3D Printing, Raspberries and Microbits:

Engaging Science and Engineering Students into Coding and Prototyping with Physical Computing

Fernando Russo Abegão, Chris O'Malley, Jon Goss, Matthew Dyson, Richard Law, Rosemary Norman, Sharon Joyce
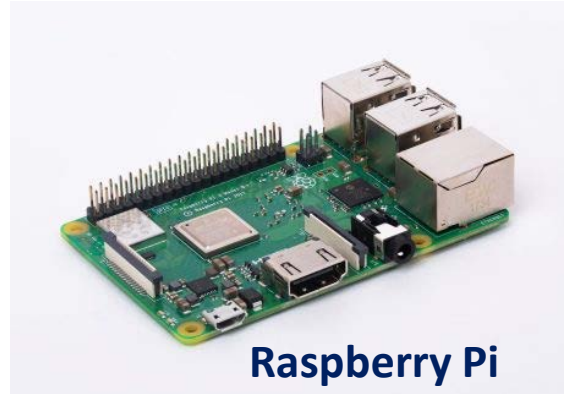*School of Engineering*

Anna Vasilchenko, Megan Venn-Wycherley, Marie Devlin
School of Computing

Helen Adamson
School of Natural and Environmental Sciences
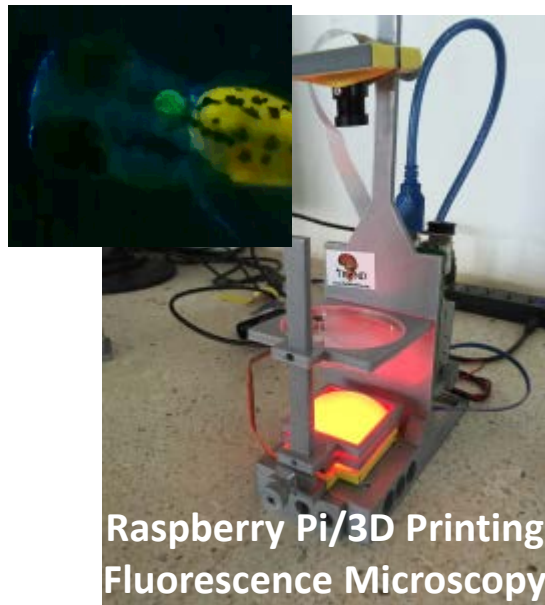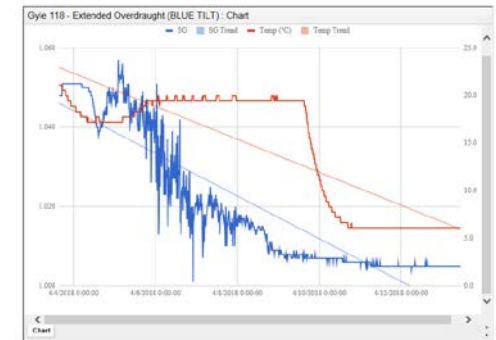
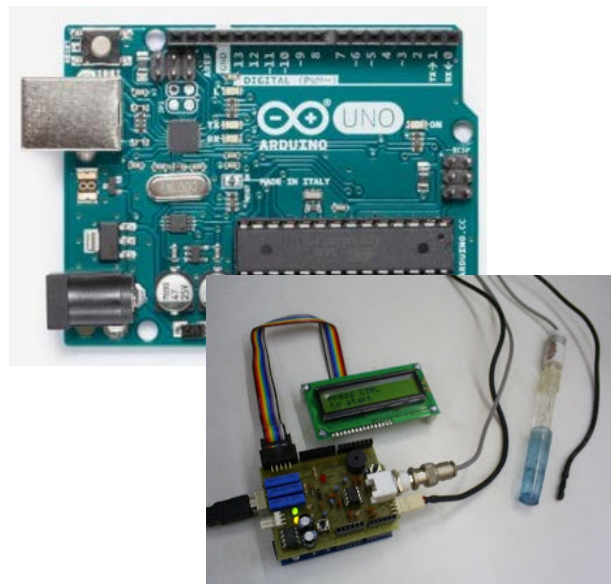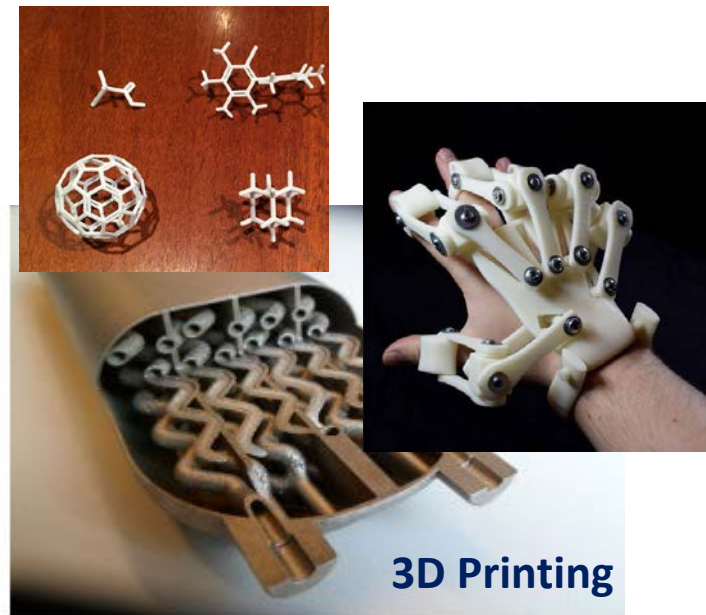# Physical Computing

BBC Microbit Robot

Raspberry Pi

Stu Brew Process Control

Raspberry Pi/3D Printing
Fluorescence Microscopy

Arduino pH Meter

3D Printing

Cross section flow reactor

Project

- **Strategic Innovation Fund, ULTSEC**;

- **Aims:**

  - Introduce Physical Computing as a tool to teach and engage students into coding, prototyping and engineering design skills;

  - Widen access to engineering and science students from non-computing or non-electronics background students;
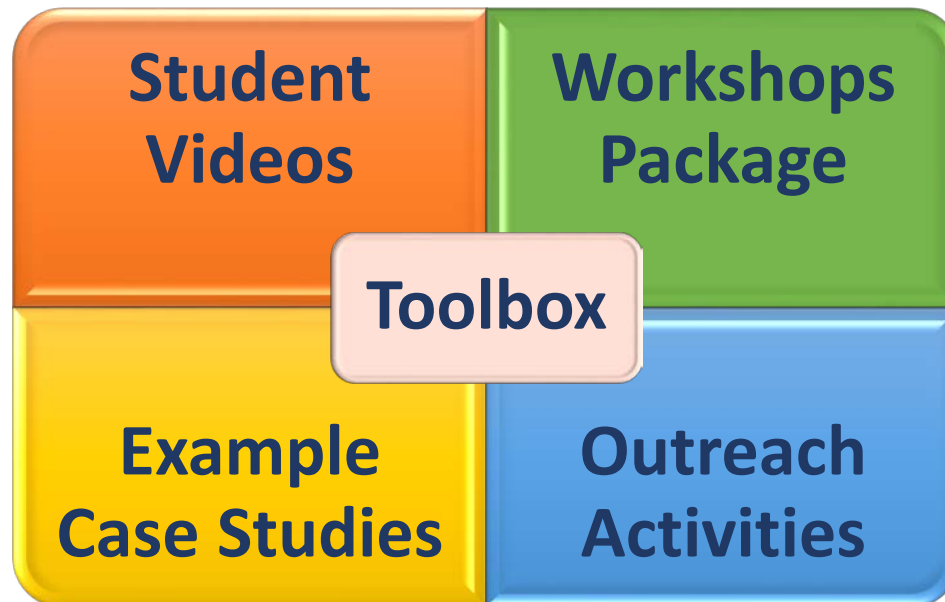
Workspaces

- **Student videos** used as workshop primer;

- **Comprehensive package:**
  - BBC Micro:bits
  - Raspberry Pi
  - Sensors
  - Motion control
  - 3D Printing

- **Themed:**
  - Environment
  - Fitness
  - Bionic Hand

- **Student Feedback:**
  - Surveys
  - Focus Groups

Student Feedback

Interesting Content
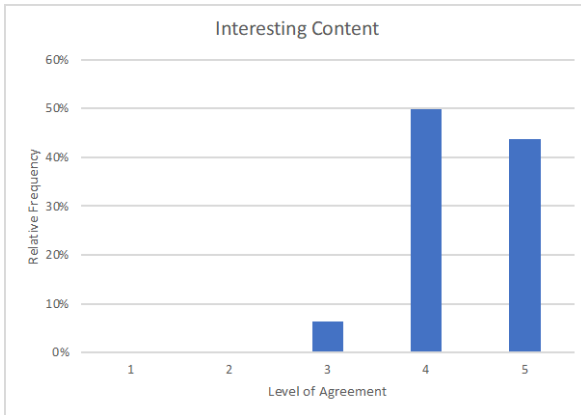
Improved Understanding

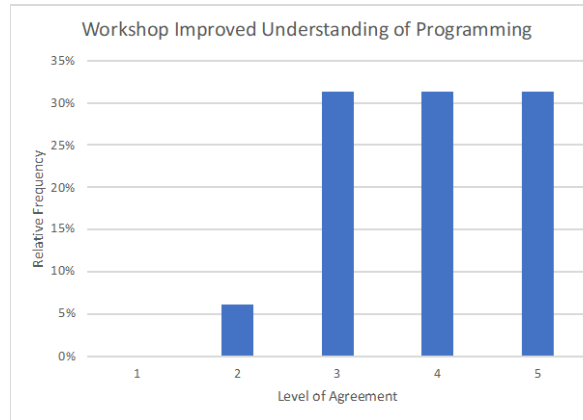## Embed into Modules
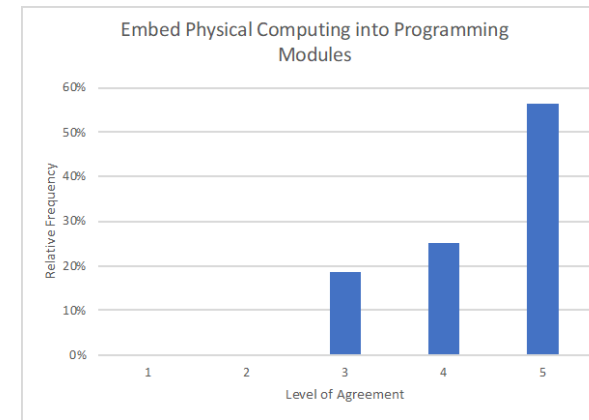
4.6 ⇒ 7.3
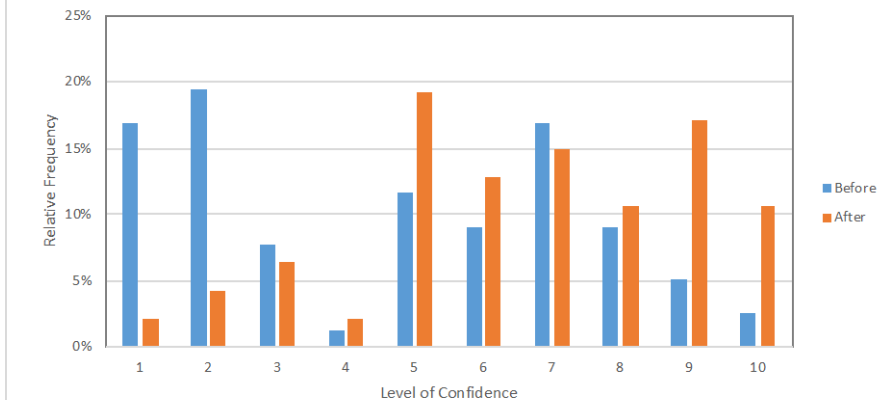
4.5 ⇒ 6.7

Student Feedback

- Most Interesting Parts:

  - It seems like a really simple-to-use program;
  - It introduces basic programming skills to novice and makes it easy to understand;
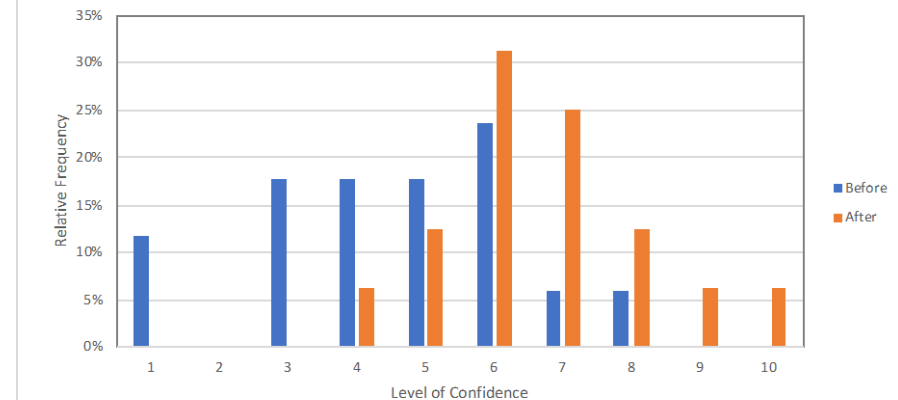 - Sensor: Ability to work with it on computer and seeing it displaying in the board;
  - Found programming the micro:bit to count calories interesting as the application has been used in so many devices;
  - Programming the robotic hand - provided a good visualisation of how the coding works allowing better understanding;
  - The display aspect feels like magic;
  - Practicals and challenges.

- Other comments:

  - Thank you for organizing this. It was fun.