Our Makerspace Journey:

## Bentleigh Secondary College

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The development of our makerspace was not actually initiated by school, but through the curiosity of a (then) Year 7 student in 2015, who was eager to learn how to code. Hearing about the HTML/CSS course we offered in Year 9 IT, he asked if he was able to access the tutorials we provided them with so he can try it himself. A few days later he devoured the whole course, and came back with some of his interested friends asking if we had any more courses in other programming languages like C++ and Java.

Feeling limited by only being able to offer coding classes within our IT electives and the scope of what they can learn within, we discussed the idea of running an after school club of students who were interested not only in coding, but robotics, computers and developing STEAM based projects. The idea grew, and we "recruited" other students to become leaders in this club such as a Year 8 student who was an expert in Arduino electronics; a Year 9 student who was expert in Linux based operating systems; and a Year 7 who was proficient at building computers. With a group of committed students, we got to work.

We developed a club name (Byte Club) and a membership form that required students and parents to sign featuring terms and conditions particularly in regards to safety. We meet once a week after school on Thursdays from 3:30pm to 4:30pm.

We initially started with collecting old equipment from the IT office to take apart and explore in the library, but that got messy quickly. We were allowed to relocate the club and the equipment in an old storeroom and classroom in the Technology block.

We found that as the club grew, more support from other teachers was needed. So we now have two more teachers who volunteer to attend every so often only to mentor and supervise the students (we never leave them unsupervised). We enforce the idea that this is not a classroom nor do we take attendance; students choose to be there to learn and do and are free to come and go as they please as long as they have an idea of what they want to do in that time.
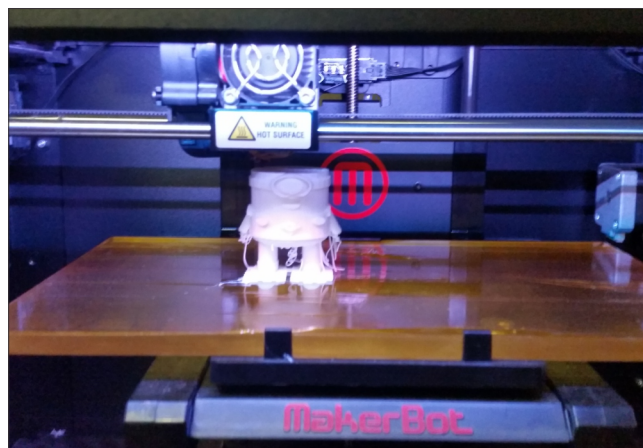
A student prints out a minion she designed on Tinkercad.

We have four tenets of Byte Club: To watch (others do projects); To assist (others with their projects); To Learn (how to do projects); and To Make (their own projects). This caters for the different skill levels and abilities of each member. A student who is good at coding but not at robotics could get help from a fellow student robotics expert, and vice versa for example.

The Byte Club room features a 3D printer the school had acquired earlier on, a large LCD screen that allows a raspberry pi to be attached and coded/configured, and even a set of taps to clean up and for experiments that might require water.

Our collection of equipment is growing based on generous community donations of old computers, laptops and other electrical equipment that we are repurposing (including a Wii!). We are also given a budget to purchase new equipment from the school.

With this we have sets of Little Bits electronics which allow magnetic connecting of components to form circuits, machines and new inventions without prior knowledge of electronics needed. Combined with recycled containers and materials,

Makerspace room 2.0

donated Lego/meccano sets, and or designed components printed on our 3D printer - this is all one needs to invent prototypes of any innovative technology idea they might have.

We have "Makey Makeys" which were ordered from the US to allow students to turn any conductive object into a keyboard. For example, turning a bunch of bananas into a piano, or using playdough to create buttons and controls for a PC computer game. We have Arduino kits for the more advanced, allowing students to explore building and controlling through code basic circuits of LEDS and servos which are essential components for basic robotics.

We have Raspberry Pi's with Raspbian OS installed. This comes with a free version of Minecraft that students can learn to make "mods" using guided lessons on Python programming.


Little Bits play

Students are also able to learn coding, video editing, graphic design or 3D design using guided online websites tutorials and lessons facilitated by our staff supervisors or student leaders. Such websites are http://code.org, https://scratch.mit.edu, https://codeacademy.com, https://circuits.io, https://learn.sparkfun.com,

http://appinventor.mit.edu, and https://tinkercad.com.

We have old laptops and computers we are rebuilding, reinstalling and repurposing. One project would be to eventually set up our own local network of computers which can be experimented with to learn about network and internet security, load, penetration testing and protection, or even set up a Minecraft server. Another idea would be to donate working repurposed computers to the community.
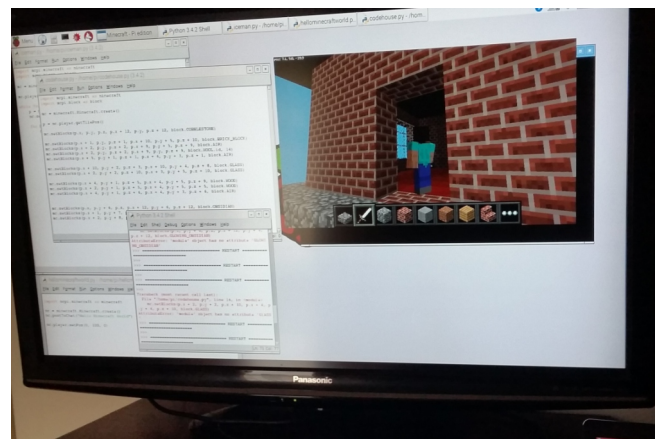
Minecraft modding a Raspberry Pi

The number of members attending sessions grows and shrinks throughout the years due to school and after school commitments, though there is always a small group of students who attend each session. We had students of all kinds of backgrounds and skill levels join. As our original founders got older with more commitments, they made way for new leaders to take over but are always happy to lend a hand if needed.

We believe that through play comes passion, and from passion comes purpose. Byte Club offers experiences in a fun environment surrounded by like-minded people that many would not find anywhere else. We encourage students to have a go at things they've never tried, to see if they might have a natural skill in particular areas. We encourage students to support and guide others exploring in areas they are skilled at.

Making catapults