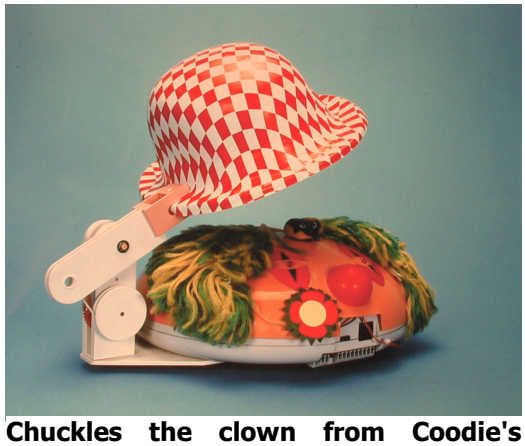
Robotic Performing Arts™

GO Valiant User Group Magazine

The Robotic Performing Arts™ Project has its roots back in the launch of the Classic Roamer in 1989. We made a video in Southmead Primary School, Wimbledon, South London. In this article Dave Catlin fast forwards 20 years and presents a powerful project idea.

In 1989 we were making a video to show people Roamer's capability. We decided ask the students at a local school to write an animate a robot play. They had to create a story line, build and program Roamer act the parts, create the scenery and provide the voiceovers. In those days we had to hire a film crew to capture the outcome. You can still see this online as part of Objects to Think with. Today schools, generally have video cameras and video editing software. They can do the whole task.



Chuckles the clown from Coodie's Circus. Chuckles used stepper motors to raise his hat.

Political pressure has led to a dominance of STEM subjects around the world. I have always found it a bit strange that the arts are consider to be the creative subjects, whereas we characterise the sciences as formulaic, mechanical and dull. Yet the history of science is littered with creative leaps of imagination, what Thomas Kuhn calls paradigm shifts. Famous amongst these is Archimedes' eureka bath time episode or Einstein's breaking the shackle's of time by daring to imagine it was not as constant as it appears to be. It is frankly madness to think that we can create great technocrats without lighting their imaginative souls.

Puppets, artificial life forms and robots have all found their way to Hollywood and fame.

By the same measure, to think that artists and artisans are somehow isolated from their technological society is equally odd. While we think of robots as mechanical entities, their place in our culture has a long history of antecedents. From creation myths to Frankenstein, from automaton to puppet plays, we have imagined ourselves life creators. Robot came into the lexicon from the arts - Karel Capek's play Rossum's Universal Robots. The word is Czech for serf labour, hard work – drudgery.

Isaac Asimov's famous robot stories and three laws of robotics was a mix of art and science. Asimov was a bona-fide scientist, using his imagination to divine possibilities and asking the question where can technology and science take us. What will it be like when we get there, and what ethical and moral issues will we face. These are tremendous questions for students to think about.

The importance of the creative aspect of STEM and the availability of video technology led me to propose the Robotic Performing Arts™ Project (RPA). I outlined the general idea and presented it at the Constructionism 2010 Conference in Paris [Catlin, 2010]. The general notion was to

approach STEM subjects from a personal, emotional and artistic perspective. In this I proposed several key ideas:

1. Cooperation — The RPA replaced the rivalry of robot competitions with an atmosphere of cooperation.
2. Cross Curricular — This is STEM connected to other subjects. It helps students understand concepts in an holistic way, not as isolated bits of knowledge.
3. Engagement — We would expect to see the student highly engaged in the subject matter.

The young movie makers were asked to create a film based on a particular STEM theme. The premise was this provides students with a way of expressing their intuitive and culturally based understanding about important ideas. Many students do not feel drawn to the sciences, often because of the way the subject is presented in school. In a RPA project, many tasks exist that engage students with the STEM topic in a radically different way. Often students don't engage in STEM materials because they don't see its relevance to things that interest them. Our premise, which has been supported in our pilot work, is that students like the idea of making a movie. The opportunity is for some of this enthusiasm to "brush off onto" the STEM subject materials.

We received some modest funding from the Design And Technology Association (DATA) from which were have run two pilot projects. Coincidently, both of these took place in South London Girls schools.

Sydenham School

This project took place in a STEM after school club. It was run by teachers Gary Levart and Sandy Callacher. It took place over a period of 3 months from July to October 2010. This was a first and exploratory approach in how to organise the lesson. Despite this the student's view on the activity was unequivocal.

"This is the best project we have ever done!"

As a theme Gary decided to choose a non STEM topic – the personal safety of the students. This certainly focused the students on discussing the issues and reviewing strategies for dealing with situations. The STEM elements in the project derived from the tasks required to create the movie. This included the design and manufacture of the stage sets and vacuum formed 'costumes' for the Roamers.

Roamer Drama Project

We really enjoyed the Roamer Project because it gave us a chance to learn how to program the movements of a robot. It was hart to get your head round it at first, but once you got the hang of it, you could do it quite quickly and easily.

We also enjoyed writing the script and making the sets; they had to work with the robots and therefore had to be built to the correct scale. Some of our set ended up being knocked over by our robot!

It was fun to combine the creative aspects with the actual programming. We had to use our directing and (in some cases) acting skills as well as Science, Technology and Maths to ensure that our robot plays were a success.

Our final outcomes were filmed and we then edited the film using Microsoft Moviemaker. These have been displayed at both the national and regional Big Bang events and the overall project has enabled us to gain a Crest Award.

All in all we had a great time with the Roamers, we learnt a lot and realized that technology can be used in all sorts of creative ways.

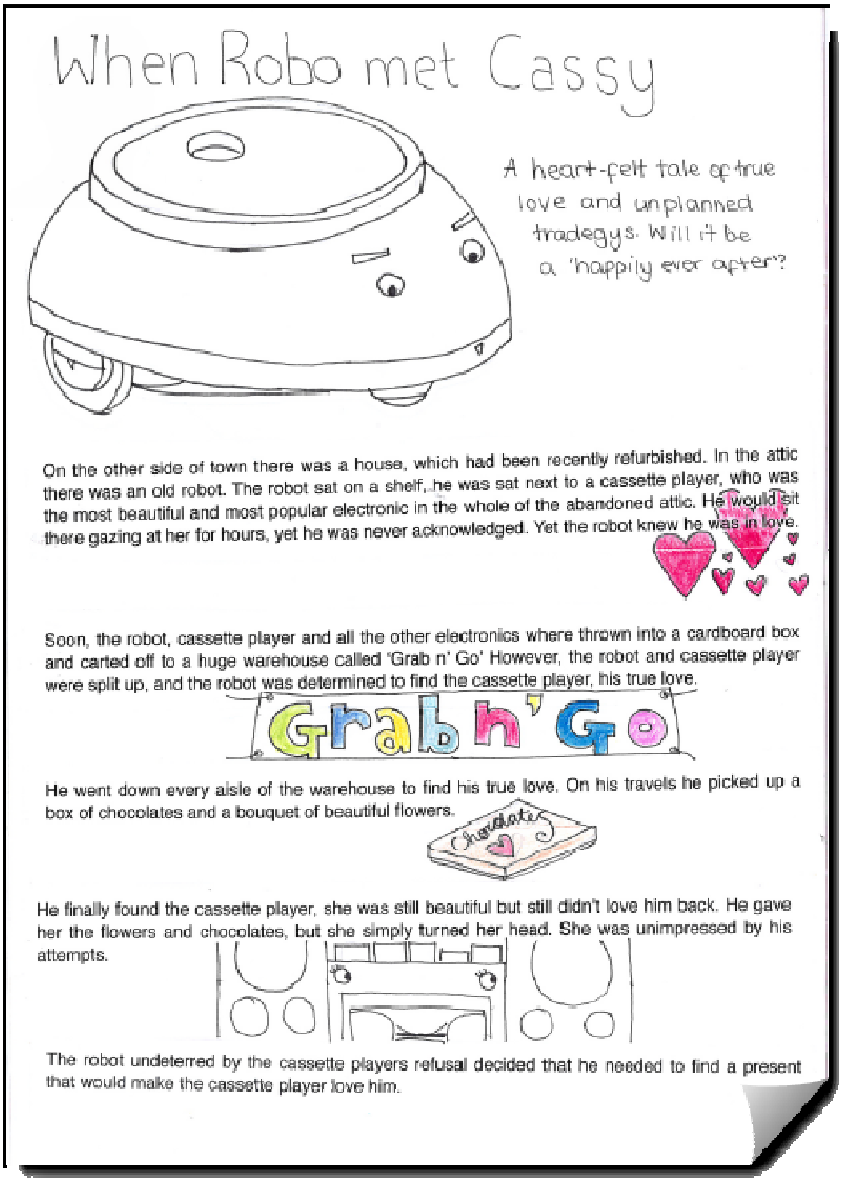
Isobel Hecker and Emily Swift

Sydenham School

Streatham and Clapham High School

This project took place over a 12 week period as part of a Year 9 Design Technology Project run by Tom Heaton and Bridget Elton. This project benefitted from lesson plans devised on the experiences at Sydenham. The activity took place as part of the students course work, which was a more managed situation than the after school club. The topic chosen was energy. Somehow, this was relegated and the process become much more about the robots and film making. I think we can improve this aspect with a number of lesson plan refinements [Catlin 2012].

Script from one of the SCHS Project



When Robo met Cassy

A heart-felt tale of true love and unplanned tradegys. Will it be a 'happily ever after'?

On the other side of town there was a house, which had been recently refurbished. In the attic there was an old robot. The robot sat on a shelf, he was sat next to a cassette player, who was the most beautiful and most popular electronic in the whole of the abandoned attic. He would sit there gazing at her for hours, yet he was never acknowledged. Yet the robot knew he was in love.

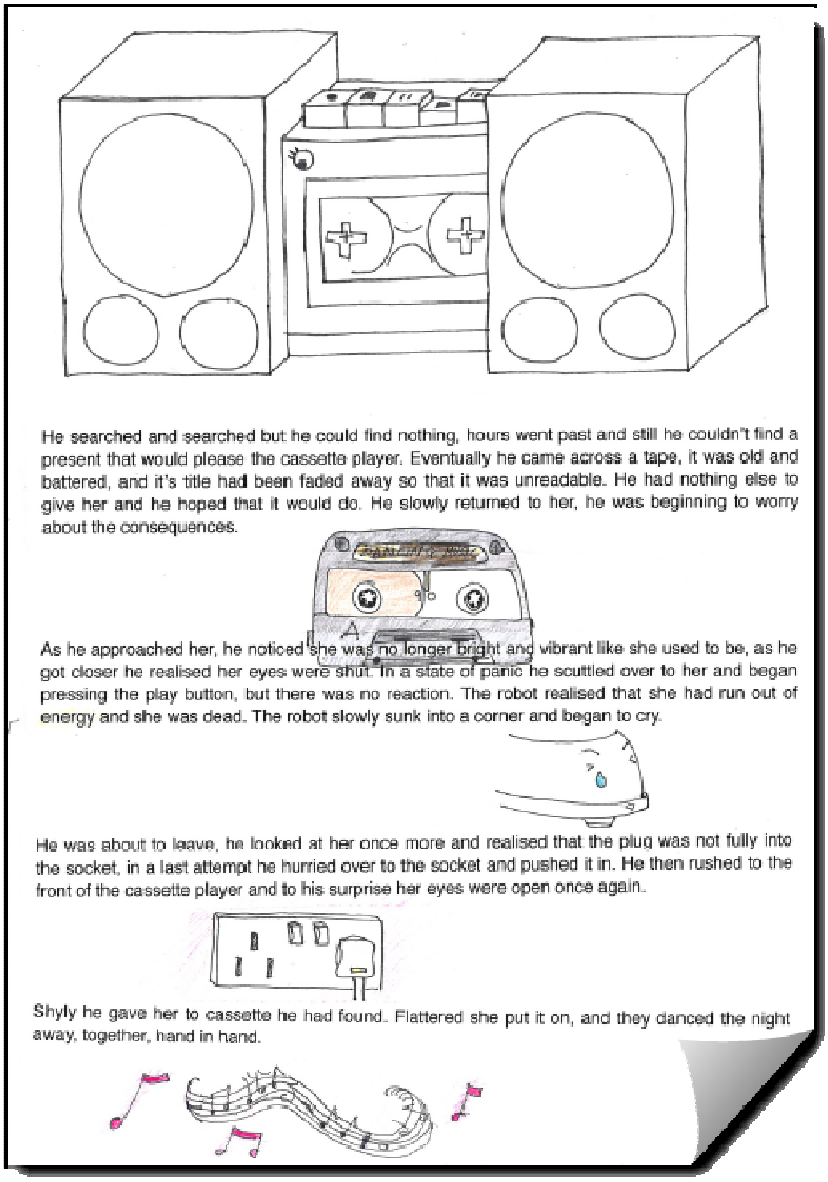
Soon, the robot, cassette player and all the other electronics where thrown into a cardboard box and carted off to a huge warehouse called 'Grab n' Go' However, the robot and cassette player were split up, and the robot was determined to find the cassette player, his true love.

Grab n' Go

He went down every aisle of the warehouse to find his true love. On his travels he picked up a box of chocolates and a bouquet of beautiful flowers.

He finally found the cassette player, she was still beautiful but still didn't love him back. He gave her the flowers and chocolates, but she simply turned her head. She was unimpressed by his attempts.

The robot undeterred by the cassette players refusal decided that he needed to find a present that would make the cassette player love him.



He searched and searched but he could find nothing, hours went past and still he couldn't find a present that would please the cassette player. Eventually he came across a tape, it was old and battered, and it's title had been faded away so that it was unreadable. He had nothing else to give her and he hoped that it would do. He slowly returned to her, he was beginning to worry about the consequences.

As he approached her, he noticed she was no longer bright and vibrant like she used to be, as he got closer he realised her eyes were shut. In a state of panic he scuttled over to her and began pressing the play button, but there was no reaction. The robot realised that she had run out of energy and she was dead. The robot slowly sunk into a corner and began to cry.

He was about to leave, he looked at her once more and realised that the plug was not fully into the socket, in a last attempt he hurried over to the socket and pushed it in. He then rushed to the front of the cassette player and to his surprise her eyes were open once again.

Shyly he gave her to cassette he had found. Flattered she put it on, and they danced the night away, together, hand in hand.

Podcast

Click on the podcast system to watch movies from Sydenham and Streatham and Clapham High School. Also listen to the Teachers and Students from Streatham talk about their experience.

Interim Conclusions

I think we have seen enough in these two trials to confirm the potential of RPA to provide an excellent learning environment. While the organisation and presentation of the Streatham

project improved significantly from our first attempt at Sydenham, there is still a lot to do. The Sydenham project focused more on the topic than Streatham project, whereas Streatham were stronger in the film making process. Certainly, use of project managers by Streatham had a significant impact on the student's approach. It is hard to say whether this was a matter of personalities involved or what I think is more likely, the informality of and after school club compared with a project structured into curriculum time.

What is significant is that both schools want to do the project again. In many ways that is a true indication of the projects success.

References

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Further Reading

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