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Key stages	KS1 - KS2
School type	LA maintained, primary
Themes	Technology, ICT Raspberry Pi

Using Raspberry Pis in the classroom

St Joseph's Catholic Primary School

Context

St Joseph's Catholic Primary School is an average-sized school located in Waltham Cross in the Broxbourne district of Hertfordshire. Around 13% of pupils at the school are eligible for free school meals. The school was rated as outstanding by Ofsted in 2006.

Brief Description

Since September 2015 St Joseph's School has been innovatively using Raspberry Pis as a means of integrating computing and programming into the curriculum. A Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn more about how computers work. A Raspberry Pi is capable of doing most things that a regular desktop computer can do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing and playing games. The Raspberry Pi Foundation aims to engage young people in computing, instilling an understanding and passion from an early age.

St Joseph's School has always used traditional PCs, laptops, iPads and Learnpads but decided to introduce Raspberry Pis as a way of exposing pupils to even more pieces of hardware, meeting the requirements of the national curriculum at the same time. James Harvey, the computing subject leader, set up the initial Pi suite and runs a coding club to support pupils using them. The school currently has six Raspberry Pis, which it aims to increase over time. Not many schools in the UK have developed an understanding of how to use Raspberry Pis in education yet, but at St Joseph's School the use of Pis is working well and is encouraging pupils to engage and enjoy computing and programming.

The use of Raspberry Pis at the school

Setting up the Raspberry Pis

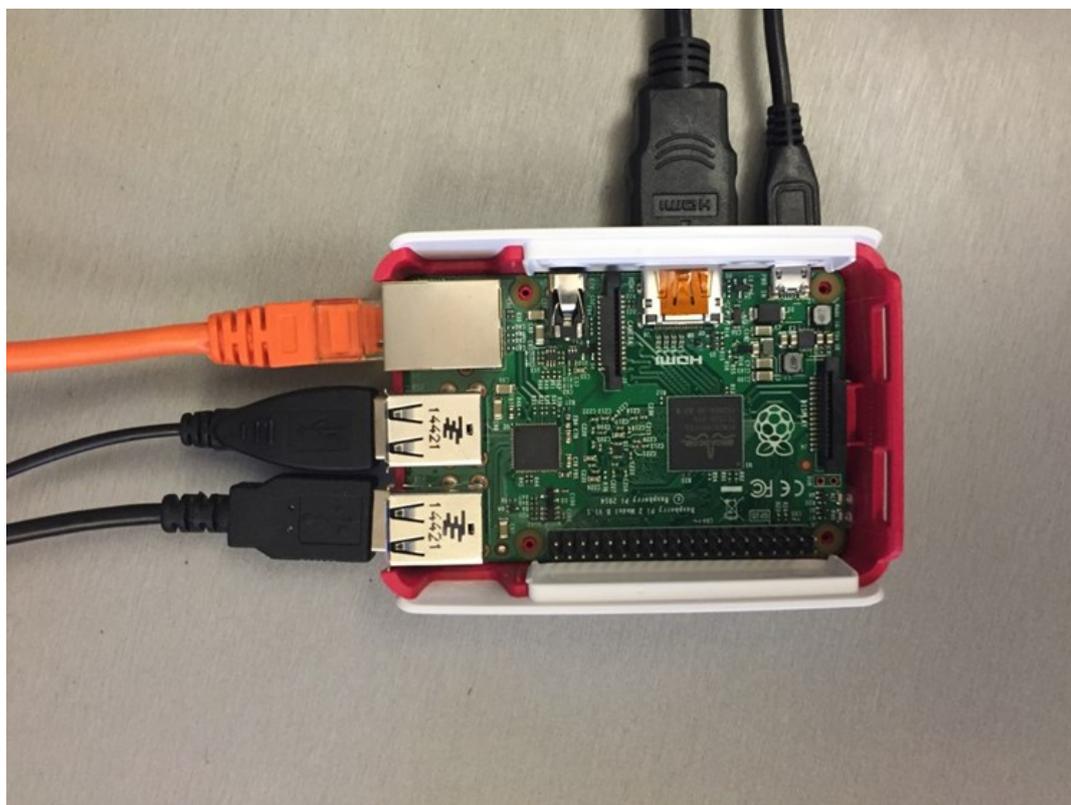
The six Pis which the school is currently using are all Raspberry Pi 2 models. The operating system for each Pi runs from a micro-SD card, using NOOBS (the recommended installation method).

James has used an old laptop to act as the server which uses Ubuntu to run PiNet, the central server in which pupils' accounts are stored. Ubuntu is an open source software platform that runs everywhere from the smartphone, the tablet and the PC to the server and the cloud. James has set the Pis up so that they use the suite peripherals for each pi. There is no connection to the internet from the Pis so the setup is safe and the children can just use each of six stations either for accessing the school's main system (CC4) or for PiNet.

Pupils can log into any Raspberry Pi in the classroom using their own username and password; there is no need to figure out which SD card belongs to which student.

Within Pi Net James has created an image of what the Pis will show and the school can connect as many Pis as they want to the Ubuntu server. Nothing is stored locally to the Pis and everything is virtual. The school has a number of Pi applications installed including Sonic Pi, Scratch and Minecraft Pi. Any of the software packages have to be installed on PiNet first and a software update is complete once the Pis are restarted.

One of the main benefits of using Raspberry Pis is that they are relatively cheap to set up. Each Pi and starter kit cost around £40, and together with the Ethernet cables and router the suite of six Pis cost under £300 to set up; all under the cost of one PC or laptop. The software is simple to control meaning that schools can take advantage of the size, portability, cost, programmability and connectivity of a Raspberry Pi.



How the pupils use the Raspberry Pis

The school runs a coding club for year 5 pupils during lunchtimes where pupils try a mixture of things with the Pis using Python and Scratch; two programming languages which can be used free of charge with the Pis and help pupils learn to code. Pupils in the club receive three days of coding practice per week and another day to play an offline version of Minecraft on the Pis. This version allows one pupil to start a game and other pupils to then join in on the same game.

Scratch is a visual programming tool which is designed to teach young people to program, and the version of Scratch included with the Raspberry Pi has a number of unique features. Using Scratch, pupils can create animations and games with a drag-and-drop interface. It allows pupils to create their own computer games, interactive stories, and animations using some programming techniques without actually having to write code. One of the most useful features of Scratch is its ability to communicate with the General-Purpose Input-Output pins on the Pis, or GPIO. These pins allow pupils to connect their Raspberry Pi to a range of devices, from lights and motors to buttons and sensors.

Python is one of the programming languages that is available on the Raspberry Pi's. Pupils can use Python syntax to enter commands and hear the computer repeat and learn them; much like the Linux operating system the Raspberry Pi operates.

Impact

By exposing pupils to a variety of hardware, St Joseph's School is helping children develop their computing skills as required by the national curriculum. Since using Raspberry Pis year 5 pupils have learnt about the background to working with computers and have learnt some of the terminology and language of coding.

The coding club facilitates much pupil-led learning and discussion, which is only possible due to the potential of discovery using a Raspberry Pi. As a result pupils have become better at discovering new things for themselves. Pupils often have discussions about IT which have not been initiated by the teacher; this can include discussions about why the network slows down when pupils use Scratch and how pupils can join each other's Minecraft games.

All pupils enjoy attending the coding club and a few pupils commented on how they would rather use a Raspberry Pi than a Windows computer in a computing lesson. One pupil has become so confident with using Raspberry Pis that he purchased one to use at home and gets asked for advice by other pupils when the teacher is not available.

The school has seen an increase in the amount of girls who are starting to enjoy gaming and coding, and an increase in boys playing games together, rather than alone at home. This demonstrates the positive social impact of attending the coding club and using Raspberry Pis.

Next Steps

The school intends to further develop the functionality of the Raspberry Pis in the next year and will invest in buying more Pis over time. The long-term goal is to match the number of PCs in the computing suite with Pis so that pupils have the opportunity to choose which one they want to run in computing lessons. Next year the current year 5s will act as mentors to support the next year 5 pupils with coding.

St Joseph's School, in partnership with Herts for Learning, is running a course entitled *Raspberry Pi, a Piece of Cake*, on 26th May 2016. The afternoon course will cover how to set up and start using these devices to support the primary computing curriculum. You can find out more and book into this course using the Herts for Learning online booking system by clicking [here](#)

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Related documents and links	http://stjosephsherts.co.uk https://www.raspberrypi.org/

If you have an aspect of interesting practice that could be shared or are interested in finding out more about a case study please get in touch by emailing exchangingexcellence@hertsforlearning.co.uk

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