

Tinker, tailor, solder, ply

Nanyang Poly lets students give vent to their creativity and realise their ideas on campus

Toh Wen Li

Instead of going home when school is over, some Nanyang Polytechnic students head for a design workspace on the second floor to tinker and make things, both for work and play – and quite a few don't leave till it closes at night.

MakerSpace@NYP, which opened last July 4, has become increasingly popular with students, seeing about 150 a day.

Across the brightly-lit, 700 sq m space are tools and machines such as 3D printers, drills and a laser cutter. When The Straits Times visited last month, the atmosphere was relaxed, and one could make out the whirring of machines beneath the

chatter of students at work.

Gathered near the entrance were about 20 students waiting to begin a safety training session, part of a six-hour course they must pass before they can use machines in the controlled-access area.

MakerSpace@NYP, according to its designer and deputy director Yang Tien, 49, aims to be an "open, cross-disciplinary platform that allows just about anybody to come and go and explore ideas".

It aims to encourage students from different departments to collaborate. They can use MkzApp, which has more than 1,400 registered users, to book tools and invite peers to work on projects.

Every object there, from toolboxes to work benches, has a QR code,

which students can scan for videos offering tips and advice. There are also people offering help.

The idea of a "maker space" in Singapore schools is not new.

Singapore Polytechnic has a Fab-Lab, launched in 2011. And in March, Ngee Ann Polytechnic's School of Infocomm Technology will open a Smart Learning Space with a "digital makers" zone.

At Nanyang Polytechnic or NYP, the goal is to encourage experimentation. Said Mr Yang: "You will seldom find us saying no. We don't give grades (at MakerSpace), we don't have the pressure of that. Once you take that away, we can explore just about anything."

NYP principal Jeanne Liew sees MakerSpace as a place where students can "learn that failing is okay if one bounces back with better ideas – and (that) there are many paths that can lead to eventual success".

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MR YANG TIEN, designer and deputy director of MakerSpace@NYP, on encouraging experimentation.

Student makers can apply for project funds ranging from \$30 to \$5,000, which are awarded based on a tiered system, "so students don't think, 'the very moment I think of an idea, I must pitch a product'", said Mr Yang.

"Having that mindset that things don't have to be perfect at the get-go, and letting it evolve, that's an important process in cultivating innovation," he added.

Mr Yang, previously deputy director of the polytechnic's school of interaction and digital media, has a keen eye for detail.

This is reflected everywhere in MakerSpace, down to the colour of its walls. The machine room walls are a metallic yellow to make users more alert. The room storing toolboxes, he explained, was painted a pinkish hue to discourage theft. "If an individual comes in thinking, 'Should I steal this item?', the pink shifts this person psychologically

into a more gentle state."

MakerSpace offers sound booths and a dark room for videography for students who want to market their products. There is even an old-fashioned letter press from England. All this, including renovation works, cost the school less than \$1 million in total.

While students are expected to source most of their materials, they can also pick scrap pieces from a stash at MakerSpace.

Pointing to a mobile food stall salvaged from a canteen pancake seller, which is now used to hold food during talks, Mr Yang said: "We are the karang guni people of NYP."

Student Leong Tze Wan, 17, a regular user of MakerSpace, said: "I've made new friends along the way; it's also where I belong, my own little bubble where I can express myself."

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180-degree ironing? Hot idea

Some students are working on what MakerSpace's deputy director Yang Tien dubs "the Swiss army knife of housewives".

The idea: An ironing board with a pivot that allows the board to be rotated 180 degrees so the user can iron the other side of the piece of clothing without having to pull it out and flip it over first.

It also comes with sections that can be extended sideways, so an entire shirt or pair of trousers can be placed over it at any one time.

It was conceived three years ago by marketing student Bryan Tan, 22, who confessed: "I don't really iron clothes... my mum (does that)."

And it is being developed and fine-tuned by a five-student team that in-

cludes Mr Tan, as part of their entrepreneurship module.

For them, MakerSpace has been the go-to place for recycled wooden boards for their prototype, and machines such as the laser cutter.

After the final prototype – to be made of wood, cardboard and metal – is completed next month, it will be pitched to potential industry investors.

While the idea of a 180-degree ironing board is not new, their

design has features like a USB port and a retractable cable to make it easier for the user to multi-task.

"You can iron in many parts of the house, and you can use and charge your phone while ironing," said Mr Tan.

The ironing board also doubles as a step-ladder.

"In recent years, apartments have become smaller. We want to emphasise conserving space," he added.

Sew far, sew companionable

For the past four months, animation student Zuyse Mak, 17, has been working on a black tuxedo-like Cosplay costume.

The design, he said, is "based on a character from an anime no one knows – Van, from Gun X Sword".

He started using the sewing machines at MakerSpace in Septem-

ber, after encouragement from a senior. "I always wanted to sew something, but never had a sewing machine at home... The only sewing machine I ever had experience with was the huge old one with a giant pedal... I really enjoyed watching my grandmother using it."

Making his costume has helped

Zuyse appreciate the effort that goes into making clothes. "Usually when you go to the store to buy clothes, the only thing you care about is the money. But when you make it yourself, you feel the sweat that (goes) into designing it."

Using MakerSpace also allows him to immerse himself in the company of others. Zuyse, who used MakerSpace nearly every day during the holidays, said: "I don't necessarily have to interact with them, I

just like hearing them talk."

This was echoed by Leong Tze Wan, 17, who is doing a diploma in chemical and pharmaceutical technology. When The Straits Times visited MakerSpace on Dec 14, she was trying to figure out how to attach elastic to cloth using a sewing machine – with help from YouTube.

She said: "Sometimes when I'm alone, it's boring... That's why I come here, so I have people to talk to when I work."

Source of ingenuity

Walk into MakerSpace@NYP, and chances are you will find engineering student Soh Guo Dong in a corner somewhere, tinkering with various materials and machines.

"I'm here until they close the doors," said the 19-year-old design enthusiast. "(Since) the day I stepped in, three days after MakerSpace first opened last July, I have spent my whole NYP life here."

As one of five technical student assistant coaches, Mr Soh helps maintain the machines and ensure they run smoothly. He also helps students improve product designs.

Last September, he helped four students from the School of Chemi-

cal & Life Sciences improve their design for a one-handed chopping board for the disabled, which was part of their course module. He suggested they make the second acrylic "clamp" – one of two clamps holding the food in place – removable and adjustable, so the board could be cleaned more thoroughly.

Mr Soh also sources for materials the students need for their products. "I went to different industrial parks in Ubi, Ang Mo Kio, Kaki Bukit... I negotiated (with companies) on whether it would be possible to get (materials) at a lower price and at a size that's suitable for students to use," he said. Now he of-



Mr Soh with a one-handed chopping board by students from the School of Chemical & Life Sciences, whose design he helped to improve. PHOTO: DON WONG FOR THE STRAITS TIMES

fers a "non-profit, one-stop solution" for peers who give him their orders, which he then sends as a bulk order to industries.

Mr Soh, who aspires to be an en-

gineer in the high-tech manufacturing industry, added: "I'll probably hire all my classmates, and hire the students as interns. It'll be like a family."



Mr Chin has gained much from his experience at MakerSpace but has also given a lot in return with his many creations as well as improvements to the workshop's existing tools. PHOTO: DON WONG FOR THE STRAITS TIMES

Space for invention

Digital and precision engineering student Wilson Chin, 21, has long been passionate about making things – so much so that his father bought him a 3D printer and metal lathe several years ago.

While he is lucky enough to have the machines, which he keeps in his bedroom – "so I keep the mess to myself, and my mum doesn't scold me" – he visits MakerSpace nearly every day because of the buzz and helpful feedback he gets from other students.

He said: "I ask my friends, 'How does this look? What do you think I can improve on?'"

At NYP's MakerSpace, where students go to make things, he has created an aluminium yo-yo that took 14 hours to make, and also improved existing tools.

One of these is a "machinist's pen", which for added convenience combines a scribe, a tool for marking lines on metal, with a ball point pen on the other end.

He has also created custom-made cutters for making grooves

in surfaces. Another of his creations is a "quick change tool" for a metal lathe – a machine tool that removes material from a rotating workpiece – that allows the user to change cutters without having to re-adjust the entire setup.

"If you change the tool, you need to adjust the tool centre height... (Now) you can take a new tool, and just slot it in. It'll be a lot faster to use, and easier," he said.

Mr Chin has gained much from his experience at MakerSpace, but has also given much in return.

Two more of his creations – an accordion-like cardboard "drawer" collecting debris from machines, and a clear acrylic screen to shield users from waste during drilling – are now in use in the workshop. He is also one of five technical assistant coaches who advise students on their designs and help to service machines.

MakerSpace deputy director Yang Tien said of Mr Chin: "He doesn't just use the machines. He strips them down and reassembles them."