



Finalist 'Best Coding Project'

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School: Samuel Marsden Collegiate School, Wellington

Name of coding project: Robots

1. Describe the coding project that you want to be considered for the award?

Robots: Students designed and made robots out of recycled materials. As part of the design process they learnt how to use a Hummingbird Micro-controller (Audino) and had to decide how they wanted to programme their robots to move. They learnt to programme using the Visual Programmer, through first watching YouTube tutorials and then experimenting with the programme. From here they had to decide what they were going to programme their robots to do. Some students soon stood out as being programming 'experts' and helped those who were less confident. <https://www.youtube.com/watch?v=t101wuJua0> Intro to Visual Programmer
<http://www.hummingbirdkit.com/learning/using-visual-programmer/> Visual Programmer

2. Why did you choose to use this project?

I wanted to introduce my class of all girls to computer programming in a way that was fun and authentic. I didn't want it to 'look' like programming. So the project started off as an art/technology activity and I planted the idea of programming by simply saying: 'imagine if we could make our robots move-what would you like yours to do?' This got them excited and I then introduced them to the Hummingbird and Visual Programmer and they ran with it. I feel passionate about getting girls involved in computer programming and engineering. I had spent many hours researching the best Arduino board to use with this age group (year 6) and playing around with it myself until I felt comfortable enough to use it with my class.

3. How did you implement and use this project?

I introduced the idea of making robots from recycled materials as an art/technology activity and we discussed what makes a robot a robot and looked at examples.

Students started designing their robots in their visual diaries. I then asked them to think about how they would incorporate movement into their robot designs if it were possible. They had fantastic ideas, the student creating a rabbit robot wanted the rabbit's tail to move back and forth, another wanted flashing lights as the buttons on their robot.

I introduced them to the Hummingbird and told them that this was going to help them make their ideas a reality.

We watched a YouTube clip introducing us to the Visual Programmer, which is one of the ways you can programme using the Hummingbird. Students then had turns at programming servos and LED lights. Through trial and error they learnt how to make the lights change colour, flash and turn off and on when they wanted them to. They started using programming language like 'sequence', 'output', 'expression' etc.

We went on a class trip to The Mind Lab and participated in a robotics class.

Students created programmes for their robots and discovered something that I didn't know, that you could programme your robot to talk or add sound. Because I hadn't known the programme

could do this, before I knew it the students' robots were saying all sorts of interesting things! One student had made a pink female Dalek from Doctor Who that she programmed to say: 'I'm going into Glassons to exterminate the cashier and take all the makeup I can'.

There was many a frustration along the way as some ideas were too hard to implement, but I was so impressed with the way students worked together and helped each other out.

When we had completed our projects we filmed them.

4. What outcomes has it achieved for you and your class?

My objective in the beginning for the programming side of the project, was simply to introduce the students to basic computer programming using the Hummingbird and Visual Programmer. It became so much more than this. What stood out for me was how our key competencies were all in play.

- Relating to others.
- Managing self.
- Participating and contributing.
- Thinking.
- Using languages, symbols and text.

I saw all of these things happening during this project. Students helped each other, learnt from each other. They had to manage their time, resources, work independently and together. They shared ideas, knowledge. Students had to problem solve constantly-'why is my programming sequence not working?' 'How do I stop the robots head from falling off every time it moves?' And of course the Visual Programmer required them to symbols and to develop a vocabulary around computer programming.

I want my students to see computer programming as an exciting technology that opens doors to creativity and opportunity so that they will continue to explore it and not see it as something daunting and best avoided.

Here is a link to our Robots on YouTube:

https://www.youtube.com/playlist?list=PLJkpEipmXmQxQCAO_bEtORPp2G2-UtIQd

This year I'm presenting my project at Ulearn and here is a link to my presentation:

https://docs.google.com/presentation/d/1No-im-wUGYL7aFDvV-6Hpw1wifo4-E2_pREhWUe4JFo/edit#slide=id.g65009089e_0_0