We call him Tom!

Being a student was one of the most enjoyable periods of my life. What better life than waking up every morning with few, if any, responsibilities? Of course, there are homework assignments and tests, and perhaps pressure on occasion. But your basic task each day: learn. Know more tomorrow than you know today. It’s hard for me to imagine anything more enjoyable, and I call upon you today, throughout your studies at SUTD, and even beyond, after you graduate, to embrace the joy of learning.

Joy by definition is an intense and especially ecstatic or exultant happiness, or a feeling of great pleasure and happiness. Some of you might ask: what does that have to do with education and learning? I say a lot, and clearly, I am not alone. Many researchers in education, psychology and neurology would say the same.

Empirical evidence shows that active, hands-on and experiential or contextual learning is more effective than traditional passive “chalk and talk.”

We learn that joy has a positive effect on learning and that joy is enhanced through, among other things, active and discovery learning, social interactions, placing learning in context, creating things, celebrating achievements, and having time to breathe and freedom for self-expression and actualisation.

Perhaps much about the importance of emotions and joy is captured most succinctly by Aristotle:

“Educating the mind without educating the heart is no education at all.”

Aristotle

We have taken these learnings to heart in designing SUTD.

At SUTD, through our cohort-based learning communities and in many other ways, we embrace active learning, teamwork and cooperation. As students, you will be designing and creating things, typically with others, at every turn, be they devices, buildings, algorithms, software, processes or systems. When you have created something yourself, and watched your ideas come to fruition, you will feel a sense of accomplishment, a sense of joy. I am eager to see the magic you will be creating once you start school.

You will have every Wednesday and Friday afternoon free to pursue your passions and self-expressions. Through the pillar tracks, you will have the opportunity to embed your studies in meaningful contexts. You will have the opportunity to pursue anything you want. And if something does not exist now, by all means, start it.

In term 2, you will be engaged in a full term subject on design that culminates in a significant design exhibition. After your summer break, through a Learning Celebration Carnival, your parents and industry partners will have the opportunity to witness the projects from your internships, exchanges and other summer experiences.

These are but some of the very exciting experiences that will soon be upon you. You will learn, and enjoy learning. Relish that.

Through learning, you will have the freedom to develop in your own way, the freedom to create positive experiences, and allow yourself to flourish as an individual. You will learn a lot about yourself and develop your own personal identity. You will learn through making your own decisions and choices, and heighten your curiosity, pushing boundaries.

For me, it is hard to divorce learning from teaching. When teaching, I get great joy out of trying to find the best way to explain material to enhance students’ (and my own) comprehension. I like my students to think and work with me. I am particularly driven, perhaps even obsessed, to see if I can distill material into its essence, to find the most effective and simplistic way to bring the concept to life for me and my students. Nothing is more enjoyable than seeing the joy in a student’s face as he or she sees the idea come to life for him or her.

I believe that you will see much of the same passion and excitement in my fellow educators at SUTD. After all, this is why we are here.

If I could conclude by offering a few words of advice. Throughout your studies, stop occasionally and try to summarise what you are learning. Ask yourself: what are the most essential things I have learned and why might what I am learning be important? Why might others, such as my instructors, feel that it is important?

If you really want to understand something, become a teacher. Explain what you have learned to a friend or family member in a way that they can comprehend.

Think about how what you have learned might change how you think about the world? About yourself? Does what you have learned provide you with new tools or perspectives that you might use in later courses or later in life? I believe that thinking like this will not only help you learn, but also add to the enjoyment of your learning experience.

For the graduates, you will soon be soaking up new knowledge and work experiences. Embrace that, make a difference in the world, and constantly carry with you the sense of joy in learning something new.

Thank you everyone.
THE SUTD-SMU DUAL DEGREE PROGRAMME IN TECHNOLOGY AND MANAGEMENT

BY NORLIZAH BINTE ABDUL WAHAB

25 February 2014 saw something new and exciting shaking up Singapore's higher learning landscape. It was the day that SUTD and SMU launched an iconic scholars programme integrating technology, design and business – the SUTD-SMU Dual Degree Programme (SUTD-SMU DDP) in Technology and Management.

While there are many double degree programmes being offered within a university, this is the first time in Singapore that two autonomous universities have come together to offer high-achieving students a very unique value proposition. SUTD-SMU DDP students essentially belong to both universities and this translates to opportunities for them to be immersed in two different campus cultures and student life activities. They will also enjoy a myriad of career preparation, internship and international exposure programmes offered by SUTD as well as SMU.

The highlight is the rigorous degree programme in which students will pursue an engineering degree from SUTD and a business management degree from SMU for a truly interdisciplinary learning experience. The curriculum has combined the best of the two specialised universities with design as a common, interlinking theme. While distinctive in their own right, SUTD and SMU are modelled after American schools, but adapted for Singapore and Asia. Both institutions share the same spirit of innovation and entrepreneurship and inculeate a multi-disciplinary approach to solving real-life problems. SUTD-SMU DDP students will be exposed to the real world through "outside-the-classroom" learning and activities. The DDP will culminate in an encompassing and seamless three-term technology cum business capstone (i.e., final year project equivalent) programme that each senior year student will undertake in a team-based project sponsored by industry or government agencies.

At the end of four years, students graduate with two degrees: a Bachelor of Engineering from SUTD and a Bachelor of Business Management from SMU. The programme for the inaugural cohort began in May 2014 and come year 2018, the world should prepare itself for a new breed of technology and management-savvy leaders, innovators and entrepreneurs who are highly effective in an increasingly complex globalised world.

THE NEW TECHNOLOGY FOR WATER DESALINATION AND PURIFICATION

BY DR YANG HUI YING

To meet the need for clean water around the world, especially in areas where infrastructure is not well developed, researchers have been searching for alternatives to large-scale desalination plants, which are difficult to implement. This is because these water treatment technologies usually consume large amounts of energy, involve high operating costs and require extensive infrastructure. Therefore, there is increasing interest in smaller portable water purification devices that house activated carbons – a material that adsorbs contaminants. However, such devices are often limited by their capacity to remove salt.

Dr Yang Hui Ying and her team in SUTD exposed ultralong carbon nanotubes (UCNT) - based membranes to plasma treatment, which successfully enhanced the desalination efficiency of the UCNT-based membranes. The modified membranes utilised their ultra-high adsorption capacity to remove salt from sources with lower salt loadings rather than rejected, the required operation pressure was also significantly less than that required by traditional reverse osmosis processes. The team incorporated the plasma-modified UCNT-based membranes into a micro-channel device to test the performance of the membranes. They found that the modified UCNT-based membranes not only efficiently desalinate water but can also remove organic contaminants and heavy metal nanoparticles that are linked to waterborne diseases.

Moreover, these modified membranes were mechanically robust and requires less energy. Dr Yang’s team anticipates rechargeable low energy devices to be made using the newly-discovered UCNT-based membranes for water treatment applications. This work, which will be conducted in collaboration with PUB, will be funded by the Singapore Environment & Water Industry grant.

SUTD PROFESSOR WINS BEST PHD DISSERTATION IN INNOVATION MANAGEMENT AWARD

BY DR NIYAZI TANERI

Dr Niyazi Taneri of the Engineering Systems and Design pillar won the award for the Best PhD Dissertation in Innovation Management given jointly by the International Society for Professional Innovation Management (ISPM) and the academic publisher Wiley. He was chosen after a double blind review process where a scientific panel evaluated more than 150 nominees from over 40 different countries.

Dr Taneri’s research is about the effective management of alliances for the development of new products and services. His PhD thesis focused on the design of contracts to transfer university technologies to industry and on how project risk, operational constraints and resource allocation decisions affect whether it is preferable to design products collaboratively or as a single party. Mathematical and statistical tools were used in his analyses.

Dr Taneri’s work on contract design allows university technology licensing offices to choose financial terms to address information problems where better-informed partners gain an advantage or exert less than optimal. A game-theoretic approach was applied to a case study and the results translated to opportunities for them to be immersed in two different campuses.

His second stream of research, about the alignment of partner and project characteristics with product development paths, also develops a statistical model that forecasts the type of pharmaceutical R&D partnership formed correctly over 80% of the time. Recent extensions of the work, carried out with Prof Arnoud De Meyer, President of Singapore Management University, show that choosing the “wrong” path leads to a significantly higher rate of failure; a clear indication of the practical implications of the research.

Lastly, the nature of the work is not industry specific. Dr Taneri is now applying the concepts developed for university licensing contracts to help write contracts between a global Oil & Gas company and their contractor for the construction of billion-dollar Gas-to-Liquid plants to convert shale gas to liquid fuel.
FIFTH ROW ACTIVITIES

To date, students have set up over 90 clubs and interest groups on campus ranging from performing arts to sports and culture groups. These student groups sustain themselves by actively engaging current and potential members through interesting activities as well as looking into ways to offer their services to the schools and the community at large to better the world.

COMMUNITY

One such student group is the Rotaract Club that aspires to promote international understanding and peace through a framework of friendship and service. The club has been partnering the Southwest CDC (SW CDC) in various projects like the FUN@Southern Ridges 2012 and the Triple E event 2013. These activities were targeted at underprivileged children between 5 and 13 years old. The purpose of these activities was to allow the children to explore the world outside their textbooks and to have fun while learning something new.

The club also embarked on a new initiative “Adopt-A-Block Activity” together with SW CDC, to adopt a block of HDB flats along Dover Drive. They will be planning activities for its residents, like assisting students with their school work and organising interactive activities for the elderly.

In January this year, the student group went on an overseas community service trip to Chiang Rai, Thailand, to work with the Hill Tribe people on an aquaponics system—a combination of vegetable cultivation and fish rearing to supplement their protein intake, as well as, to conduct English lessons for the children. Thus, bringing technology to a less developed area.

ARTS

Our student groups are also passionate about aesthetics. One such group, SUTDojo, hopes to inspire a passion for architecture, art and design by encouraging creative thinking and artistic expression. Some of the activities they have organised include the Tiong Bahru Heritage Sketchwalk and the Sketching Knife Workshop.

Participants at the Sketchwalk explored the historical Tiong Bahru estate as well as the Monkey God Temple and the Seng Poh Garden. At the Sketching Knife workshop, participants were introduced to different techniques of making a sketching knife from ice-cream sticks, recycled cans and aluminium sheets. Participants also learnt how to use the hand-made sketching knives to create texture and to vary line weights.

19 members from SUTDojo (5 male and 14 female students) were involved in the major Chinatown Chinese New Year Light-up project. They were approached by the Kreta-Ayer-Kim Seng Citizens’ Consultative Committee and the Singapore Tourism Board to design the street light-up. The students designed the horse-shaped lanterns and gold coins as well as an interactive fringe installation (that showed the evolution of the Chinese character of the horse) on the Garden Bridge. The designs were very well-received.

Sports is also a major part of our students’ bustling school life. To date, we have more than 20 clubs registered under the sports umbrella. The SUTD Sports clubs are very active; teams from the badminton, basketball, bowling, ultimate frisbee, table-tennis, tennis and volleyball clubs have participated in competitions at the National level, including the Singapore University Games (SUniG) and the Institute-Varsity-Polytechnic (IVP) Games. Two female students also represented SUTD in the 100m run and the high jump at the Inter-varsity Track and Field Championship.

The Floorball team participated in a 3-on-3 Face-off competition organised by U Sports in March, while the SUTD Climbers participated in the NTU Bouldermania and the SMU Gravical competitions this year.

The Ultimate Frisbee club, which is the largest club with more than 40 student members, recently participated in the 3rd Utk-Sports Tournament. The club has also organised numerous friendly matches with other universities.

The SUTD sports scene will get more vibrant with the addition of up and coming clubs, such as, Russian martial arts, fencing, and many more.

SUTD also has 11 different music bands registered collectively under SUTD Bands, three dance groups (Ballroom Dancing, Dance Derivative62 and Indian Dance) and three singing groups (A Capella, Choir and LiveSync). In total, there are 195 students in all these groups, with some students involved in more than one club.

The Fifth Row is what SUTD refers to co-curricular activities, as it is the fifth activity students do each term in addition to their four academic subjects. It spans an array of activities from student groups to research projects, including modules in writing, machining and fabrication, public service, business activities, and more. Though not compulsory, Fifth Row is a big part of the SUTD culture. As these activities add considerably to the learning experience by providing opportunities for self-expression, and enhancing knowledge and creativity, two afternoons per week are dedicated to Fifth Row. We currently have more than 90 Fifth Row clubs and interest groups.

The Fifth Row Club members engaging children in Chiang Rai

The Fifth Row members participating in Bouldermania competition organised by NTU

Open Mic performance by one of the bands

The Tiong Bahru Heritage Sketchwalk

The Ultimate Frisbee club members exploring the historical Tiong Bahru estate as well as the Monkey God Temple and the Seng Poh Garden.

The Sketching Knife workshop participants were introduced to different techniques of making a sketching knife from ice-cream sticks, recycled cans and aluminium sheets.
SUTD’s Independent Activity Period (IAP) which occurs every January, is dedicated to giving students the opportunity to pursue their passion in a myriad of activities of curricular and/or co-curricular interests. 10 IAP modules were organised for the first time this year. Each module involved hands-on projects with design activities and prototyping which gave students the opportunity to learn advanced concepts from current research in a self-motivated setting, and verify the concepts so as to integrate their multidisciplinary knowledge gained from various freshman subjects. The IAP season served as a productive platform to launch such exciting activities for students, which is very much in line with SUTD’s emphasis on integrating technology and design with science and engineering and interdisciplinary learning.

During this IAP, students were introduced to 10 interesting and valuable interdisciplinary educational modules related to the fields of Nanotechnology, Energy, Sensors, Environment, Biotechnology, and Health, etc. These hands-on active learning sessions were inquiry-based (science, technology, engineering and mathematics) classes, conducted in an informal learning environment under the supervision of one or two faculty members who had volunteered to do so.

About 55 students (both freshman and sophomore year) participated in the IAP. At the end of it, student groups gave short presentations to share their learning experience and design projects with students and instructors from other modules.

The Frost & Sullivan Case Challenge 2014 offered undergraduates the opportunity to develop and present solutions for Nairu (a fictional country), to develop a nation-wide manpower strategy to ensure that the future demands of the workforce were met, simultaneously balancing the need for economic growth. 41 submissions from universities across all faculties in Singapore were received, and our team, Team Whole One, was handpicked after trial and error and feedback from our mentors. The two-session presentations to communicate them effectively were just as important as the ideas themselves. During the refinement stage, our team members planned and designed integrated solutions before launching mentorship experience with the consultants showed us the importance of using a broad perspective to analyse developmental issues in a country and to carefully design solutions before launching detailed plans.

Throughout the process, we learnt to analyse problems from a consultant’s point of view; from considering the value propositions of multiple stakeholders, to prioritising the issues and deciding on the areas that would maximise returns with efficiently used resources. It was challenging, but having been trained as Systems Engineers, we managed to systematically break down the multitude of issues given in the Challenge and design an integrated solution that would address the country’s immediate problems in the short term and provide long term strategies to develop the country.

In addition, we learnt that packaging our ideas, and crafting the presentation to communicate them effectively were just as important as the ideas themselves. During the refinement stage, our presentation slides underwent several changes. It was a tough but satisfying process to integrate the science of problem solving and the art of effective communication.

Overall, we enjoyed the entire Challenge, from problem solving to presenting our solutions to an esteemed panel of judges. Of course, winning the challenge was greatly satisfying as well. We look forward to bringing the skills and lessons we have picked up to add value to real world projects we will be taking on in the future.

The SUTD Design Opportunity Programme focusses on creating educational contents for workshops and events to provide a birds- eye view of SUTD. These events demonstrate “What we do” and “How we do it”, by highlighting the design centric teaching methodology, the interactive cohort pedagogy, and the interdisciplinary curriculum of SUTD that encourages creative thinking to meet the educational needs of the 21st century.

Two separate inaugural Design Opportunity Workshops were held in January 2014: A Teacher Workshop and a Student Workshop.

This was a 1.5-day inaugural workshop for Junior College (JC) and Polytechnic (Poly) teachers of Physics and Chemistry, conducted by Dr Peter Dourmashkin (MIT-SUTD Physics) and Dr Patricia Cristo (MIT-SUTD Chemistry). The following SUTD faculty members also provided assistance: (Physics) Dr Cheah Chin Wei, Dr Massimiliano Cola and Dr Teo Tee Hu; (Chemistry) Dr Bong Eng Ying, Dr Apple Koh, Dr Maggie Pea, Dr Tan Mei Chee and Dr Tan Mei Xuan. The workshop focussed on creating an active learning environment in classrooms. Peter and Patti’s excellent planning and enthusiasm was reflected in over 80 participating teachers from 20 different JCs and polys.

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Students working on their design
THE EPD 2D F1 CHALLENGE
BY KABINCALAN R PARTHIBAN

As an SUTD undergraduate, we had the opportunity to race in the F1 Grand Prix. For real? Well yes, we are referring to the Singapore Formula One Grand Prix car race indeed, but not the actual race. It was about the 2D design challenge, set for the junior year students of the Engineering Product Development pillar.

2D has been an integral part of the SUTD curriculum, where students are expected to marry the skills and knowledge from two modules to solve a design project. In this particular design challenge, the two core modules combined were the Systems and Control, and the Engineering Design and Project Engineering.

It would be perjurious if we said our team was fully equipped with the necessary skills and experience to take on such a challenge. Especially since we were only in our second term of pillar year, the necessary skills and experience to take on such a challenge. Reality is, isn’t it? Those projects provided us the opportunity to grapple with such bona fide quandary where we repeatedly found ourselves in a state of uncertainty over what to do in a difficult situation, and then finding a solution to overcome those obstacles.

We spent hours trying to get the car to move the way we wanted it to. We pulled, twisted, tugged, ripped and tightened all the loose ends on the wirings in the robot. Changed the wheels, replaced the rubber that drove the power train, lowered the sensors and charged the batteries. In the meantime, the programmers in the group edited and debugged codes for the Arduino microcontroller which acted as the “driver” of the car. After many more trials and test runs, at two in the morning of race day, it finally worked! Our car finally completed the lap in 1 min 45 sec. We did not win the race, but we completed it, with much contentment and joy.

The winning team ultimately completed the lap at an astounding time of a mere 30 sec and won themselves each, a ticket to the upcoming Singapore F1 Grand Prix. A victory well-deserved and most befitting the challenge. At the end of the day, all of us emerged victors as every team completed the challenge and gained immense experience and knowledge through the entire process of this 2D challenge. An experience like no other, only at SUTD.

Controlling this robot is possibly harder than controlling a real F1 race car. The race against time

The race against time

books nor were found in our weekly homework. Well, this is what we did not expect; running into problems we did not solve in what’s interesting is the fact that we were encountering challenges that we did not expect running into problems we did not solve in the subject matter in the process of working on the project. This is what we did not expect running into problems we did not solve in the subject matter in the process of working on the project.

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