

# The movement toward Maker Education

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Over the last three years the UK and Australia have been leading the charge with the development of computing and digital technologies curriculum in schools. The new Australian Digital Technologies curriculum promotes creative, innovative and enterprise when using traditional, contemporary and emerging technologies. Students are encouraged to become confident makers, users and remixers of technology who understand how technologies have developed over time.

A result of this focus on digital technologies is the rise of The Maker Education Movement and Makerspaces.

So what exactly is Maker Education, what are Makerspaces, and how can you become involved at your school? Read on and be inspired to begin your first project.

## What is Maker Education?

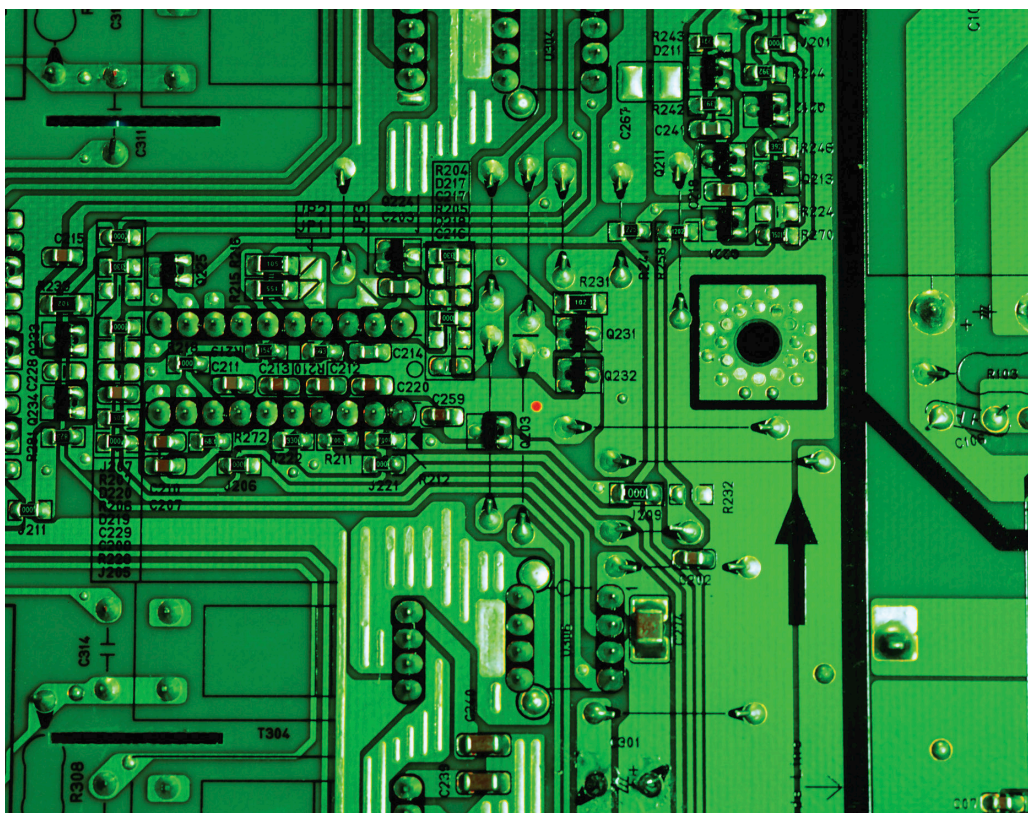
Maker Education is hands on tinkering. It can range from using cardboard boxes and duct tape, right through to the latest electronic gadgetry such as Arduino, MakeyMakey and Raspberry Pi. It can also be construction using cardboard boxes, woodwork or electronics. It's about students creating objects that work, objects that are built out of the desire to experiment, tinker and learn, to satisfy a user need.

"Makerspaces provide creative time and, well, space for people of all ages to build prototypes, explore questions, fail and retry, bounce ideas off one another and build something together," says Mary-Beth Hertz, K-8 Technology Teacher in Philadelphia, PA.<sup>1</sup>

Maker Education inspires and nurtures innovation and experimentation.<sup>2</sup> The core construct of Maker Education is that learning through active discovery. It can be said to have grown from modern constructivist theory and Piaget thinking.

Through Maker Education we can differentiate education, teach life skills, engage students in relevant and real learning activities. It really is about students diving into a project that inspires them and guiding them to discover, experiment, fail and construct using technology as a learning tool. It reminds me of tinkering in the shed with Grandfather as a child.

Some of the types of activities that might be the focus of Maker Education in your school might include the following list. Because each



school is different, each Makerspace or classroom would offer activities their students or teachers would enjoy using. You might focus on computer creation, games creation, coding, electronics, 3D Design and printing, Robotics or app creation. Before you dive in, stop and consider your budget, the general interest area of students and even future skills needs of your learners.

All links for these resource mentioned in the list and this document can be found on the Makerspace Pinterest Board at: <http://bit.ly/makeredu>

## Two popular Makerspace technologies

### 3D printing

These days we can design, prototype and print a 3D object from imaginations right through to a physical object. This is very exciting. At Hilltop Road Public School in Western Sydney, Year 1 students design, then use Google Sketch Up to create a new, age appropriate toy. Students then vote individually on which they consider the best toy in the class. This toy is then printed

using the 3D printer. When students see their imagination come to life, their eyes light up."

Other software you might use to create 3D objects include Makers Empire <http://makersempire.com> (software and apps), Tinkercad <https://tinkercad.com> (webtool and apps) and MakerBot <http://www.makerbot.com> (software and apps)

Once you have designed your 3D object you will want to print it out. To do this you will need a 3D printer. Makerbot have a great range of printers to suit your budget and school needs <http://www.makerbot.com/>

To find out some great examples of 3D objects check out the Makerbot Gallery known as Thingiverse <http://www.thingiverse.com/> The gallery has some objects that you can download and edit to make into your own objects.

### Makey Makey

This intriguing, affordable technology sells itself as 'an invention kit for everyone'. With a simple Makey Makey kit <http://www.makeymakey.com> you can turn a bunch of bananas into a piano, a



chunk of playdoh into a games controller, some buckets into a dance mat and even a set of stairs into a piano. Watch the video below to find some more examples of what you can do with this cheap and fun technology that has as many possibilities as a student's imagination.

VIDEO <https://www.youtube.com/watch?v=rfQqh7iCcOU>

### How can I begin integrating Makerspace in my school?

There are a few different options for opening up, or diving into, Maker Education in your school. Will you integrate into regular classroom time? Create a special club? Make a dedicated Makerspace in the school? Below are some options you might like to consider before making any decision.

**Genius Hour** – In Genius Hour, students spend 20% of their time focussing on a topic that interests them. This time could be spent in Maker Education, opening opportunities for students to focus on tinkering and experimenting with various maker tools. To find out more about Genius Hour in schools, check out this wikispace of ideas <http://geniushour.wikispaces.com>.

**Makerspace** – A maker space is a dedicated area with hardware available for hacking, remixing, robotics, simple electronics and general hardware fun! Create a Makerspace to be used during recess or lunch. Grab a group of teachers and work together to open up this opportunity to students. Create a space in the library, in a space storage area, or in a spare classroom. Make sure you have plenty of electricity points and can observe OH and S protocols.

**Design Thinking in Education** – If introducing maker Education into your classroom, you might like to consider scaffolding the process by using Design Thinking processes. Through Design Thinking, users are scaffolded to create a solution to a design brief by discovering and researching to problem, interpreting what this problem means to the community, ideate ways to solve the problem, prototype and experiment a possible solution and finally, evolve and reflect on the project just completed. It is a contemporary construct used in the creative and design industry. You can see more about Design Thinking via this wonderful resource hub at <http://www.designthinkingforeducators.com>. Be sure to download the Educator Toolkit for all you need to get started on Design Thinking.

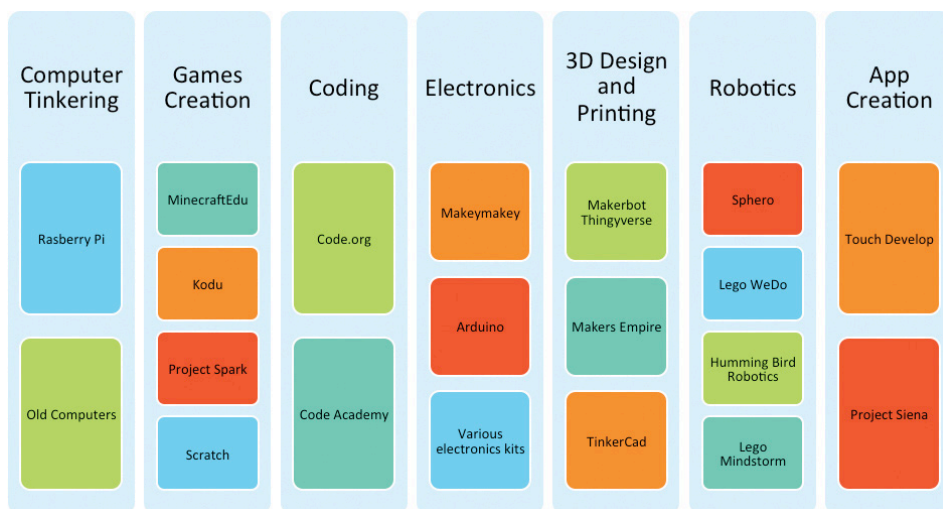
**After School Makerspace Clubs** – Does your school have any after school clubs running in partnership with community groups? Is there room to create a once a week, once a fortnight or once a month group that dives into maker Education. That spends their afternoons tinkering away, innovating and experimenting with the coolest toys, gadgets and online spaces?

### Makerspace resources

- Martinez, S and Stager, G; Invent to Learn – Making, tinkering and engineering in the



Top: Mozilla maker night; bottom: What can be done in a maker space



classroom. {eBook Version} retrieved from Amazon, 2013

- Makerspace Pinterest Board: <http://bit.ly/makeredu>
- Creating Makerspaces in Schools; Accessed August 3rd, 2104 <http://www.edutopia.org/blog/creating-makerspaces-in-schools-mary-beth-hertz>
- How the Maker Movement is Embracing Education; Accessed August 3rd, 2014 <http://smartblogs.com/education/2014/06/02/how-the-maker-movement-is-embracing-education/>

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### References

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