectively.

Most of the winners hailed from technical training institutes. This implies that our talents in technical training institutes do have qualities and capabilities that are compatible to university students when dealing with specific tasks, missions or problem solving skills throughout the challenge. In our race to become a competitive country in the new millennium, it is essential to fill in the gaps between the quality of our school leavers and what the industry needs in the future. With proper training and clear direction, our young talents can be molded into professionals or skilled workers needed by the new technology age.

Robotics Education: Future and Promises

Progress in robotic education has changed the way knowledge is being thought beyond the classroom. A dynamic robotics learning experience not only encompasses all four pillars of STEM education, it also encourages other life survival skills like teamwork, communication and critical thinking.

Robotics Education : Emerging Trend in Technology Education

By Assoc. Prof. Dr. Muhammad Fahmi Miskon

The Institute of Electrical and Electronics Engineers (IEEE) Robotics and Automation Society (RAS)

The Institute of Electrical and Electronics Engineers (IEEE) Robotics and Automation Society (RAS) Malaysia is one of the 24 IEEE Malaysia Section technical chapters in Malaysia. IEEE is a non-profit organization and is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity. IEEE and its members inspire a global community to innovate for a better tomorrow through its more than 420,000 members in over 160 countries, and its highly cited publications, conferences, technology standards, and professional and educational activities. IEEE is the trusted "voice" for engineering, computing, and technology information around the globe.

IEEE RAS Malaysia strives to advance innovation, education, as well as fundamental and applied research in robotics and automation. Robotics focuses on systems incorporating sensors and actuators that operate autonomously or semi-autonomously in cooperation with humans. Robotics research emphasizes intelligence and adaptability to cope with unstructured environments. Automation research emphasizes efficiency, productivity, quality, and reliability, focusing on systems that operate autonomously, often in structured environments over extended periods, and on the explicit structuring of such environments.

The society provides aid in promoting close cooperation and exchange of technical information among its members and affiliates, and to this end holds meetings for the presentation of papers and their discussion, sponsors appropriate periodicals and special technical publications, and through its committees studies and provides for the needs of its members and affiliates as well as supporting robotic and innovative competitions and talks around Malaysia. Almost annually IEEE RAS Malaysia organizes the society flagship competition and conferences i.e. the IEEE International Symposium on Robotics and Manufacturing Automation (IEEE ROMA), the IEEE RAS International Robot PRIDE Competition and the IEEE International Symposium on Robotics and Intelligent Sensors (IEEE IRIS). Last year, the IEEE ROMA was conducted as part of the Robot Fiesta Malaysia 2016 held in Universiti PETRONAS Malaysia and IEEE IRIS was conducted in Tokyo, Japan. PRIDE competition was held during both of the events
.

As a society that promotes innovation and education in robotics and automation, the use of robots in education is highly encouraged and 'robots in education' has become one of the regular tracks in any of the RAS Malaysia conferences. In fact the PRIDE competition which is endorsed by the Ministry of Science, Technology and Innovation Malaysia (MOSTI) and Ministry of Education Malaysia (MOE) received participation from primary and secondary schools as well as from colleges and universities. Private robotic clubs also often send children that enroll in their courses to join in the competition. Having to innovate and then to defend ideas to international judges exposes the participants to an innovation culture.

An innovation competition such as PRIDE is the pinnacle of excellence in Robot education. In its background, many courses that teach and use robots in education become the platform for creating the pool of talent from various levels.

In institutes of higher learnings (IHL), colleges as well as secondary and primary schools, robots are used as educational tools for science, technology, engineering and mathematics (STEM) teaching and learning activities.In IHLs, dedicated robotic coursesare designed to prepare graduates for robotics related jobs such as designing new robots and applying existing robots for industrial automation. Other courses use robots as means to demonstrate abstract concepts in STEM, to increaseengagement as well as to expose students to skills required in the futureincluding computational and critical thinking, complex problem solving and creativity. Robotic projects allow learners to be actively involved in knowledge construction. Learners will achieve in-depth understanding of the subject matters by relating their existing information with the new information they obtain while working in robotics project.

Robotics Education in Classroom

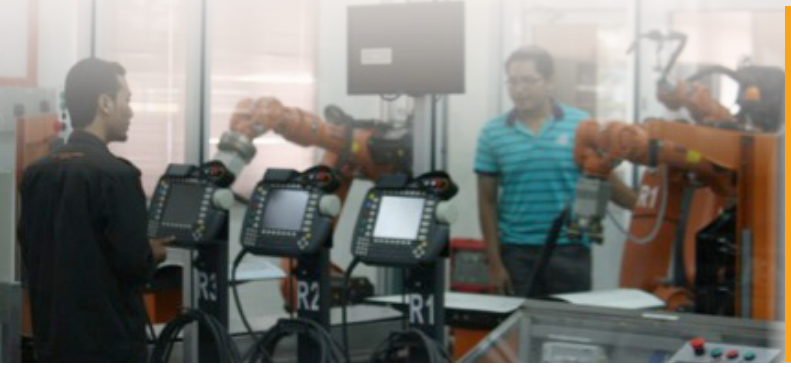
The multidisciplinary knowledge involved in robotics study can systematically be categorized into knowledge in science and technology applications.These includestatics and dynamics, kinematics, mechanisms, controls, sensors, actuators and drives, communications, programming and computing. Many branches of mathematics including algebra, geometry, trigonometry, calculus, probability and statistics areappliedin many of the long lists of disciplines mentioned. In many occasions, other disciplines includingbiology, psychology, computer science, chemistry and even geography arealso involved in branches of robotics study.Considering the multidisciplinary nature of robotics, curriculum design for teaching and learning using robotics has a lot of room to be creative. Almost any knowledge, no matter how basic or how advanced, can be leveraged by the use of robots during learning.

The resources needed in using robots in the classroom must be taken into account before committing to the robotics learning approach. This is

to ensure the ability to sustain the operation and maintenance of the robots and to come-up with a suitable approach in conducting robotic classes. One of the obvious factors is the much higher financial burden to purchase and maintain a robot. Another factor is the requirement to have the expertise to operate the robot. Instructors must also commit to the extra effort required to design suitable learning material and preparation of the robotic modules. They must have the patience and knowledge to troubleshoot many of the technical problems that arise. They must also consider the amount of access and equal opportunity that each individual student will have in interacting with the robot. The capacity of using a robot must be carefully built before the learner is exposed to more complex robotic tasks. Other risks involved in having a robot in the classroom should also be considered. These include the safety of the user and the robot, equipment downtime, incompatibility and limited licensing of the programing software and overwhelming task for the learners in robotics project. With these factors in mind, one needsto carefully think of the worthiness and return of investmentin using robotics in education.

With the huge amount of investment being poured into having robotic technology in the classroom, the utilization of the robot must be optimized. Alignment between all courses that build up the capacity of the learner to use the robot should be done prior to choosing the type of robotic brand. Robotic simulation software that is compatible with the robotic platform should be considered instead of having too many duplicates of the robots. This will reduce cost, improve safety as well as provide more access to students to the learning materials. Moreover, the procurement must carefully consider the period and coverage of the warranty and after sales service.

In conclusion, even though having robots in class is highly beneficial, careful planning and consideration should take place before committing to having robotics modules for the classroom. Appropriate teaching methods need to be formulated and integrated into school curricula to ensure efficiency and effectiveness in deliverables.



Bibliography:
Dr. Fahmi is an associate professor in Universiti Teknikal Malaysia Melaka (UTeM) and an Executive committees (Social and Education) IEEE Robotics and Automation Society (RAS) Malaysia 2017. He was the former Vice Chair IEEE Robotics and Automation Society (RAS) Malaysia 2016. He has a PhD. in ECSE (Robotics) Monash University, Australia.

ROBOTS FOR MEDICAL APPLICATION

By Prof. Madya Dr. Kushairy Abdul Kadir

Current robot technologies are used for jobs that are tedious, dirty, or dangerous, or for projects that demand more speed, precision, or endurance than a man can offer, such as welding, painting, and assembly tasks. Thus, robots have become an important element of production in industries ranging from electronics to the automotive industry.

One of the recent trends in robot application is in the field of medical robot. As the world population grows older there are increased needs of healthcare services. To meet these needs, a number of medical robots have been developed. From surgical to rehabilitation and home care, the robots look set to transform the healthcare industry.

Da Vinci Surgical System

Surgical Robot : In operating theatres, robotic systems are used in both soft and hard tissue surgeries. These robots, while not yet autonomous, greatly enhance the capabilities of surgeons, allowing the surgery to be done with greater precision, using smaller incisions resulting in less blood loss and quicker healing time. They also enable remote surgeries.

Rehabilitation Robot : Rehabilitation is defined as "a set of measures that assist individuals who experience, or are likely to experience, disability to achieve and maintain optimal functioning in interaction with their environments". Rehabilitation generally concerns the regaining of lost functions (motor, cognitive, sensory, etc.). Rehabilitation robots assist in therapeutic training and assessing the sensorimotor performance of the patient. Therapy based robots are used to increase the efficacy of the therapist's work given that exact measurements are now possible through sensor technology such as an electromyogram (EMG) and electroencephalogram (EEG). This will allow the therapist to better gauge the improvements or decline of a patient's progress, saving time in the process.

Lokomat Gait Therapy by Hokoma

Panasonic Autonomous Delivery Robots HOSPI

Autonomous Delivery Robot : perform the delivery and transportation tasks to free clinical and service staff to focus on patient care. The robot is equipped with security features to prevent tampering, theft and damage during delivery. With advance sensors and programmed with the hospital's map data the robot can avoid obstacles such as patients in wheelchairs and complete deliveries with minimal supervision. New hospital routes can be programmed in advance, allowing flexibility. The autonomous robot communicates and relays information on its whereabouts to the control centre, enabling its location to be monitored and recorded at all times.

Medical Robotic Future in Malaysia

Malaysia is not much behind in the use of medical robotics. Since the introduction of Da Vinci robot in Malaysia around 2005 (one in HKL and one in Sarawak general hospital), it has been successfully used for cancer surgery especially on prostatectomy surgery. As more robots will be used in medical applications, there are many opportunities for Malaysian universities to venture into such research and to create local medical robot technologies in the future.

Robotic Assisted Surgeries

Prince Court a private medical centre in Malaysia offering robotic assisted procedures using the da Vinci Surgical System

Source: malaysiahealth.com, 17 June, 2009

PATHWAY TOWARDS PROFESSIONAL STATUS FOR GRADUATES OF POLYTECHNICS AND COMMUNITY COLLEGES

By:
Noor Aidil Nadzri
Head
TVET Special Projects Department
of Polytechnic Education

Technical and vocational education and training (TVET) initiatives under the 10th Malaysia Plan have improved public perception on TVET, resulting in a significant increase in TVET enrolment from 113,000 students in 2010 to 164,00 students in 2013. With such a significant increment, further emphasis is given to TVET under the 11th Malaysia Plan, whereby, intake of SPM leavers to TVET programmes is targeted to increase from 164,000 in 2013 to 225,000 in 2020.

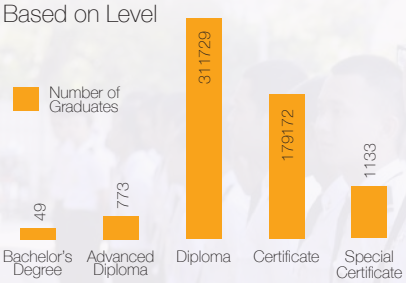
Polytechnics and community colleges under the purview of the Ministry of Higher Education Malaysia (MOHE) are TVET institutions at post-secondary level offering programmes from certificate to Bachelor's degree. The Boston Consulting Group 2011 reports that enrolment across all industry sectors is highest in polytechnics and community colleges combined,with a total of 63%, compared to only 15% in Giat MARA, and 9% in institutions that are under the Ministry of Human Resource.

Polytechnic education began in Malaysia with the establishment of Ungku Omar Polytechnic Ipoh, in 1969, under the United Nations Development Plan. The need to provide wider access to technical education and training for the country was given prominence by the Cabinet Committee on Education in 1979 and in the First National Industrial Plan (1985-1995). In addition to decisions made by these committees, the Cabinet Committee on Training (1991) paved the way for the development in Polytechnic education. As a result, there was an increase in the number of polytechnics. These institutions were able to offer more programmes that catered to the demands of semi-professional personnel in the engineering, commerce and service sectors. On 26th March 2010, the Cabinet further deliberated and approved the Higher Education Memorandum to Establish Four Maximising Education and Training Opportunities (METrO) Polytechnics in the 9thMalaysian Plan. Currently, there are 33 polytechnics in operation throughout the country.

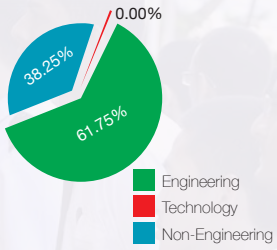
The idea to establish community colleges was put forward via a memorandum that was presented by the Minister of Education to Cabinet Members on 5th July 2000. The Cabinet was receptive to the idea as it was seen as the hub for life-long learning (LLL). There are now 93 community colleges operating throughout Malaysia.

To-date, a total of 492, 856 students have graduated from polytechnics since their establishment in 1969.

Number of Polytechnic Graduates Based on Level



Polytechnic Graduates Based On Cluster



Diploma / *Diploma*

TAHUN / YEAR	BIL. LULUSAN NO. OF GRADUATES
2008	301
2009	435
2010	400
2011	3
JUMLAH / TOTAL	1139

Sijil Kolej Komuniti (2003-2014)
Community College Certificate (2003 – 2014)

TAHUN / YEAR	BIL. LULUSAN NO. OF GRADUATES
2003	997
2004	1637
2005	3375
2006	4065
2007	4333
2008	5379
2009	7242
2010	7063
2011	6621
2012	5727
2013	3282
2014	6483
JUMLAH / TOTAL	56 204

Sijil Kolej Komuniti Bermodular
Community College Certificate (Modular Programme)

TAHUN / YEAR	BIL. LULUSAN NO. OF GRADUATES
2010	3909
2011	13 109
2012	17 360
2013	25 645
2014	9123
JUMLAH / TOTAL	69 146

For such a long time, TVET has often been seen as an "alternative route" or a "last choice education" due to a myriad of factors. This mind-set of the general public can indeed be transformed in line with the mission of the Malaysia Board of Technologist (MBOT) towards elevating the standing, visibility and recognition of technologists and technicians in Malaysia. With a total of more than 500,000 graduates of polytechnics and community colleges already in the work market, of which more than 50% are of technical background, a clear pathway for these graduates to be recognised as technologists and technicians in their career of choice via exceptional quality in services rendered, would certainly be aided with the presence of MBOT. Looking at this scenario, all graduates of TVET institutions, especially those from polytechnics and community colleges, should take advantage of this long-awaited chance to register as graduate technologists or qualified technicians, and to work towards becoming professional technologists or certified technicians. The benefits and perks that come along are spelled out in the Technologists and Technicians Act 2015 (Act 768).

BIOGRAPHY

Noor Aidi Nadzri was appointed to spearhead quality assurance matters for all polytechnics since 2010. She is now looking into matters pertaining to the recognition of polytechnics at the national and international level."

LEMBAGA TEKNOLOGIS MALAYSIA
MALAYSIA BOARD OF TECHNOLOGISTS

MEMBERSHIP REGISTRATION

PROFESSIONAL TECHNOLOGIST

- Graduate Technologist with practical experience as stipulated by the Board

GRADUATE TECHNOLOGIST

- Holds a bachelor's degree recognised by the Board

CERTIFIED TECHNICIAN

- Qualified Tecnician with practical experience as stipulated by the Board

QUALIFIED TECHNICIAN

- Holds a certified qualification recognised by the Board

Visit www.mbot.org.my for registration

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