

Annex A

FACT SHEET

Digital Garage

Background

In April 2017, Dr Yaacob Ibrahim, Minister for Communications and Information, talked about the need to nurture a digital society, where Singaporeans have access to technology, understand it and are passionate about using it to improve our work processes, our services and help in our everyday lives. This required Singaporeans to develop a curious mind and a passion to tinker and create.

To make this happen, Dr Yaacob unveiled the Digital Maker Programme and how it will work to introduce digital making to both schools and to the community. It will introduce simple-to-use and open-ended technology that students and adults will find easy to adopt.

Digital Garage: An Anchor to Build Community of Digital Makers

Tanjong Pagar Community Club and IMDA have set up a community digital maker space called 'Digital Garage @ Tanjong Pagar Community Club' to cultivate a community of innovators imbued with the culture of collaboration and co-creation, IMDA has been working with partner agencies, like the People's Association to introduce digital making to the community.

Introductory workshops will be offered at community locations for families, students or adults to learn how to use a simple microcontroller known as the micro:bit to create simple projects. The space will offer tools and equipment so that members of the community can build their own creations.

The creation of the Digital Makers Interest Group at Tanjong Pagar Community Club will attract and sustain continuous learning in digital making at the community level. A team of volunteers will also plan and organise various activities to deepen the interest and grow the community and nurture innovations. Activities could include:

- talks with other makers, engineers, technopreneurs
- visits to fabrication labs, maker spaces and maker events, tech companies, institutions of higher learning
- competitions to exercise creativity and address problem statements

Partnerships

The Digital Garage will also be a working collaboration between players involved in Singapore's maker landscape:

- Home-Fix will be providing tools, equipment and furniture that are suitable for community use.
- Microsoft will be providing training to the core team of volunteers to enable them to design and organise activities and workshops customised for Tanjong Pagar's Digital Maker Interest Group.
- Singapore Polytechnic will also be extending their FabLab to the Tanjong Pagar Community Club Digital Makers Interest Group so that the Interest Group can expand their digital making to using more complex technologies and high-end equipment, as well as to tap the deep expertise of the institution.
- NCS Pte Ltd, as part of its CSR initiatives, will provide staff who will be volunteers at the Tanjong Pagar Community Club Digital Makers Interest Group. These volunteers will design and organise activities and workshops for the Interest Group.

Benefits to the Community

By offering venue, facilities, equipment and technical training, individuals with no technical understanding can pick up making skills and learn to tinker with technology as a means to experiment and creatively problem solving.

A dedicated space such as the Digital Garage also functions as a meeting point for like-minded individuals to meet and share ideas with each other, creating a vibrant community of passionate individuals that can collaborate and learn from each other to enhance their making skills and to learn how to develop solutions to personal or community problems.

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For more information, refer to:

Website: www.digitalmaker.sg

Facebook and Instagram: [Digital Garage SG](#)

Annex B:

FACT SHEET

IMDA's Digital Maker Programme

IMDA's Digital Maker Programme aims to nurture a new generation of digital creators and makers by introducing simple-to-use and open-ended technology that students and adults will find easy to adopt. The goal is to cultivate a community of innovators across different age groups, imbued with the culture of collaboration and co-creation, to solve real-world problems.

Over the next two years, the Digital Maker Programme will introduce making and creating with technology, using a microcontroller known as the micro:bit to encourage students and adults to explore the possibilities of digital making.

Introducing Digital Maker Technology to Schools

IMDA will introduce digital making to schools by providing all interested primary and secondary schools with micro:bits for up to one level of students when they sign up for the programme.

Schools can decide which level they would like to introduce the micro:bits to (e.g. for a specific level or rotate across levels each term) and how they may want to use it (e.g. for their Design and Technology lessons or Applied Learning Programme).

Microsoft is a key technology partner in this programme. It will provide a browser-based introductory programming experience to beginners who have never programmed before; an architecture that allows enthusiasts to dig deeper to uncover the many capabilities of the micro:bit; materials and a platform to support teachers on the use of micro:bits in their classrooms.

The training and curriculum will introduce educators and students to the technology, and provide them with ideas on how to use the technology in their lessons and programmes. They will also be supported by Microsoft's learning partners.

Building Communities of Digital Makers

IMDA will also work with partner agencies, like the People's Association, Science Centre Singapore and Centre for Fathering, to introduce digital making to the community. Introductory workshops will be offered at community locations for families, students or adults to learn how to use the micro:bit to create simple projects.

First-time workshop participants will receive micro:bits to allow them to explore and create more projects on their own after the workshop. They can gather new ideas from the digitalmaker.sg portal and share their ideas with the community. Digital making events and challenges will be organised to bring enthusiasts together to foster a digital making culture and help further develop their interests.

Spur local companies to develop and market Maker products

IMDA will also encourage local companies to develop and market maker-centric products to support the maker communities and tap the potential market, both locally and overseas. Seed funding will be provided to local companies to develop products with the potential for commercialisation.

Programme Benefits

By taking a fun, 'easy to learn, easy to use' approach, the Digital Maker Programme will encourage learners to pick up technical understanding quickly, and share their achievements with their peers and across communities. Digital making within the schools and different communities can also bring people across different ages and expertise to learn, collaborate and co-create to solve problems together. This fosters the environment for entrepreneurship to grow. Equipping our people with digital creativity and innovation skillsets will help our people ride the waves of the digital revolution.

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About micro:bit

The micro:bit is a pocket-sized codeable computer with motion detection, a built-in compass and Bluetooth technology. It has various built-in features, like 25 red LED lights that can flash messages, and two programmable buttons that can be used to control games or pause and skip songs on a playlist.

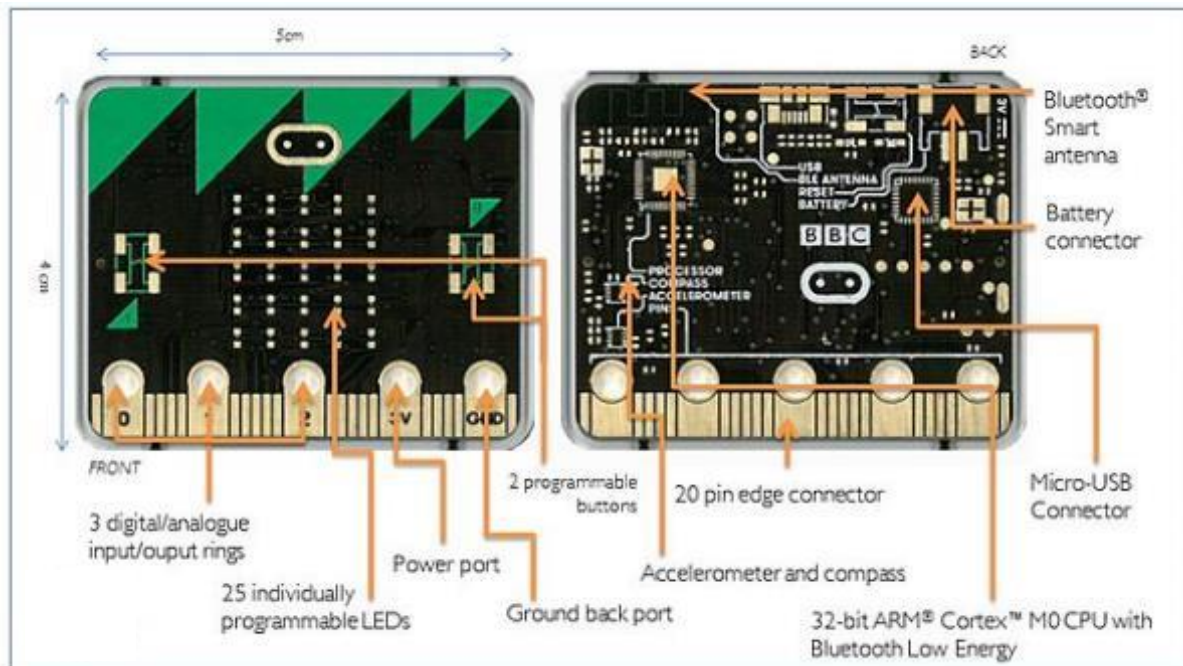


Diagram 1: Front and back views of the micro:bit

The micro:bit is positioned as a standalone, entry-level coding device that allows children to pick it up, plug it into a computer and start creating with it immediately. It is designed to be a starting point to get students interested in coding so they can move onto other, more complex devices like Arduino and Raspberry Pi in future. This helps a child's natural learning progression and gives them even more ways of expressing their creativity.

The micro:bit can be programmed using a simple browser-based introductory programming platform provided by Microsoft, the Blocks Editor (PXT) (see diagram 2 below) or more complex languages like Touch Develop and JavaScript.



Diagram 2: Programming a step tracker using Microsoft's Blocks Editor (PXT).



Annex D:

Examples of micro:bit applications

1. Reviving the “Tamagotchi” idea, the micro:bit can be programmed to be a digital pet. The pet can be “walked” by shaking the micro:bit. There is also a button to feed it, and another button to clean it. The pet can also display its emotion through the animations shown on the 5 x 5 LED display.



Project 1 – Digital Pet

2. Micro:bit can be programmed to measure the soil moisture level and trigger a water pump when the moisture level is low.



Project 2: Auto plant watering system

3. Micro:bit can be programmed to count the scores whenever the ball goes through the cup.



Project 3 – Basketball Scoreboard

Annex E:

Quotes from Industry Partners

“Home-Fix is excited to partner with IMDA, Microsoft and Tanjong Pagar Community Club in extending the ecosystem for imagination and innovation to a growing community of budding inventors and future makers in Singapore. We hope to see extraordinary makers of all ages and from different walks of life learning, collaborating and sharing to hone their crafts, harness the technologies, embrace the values and find simple joy in dreaming the impossible and exploring the possibilities.”

Low Cheong Kee, Managing Director, Home-Fix D.I.Y. Pte Ltd

“As the world we live in becomes increasingly digitised, there is a growing need for us to leverage technology to ‘hack’ real-world problems and create social and economic value. The launch of the Digital Garage will empower Singaporeans by making available opportunities to gain traditionally specialised skillsets and hands-on experiences. We believe that the Garage will help to build a richer and more diverse local ecosystem that co-creates a better future for all of us,”

Kevin Wo, Managing Director, Microsoft Singapore

“We thank Tanjong Pagar CC for this partnership where our students can play a part in preparing the community for a digital economy. Our students are able to apply their knowledge and skills in areas such as programming and 3D printing to help the community realise the true potential of new technologies.”

Mr Lim Peng Hun, Deputy Principal (Academic), Singapore Polytechnic

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About Industry Partners

Home-Fix D.I.Y.:

Home-Fix contributed to the outfitting of the Digital Garage, providing makerspace hardware, workbenches, work tools, general equipment, design and consulting services. Home-Fix also provided consultancy for the design and development for the makerspace as well as a maker community development and engagement programme.

In addition, the Home-Fix team also cohosted a series of maker education workshops for beginning digital makers with IMDA.

About Home-Fix D.I.Y.:

Home-Fix, Total Home Improvement & Lifestyle Provider

Home-Fix is the largest and most popular home improvement and lifestyle retailer in Singapore. It operates a growing network of more than 30 stores in Singapore, Malaysia, Cambodia and Mongolia.

Home-Fix is committed to providing efficient, innovative and affordable home improvement solutions for its customers. We aim to be a one-stop shop for all home improvement needs, and is synonymous with a house-proud, home-centric and holistic lifestyle.

Microsoft:

Microsoft will be providing training for a core team of volunteers to equip them with digital skills necessary to design and organise maker workshops customised for Tanjong Pagar's Digital Maker Interest Group. Additionally, through the Microsoft Student Partner (MSP) programme, Microsoft intends to engage MSPs as workshop facilitators to guide participants in the coding and digital making sessions.

About Microsoft

Microsoft (Nasdaq "MSFT" @microsoft) is the leading platform and productivity company for the mobile-first, cloud-first world, and its mission is to empower every person and every organization on the planet to achieve more.

For news about Microsoft in Singapore, visit news.microsoft.com/en-sg/ or join the conversation on Twitter @Microsoft_SG.

NCS:

NCS contributed in terms of laptop (notebook) donation, digital garage workshop volunteers and Digital Maker Interest Group support in the workshop program and DMIG projects.

About NCS

NCS is a member of the Singtel Group and the leading information, communications and technology (ICT) service provider with presence in over 20 countries. NCS delivers end-to-end ICT solutions to help governments and enterprises realise business value through digital transformation and the innovative use of technology. Its unique delivery capabilities include consulting, applications development, systems integration, outsourcing, infrastructure management and portal solutions. It also provides mobility, social networking, business analytics and cloud computing services.

Factsheet on Singapore Polytechnic's collaboration with Tanjong Pagar Community Club

As part of the collaboration, up to 10 Singapore Polytechnic (SP) students will go on a six-week internship at Tanjong Pagar Community Club (TPCC) to help train and educate the community on digital making and creating starting from September 2017. Through this collaboration, SP hopes to play a part in helping the community to prepare for the possibilities of a digital economy as well as Smart Nation.

The students from SP's School of Electrical & Electronic Engineering will help to plan and conduct coding or tech making workshops for Tanjong Pagar residents. Some of these workshops may include:

1. Programming a micro:bit
2. Computer-aided Design & Modelling
3. 3D Scanning & Printing

To further foster a spirit of innovation and experimentation, residents who are keen to take their digital making skills further can pursue a modular Fab Academy Diploma at SP's FabLab: <http://goo.gl/vdFbVY>

The Fab Academy Diploma programme teaches the principles and applications of digital fabrication and provides a hands-on introduction to the resources for designing and fabricating smart systems. The course which is taught by Prof Neil Gershenfeld (Director, Massachusetts Institute of Technology Center for Bits and Atoms), also puts emphasis on learning how to use digital fabrication tools and understanding how they work.

As this is a modularised course, participants can take only the modules they are interested in amid their busy schedules. They can also go through the full 20 week course for 30 hours each week.

SP's FabLab was established and began its operations in 2011. It is the first in Singapore to be recognised by the global FabLab platform, created by the Massachusetts Institute of Technology. A Fab Lab is a technical prototyping platform for innovation and invention and is also a platform for learning and innovation.

SP's FabLab currently houses equipment such as 3D printers, Laser cutters, 3D CNC Prototype Mill, PCB Mills and Electronic Workbenches for students from different diploma courses to work on multi-disciplinary projects and create prototypes.

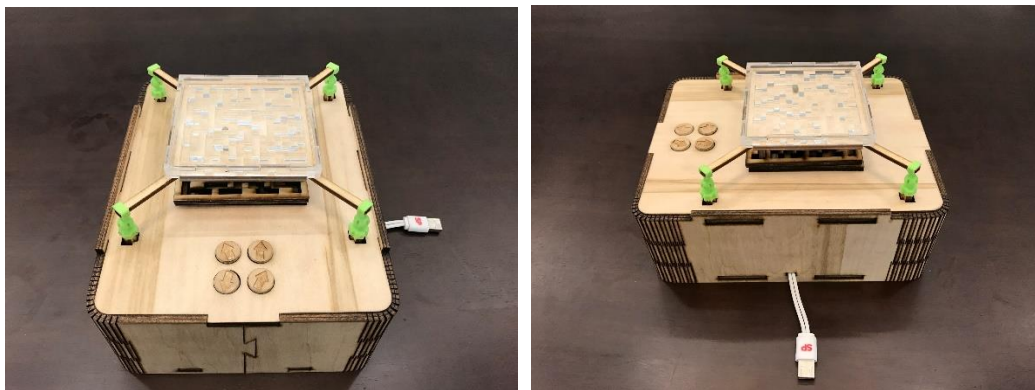
Student Profiles

Ashley Chua Jun Hong

Second year student from the Diploma in Aerospace Electronics

As a teenager, Ashley was interested in airplanes and he would wonder how such large objects could fly effortlessly. A hands-on learner, Ashley decided to pursue his passion at Singapore Polytechnic (SP).

As part of his diploma course, Ashley was exposed to digital making and creating in his first year. Prior to his project, he had no experience at all.



The Spidaze project has moving mechanical and electronic parts which are fabricated in SP's FabLab.

His project, Spidaze, was built over a period of 18 weeks at SP's FabLab. Spidaze is an interactive maze game with electronic and moving mechanical parts. The aim of Spidaze is to move a ball through the maze using the built-in buttons.

To design Spidaze, Ashley picked up 3D modelling and went through many iterations and prototypes before deciding on the final look. He also tapped on the FabLab's plasma cutter to cut out the shapes of his maze. Along the way, Ashley also picked up simple programming and electronic engineering skills to complete his project.

Ashley hopes to impart the skills he has picked up to residents at Tanjong Pagar CC and to assure residents that anyone can embrace new technology easily while having fun.

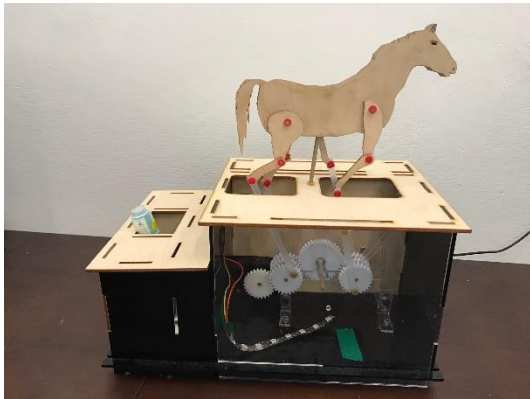
Sim Jia Ren

Second year student from the Diploma in Aerospace Electronics

Jia Ren's love for helicopters led her to have a strong interest in Science and Technology in secondary school. After doing well for her O levels, she chose Singapore Polytechnic (SP) to help harness her interest and reach her potential.

While figuring out the best way to build a prototype of a mobile phone cover for her first school project, a friend introduced her to SP's FabLab and digital making. Jia Ren was amazed at the endless possibilities in 3D printing and modelling.

A passionate self-starter, she went online and began her own research on how to design and use some of the equipment in SP's FabLab. Her passion and sense of achievement even led her to design and solder a metal plane to test for air resistance for a subsequent project.



The interactive project Höffice can be customised to suit the user's preference

Over a period of 18 weeks, Jia Ren and her team put together an interactive customisable project, Höffice, which combined their skills in 3D printing, laser cutting and programming. Through a series of microchips, circuits and a sensor, the horse will start to move when it detects an object in front of it. The user can customise the animal in the project.

The project was a challenge for Jia Ren and her team as they had to work with new equipment and pick up new programming skills. However, it was all worth it as Höffice has brought laughter and joy to those who have interacted with it.

Jia Ren hopes to help train residents at Tanjong Pagar CC on digital making skills that will allow them to create their own toys.

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