How to Create Reality with Electronics, Art and Technology in Education

Cathie Howe
Macquarie ICT Innovations Centre
Why create a Makerspace?

“To understand is to invent”

Piaget 1976 (Father of Constructivism)

**Constructionism** — a natural extension of constructivism, adding that the construction of new knowledge is more effective when the learners are engaged in constructing products that are personally meaningful to them. Knowledge construction is especially effective in context. Papert (1980)

“The Maker Movement is an invitation to play… play is highly satisfying”

Dale Dougherty 2013. Founder of *Make* magazine
MakerDay C.R.E.A.T.E!

- Electrify
  - Squishy circuits
  - Little Bits
  - Electronic parts
MakerDay C.R.E.A.T.E!

Coding

- LEGO WeDo
- Scratch
- Kodable
- Hopscotch
- Freescale microprocessor: C++
MakerDay C.R.E.A.T.E!

- Build/Mechanics
  - MakeDo
  - WeDo tilt sensor & motor
  - Cardboard
Contact details

catherine.howe@det.nsw.edu.au

http://au.linkedin.com/in/cathiehowe

@cathie_h
@macict

www.macict.edu.au

Macquarie ICT Innovations Centre
Building C5B, Macquarie University
NSW, 2109
Ph | 02 9850 4310 | macictsupport@det.nsw.edu.au
Electrify Challenge

Grades K-2 Primary teachers
1. Use conductive & insulating dough to demonstrate the flow of electricity using a battery pack and LEDs;
2. Construct a simple light circuit with the squishy circuit using a power source, a switch and LED;
3. Add the squishy circuit to plane with WeDo program.

Grades 3-6 Primary teachers
1. Use conductive & insulating dough to demonstrate the flow of electricity using a battery pack and LEDs;
2. Use littleBits to make a simple servo circuit operated by a touch switch;
3. Secure the servo circuit to the cardboard leg using tape and other craft;
4. Run WeDo game and activate leg using the touch button to operate the servo.
Design Brief - Years 7 - 10

- **Problem:** Use your maker skills to create a useful gadget for round the house.

- **Starter Kit:** You will be given a basic set of electronics: 1 microcontroller, 1 resistor, 1 motor, 1 transistor. (check what this is)

- **Recyclables:** You can use any of the recyclable materials you can find in the classroom.

- **Consumables:** With your limited budget of Maker Dollars, you can purchase extra components

- **Constraints:** You only have 90 minutes, $100 maker dollars and the equipment in this room.
Design and create your own project!

You have 90 minutes to design and create your own take-home project, incorporating similar Build and Electrify steps you learnt during your training.

Be creative and invent your own or choose from a prompt below. **P.S.** A good prompt offers just enough scope to motivate a student, without stifling their creativity:

- Construct and give behaviours to a robotic animal;
- Bring a stuffed toy to life with robotic components;
- Invent a musical instrument;
- Build a better mouse trap;
- Build a security boom gate;
- Build a vending machine.

Prompts adapted from “Invent to Learn” by G. Stager