Crystal @ SME Programme: Developing Innovative Minds in Schools & Universities

ENGINEERING EDUCATION TECHNICAL DIVISION

reported by
Ir. Dr Mandeep Jit Singh

Ir. Dr Mandeep Jit Singh *received his B.Eng. (with honours) and Ph.D. degrees in electrical and electronic engineering from the University of Northumbria, UK, and Universiti Sains Malaysia, in 1998 and 2006, respectively. He is currently the Deputy Chairman of E2TD committee and an Associate Professor at Universiti Kebangsaan Malaysia.*

reported by
Hafizah Husain

Hafizah Husain *received her Bachelor of Science (Electrical Engineering) from University of Hartford, USA in 1986, Masters of Science (Mechatronics) from De Montfort University, UK in 1995 and Ph.D. in Electrical Engineering from Universiti Teknologi Malaysia in 2007. She is currently an Associate Professor in the Department of Electrical, Electronics and System Engineering, Faculty Of Engineering & Built Environment in Universiti Kebangsaan Malaysia.*

ET2D chairman giving a talk on STEM

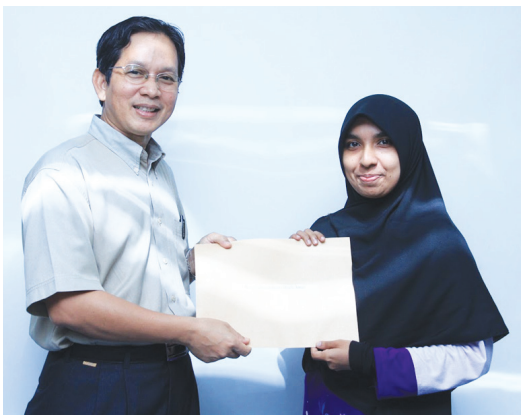
Teenagers have an innate curiosity and natural creativity. These characteristics need to be nurtured and channelled into structured, organised and continuous activities, so that they will continue to flourish.

The Crystal@UKM programme was conceived to realise the country's innovation agenda, nurture creativity and develop a sense of competitiveness globally. It utilises facilities and staff expertise at the Faculty Of Engineering & Built Environment as well as the School of Information Science & Technology, based on a module that integrates electronics and programming skills to educate the school students who will also be mentored by university students.

In 2009, the programme was proposed to the office of the Deputy Vice-Chancellor (Industry and Community Affairs) by the Faculty Of Engineering & Built Environment, in collaboration with UEM Group. The plan was to foster a culture of innovation in young people through exposure to technology by using a microcontroller-based Arduino Board.

This affordable and easy-to-use board can be programmed using a computer. By interfacing the board to specific devices, it can be programmed to perform various tasks automatically, either for the purpose of games (fun-and-play) or for actual industrial application. There are no limitations to what the students can develop as it all depends on their creativity.

The main features of the programme, other than inculcating interest and awareness in automation and intelligence, are to encourage students to move on to a higher level of education and to prepare them for the working world.



Presentation of certificate by Prof. Datuk Ir. Dr Mohd Marzuki Mustafa pro vice-chancellor (strategy and corporate development)

Group photo between the students, mentors and JKEES staff

The programme offers students the opportunity to explore technologies not available in the classroom. University students mentor school students by guiding them in designing and programming the microcontroller chip to develop microcontroller-based systems that can be used to solve real life problems. Ultimately, the experience produces graduates who are concerned for the well-being of society and equip them with skills that will be useful in the working world.

The programme comprises three phases. In the first phase, school students are given "hands-on" training, using specially designed modules and kits. They are taught to develop simple automatic circuits using the microcontroller. In the second phase, they are divided into groups of four students. Each group is required to prepare a proposal according to the theme and present it to a panel. The students are expected to conduct a study based on the problem that needs to be solved. In the third phase, the students will design and develop the alpha prototype of their projects. The entire programme takes 6-8 months to complete.

The pilot project started with two schools in Gelang Patah, Johor, namely SMK Taman Nusa Jaya and SMK Kompleks Sultan Abu Bakar. So far, 200 students from 15 schools and 150 UKM students have taken part in the programme.

The latest programme, involving eight technical schools, was successfully completed in February 2015. Two of nine products developed by a group of students from Sekolah Menengah Teknik Kuala Lumpur, the Page Turner and the Handicapped Parking Detector, won several gold and silver awards at the national (IComp Ex2015, IIDEX 2015 and National Innovation Award 2015) and international level (WIC2015, South Korea).

The 2 gold medals won in South Korea were an acknowledgment of innovation and original ideas. By winning the international awards, the students have gained a high degree of self-confidence and demonstrated national pride. All nine prototypes developed can be commercialised and produced on a large scale. ■

Students assembling the prototype

"Hands-on" training using specially designed modules and kits