

## **3D printing at Lansdowne Crescent**

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A conversation

Lansdowne Crescent Primary occupies a pleasant location on the eastern bank of the river Derwent, close to central Hobart in Tasmania. The community it serves is slightly better off than the Australian average (ICSEA=1126) and there are 420 students enrolled.

In Digital Technologies, Lansdowne shot to fame early in 2017 because the students built their own 3D printer!



The printer was constructed using an Arduino 3D printer kit from Jaycar. The rationale for building, instead of buying, a pre-made 3D printer was explained by the group of students including Sacha, Henry, Hugo, Andre, Ewan, Ben, Alex, Matilda, Mathew and others. They decided they wanted the school to have a 3D printer, but were made aware of the resource limitations. So they performed online and other searches to find the most cost-effective way to obtain one. The Jaycar offering provided the largest printable volume for the least investment.

Delta printers are so called because they have a static print bed, and the plastic filament extruder is suspended by three arms in a triangular configuration –

resembling a capital Greek letter delta. This makes it easier to service and maintain. During the construction phase, the students were able to troubleshoot some crossed wires, a dud motor and managed to z-calibrate the system (so it knew where the print bed was). They found errors in the manual so had to re-locate one of the sensors. As a group, they were very motivated and very willing to share their experiences. In their book, FAIL just spells ‘first attempt in learning’!!

But how did this this project originate in the school? Advanced Skills Teacher Bridget Field shares responsibility for ICT coordination and supported the 3D project as part of a digital technologies rotation amongst the Year 4-6 classes. This Digi-Tech rotation involves each class in a computer-based activity on a regular basis. Beyond 3D printed, the activities so far have included:

- Makey-Makey interfaces
- Garage Band music composition with iPads
- STEAM challenges
- Stop Motion animation
- Game construction with GameMaker
- Programming in Scratch
- Making robots with Mindstorms kits
- Designing with Sketchup

This puts the introduction of digital technologies into perspective, with the staff finding these activities more engaging and good ways to amplify STEM learning. Although the Tasmanian government ICT checklist is used for reporting on the general capability, digital technologies are not yet formally part of the school curriculum.

So where does this put our budding band of printers? They only have one spool of plastic filament, but already they have generated a test 1cm cube. The students have a future program in mind for operating the 3D printer and want to design new articles using a range of software such as TinkerCAD, Sculptris, Blender, Cura and Slic3r. They debate the arguments for PLA and ABS filament according to the rigidity and durability demands of each project and have a plan for recycling old prints and rafts using a shredder and Filastruder for sustainability. The students reckon grouping elements in TinkerCAD helps produce good prints, and pre-heating the bed prevents distortion.

It is clear these young people are engaging with the new technologies, and striving to make them part of their learning at school. Further videos of their work and a fascinating 360-degree photo are available at:

<http://www.lansdownecrescentprimary.org/media.html>.